A CASE STUDY OF 1:1 TECHNOLOGY POLICIES IN FOUR TEXAS HIGH SCHOOLS
AND THEIR RELATIONSHIP TO PRACTICE

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With increasing emphasis on technology in schools, the importance of technology policies is great. This study investigated policies for four 1:1 secondary schools in Texas (schools with a ratio of one computing device per student), particularly with respect to the relationship of those policies to practice. The purpose of the study was to determine the current status of the National Education Technology Standards (NETS) essential conditions as reflected in policy and the relationship of those conditions to practice as measured through levels of technology usage and teaching innovation. Schools were selected through purposive, criterion sampling. Open-ended interviews were conducted with twelve participants (principals, technology directors, and superintendents). Policies were rated by campus principals and the researcher using a rubric based on the NETS essential conditions. Finally, surveys of proficiency and readiness measures were collected from 156 teachers using the School Technology and Readiness (STaR) instrument and the Levels of Teaching Innovation (LoTI) instrument.

Interviews were transcribed and coded using structural and frequency coding. Policies were analyzed using magnitude coding and policy ratings. A qualitative analysis determined patterns between policy and practice. Quantitative data collected from surveys were measured against policy ratings and magnitude coding using bivariate correlation methods in SPSS.

Quantitative analysis revealed two statistically significant relationships between policy and reported levels of practice in the classroom. Qualitative elements of the study from interviews and policy ratings revealed six findings that may explain a lack of correlation between policy and practice: a lack of ability for leadership to identify 1:1 program policy; lack among
school leaders of perceived relationship between policy and practice; a belief among leaders that they are communicating policy to stakeholders even though they demonstrated difficulty in articulating policy; an inability to identify specific research-based theoretical foundations in policy; a lack of meaningful measurement of practices; and a lack of leadership at the same school to interpret policy similarly. A seventh finding revealed potential patterns between conditions that are addressed extensively in policy and evidence of those conditions in practice. Qualitative findings, in particular, contribute insights into disconnections between policy and practice in 1:1 settings.
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To Toby: 1 Corinthians 13: 4-7 describes you through this process, and always:

“Love suffers long and is kind; love does not envy; love does not parade itself, is not puffed up; does not behave rudely, does not seek its own, is not provoked, thinks no evil; does not rejoice in iniquity, but rejoices in the truth; bears all things, believes all things, hopes all things, endures all things.” Thank you for walking with me on this journey, strewn as it has been across years of our lives and through rooms in our home, to accomplish a goal that I set before ‘we’ came to be. Your love is a beautiful thing.

To Dad and Mom: From whom I learned that the fear of the Lord is the beginning of knowledge, and who modeled lifelong learning in obviously contagious ways.
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CHAPTER 1
INTRODUCTION

1:1 laptop programs, where each student has his/her own internet-ready technology device for learning, are increasing in popularity as the cost of devices has dropped to levels that make them affordable in a 1:1 ratio. The National Education Technology Plan (U.S. Dept of Education, 2010) publication Transforming Education: Learning Powered By Technology set a goal for reforming education with technology, and in 2009 President Obama challenged educators to give every child access to an internet-connected tool (Ash, 2010). Even in the decade before this president’s call to increase technology in education, schools across the country had invested heavily in technology products to equalize educational opportunities for all students.

Some of the 1:1 programs have been initiated at the local level, and some have arisen from a state level. In some states, proceeds from riverboat casinos fund technology initiatives. In an outright commitment to improve technology access for all students, Maine funded an initial purchase of one laptop per middle school student across the state in 2001. Many school districts in Texas have used bond monies to improve technology capacity. Texas moved from a textbook fund to an instructional materials allotment in 2011 to allow for the possibility of a school to allocate its dollars to purchase technology equipment. In any case, education entities are identifying technology-rich environments as a necessary step to equalize opportunity and to keep pace with a changing global demand for technology providing connectivity and access to people and information. Much like print-rich homes were seen as essential to student learning in the 1960s, the 1:1 technology ratio to create an information-rich school environment for a child is now seen as essential to student learning.
Outcomes of these 1:1 initiatives in schools have been studied with mixed results. An initial concern for studying program efficacy is that each program has different stated goals. Therefore, the studies target different outcomes. One of the most hoped-for outcomes is an increase in student achievement. Because it is difficult to attribute causality of student achievement to technology infusion regardless of the measure (which is usually standardized test scores), relatively few empirical studies have been performed (see literature reviews of Apple, Inc., 2005; Penuel, 2006; Franklin & Bolick, 2007).

Penuel’s (2006) literature review identified four common foci for laptop programs: (1) improving academic achievement, (2) increasing equity of access to digital resources, (3) increasing economic competitiveness, (4) effecting a transformation in the quality of instruction (p. 335). Because of the prolific numbers of variables in education, attributing student growth to any one measure is difficult. As a result, schools moved away from stating that 1:1 technology would necessarily lead to student academic growth or improved academic achievement.

Two newer goals have emerged, but have so far been the subject of little research: preparing students sufficiently for technology proficiency in career settings, and in higher education settings. No published studies have followed students who were educated in 1:1 environments in high school and college to determine if their skills were sufficient for college or career readiness. Shapley, Sheehan, Maloney, and Carnikas-Walker (2010) write about measuring technology proficiency, but use TAKS scores (state standardized test for reading, math, science, and social studies in Texas) as the measure. TAKS scores are lagging indicators to begin with, but TAKS does not measure technology use or technology proficiency in any way. Therefore, using TAKS to measure technology proficiency is a faulty research practice. And yet, researchers use this methodology time and again (Angrist & Lavy, 2002; Chang & Kim, 2009;
Claro, 2007; Gabriel, 2011; Grimes & Warschauer, 2008; Gulek & Demirtas, 2005; Lei & Zhao, 2005; Morrell, 1992; Schacter, 1999; Shapley, Sheehan, Maloney, & Carnikas-Walker, 2010; Suhr, Hernandez, Grimes, & Warschauer, 2010). Perhaps the reason this is true is because we have an unwritten policy that education dollars are tied to student achievement, and since technology costs dollars, we should expect a change in student achievement. It may be that the policy has to do with pedagogical theory rather than a tool, and that would be where our research studies should focus.

Dr. Douglas Reeves of the Learning and Leadership Center argues that school district technology departments should be organizationally structured as subordinate to curriculum and instruction departments because student outcomes are changed by sound instructional practice, with or without technology (2012). Chris Moersch’s (2012) HEAT framework—which combines higher order thinking, engaged learning, authentic connections, and technology use—has been used as the basis of dozens of dissertations and hundreds of studies because it focuses on instruction, not on technology. Technology research has looked for technology practices that cause gains in student achievement instead of instructional practices as a whole that are responsible for student achievement; subsequent frustration is grounded in the fact that we can tie a specific dollar amount to a laptop, but we cannot tie a specific dollar amount to engaged learning or authentic instruction or higher order thinking.

The National Educational Technology Plan states that our “regulations, policies, actions, and investments must be strategic and coherent” (U.S. Dept of Education, 2010, p. v). Further, the plan “urges our educational system at all levels to be clear about the outcomes we seek” (p. v). Because of the vast resources dedicated to a 1:1 program locally—and incomprehensible amount dedicated at a state or national level—one would hope for overwhelmingly positive
research. But what exactly are we hoping to achieve? Christensen (2008) calls for technology to change the way schools are designed and operated. But “transforming education” is as broad and unspecific an idea—and as difficult to measure—as “student achievement.” Have we clearly articulated what we are hoping to achieve, at the national or local level, with 1:1 programs? Only then can we design studies that measure intended outcomes of those programs.

A fundamental issue can be investigated to address the lack of clarity and consistency that has been problematic in studies: instead of trying to link computers to standardized scores, examine 1:1 laptop program policies and how they impact instructional practices. Thus, this research seeks to examine policies of four secondary schools in Texas that have 1:1 programs, and to compare those policies to implementation using the technology practices and readiness measures for those schools.

In 2003, the State of Texas established a technology immersion program (TIP). This TIP program funded 21 schools across the state in an effort to determine the academic effects of ubiquitous technologies—that is, giving students 24/7 access to learning, including full technology immersion (and internet access) inside the classroom. In studying this program, it was evident that some of the participating schools were not, in fact, allowing students to take home the technology (Shapley et al., 2010, pp. 29-30), which is antithetical to the very definition of ubiquitous technology. After recognizing that policy and practice were not aligned, I began to look at whether this disconnect existed in other so called “immersion” and “ubiquitous access” programs—that is, whether espoused beliefs matched actual practice in 1:1 programs. Penuel (2006) shares that one reason innovations have proven unusable is because “policies are not congruent with technology use” (p. 333).
In initially considering this disconnect between policy and practice, I looked no further than my own district, which had returned again and again to its philosophy and policy while implementing our 1:1 program. When questions or issues arose, we turned to our stated philosophy about technology and let it guide our resolution, despite any instinct to act otherwise. For example, we believed we had to give all students access all the time, which meant lending a computer for temporary use if the student’s issued machine was being repaired, or working around behavior issues to maintain access instead of taking a computer away as a disciplinary consequence. Furthermore, because our school was asked to host other schools that were investigating or implementing 1:1 programs, as an administrator who gave tours through our school I was able to visit with various individuals new to 1:1 laptop programs. I began to recognize that perhaps not all schools were holding closely to their theoretical and philosophical bases with their 1:1 programs; in fact, not all schools even had plans that guided their implementations. And certainly administrations were not always united in their own school’s efforts. Such a reality meant that 100% of the team was not on the “same page” philosophically, and certainly a division meant they were not supporting the same plan or philosophy if the district or school had one in place.

Research shows that programs guided by vision and mission statements and grounded in theory or philosophy have a better chance of success. The National Education Technology Plan directs that we must “be clear about the outcomes we seek” (U.S. Dept of Education, 2010, p. ix). Akiba and LeTendre (2009) cite four studies that illustrate “the importance of congruence or coherence in policy for the success of education reforms”: Cohen and Hill, 2001; Darling-Hammond and Sykes, 2003; National Commission on Teaching and America’s Future, 1996; and Wilson, Darling-Hammond, and Berry, 2001 (p. 15). It is in the interest of schools, then, to
ensure that a policy exists to guide its program, a foundation upon which the goals, expectations, processes, and practices are established.

The Consortium for School Networks (2011) policy guide explains that there is “value in establishing policy that defines the role that [information and communications technologies] plays in creating a quality learning environment” (pg. 2). School districts in Texas generally adopt an acceptable use policy (AUP), but an AUP does not always include the relationship between curriculum and instruction and the technologies. This is an important piece to consider in making distinctions between and among policies, in examining their qualities, and in drawing conclusions about a policy’s relevance and influence on the success of a program, or even in a broader view the success of a transformative opportunity in education.

Research has looked at philosophies of teaching strategies in technology-rich classrooms, professional development toward better technology use, technical aspects of 1:1 programs (network capacity, wireless networking, servers, etc), and changes in student learning. However, the body of literature is scarce with regard to examining technology programs at a policy level. Literature has yet to consider that the reason for mixed results in 1:1 programs might be, to begin with, that technology policies themselves are not strategic, not coherent, not clear about intended outcomes, and not grounded in learning or teaching theory.

Statement of Problem

School districts across Texas are implementing 1:1 programs. Many of the stated goals of technology programs are to increase student achievement in 21st century education, but research shows that the programs are marginally effective or not at all effective in accomplishing that goal. Instructional literature about 1:1 policies is prescriptive; that is, it prescribes what to include in a policy (usually from a technical perspective). Literature is not descriptive, and lacks
clear understanding of how current policies affect instructional programs. Interestingly, school curriculum policies consider technology, but technology policies do not largely consider curricular theories and philosophies. No studies have emerged to date that look at how schools address technology policies in relationship to the success of a 1:1 initiative.

The purpose of this study is to determine the current status of the National Education Technology Standards (NETS) essential conditions, level of technology usage, and level of teaching innovation in four Texas high schools, and then to determine the relationship between the NETS essential conditions and the level of technology usage and level of teaching innovation in those schools.

Conceptual Framework

As a result of the need for creating 1:1 policy based on educational theory and philosophical foundations, the conceptual framework for this study (see Figure 1.1) considers the theoretical and philosophical inputs to policy in possible relationships to teacher practice in the classroom.

The definition of policy is explored deeply in Chapter 2. To clarify for purposes of this study, policy is informed by educational theories and educational philosophies. It is a goal of this study to explore what inputs are present in 1:1 policies in this case study.

Philosophy can be defined as a set of beliefs, concepts, or values. To establish a framework for this study, the researcher chose to use a set of conditions that are believed to be necessary for learning with technology and reflect beliefs, concepts, or values about learning. The International Society for Technology in Education, or ISTE, has published (2009) standards for technology in education for various users—technology standards for students, technology standards for teachers, technology standards for administrators, and even in 2012 technology standards...
standards for coaches. These standards are widely accepted by educational professionals, politicians, and businesses interested in education. Standards for administrators and essential conditions provide the conceptual framework for examining technology policies in each 1:1 school in this study. These National Education Technology Standards are referred to in the Texas Education Agency’s 2010 *Progress Report on the Long-Range Plan for Technology, 2006-2020*, as standards that are applicable at the state level.

*Figure 1.1. Conceptualization of research.*

In addition, the National Education Technology Plan, published by the U.S. Department of Education in 2010, outlines goals for infusing technology in education in the areas of learning (engage and empower), assessment (measure what matters), and teaching (prepare and connect) that were incorporated into a rubric that each policy was evaluated against.

This research analyzes policy for philosophical underpinnings, examining alignment to widely accepted standards and relationship to teacher-reported levels of practice, levels of proficiency, and technology readiness as reported in the State Technology and Readiness Survey as well as responses to Level of Teaching Innovation survey. For schools with certain reported levels of practice, what policy patterns are evident? These findings may be used to begin a discussion about whether 1:1 policies inform practice in 1:1 settings—that is, whether there is a relationship between the underpinnings of 1:1 policy and teacher practices in 1:1 programs.
Research Questions

This study addresses questions descriptively and correlationally.

Descriptive questions include the following:

1. What is the current status of philosophies underlying the technology plans related to 1:1 programs in four Texas high schools?
2. What is the current status of the NETS essential conditions in four Texas high schools?
3. What is the current status of the level of technology usage in four Texas high schools?
4. What is the current status of the level of teaching innovation in four Texas high schools?

Correlational questions include the following:

5. What is the relationship between the NETS Essential Conditions ratings and STaR survey ratings?
6. What is the relationship between the NETS Essential Conditions ratings and LoTI levels?

Significance of Study

This research is important to understand whether technology programs are sound at their inception, and whether an appropriate foundation exists at the conceptual and visionary level. It will contribute to the research on the importance of policy and content of policy in effective 1:1 programs. If a relationship indicates the possibility of correlation, such a finding may warrant further experimental research to explore a predictive relationship between 1:1 policy and implementation practices.

Little research has been published in the area of 1:1 program policy. In a search of ProQuest Dissertations and Theses Database, only three dissertations deal with technology policy development for public or secondary schools. Hunt’s (1995) and Wojtylowski’s (2006) studies reported on the formulation of educational technology policy in three large Illinois districts and
four northern Illinois counties’ schools respectively. Hunt’s policy study focused on the “objects of technology” (p. i), while Wojtylewski’s focused on legal protections of a district (such as acceptable use policy). Scot’s (2005) dissertation focused on professional development policy with regard to technology. None of these three studies dealt with 1:1 programs. This study contributes to the descriptive literature in the area of philosophy in conceptual frameworks of technology policy.

Resources being allocated to this effort to infuse schools with technology come attached with expectations of improving student outcomes. This study provides insight into the policy level issues that contribute to the overall success (or lack thereof) in 1:1 programs in Texas secondary public schools as related to the reported practice, proficiency, and readiness measures.

Delimitations

This study is a mixed-methods case study that examines the policies of four schools with 1:1 programs in existence in 2013. Only public, non-charter secondary schools in Texas that have 1:1 laptop programs were considered.

Decisions driven by the tool may be a topic for further study. This study does not consider Apple versus PC platforms. This study does not consider policies at iPad campuses nor bring-your-own-device/technology (BYOD or BYOT) campuses.

Limitations

This study is limited by the published policies of those schools that were selected, described further in Chapter 3. Furthermore, technology policies that guide schools are sometimes limited to AUPs (penalties for infractions of use). While these were examined to ensure that they were not misnamed and whether they included guiding philosophies or theories, studying technical requirements of AUPs was not generally in the scope of this research.
Definition of Terms

*Policy* – In Texas public school districts, policy is formally adopted by local school boards within guidelines of federal and state laws and regulations. Generally broad in scope, policy governs how schools will operate.

*Technology plans* – Technology plans are required by the Texas Education Agency for all public and charter schools in Texas. In Texas, technology plans are approved by the local school boards, and they are the *only* such plan required to be approved by the board and submitted to the state for oversight (unlike financial plans, construction plans, or instructional plans which are not subject to submission to the state). According to TEA, the technology plan should “allow a district to evaluate their current technology; determine areas of need, set goals, objectives, and strategies to meet those needs; and allocate funding for meeting the objective” (Texas Education Agency, 2012).

*Philosophy* – For purposes of this study, a philosophy is a set of beliefs, concepts, or values. In this study, philosophy will be described as it is reflected in 1:1 policy or technology plans.

*One-to-one, or 1:1* – Using Penuel’s (2006) definition, 1:1 in this study assumes a student has a laptop s/he can take home daily, that can access the internet at school or other places, and has the focus of helping students complete academic tasks (p. 331).

*NETS essential conditions* – National Educator Technology Standards essential conditions, codified by the International Society for Technology in Education. These standards are widely accepted as appropriate standards of technology literacy for students, teachers, and administrators; the conditions necessary to attain these standards are codified in the NETS essential conditions.
STaR – School Technology and Readiness survey, required of all teachers and principals in Texas annually, produces a profile of the campus’ status toward reaching the goals of the Long-Range Plan for Technology and No Child Left Behind (TEA, 2010, p. 10).

LoTI – Levels of Teaching Innovation is a conceptual model used to measure a teacher’s implementation of classroom technology or authentic uses (Moersch, 2012).

Organization of Study

This study considers a review of the literature in Chapter 2 regarding 1:1 programs, as well as a review of the literature for educational technology policy studies in general. Methodology of the study is discussed in Chapter 3. District/school technology policy analyses, LoTI survey information (a survey titled Levels of Teaching Innovation measures as reported by teachers on campuses), STaR survey information (a survey titled School Technology and Readiness measures as reported by school personnel in Texas), interviews, and on-site observations are described in detail. Chapter 4 presents results of the research. Chapter 5 analyzes data, provides a summary, draws conclusions, and shares potential for further studies in this area.
CHAPTER 2
LITERATURE REVIEW

Literature about technology in education has been plentiful and, in recent years, has grown at a rate similar to the exponential growth of technology itself. Actual research studies have been less plentiful and, initially, generally lacked the quality that applies to rigorous research—though this is beginning to change as researchers recognize the kinds of studies that are helpful to improving the use of technology in education. Especially salient to this study is literature on policy for technology in education. While many articles have been written suggesting what to include in policy, very few studies of policy for technology in education have been conducted.

This chapter provides a context for the study of policy in 1:1 laptop environments. First, literature about the current state of 1:1 initiatives is examined. Second, the review examines a framework for defining policy, the necessity of policy, and the creation of technology policy. Third, the relationship of theory and philosophy to policy is considered. Fourth, the policies that exist are examined through the filter of previous literature. Finally, the extent of literature available on policy for 1:1 initiatives is reviewed.

1:1 Initiatives

In 1970, the United States Department of Health, Education, and Welfare released a working paper titled Learning into the Twenty-First Century. 1970 White House Conference on Children, Report of Forum 5. This working paper delineated the vision of a reformed educational system infused deeply with technology. In part, it reads:

It is possible that advanced technology will return the family to center stage as the basic learning unit. Each home could become a school, in effect, connected via an electronic console to a central educational computer system, a computer-regulated videotape and microfilm library, and a national educational television network. Whether at home or
elsewhere, each student will have, at the touch of a button, access to a comprehensive ‘learning package,’ including printed lessons, experiments to be performed, recorded information, videotaped lectures, and films.

The moment so much teacher energy is made available through the twenty-four-hour span of the day to all individuals at any place, school need no longer be what we have known it to be. It may be used for other functions not fully recognized until now. It will be the place where human beings come together, not for the formalities of learning subject matter, but for the higher literacy going far beyond reading, writing, and arithmetic.

And so the schools of the twenty-first century, by whatever name they are known, will continue to play a major role in advancing insight and knowledge. But these ‘school learnings’ will focus more on developing man’s ability to know himself and to relate to others. (pp. 5.11-5.12)

In the 40 years since that conference’s leaders published their vision, technology’s role in reforming schools—in changing the very cultures of educational institutions—has continued to be a relevant subject. When laptop computers made learning portable, and the internet gave us access to information at times other than when the public library was open, and the cost became such that individual citizens could afford to have the technology, the term “ubiquitous” became important to learning. And through that lens, administrators and policy makers are looking at the re-forming of education. Indeed, the culture of schools is changing with technologies, and with it the policies, philosophies, and theoretical framework for schools.

As policies were supported by funding, some schools sought to create truly ubiquitous technology-based learning environments. In 2001 the Maine Learning Technology Initiative was the first large-scale program offering a 1:1 laptop setting to all middle schools in the state (100% participating in 2010), followed in 2006 by the same offer to high schools (55% participating in 2010). Henrico County, Virginia, implemented a 100% 1:1 initiative in 2002 for middle and high schools, which it has maintained since. Also in 2006, Texas implemented an experimental program with 21 middle schools participating and 21 like-group middle schools chosen to be part of a control group for study purposes. McLester (2011) reports Michigan as a state with wide-
spread 1:1 implementation. However, pockets of implementation have occurred in California, South Dakota, North Carolina, Arizona, Colorado, New Mexico and elsewhere.

Each of the programs had different reasons for implementation: Maine’s initial purpose was to create economically competitive graduates, while others were trying to implement policy directed from the federal level. Regardless of the reason, one common factor was scrutinized to determine the “success” of a program: standardized test scores. As a result of this practice, many scholars criticized the initiatives as failures—among them Cuban (2011), Monke (1998, 2007), Norris (Norris & Soloway, 2010), and even the computer pioneer Alan Kay (Kahney, 2010). They cite reasons such as the tool is a distraction, schools do not use the tool to make students argue in a richer way, sloppy thinking, lack of attention to relationships with students in a technology-rich environment, and using technology as a replacement instead of an opportunity to enhance or transform instructional practices. The authors leave readers to assume that specific poor practice leads to poor standardized test results, without providing justification for that link. Some empirical studies have attempted to link practice to standardized test results. In 1999, Schacter’s review of 700 empirical studies pointed to evidence in some studies that technology is less effective or ineffective when learning objectives are unclear and there is a lack of focus on technology use. Some rigorous quantitative studies in this no-growth category include Morrell (1992); Angrist and Lavy (2002); Anglin (2008); Donovan, Green, and Hartley (2010); and Bebell and Kay’s three-year study in Massachusetts (2010).

On the other hand, researchers showed that students are benefitting from such technology-rich endeavors. Schacter’s same 1999 review of 700 research studies showed positive gains in achievement on researcher-constructed tests, standardized tests, and national
tests—including Suhr, Hernandez, Grimes, and Warschauer, 2010; Gulek and Demirtas, 2005; Ash’s (2010) study in Michigan; and Silvernail’s (2005) study in Maine.

Though studies have not generally shown 1:1 programs as a remarkable panacea to improve standardized test scores, they were showing improvement and benefits in other areas. So researchers began to look at what is making programs sustainable and successful by criteria other than improved standardized test results. Even as early as 1991, Apple published research showing that children who use technology developed skills that are not accurately measured by traditional or standard testing measures. Zucker’s (2009) and Warschauer, Arada, and Zheng’s (2010) studies in Littleton, Colorado declared the program successful in improving authentic writing and student voices because their mission and goals were clear. Studies of the Maine Technology Learning Initiative and other programs showed improvement in writing and understanding (Mara, 2006; Penuel, 2006). Delaware’s Challenge Project showed improved levels of use and narrowed achievement gaps for underprivileged students (Giancola, 2001). Shapley et al.’s (2008) work in the Texas Technology Immersion Pilot program showed use of ubiquitous technology access as a predictor of greater student achievement. Studies also distinguished levels of program implementation (Hope, 1998; Papanastasiou, Zembylas, & Vrasidas, 2003; Shapley et al., 2008; Public Education Visioning Institute, 2008), quality of work not quantity of time results in positive grade point average gains (Lei & Zhao, 2005; Papanastasiou et al., 2003), student engagement increases (Gabriel, 2011; Waters, 2009), an increase in technology use and proficiency (Lei & Zhao, 2008; Nicholas, 2006; Penuel, 2006), improvement in student writing (Goldberg, Russell, & Cook, 2003; Grimes & Warschauer, 2008), a leveled playing field between children in poverty and those who are not (Chang & Kim, 2009; Cuban, 2011; Rousseau, 2007). Penuel’s (2006) research synthesis of 1:1 initiatives
showed that successful programs tend to have extensive professional development, access to tech
support, and positive teacher attitudes toward student technology use.

In addition to literature that reveals positive or negative affects on student achievement
using standardized test scores as indicators, as well as literature that reveals possible affects on
other specific learning categories, articles that inform future research are abundant. These
studies are seeking a way to leverage technology-rich programs to transform education (once
again, with the ultimate goal of greater student achievement). Strudler (2010) points out that
mixing lower-level student and teacher users tends to cloak positive gains that might otherwise
be obtained; he points out that if our research about achievement is negative, this might be the
reason why. Researchers show how technology used for instruction is critical to seeing changes
in student learning (White, Ringstaff, & Kelley, 2002), and that technology used badly can
actually result in poorer student achievement (Toyama, 2011). The focus should be on the
implementers (Monke, 2011) and the implementation and adoption practices and processes from
research-based models such as the Concerns-Based Adoption Model (Hall & Hord, 2011) and
Roger’s Adoption and Diffusion models (Boutwell, 1995; Hope, 1998; Straub, 2009). Where
implementation is concerned, Gershner and Snider (2001) documented important evidence that
changes in behavior precede rather than follow changes in belief and understanding.

What is important to recognize about the literature surrounding 1:1 programs is a
fragmented focus (Franklin & Bolick, 2007). Culp, Honey, and Mandinach (2005) found in their
review of literature that “a gap begins to emerge during this period [after 1997] between a
relatively rapid but incremental process of innovation and investment occurring in the schools,
and a research-driven articulation of technology as a crucial ingredient to the reformulation of
the teaching and learning process” (p. 302). As Wojtylewski (2006) alludes to in her dissertation
about technology policy in Illinois, research has been reactionary to policy instead of policy having necessarily been informed by research. But such is the reality with an innovation that very quickly entered onto the scene without much time to adjust. Alan Kay, who worked for Apple in its infancy when it was developing technology for educational uses, likens technology proliferation to the arrival of the printing press onto the medieval scene (Kahney, 2010). It changed how people received information, and how they processed information, and in fact changed thought patterns. Internet-accessible laptops in the hands of every student has been a rapid change to which policy makers are reacting as well. Returning to the 1970 report, educators have known change was occurring, but the exact nature of the technology changes has largely positioned policy makers, implementers, and researchers as reactive rather than proactive.

Policy: Definition, Necessity, and Creation

Policy is an unwieldy term that requires parameters and definition to be applied if an effective study of policy is to occur. Merriam-Webster online dictionary provides these definitions of policy:

(a) prudence or wisdom in the management of affairs; (b) management or procedure based primarily on material interest; (c) a definite course or method of action selected from among alternatives and in light of given conditions to guide and determine present and future decisions; (d) a high-level overall plan embracing the general goals and acceptable procedures especially of a governmental body.

It is important to note at the outset that in policy analysis, the “term policy is not defined in any uniform way” if at all (Guba, 1984). Guba provides eight definitions of policy in an article entitled “The Effect of Definitions of Policy on the Nature and Outcomes of Policy Analysis.” Indeed, the definitions do have an effect on policy analysis, for they clarify the kind of policy, the impetus for policy, the drivers behind policy, and the intended outcomes as a result of policy implementation. In Table 2.1, Guba’s classifications based on policy definitions are described.
### Table 2.1

*Summary of Guba’s Policy Definitions and Categories*

<table>
<thead>
<tr>
<th>Definition</th>
<th>Type</th>
<th>Determiner</th>
<th>Point of Action</th>
<th>Complexions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Policy as an assertion of intents or goals.</td>
<td>Policy-intention</td>
<td>High level agents</td>
<td>Far from point of action</td>
<td>A set of ends</td>
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<tr>
<td>2. Policy is the accumulated standing decisions of a governing body by which it regulates, controls, promotes, services, and otherwise influences matters within its sphere of authority.</td>
<td>Policy-intention</td>
<td>Lower level subordinate agents</td>
<td>Intermediate point of action</td>
<td>Rules</td>
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<td>3. Policy is a guide to discretionary action.</td>
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<td></td>
<td></td>
<td>Guidelines with built-in discretion</td>
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<tr>
<td>4. Policy is a strategy undertaken to solve or ameliorate a problem.</td>
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<td></td>
<td></td>
<td>Set of tactics</td>
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<tr>
<td>5. Policy is sanctioned behavior, formally through authoritative decisions, or informally through expectations and acceptance established over (sanctified by) time.</td>
<td>Policy-in-implementation</td>
<td>Operational implementers and immediate supervisors</td>
<td>Close to point of action</td>
<td>Expectations</td>
</tr>
<tr>
<td>6. Policy is a norm of conduct characterized by consistency and regularity in some substantive action area.</td>
<td></td>
<td>All levels</td>
<td>At all levels; proximity is not relevant</td>
<td>Norms</td>
</tr>
<tr>
<td>7. Policy is the output of the policy-making system: the cumulative effect of all the actions, decisions, and behaviors of the millions of people who work in bureaucracies. It occurs, takes place, and is made at every point in the policy cycle from agenda setting to policy impact.</td>
<td></td>
<td>All levels</td>
<td>At all levels; proximity is not relevant</td>
<td>Effects</td>
</tr>
<tr>
<td>8. Policy is the effect of the policy-making and policy-implementing system as it is experienced by the client.</td>
<td>Policy-in-experience</td>
<td>Clients</td>
<td>Within the point of action</td>
<td>Encounters</td>
</tr>
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</table>

Based on this deconstruction of the term *policy*, researchers can make distinctions about policy in an analysis. Since various groups or entities build policies with different purposes, goals, or
assumptions in mind, Guba’s distinctions are useful as a way to focus specific uses of the term “policy” in this study.

Realizing as a result of Guba’s work that policy is wide-ranging in nature, literature makes it clear that policy—much like research on 1:1 initiatives—has developed in a similarly chaotic fashion. Yet one thing is clear: a plan for why and how educational technology is to be used needs to be in place (Hope, 1998). In Kotter’s (1995) article “Why Transformation Efforts Fail,” this Harvard Business School professor addresses eight major reasons he has observed for institutions failing to change successfully. All eight are applicable to education, but reasons number three and four are specifically salient to this topic. Reason three that failure occurs is because an institution does not create a vision. “You often find plenty of plans and directives and programs, but no vision,” he writes. He cites the case of a company that had a four-inch notebook of procedures, methods, and deadlines, but no “clear and compelling statement of where all this was leading” (p. 63). The fourth reason failure occurs is undercommunicating the vision by a factor of ten. He reminds us that “communication comes in both words and deeds,” but the communication should occur in all existing and available forms (p. 64). Given this, a policy—as defined by Guba as “an assertion of intents and goals”—is necessary to the success of a technology initiative. As a case in point, the 2009 Colorado Technology and Information Literacy Plan includes a plethora of individual regulatory or controlling policies for student use, staff use, email, FERPA, and the like, but contains no requirement for districts to create a visionary policy. Clausen, Britten, and Ring (2008) discuss this very notion of lack of vision and failure to communicate it at the point of, or even inside, implementation. Harvey and Rand Corp. (1995) observed:

. . . educators do not appear to have a single, compelling vision driving them toward technology. Some argue for changing the culture of the schools. No one at [the Critical
Technologies] workshop argued that technology is essential to reach emerging educational standards or new national education goals. Schools appear to be moving to the beat of an external drummer—technology is now ubiquitous in American life and students need to be exposed to it. Largely as a result of the lack of a single vision, different schools, districts, and states are emphasizing different things. (p. 8)

In Zucker’s (2004) article “Developing a Research Agenda for Ubiquitous Computers in Schools,” he broaches a philosophical question: is there monetary value on learning? What outcome(s) do we expect—increased test scores, acquisition of 21st century skills, learning to use computers, increased student motivation and attendance, or increased equity of access? Each of these outcomes is undergirded by a philosophy about education and its value. The outcomes, and their associated philosophies, should be part of the policy. According to Zucker, “the responsibility to integrate scattered and sometimes contradictory research findings and to decide how to spend education dollars rests with the public and key policymakers. With limited research available, their judgment is especially critical” (p. 384).

Guidance on creation of policy has been abundant. Hunt’s (1995), Clark’s (2002), and Wojtylewski’s (2006) dissertations examine policy creation in public schools. The North Central Regional Educational Laboratory (NCREL) published online a critical issues brief on building collective vision as guidance for local policymakers (2005). NCREL (1998) and Consortium for School Networks (2011) created a guide for updating school district policies in a “web 2.0 smartphone era” as well as to address the various ways student achievement could be measured based on goals and emphases (NCREL, 2005). Gene Hall, well known for his work on the concerns-based adoption model for change management, expresses his concern for lack of high-quality technology implementation in the area of process policy (2010)—“as experienced by the client” (Guba, 1984, p. 65). Urrea (2011) strongly urges that students’ learning should be the central
part of policies and should address strategies designed around them (policy-in-experience, within the point of action).

Arne Duncan, Secretary of Education in the Obama Administration, said that “rethinking policies around use of technology in the classroom” with “potentially transformative productivity gains are primarily state and local issues that have to be grappled with,” although national policy (discussed in the next section) demands the use of technology in instruction (Hess & Petrilli, 2010, p. 2). In part, Secretary Duncan was alluding to the financial obligations that come with technology. In that vein, Pitler, Flynn, and Gaddy (2004) suggest that policymakers take note of changes in the learning environment that can occur through implementation of 1:1 initiatives, and address those changes in policy.

Scot (2005) talks in his dissertation about the challenge of converting policy intentions to practice, which may be made easier if policy were clarified vis a vis Guba’s policy definitions. But he also rightly observes that often we get the proverbial cart (practice) before the horse (policy) in this world of technology rich instructional environments. Ultimately, he advises, leadership must hold to the theories and philosophies that make their policies valid in the first place. Policy needs to occur at various levels, each time with a more specific vision established by the policymakers.

Amory (2010) summarizes the importance of strong policy: “It is important to understand educational ideological position so to facilitate the development of appropriate educational technology design and praxis,” because it affects how we define “what constitutes learning, what constitutes technology itself, and what constitutes theoretical positioning and design for inquiry about these phenomena” (p. 69). Policymakers at various distances from 1:1 initiatives are themselves affected by political and social and economic milieu. Thus, for
schools, designing policy around research-based theory and philosophy is significantly important.

Theoretical and Philosophical Bases of Technology Policy

Policies are value laden. School’s vision statements often include phrases with implied rationales: schools will use technologies “to improve student learning” (because it isn’t done well enough); “to expand how we deliver curriculum” (because students aren’t engaged) through “improved teacher tools,” many of which are interactive (because teachers are still lecturing) (Peterson, 2005, p. 7). It would be helpful if the values behind the policies were explicitly stated. Weston and Bain have shown from studies (2010) that teaching, learning, and technologies are intricately linked in policy and drive the overall design of the learning organization. Based on that research, the following questions give possible guidance to what stakeholders might explore when establishing policy: Do we value engagement? Do we value higher order thinking? Do we value global competition? Do our practices align with our values? What is the goal of education, and how will that be measured? Do our practices lead to those results? Do the dollars (monetary value) we invest in education support what we say we value (morally and ethically) in learning for our children? And can or should our moral and ethical values for education be equated to monetary values?

The good news with regard to 1:1 research is that if there is a historically cohesive body of literature regarding technology-rich instructional environments, specifically 1:1 programs, it surrounds the idea that theory and philosophy should undergird policy at all levels. The problem remains, however, that neither the theories nor the philosophies stemming from them, nor the practices birthed from philosophies, are clearly articulated, nor are they consistent from state to state or district to district when they are clearly articulated.
Theory in 1:1 initiatives

Research has pointed out the necessity of underlying theory, but not that specific theories have been clearly articulated in 1:1 programs. Nevertheless, research does exist that reveals a complementary fit with technology-rich educational environments. Thus, one might expect to find certain theoretical bases references more often than others in these 1:1 environments.

With regard to instructional theory, constructivist epistemology underlies the prevailing views of successful technology-rich instruction. If students as “active, scholarly participators in the learning process” is the goal, their experiences should include constructivist practices such as problem-based learning, inquiry-based learning, dialogic learning, exposure to multiple sources of information, and multiple forms of output (Gordon, 2009). Technology enhances these practices, or makes them possible in the first place. Apple’s Classrooms of Tomorrow (Apple, Inc., 1991) were grounded in constructivist theory, arguing that students will “discover interdependencies and articulate them” to gain a deeper and more enduring knowledge of the subject by learning in “knowledge construction classrooms” as opposed to “knowledge instruction classrooms” (p. 2). Consistently since that time, the theory of constructivism applied to technology has been a staple in literature (Coupal, 2004; Culp, Honey, & Mandinach, 2005; Delacruz, 2009; Donovan, Hartley, & Strudler, 2007; Gordon, 2009; Liu & Szabo, 2009; McDermott & Murray, 2000; Ravitz, Becker, & Wong, 2000; Strudler, 2010; Weston & Bain, 2010; Yang & Huang, 2007).

As a result of the Speak Up 2008 report (Nagel, 2009), the term “free agent learners” has become relevant: students who believe that technology has given them the responsibility (and the right) to create and control their own learning, in directions and toward ends they define (p. 3).
The teacher supports that learning experience and ensures that students are on track to achieve their goals.

Clear articulation of theory might be significant to practice. Because there is much misunderstanding of what constructivism looks like, Gordon’s (2009) article is helpful in defining constructivist pedagogy in a clear manner. Furthermore, in 2011, VanSon wrote an article arguing that the aim of education is to improve the wealth, health, and happiness of children, not to garner high scores on standardized tests per se. He argues for a blend of traditional (Spartan method of drill) and constructivist (Athenian method of guided conversation) approaches to deliver instruction.

Again, as policymakers react to reality in the classroom and various definitions of success in technology rich environments, it is possible this tendency to a blended approach of instruction may persist if a pure constructivist approach does not prevail. Although schools do not necessarily, or in all cases, subscribe to this theory in practice, constructivist epistemology is seen as the way schools can meaningfully implement technologies and, in so doing, transform instruction (Culp et al., 2005).

Philosophy in 1:1 initiatives.

With regard to philosophies, policymakers must consider the value of education and the value of a child. Dr. Jeff Turner, superintendent of the Coppell Independent School District in Coppell, Texas, reflected on the remarkable 97% attendance rate and exemplary standardized test results of the district’s New Tech High School. If such an instructional environment could be responsible for success for those students, Dr. Turner said it would be “educational malpractice” not to make it available to every other student in his district. Delacruz (2009) asks if educational institutions’ realities align with their philosophies—that students can and should have access to
information and creativity. He talks about the notion of offering students opportunities of civic responsibility and of public forums preparing students as citizens.

Dr. Turner exemplifies the notion that our belief about what we value should truly be reflected in our policy. That is not always the case, however, because several drivers of policy exist. In Franklin and Bolick’s (2007) review of literature, they write about the societal and cultural aspects that technology encompasses. The transition to technology, which these authors liken to the Industrial Revolution, is “intertwined with education, politics, economics, and culture” (p. 34), referred to as “technoculture.” Some of what we practice or experience is simply a result of innovation, and not necessarily an expression of our moral or ethical values.

Politics and legislation is a notable driver for policy. For example, at the federal level No Child Left Behind requires technology literacy in the eighth grade (Culp et al., 2005). Maine has been committed at the state level in ensuring that all eighth graders in the state have access to technology so that they can learn and demonstrate mastery of these required literacy skills.

The U.S. President’s National Technology Plan calls for each student and teacher to have at least one internet access device (U.S. Dept of Education, 2010, p. xix). The proliferation of technology itself is a driver of reform: “its availability has caused changes to how teachers teach, how schools are organized, and how students work together and learn” (p. 301). As Christensen wrote in Disrupting Class (2008), many hoped computers would be the driving force behind education reformation. In fact, technology proliferation has introduced an opportunity and been one of several impetuses to change education because it allows schools instructional options that never before existed. Sometimes the questions that arise because of the novelty of technology tend to complicate and cloud best practices.
Another driver related to the proliferation and availability of technology is that the increasing demand from businesses and a culture of personal use have to some degree overtaken the push from the legislative arena to provide technology to every child. The growing belief among citizens that everyone should have continuous access to the internet is a powerful driver. Parents and communities have come to think of “a ‘good’ school as synonymous with a technologically equipped one” (Fienberg, 2001). If that is our belief, then policy will dictate that the district be well-equipped.

Franklin and Bolick (2007) present a challenging philosophical consideration: does funding limit what we believe is right with regard to the education we offer our children? Other questions focus on our basic philosophies: “Why have we chosen to invest in educational technologies? What rationales have motivated and shaped these investments over time? What assumptions underlie our vision for how technologies can impact teaching and learning, and how have these changed over time?” (Culp et al., 2005, p. 281). In 1:1 environments, decision makers have found a way to answer those questions. There is a belief that every child deserves ubiquitous learning opportunities. Yet when institutions provide sweeping change to access, their policies do not always help to sustain what they believed was purposeful change. For example, some Texas TIP schools espoused a notion of ubiquitous learning but did not allow students to take their laptops home (Shapley et al., 2010), creating a situation where local policy did not reflect philosophy, or reflect policy of the widespread TIP program. Garthwait and Weller’s study showed a similar practical disconnect (2005). Politics, too, determine funding (Franklin & Bolick, 2007), and conversely funding is shaped by policy, but unfortunately the funding is tied to an expectation of increased standardized test scores—which may be in direct conflict with the perceived benefits that local stakeholders believe is the value behind a 1:1
initiative. Culp et al. (2005) suggest that “future policy needs to be crafted to effectively leverage the interaction of these issues and to be informed by clear evidence that documents how ‘pushing’ on one issue can influence the others” (p. 304).

Apple, Inc.’s (2005) review of thirty rigorous studies revealed a challenge that the goals of initiatives vary widely, from academic achievement to equity of access to economic competitiveness to effecting a transformation in the quality of instruction (p. 3). Each of these goals is tied to a driver, and to a philosophy. The fragmented nature of studies on effectiveness of 1:1 initiatives is intricately linked to the lack of definition in policy—in the philosophies that underlie the policies, which should be used to create measurable goals. And thus the measures in the various studies vary widely.

Particularly with regard to philosophy, a disconnect exists with the policy (Harris, 2005). We may believe one thing to be true, but find ourselves with a policy that doesn’t support our belief. For example, asking students to “power down” at school and “power up” after school is in opposition to almost every district and state policy for instruction (Nagel, 2009). This disconnect may be explained by the Critical Juncture Theory. When a crisis, ideational change, or policy change sets in motion institutional change, the institution is at a critical juncture (Donnelly & Hogan, 2012). In this event, change agents can question previously held beliefs and notions. When a window of opportunity presents itself, policy change occurs “as policy entrepreneurs attempt to gain government support for the solutions they put forward by linking problems, ideas, and politics” (p. 325). If the policy entrepreneurs (opportunists, or change agents) can gain support for their position, policy change often follows. And therein lies the potential for policy to become layered, to drift, to be converted, or to be displaced—any of these
providing an occasion for philosophy to become disconnected from policy, which is evident in certain technology policies.

In addition to these reasons for philosophy and practice to be disconnected, there are other instances where policy does not reflect theory or philosophy. When a policy is written in a way that is limited to Guba’s definitions three through eight, there may be no reflection at all of theory or philosophy. Apple Inc.’s 2005 study of research found that leaders must be able to adapt to policies—the complexions of rules, guidelines, expectations, tactics—for surely the theory and philosophy is not shifting so rapidly that leaders cannot adapt quickly enough, whereas the rules and expectations do shift rapidly.

If every child having a laptop is a valid expectation, what theory is it based on? What philosophy is it based on? Is that theory or philosophy clearly communicated in local policy? If the theory or philosophy is clearly communicated, does it strengthen a 1:1 initiative? What goals or outcomes can then be measured in order to determine if the initiative is successful? In answer to these questions, Culp et al. (2005) suggest that we can measure improved decision making, increased citizen participation, better prepared workers in a modern workforce, enhanced social well-being, and a narrowed digital divide (p. 286). This differs from the results that rely on standardized tests.

Fullan (2007) notes that innovations fail because of stakeholder resistance. A policymaker may resist for different reasons than a teacher resists an innovation. But if the theory and philosophy behind the policy has solid ground on which there is no disagreement, it stands to reason that there is a lesser chance of resistance to the innovation by any stakeholder.
Existing Policies

According to Guba, policymakers can be distant, intermediate, close, or inside the innovation of 1:1 programs. In educational technology, policy exists at all levels. From the national level comes the National Education Technology Plan 2010, developed based on goals set by the President, legislators, and experts in the field. Aspects of this policy meet criteria in almost all of Guba’s definitions; however, the theory and philosophy behind the plan is not stated. Although it was a collaborative work of several experts in the field, in this regard and in its title, it is a plan dealing more with guidelines and expectations (definitions 3 and 5).

The Texas Education Agency (TEA) published online the Long Range Plan for Technology 2006-2020. Indeed, it is a plan similar to the federal plan absent of stated theory and philosophy but rich in guidelines and expectations. The US Department of Education links to all state technology plans, most of which include a specific section on vision and mission, but not on theoretical or philosophical underpinnings stated in explicit terms. Perhaps this is a reflection of the Critical Juncture Theory at work, perhaps it is a function of politics dictating policy instead of policy being based in theory, or perhaps it is a combination of many factors.

The Public Education Visioning Institute (associated with Texas Association of School Administrators) published a work in progress titled “Creating a New Vision for Public Education in Texas” in 2006. This document was intended to establish and communicate a vision for technology-rich instruction in Texas schools. The document presents major conceptual themes that reflect philosophies of preparing students first for success in life and secondly for success in the workforce, for instructing students in a constructivist pedagogy instead of traditional methods, and for ensuring that alternate means of assessment can be used to determine success (p. 2). This document truly fits the policy definition Guba defined as “an assertion of intent and
goals” that is undergirded by strongly implicit theory and explicit philosophy. And while it exists at a state level, we do not see these policies adopted at a local level to guide 1:1 implementation.

The International Society for Technology Education (ISTE), which publishes the widely accepted National Education Technology Standards (NETS) for administrators, teachers, and students, has public policy principles (available at http://www.iste.org/Libraries/PDFs/PublicPolicyBrief-255_10.sflb.ashx) that are grounded in explicit philosophy of equal access for all students, explicit emphasis on research-based findings, and explicit goals of economically competitive graduates.

Shaped by these government documents, local district policy in 1:1 Texas public secondary schools will be examined in the study.

Policy for 1:1 Programs

While there is a fair amount of literature about technology initiatives, literature specifically about policy for 1:1 programs is scant. A search in the Ebsco database for any computer in education article with the search terms technolog*, school*, polic*, and one-to-one or 1:1 or one to one returned 65 hits, none of which discussed policies for 1:1 initiatives. Using the same search terms in the Proquest Dissertation Database, eleven dissertation titles were returned. The following five deal with policy or 1:1 implementation, but not both:

Danielsen 2002 – “A Case Study of One-to-One Laptop Initiatives in Midwestern Schools”
Scot 2005 – “Conditions, Processes, and Consequences of Technology Integration: Policy to Practice”
Whitney 2009 – “The Relationship Between Web Accessibility Policy and Practice in Postsecondary Institutions”


It is clear from the titles that none deals with specific policies for 1:1 initiatives. This gap in research provides an opportunity to explore policy for 1:1 initiatives to examine what a school community believes when it undertakes such an endeavor, and what makes a program “successful” or “sustained”—specifically, to explore whether policy with a clearly communicated vision grounded in theory and philosophy makes a difference to the success of the 1:1 initiative or not.

Summary

Chapter 2 reviewed literature of 1:1 initiatives, which revealed mixed results with regard to measures of success. The review then looked at the value of policy that provide the foundation and guidance of initiatives, including educational programs; examined the theoretical and philosophical bases of technology policy that guide 1:1 programs; and summarized existing research on technology policies specifically.
CHAPTER 3
METHODOLOGY

This mixed methods research combines a qualitative case study with quantified survey data from four Texas high school campuses. The methods include a descriptive study of policy and a description of the extent to which an innovation has been implemented (Gay, Mills, & Airasian, 2007). This chapter includes the purpose of study, research questions, rationale, ethics, sampling, instruments, data collection procedures, data management plan, data analysis, and researcher as instrument.

Purpose of Study

A better understanding of the content of policy as it relates to effective 1:1 programs will inform schools as they develop such a plan. The purpose of this study is to examine the relationship between the inputs of philosophically-based 1:1 policies and the level of instructional practice in 1:1 classrooms. For schools with certain reported levels of practice, what policy patterns are evident? Such findings may be used to begin a discussion about whether 1:1 policies inform practice in 1:1 settings—that is, whether a relationship exists between the underpinnings of 1:1 policy and teacher practices in 1:1 programs.

Figure 3.1. Conceptualization of research.

Research Questions

This study addresses questions descriptively and correlationally.
Descriptive questions include the following:

1. What is the current status of philosophies underlying the technology plans related to 1:1 programs in four Texas high schools?
2. What is the current status of the NETS essential conditions in four Texas high schools?
3. What is the current status of the level of technology usage in four Texas high schools?
4. What is the current status of the level of teaching innovation in four Texas high schools?

Correlational questions include the following:

5. What is the relationship between the NETS Essential Conditions ratings and STaR survey ratings?
6. What is the relationship between the NETS Essential Conditions ratings and LoTI levels?

Rationale

Qualitative research is appropriate in situations where it is important to determine specifically how effective policies or practices come into existence. It is the collection of “nonnumerical data” to study a particular “phenomena of interest” that usually is not seeking to prove a certain hypothesis (Gay et al., 2009, p. 7). In this case, studying policy provides a way to descriptively understand how policy relates to practice—how in a 1:1 program it may contribute to success of the initiative.

A mixed-methods descriptive case study is based on multiple inputs of the participants, setting, or phenomenon with the goal of understanding fully the context of the study (Gay et al., 2009, p. 450). According to Onwuegbuzie and Johnson (2008), the “fundamental principle of mixed research” is that it should “involve the combining of quantitative and qualitative methods, approaches, and concepts that have complementary strengths and nonoverlapping weaknesses” (p. 280)—where combining and recombining data allows the researcher to test different ideas.
For this reason, inputs in this study include instructional practices as measured by teachers’ voluntary responses on an existing, research-based survey instrument; use of publicly available non-voluntary survey results of teachers’ input about technology and technology readiness; interviews with principals, district technology directors, and superintendents; on-site classroom and school observations of instructional practices and communication of technology plan; written policy (technology plans); and voluntary responses by principals to evaluation of NETS essential conditions in their schools’ policies.

Certain qualitative data is quantified for purposes of analysis. Borrego (2009) and Caracelli and Greene (2008) discuss data transformation—the “conversion or transformation of one data type into the other so that both can be analyzed together: Qualitative data are numerically coded and included with quantitative data in statistical analysis” (p. 235)—as a legitimate method for research.

The exploratory methodology design (Borrego, 2009) means that the initial phases are qualitative, then the findings are informed by quantitative measures. The transferability to larger samples is what a researcher hopes to find.

The data were collected concurrently, and all data were collected within a time period so that participants (teachers, principals, technology directors, and superintendents) did not change during the data collection period. All of the data sources in this study are primary research.

This research analyzes policy for philosophical underpinnings as aligned to widely accepted standards, and examines each policy relationship to teacher-reported levels of practice, levels of proficiency, and technology readiness. Policy is analyzed by this researcher but also analyzed by each campus principal, providing multiple analyses of policy. Policy is further studied for relationship to faculty evaluation of campus technology use and proficiency in the
School Technology and Readiness (STaR) survey for Texas, and the Levels of Teaching Innovation (LoTI) instrument.

A rich description of 1:1 programs offers a way to examine any relationship between policy patterns and effective practice. The analysis of policy may identify patterns that can then be linked to patterns of practice. In this way, this case study shows whether the inputs to policy affect the teacher practices as measured by teachers.

![Figure 3.2. Philosophy-policy-practice patterns.](image)

The advantage of this qualitative design lies in the verification of policy interpretation. On-site observations and interviews were conducted to verify what policies and surveys indicated to be true. Verification of survey information occurred through on-site observations and interviews, both of which provided an opportunity for clarification of information, practices, and perceptions.

**Ethics and Qualitative Research**

The components of this research that directly involve participants have been reviewed by the University’s Institutional Review Board in accordance with the National Institute of Humanity’s research subjects guidelines. Specifically, the LoTI survey requested of teachers and the interview guidelines were approved. Informed consent was obtained from all interview participants and LoTI survey participants (see Appendix A for sample IRB documents).
No individual teachers or staff members are identified individually in their survey results. Participants who were interviewed gave permission to the researcher to reveal identifying markers (such as demographics) in the research. All interview participants were given an opportunity to review their transcripts for accuracy. As required by the Institutional Review Board, confidentiality of individuals has been maintained to the maximum extent possible. As a result of confidentiality, the four schools in the study are identified by number: School 1, School 2, School 3, and School 4.

Sampling

In Texas in 2012, approximately 100 districts (out of approximately 1,200 districts) had 1:1 laptop programs at one or more campuses. The schools selected for this study were chosen through purposive, criterion sampling. It is necessary to learn as much as possible about the research problem from information rich cases. The criteria for the samples selected is an expectation of credible, accessible data based on the researcher’s experience with 1:1 programs. These schools demonstrated innovation by implementing 1:1 programs with a commitment to engage students, to share their processes and practices in the educational community (formally by presenting at conferences, and informally by hosting site visits), and by providing professional development to support their teachers in this initiative. The leaders were committed to a vision of providing the best technology-rich educational opportunities available for their students. This researcher had access at these campuses to the documents, survey data, interviews, and observations for this research.
Population

The schools chosen for this case study are described in Table 3.1. These four schools are geographically dispersed across the state. Their student populations and demographics are diverse as well, as indicated in the table below.

Table 3.1

<table>
<thead>
<tr>
<th>Participating School Demographics</th>
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<td>Region Service Center</td>
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<td>School 1</td>
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<td>School 2</td>
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<td>School 3</td>
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<td>School 4</td>
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Instruments

The instruments that were used in this research include Texas School Technology and Readiness (STaR) survey and Levels of Teaching Innovation Digital-Age survey.

STaR data is available from the Texas Education Agency website. The STaR survey was designed to help determine “progress toward meeting the goals of the Long-Range Plan for Technology, as well as meeting the goals of the district” (Texas Education Agency, STaR Chart, 2013). The STaR instrument is shown to be stable and reliable, as a Cronbach’s Alpha ≥.7 indicates in each of the four domains. All questions are worded positively with positive increments on the Likert scale. Annually, 100% of teachers must complete the STaR survey. The data is transferred to the Texas Education Agency by the campus principal. The limitations to STaR would occur in the initial supply of data, as teachers generally complete the survey in
haste annually. The principal must transfer the data, which always provides an opportunity for error. For purposes of this study, the researcher assumes that the instrument used by the Texas Education Agency has as much valid input data as possible.

LoTI Survey is aligned to the National Education Technology Standards. This survey is designed to diagnose instructional use of technology and offer professional development remedies. The survey’s reliability is reported to be between .85 and .94 for the total instrument (Mehta, 2011). For individual components of the LoTI survey, reliability is reported between .73 and .81. All questions are worded positively with positive increments on a scale of 0 to 6 or 0 to 7 (depending on the section of the survey). The limitations of the LoTI instrument are that the data is self-reported by teachers. In this case, the teachers completing this survey are involved in a technology-rich campus with much professional development emphasizing this point. For purposes of this study, the researcher assumes that the respondents give honest, thoughtful responses.

A bivariate correlation was performed between the NETS Essential Conditions ratings (Appendix B) and the STaR survey data (Appendix C) for each school. A confirmatory factor analysis provides fit indices. Does it follow a line of best fit? An R value of -1 to +1 indicates the strength of the correlation, with 0 having no correlation and +1 the greatest strength of correlation. If the correlation is negative, it may explain an invalid (not valid) STaR instrument.

A bivariate correlation was also performed between the NETS Essential Conditions ratings (Appendix B) and the LoTI survey results (Appendix D) to see if a possible correlation between policy and practice exists.
Data Collection Procedures

This study employed research methods of document analysis, open-ended interviews, observations, and surveys. Data collection occurred between March 2013 and May 2013.

Policy documents were collected from each district’s website at the beginning of the research. When policy documents were not readily available online, a request for existing written policy documents from the technology director was submitted. The technology policy was a written policy (as opposed to an informal, oral policy). As discussed in Chapters I and II, policy has a wide range of meanings in education, even though to formally refer to something as “policy” in Texas schools, it must adopted by the school board. However, administrative guidelines or campus policies not approved by the School Board are informally referred to as policy. Policy may be written or unwritten. In some cases, the policies are sections in a district’s technology plan; in other cases, vision, philosophies, and policies are included in marketing brochures or websites such as strategic design documents. For purposes of this study, the Technology Plan was the guiding document that existed consistently across schools and had been approved by respective School Boards. Therefore, the Technology Plan in each school was used for this study. These policy documents were printed and kept in a binder.

In January 2013, all campuses were contacted to schedule interviews and on-site observation dates, and to arrange for teachers to complete the LoTI survey for schools that had not completed the instrument in the past twelve months. The interviews and observations were conducted during March, April, or May 2013. An interview guide, approved by the Internal Review Board during the IRB process, is included in Appendix E. The LoTI survey, also completed by the IRB, is included in Appendix D. It should be noted that although interviews and surveys were voluntary and kept anonymous, having identity tied to answers could have
affected the answers provided. Specifically, in the LoTI digital survey, teachers were asked to provide their name, as well as subject and level taught. Although the researcher never accessed this information, the mere idea that teachers provided that information in conjunction with the survey might have changed their answers if they thought their campus administration could ever see it. The same is true for interviews: although the individuals are anonymous, their positions and their school demographics might lead to their identity. As a result, the answers they gave might have been tempered by the knowledge that their identity could possibly be determined.

Face-to-face semi-structured interviews with the superintendent, principal, and technology director were conducted for each school in the study prior to campus observations. The interviews were used to determine the status of the philosophies underlying the technology policies, to gather information about the status of the NETS essential conditions, technology usage, and teaching innovation on each campus. The researcher used the interview guide but, on a limited basis, asked certain clarifying questions at the time of the interview. All interviews were conducted in a setting of the interviewee’s choice, which turned out to be their office with the exception of one superintendent who chose a school board meeting room. Interviews were audio recorded and transcribed by the researcher. Printouts of transcripts were kept in a binder. Each interviewee was afforded an opportunity to verify the transcript for accuracy.

Observations included site visits to each campus to gather information in the following areas:

- Whether the policies are communicated to the campus staff, students, and community;
- How the policies are communicated to the campus staff, students, and community;
- Evidence that policies are implemented in classrooms; and
If the instructional practices in classrooms are consistent with the interview responses and
documents available from the campuses.

Observations were recorded in field notes. I recorded informal and formal instructional activities.
I noted any teacher communications that support the 1:1 policies of the campuses, any
communication (oral or written or graphic) that reflect the policies, any use of electronic
instructional tools (such as capturing instruction on an interactive white board, use of
instructional modules such as Moodle, use of drop boxes or online testing programs, etc) that
may not be evident in conversation but that are visible to an observer.

LoTI Digital-Age Survey was completed by the time of the site visit and interviews.
STaR data was retrieved online from the Texas Education Association website. Each set of data
for each school is stored in hard copy and digital form.

Data Management Plan

Data was organized and stored as hard copies in binders. All data available in electronic
format was maintained in electronic backups. Original consent forms signed by participants are
on file; copies were given to each participant.

According to IRB directives, research data and records will be maintained in the
University offices. I will own all of the data and will maintain the confidentiality of the
participants to the greatest extent possible. Interviewees’ identities will be kept confidential to
the greatest extent possible; schools are referred to by number. However, demographic
information may reveal a school’s identity and thus participants’ identities may be traceable.
Each participant signed informed consent forms, or in the case of teachers gave consent by
participating in the study. Audio recordings will be destroyed after acceptance of this
dissertation. None of the information collected in observations of individual classrooms will be
shared with any teacher’s administrators or central office staff. All references to individual teachers or classrooms will maintain anonymity.

Data Analysis

Data analysis began as soon as data was collected. Qualitative coding, or indexing, occurred beginning with the initial examination of policies as an iterative process, following Saldaña’s (2013) approach. According to Saladaña, during first cycle coding themes should appear to describe the phenomena under investigation. In this case, first cycle coding began to reveal common terminology or phrases. Subsequent readings were necessary on the basis of commonalities among interviews that are gleaned from first reading. This process was repeated until the policies were thoroughly reviewed for specific inputs. The inductive process was used to determine what philosophies may underlie the 1:1 policies. The components were classified using a concept map to organize into patterns.

A separate examination of policies was conducted, using a rubric created from the NETS Essential Conditions (Appendix B) for the purposes of determining whether the essential conditions are present within policy for each district. Once the policies were thoroughly reviewed, the researcher rated each policy for presence of the conditions. A rubric was used because each campus principal also completed an analysis using the same rubric for his/her campus with respective policy documents.

After completing interviews and observations, campus principals were asked to use the NETS essential conditions rubric to rate policy documents. Principals’ NETS essential conditions ratings were compared to the researcher’s NETS essential conditions ratings to determine similarities or differences in analysis. This served as a sort of member-checking, to ensure that observations were in line across the campuses in the study.
Campus policy ratings were compared to the LoTI survey data in a bivariate correlation to determine whether any relationship exists between policy inputs and implementation as revealed in the survey. Campus policy ratings were compared to the STaR survey data (from the Texas Education Agency that already exists for each campus) in a bivariate correlation to determine whether any relationship exists between policy inputs and the technology and readiness survey data reported by teachers and administrators for each district.

Field notes from observations during site visits were reviewed to determine what commonalities exist across schools and also to see what characteristics support the policies as well as what characteristics are consistent with responses to interview questions. By examining, categorizing, tabulating, and recombining the information obtained from interviews and observations, the research developed into patterns. In this descriptive study, data analysis involved presentation of emergent themes, specifically examining what is important, why it is important, what we can learn from the patterns, and how it contributes to the body of knowledge in this area of research (Gay et al., 2009).

To address Question 1, “What is the current status of philosophies underlying the technology plans related to 1:1 programs in four Texas high schools?” an interview was conducted (Appendix E) of each principal, technology director, and superintendent in the district. Interviews and observations explore communication of policy and processes for policy implementation, such as professional development. These interviews were transcribed and coded using Saldaña’s structural coding method.

To answer Question 2, “What is the current status of the NETS essential conditions in four Texas high schools?,” I conducted an open coding analysis of the policies to look for patterns. Additionally, the NETS Essential Conditions rubric (Appendix B) were used to
compare essential conditions of the NETS to statements in policy that reflect the essential components. Numeric values were assigned to aid in comparing criteria among 1:1 program policies. Each category had a number score assigned to aid in quantifying data. If the standard is directly addressed, it was assigned a score of 2. If the standard is indirectly addressed, it was assigned a score of 1. If the standard is not addressed, it was assigned a score of zero. The data was synthesized and compared using qualitative analysis of key factors of policies and the relationship to ratings (Glesne, 2011, p. 209). The researcher and campus principal rated the policy using this rubric.

To answer question 3, “What is the current status of the level of technology usage in four Texas high schools?” and question 4, “What is the current status of the level of teaching innovation in four Texas high schools?” the STaR survey data and LoTI survey data from teachers was used.

To answer question 5, “What is the relationship between the NETS Essential Conditions ratings and STaR survey ratings,” campus data from the STaR survey was used to correlate the data. The goal here was to determine if STaR data indicate alignment of policy in the schools. The STaR chart has four components: Teaching and Learning; Educator Preparation and Development; Leadership, Administration, and Instructional Support; and Infrastructure for Technology. Each of these four areas has six subcategories. Teachers and administration rank each of the subcategories as follows: 1 for early stages of proficiency, 2 for developing stages of proficiency; 3 for advanced stages of proficiency, and 4 for target stages of proficiency. Each of the four areas is totaled to determine readiness. A total of 21 to 24 points indicates target technology implementation for the category; 15-20 points indicates advanced technology implementation; a total of 9-14 points indicates developing technology implementation; and a
total of 6-8 points indicates early stages of technology implementation. A bivariate correlation
was run to determine if a pattern in technology policy relates to a pattern in the STaR data as
indicated by the personnel in the district. A copy of this STaR chart is included in Appendix C.

To answer question 6, “What is the relationship between the NETS Essential Conditions
ratings and the LoTI levels?” campus data from the LoTI instrument was used to correlate the
data. The LoTI survey (see Appendix D) assesses consequences of policy implementation.
(LoTI stands for Levels of Teaching Innovation, but has a component with the same acronym,
Levels of Technology Implementation.) The LoTI survey assesses three components: Current
Instructional Practices, Personal Computer Use, and Level of Technology Implementation.
Current Instructional Practice has a scale of 0 to 7, ranging from “the participant is not involved
in a formal classroom setting” to “the participant exclusively supports a learner-based approach
to instruction.” The mean is calculated to report a campus-wide level of Current Instructional
Practices. Personal Computer Use has a scale of 0 to 7, ranging from “the participant does not
have the interest or skill level to use digital tools” to “the participant is very sophisticated in their
use of digital tools and resources for student learning, is part of setting the vision for technology
infusion, and is continually seeking creative uses for digital tools.” Again, the mean is calculated
to report a campus-wide level of Personal Computer Use. Finally, Levels of Technology
Implementation has a scale of 0 to 6, ranging from “non-use” to “refinement.” Mean is
calculated to report a campus-wide level of Technology Implementation. A bivariate correlation
was run to determine if a pattern in technology policy relates to a pattern in the LoTI levels as
indicated by the personnel in the district. A copy of this LoTI levels is included in Appendix D.
Researcher as Instrument

The researcher did not provide any compensation nor is expected to provide reciprocity as a result of the cooperation on research. The researcher will not receive any incentive from the school.

Merriam (1998) and Straus and Corbin (1990) explain that researcher’s point of view is a valid contribution to research—both through understanding what is relevant and not, and that understanding one’s situation is a contribution in itself.

To clarify bias and expectations, the researcher discloses the following necessary information regarding personal background and experience.

At the time of the data collection, the researcher was an employee in one of the four schools in this study. The school’s 1:1 laptop program had been a responsibility of the researcher in that school for four years. During that time, the researcher had the occasion to visit with many 1:1 schools. Therefore, the researcher had great insight into traditional schools as well as technology-rich schools. The researcher has been an administrator in schools with and without 1:1 programs. Multiple years of experience in both settings makes the researcher qualified to evaluate 1:1 program data.

Challenges to the Mixed Methods Design

Certain challenges must be acknowledged with this design. This is a case study that employs qualitative methodology and quantifies qualitative data.

The fact that it is a case study presents a sampling and sample size challenge. The study is limited to schools with 1:1 program currently, and therefore sampling is limited to a set of schools that may ultimately be proven to be homogenous as a sample set. A case study provides issues with sample size; the teacher input is sample set of $n=101$ for the LoTI survey and $n=156$
for the STaR survey, but the $n$ for schools is 4. Therefore, any quantitative calculations where $n=4$ can create issues at the point of integration. While it is statistically permissible to run a bivariate correlation when $n=4$, certain limitations to generalizability may arise.

Qualitative methodology is widely criticized as being subjective and therefore inaccurate (Saldaña, 2013). However, credibility, transferability, dependability, and confirmability replace objective quantitative research terms of internal validity, external validity, reliability, and objectivity (Onwuegbuzie & Johnson, 2008). To overcome these challenges, this researcher sought to bring together complementary methods or data sources, collected concurrently, and compared results of each by various methods to best understand the research question. To use Onwuegbuzie and Johnson’s (2008) words, this researcher attempted to have complementary strengths in analyzing data by “putting together different approaches, methods and strategies in multiple and creative ways.” The researcher hopes that looking at data in multiple ways will ultimately create a stronger case for making claims in data interpretation.

Creswell and Plano Clark (2007) provided a list of criteria for mixed methods studies, which this study meets:

1. Representation of qualitative and quantitative perspectives on data collection, data analysis
2. Detailed quantitative and qualitative procedures, as well as sequential or concurrent data collection and analysis with defended interpretations
3. Inclusion of mixed methods features, including type of design, diagrams of procedures, purpose statement, research question(s) and data analysis, and citation of mixed methods articles
4. Sensitivity to the challenges of mixed methods design
Summary

Chapter 3 includes the presentation of this researcher’s case study that employs mixed-methods: qualitative descriptive design with quantified survey data. The researcher described the selection of participants along with a discussion of specific instruments used in the collection of data. Data collection from surveys, interviews, document analysis, and on-site observations was explained. Data analysis methods were discussed. Discovering patterns in 1:1 technology policies and their potential relationship to teacher practices is the purpose of this study.
CHAPTER 4

RESULTS

A technology device in the hands of every child is the growing trend in America. The efficacy of such programs has been met with mixed reviews. Previous chapters explained that schools often implement technology programs without fully understanding or articulating what they hope to achieve.

This mixed-methods study examines the relationship between the underlying philosophies of 1:1 technology policies and the relationship to practice in four Texas high schools. Each of the research questions is accompanied with an instrument and method for analysis described in Chapter 3. This chapter will provide the findings of each instrument as they pertain to each of the six research questions:

1. What is the current status of philosophies underlying the technology plans related to 1:1 programs in four Texas high schools?

2. What is the current status of the National Education Technology Standards (NETS) essential conditions in five Texas high schools?

3. What is the current status of the level of technology usage in five Texas high schools?

4. What is the current status of the level of teaching innovation in four Texas high schools?

5. What is the relationship between the NETS Essential Conditions ratings and STaR survey ratings?

6. What is the relationship between the NETS Essential Conditions ratings and the LoTI levels?
The purpose of this chapter is to report the findings of the study, including a description of the participants, an assessment of the data collected, and a descriptive and inferential analysis of the data. The results are addressed in sections that correspond to the six research questions.

Participants

This study compares four Texas schools, each in a different geographic region of the state. The demographic table provided in Chapter 3 reveals a heterogeneous sampling of schools with populations from 219 to 916 students. Economically disadvantaged percentages vary from 32% to 66%. Minority populations range from 30% to 79%. Mobility rates and numbers of students at-risk also vary with this sampling of schools. The number of years with a 1:1 program varies from 2 to 8. Teacher populations range from 26 to 64.

The participants in this study include 156 teachers and the four principals, four technology directors, and four superintendents in the corresponding districts. In the LoTI survey, 101 participants responded from the four high schools, a 65% participation rate. Teacher participation was 100% at School 1 and School 2, 46% at School 3, and 16% at School 4. LoTI survey data was reported to the researcher by campus as well as an aggregate total for the four schools. The STaR survey is required of all Texas teachers; however, the \( n \) is not provided on the TEA website from which I extracted the scores by school. The averages of the schools were calculated without giving more or less weight to schools that have more or less staff.

The research process included contacting schools that were known to be generous with 1:1 program information. This researcher was not familiar with two of the four schools that participated in the case study, nor any of those participants. In all cases, the researcher proceeded with the same approach: to ask the superintendent if he would be willing for his district and school to participate in the study. As anticipated, leaders at these schools were very helpful in
scheduling visits, in allowing me access to teachers at the 1:1 campus for survey purposes, and allowing me access for interviews and site visits, and principals were generous with their time to complete rubric ratings. These leaders and teachers were willing and proud to share programs they believed to be in the best interest of students by maintaining and promoting ubiquitous technology access. Participants willingly discussed their school’s or district’s 1:1 program. Their discussion was generally candid with only two superintendents appearing to be more reserved with their responses. Nevertheless, the whole of the responses painted a fairly consistent picture of leadership perceptions about policies as they relate to 1:1 programs.

Research Question 1

In order to examine the current status of philosophies underlying the technology plans related to 1:1 programs in four Texas high schools, an interview was conducted with campus principals, district superintendents, and district technology directors for a total of 12 interviews. The same nine open-ended questions (Appendix E) were asked of each participant in the four districts. The questions were designed to allow participants to discuss their perceptions of the technology plans in their districts, how they came into being, what was important at that time, and whether there was theory or philosophy underlying those plans or policies. Questions then probed whether communication about those plans and policies were communicated and, if so, what was communicated and with whom; how the 1:1 policy shaped professional development, whether it mattered if the 1:1 was successful for the district, or for an individual teacher; how much attention was given to implementation; whether policy affected implementation; and how success of implementation is measured.

Interview participants agreed to have the interviews recorded and later transcribed. Interviews were conducted during site visits to the districts during the time frame March to May
2013. Eleven participants were able to grant face-to-face interviews; because of a scheduling
conflict on the day of the researcher’s site visit, one principal responded to interview questions
via email within a week of this researcher’s site visit. The length and depth of responses were
generally significant; however, some individuals provided less detailed responses. In some cases,
brief answers were profound answers.

Participants’ answers to face-to-face interviews were each transcribed for coding.
Saldaña’s *The Coding Manual for Qualitative Researchers* (2013) provided guidance for
appropriate coding methods. In this case, structural coding was used. Saldaña identifies this
method as appropriate for qualitative studies “employing multiple participants,” “semi-structured
data-gathering protocols,” or “exploratory investigations to gather topic lists” (p. 84), all of
which were present in this study. Structural coding is used to label and index responses for
“commonalities, differences, and relationships” (p. 84). Because each question was about a
separate philosophy or process, codes were not combined across questions; that is, each question
was coded distinctly from the next.

Frequencies of words or phrases were a factor of interviewee’s style of speaking, passion,
emphasis, or simply impromptu response. The frequency was not significant to the overall
consideration of whether a pattern existed across respondents. Coding frequencies were
significant if analyzed according to numbers of participants, but not according to numbers of
responses since some participants repeated words or phrases in their interview responses. Coding
frequencies were also significant if analyzed across roles; for example, an answer might reveal
information if all principals gave common responses that were different from all technology
directors. Certainly a district’s collective responses across roles (principal, superintendent, and
technology director) tended to reveal information that was useful in comparing or contrasting
with another district or with the collective whole. Charts combine frequencies by role; for example, all principal’s responses are represented together instead of four separate principal’s responses.

Illustrative charts (Saldaña, 2013, p. 87) were used to visually represent responses. In all charts, the y axis represents the number of times the topic was mentioned by the respondents during the interview (frequencies). Findings are presented in this section.

Interview Question 1 asked each participant to talk about creation of that school’s 1:1 policy. Ten of twelve participants responded that their school did not have board-adopted policy, but did have administrative guidelines, board-approved policies pertaining to fees or penalties, strategic plans that included expectations for technology use, district and campus improvement plans, and/or technology plans approved by the district’s Board of Education and submitted to the State for e-Rate monies. The technology plan was consistently present across all four districts. The two respondents who said their districts had board-adopted technology policy clarified that it was related to hardware distribution or acceptable user policies, not a broader policy pertaining to expectations of a 1:1 program.

*Figure 4.1. Type of policy identified by participants during interview.*
Nine of 12 respondents reported that there was scholarly discussion of theory and philosophy in the creation of 1:1 programs prior to creation of written documents (technology plans, strategic plans, improvement plans, etc.). These responses were evenly distributed among respondent roles. Two principals and one technology director said they borrowed other policies. Seven participants said there was a process in deciding about their 1:1 program, and the processes included needs assessments, tours or school studies, training and staff development, and discussion of scholarly philosophy or educational theories. Technology directors elaborated more about underlying theory or philosophy. This may be attributed to the fact that superintendents or principals have changed since the inception of the 1:1 program, whereas technology directors have been with the district since the inception of the 1:1 programs in all four high schools. In three districts, the superintendent is new since the 1:1 program inception, and in the school where the superintendent was there, the principal is new since the 1:1 program inception. Therefore, technology directors would be in a better position to recall a discussion of philosophy or theory. However, the fact that a new principal or superintendent cannot articulate theory or philosophy for their 1:1 program may indicate a lack of communication to the staff or community about why the campus has a 1:1 program.

Figure 4.2. Underlying factors for policy identified by participants during interview.
Interview Question 2 asked whether National Education Technology Standards (NETS) essential conditions were part of formulating 1:1 programs and whether they are specifically addressed in policy. It is clear in Figure 4.3 that participants generally believe that policy does not reference the NETS essential conditions. While personnel may have been trained in what the NETS are, the NETS are not necessarily referenced in policy. Certain participants gave conflicting information about whether NETS are or are not present in policy.

![Figure 4.3. NETS essential conditions presence in 1:1 policies.](image)

Interview Question 3 asked how the policy was communicated to stakeholders. Because some participants believed there was no policy present and hence no policy communicated to stakeholders, the question became how the 1:1 program was communicated to stakeholders. Either way the question was exploring communication with stakeholders. Participants responded with either “how” communication occurred to stakeholders, “what” was communicated to stakeholders, or both. Figure 4.4 shows which respondents answered “how communication
occurred to stakeholders and which respondents answered “what” was communicated to stakeholders. Communication occurred, and in abundance according to the interviews. If no policy exists, what was communicated to the community may be a more significant question.

Figure 4.4. Participants’ responses of how or what was communicated to stakeholders.

How communication occurred with stakeholders included needs assessment groups; hiring personnel to help address needs; training families; training students; face-to-face meetings with parents, students, and community stakeholders; mailing letters; publishing information in local newspapers; publishing policies in handbooks; telling the School Board; publishing via website; soliciting staff input; using an automated phone call system; surveying the community and teachers. Two respondents said there was “not much” communication and that communication occurred “not well.”

With regard to what was communicated, participants said they told stakeholders they would gain access to the internet; that the 1:1 program would level the playing field for their children; that the household would have network availability; that family literacy would improve; that the technology was necessary to engage students; an explanation of what the
technology would look like; expectations for a student having a laptop every day; or information about how the laptops would be distributed to every child.

Interview Question 4 asked to what extent the 1:1 program shaped professional development. Some participants offered numeric percentages (see Figure 4.5).

![Figure 4.5. Percentages of professional development affected by 1:1 program according to participants.](image)

The influence on professional development revealed in interviews is reflected in responses to the STaR and LoTI survey reported for Research Questions 3 and 4 later in this chapter. Participants also spoke of “shaping” professional development in terms of professional development issues that were exposed as a result of the needs that a 1:1 program brought to light. Participants generally categorized those issues as positive—such as it “exposed a need for engagement,” “magnified a teacher’s ability,” or “teachers were not intimidated by it.” Some saw the issues as negative—such as teachers not being totally immersed, “it has not been a perfect process,” “wish we had taken care internally of new teachers,” or “should have been a constant learning model.” Some of the issues were neutral, such as “district now drives the focus,” “we had a shift of instructional focus,” or “teachers were trained.” A majority of participants recalled that
professional development focused on the tool and how to use the tool, versus focusing professional development on instructional practices (see Figure 4.6).

![Figure 4.6. Professional development focus.](image)

Two interviewees spoke to the fact that the professional development was a result of a 1:1 program; two interviewees made the claim that professional development was planned ahead of the 1:1 implementation. One technology director said as a result of summer training on technology tools, it became evident in that the district needed to have a 1:1 program in order to be able to implement the instructional practices that teachers were learning.

Interview Question 5 asked what incentives exist for a school to implement a 1:1 initiative successfully. Figure 4.7 shows categories of responses. Five of 12 interviewees claim that professional development is the biggest incentive, and an equal number claim that schools find incentive in doing what is best for students. But at the other end of the spectrum, five interviewees also claimed that there was no incentive for a school to be successful with its 1:1 program, or they did not know of an incentive. Technology directors focused on the nature of
the trend, while principals and superintendents focused on professional development benefits and ethical reasons for schools to be successful with their program implementation.

![Figure 4.7. Incentives for a school to have a successful 1:1 program.](image)

Interview Question 6 asked what incentives exist for an individual teacher to implement the 1:1 initiative successfully in his/her classroom. In this case, answers were heavily repeated, which indicated that participants felt passionate about their answer or they couldn’t think of multiple incentives that might exist for a teacher to implement a 1:1 program successfully. Two participants responded in the negative—that is, that money was NOT the incentive to be successful. Several times district expectations were brought up as incentives—that teachers were expected to “make it happen” regardless of other perks. Again, some participants felt there were no incentives for individuals.
Interview Question 7 asked what process was adopted to implement the policy (not the program necessarily). This question was probing whether there was a systematic, thought-out implementation, or if a lack of purpose surrounded the policy. Figure 4.9 shows the participants’ responses as they identified individual process components. Generally answers were about an implementation process, but some philosophy surrounding the program policy might be established in these answers—for example, district expectations about the frequency of technology use. The respondents seemed to believe it was important to train teachers and to establish expectations for using laptops frequently.
Interview Question 8 asked participants if they could (or would) talk about a relationship between 1:1 policy and levels of instructional implementation in the classroom. This question was very much the crux of the interview, as the researcher was interested to find whether there was a connection between policy and implementation and, if so, what could be said about this connection. The responses were easily categorized (see Figure 4.10).

After the third pass in coding, it was clear that a majority of participants (75%) saw the need for a relationship between policy and practice, but that the connection was weak or nonexistent in their schools. Interestingly, they articulated that the connection in their district/school was between a vision and implementation—and largely, that vision resided with a single leader. The connection was not, in their view, between written policy and implementation. This information sheds new light on all the questions about communication methods and effectiveness, professional development, and incentives. One may ask whether the teachers know what they are doing, why they are doing it, and whether they have
valid and authentic reasons for implementing a program to a level of success. One may ask whether the community knows why programs are necessary.

![Figure 4.10. Participants’ articulation of a relationship between policy and levels of implementation.](image)

Interview Question 9, the final interview question, asked how the participant knows if the program is successful. Technology directors talked about surveys (because they were responsible to administer them), working equipment, or frequency of teachers or students accessing subscription software, and whether computers are in use when the technology director walks into a classroom. Principals and superintendents did not provide responses about equipment (see Figure 4.11).

In a very few instances, participants pointed to hard data such as numbers of students completing dual credit courses because of laptop availability, a satisfaction measure on a survey of parents and teachers, or a decreased performance gap. Even so, these specific measures were spoken about as being a direct result of laptop programs; only one participant acknowledged that a number of variables makes it difficult to attribute causation to a 1:1 program. The obviously overwhelming answer to this question was really a litany of unmeasureable, vague criteria, such
as these direct phrases: “students are engaged,” “immediate improvement,” “they’re not having to use an outdated book,” “they’re happier because they love to do research with technology,” “I know what I want to see,” “it’s having a positive effect,” “our students felt empowered,” “it’s difficult to measure,” “a lot of teachers have embraced it,” “I think that’s really our problem.”

Nobody pointed to established goals and ways to measure goals that are required to be included in the Technology Plan, even though every district has one and every participant was aware of the Technology Plan.

![Figure 4.11. Participant-articulated ways to know if a 1:1 program is successful.](image)

Another way to answer Research Question 1 is the site observations. In every school, there was no policy or goals or destination markers visible in any school. In all schools, the presence of laptops was palpable: almost to the student, every child had a laptop in his/her possession. But the only other visible clues in school buildings that these campuses had 1:1 programs were the following: School 1 had posters about what to do if a laptop breaks, had a digital-age instructional framework posted in every room, and had an Apple Distinguished Campus plaque in the office. Another school had an Apple Distinguished banner hanging
prominently in the school. Aside from that, there were no other visible markers. Even student work in the halls was largely paper posters made by hand as opposed to printed digital assignments. Every campus has online indications of a 1:1 program somewhere on the campus or district website, but this is not prominent for any campus or district. This lack of prominence is not an indication that the public community is unaware of its existence, for after eight years two of these campuses have a instructional technology culture that is widely known to their stakeholders. Site visits revealed a lack of public communication at the school for a program being implemented on the campus.

In reviewing the memos this researcher kept during coding, it is noted that interview participants often talked about what they would like to see happen in their schools that was not currently their reality. While all interview participants spoke positively--even enthusiastically--about having 1:1 technology programs, principals and technology directors voluntarily discussed their frustrations. Superintendents were more reserved in their criticisms of any aspect of the programs.

In summary, interviews with principals, superintendents, and technology directors indicate that current practice in these four Texas high schools does not rely on or refer to policy. Policy does not rely heavily (or at all) on the National Education Technology Standards, and implementation of policy is not an important focus in these schools. Professional development is driven by the 1:1 policy. Participants talked about a lack of policy but the need for policy; at the same time, they acknowledged that policy heavily influenced professional development. Participants’ perceptions of their 1:1 program policy is a significant outcome of this interview portion for Research Question 1.
Research Question 2

To answer the second research question, “What is the current status of the NETS essential conditions in four Texas high schools,” a descriptive approach is used. First, the technology plan for each district—which is the only written and board-approved document in every district by which to make consistent comparisons—was coded using the Magnitude Coding method (Saldaña, 2013, p73). Categories were already defined by the NETS Essential Conditions (see Appendix B), making Magnitude Coding an acceptable coding method. To determine current status, analyzing the Technology Plan for presence and even frequency of items in each essential conditions category provides a way to quantify current status of the essential conditions in four Texas high schools (Saldaña, 2013, p. 73). In this section, magnitude in each NETS essential condition is charted. Secondly, each plan was rated according to a rubric based on the 14 elements of the NETS essential conditions. A simple rubric was created (see Appendix B) that indicates whether the essential condition is explicitly stated in the plan, whether it is implied, or whether it is absent. Each school’s plan was independently evaluated by the campus principal and this researcher using the rubric in Appendix B. A total score was added for each numerical value scored. The results are revealed in the second portion of this section.

In the qualitative analysis of the technology plans for each school, the researcher deconstructed the printed text. Phrases were categorized as belonging to one of fourteen NETS essential conditions. Magnitude is derived from the actual number of times an essential condition is addressed in the district’s technology Plan. In examining the magnitude of each essential condition category collectively (all schools combined), the following table provides a look at which categories were more often addressed:
Table 4.1

*Magnitude of Essential Conditions among All Schools*

<table>
<thead>
<tr>
<th>Magnitude of each Essential Condition</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Ongoing Professional Learning</td>
<td>56</td>
</tr>
<tr>
<td>Assessment and Evaluation</td>
<td>37</td>
</tr>
<tr>
<td>Technical Support</td>
<td>37</td>
</tr>
<tr>
<td>Equitable Access</td>
<td>33</td>
</tr>
<tr>
<td>Curriculum Framework</td>
<td>22</td>
</tr>
<tr>
<td>Support Policies</td>
<td>20</td>
</tr>
<tr>
<td>Consistent and Adequate Funding</td>
<td>17</td>
</tr>
<tr>
<td>Student-Centered Learning</td>
<td>16</td>
</tr>
<tr>
<td>Skilled Personnel</td>
<td>14</td>
</tr>
<tr>
<td>Empowered Leaders</td>
<td>9</td>
</tr>
<tr>
<td>Implementation Planning</td>
<td>8</td>
</tr>
<tr>
<td>Shared Vision</td>
<td>8</td>
</tr>
<tr>
<td>Engaged Communities</td>
<td>6</td>
</tr>
<tr>
<td>Supportive External Context</td>
<td>0</td>
</tr>
</tbody>
</table>

Table 4.1 reveals that all but one condition are present in the schools collectively. It also reveals that generally there is a greater emphasis on some of the essential conditions than others. For instance, Ongoing Professional Learning is more heavily emphasized than Engaged Communities. The significance of viewing combined data by magnitude is that the separate policy categories can be qualitatively compared against the information revealed in the interviews of principals, technology directors, and superintendents. Ongoing Professional Learning was a point of ready discussion for the interview participants. Shared Vision rates low on the magnitude scale, and communicating policy with stakeholders was an area that interview participants struggled to readily articulate. The interview questions did not parallel exactly the categories into which the policy was deconstructed, but a low emphasis in policy on National Education Technology Standards and incentives for schools or individual teachers to implement
a 1:1 program successfully seems to contradict the moderate magnitude of Curriculum Framework.

Table 4.2 reveals a breakdown of Magnitude Coding by individual school. No two schools had the same condition with greatest magnitude. No school addressed the condition “Supportive External Context” in its plan. Even removing that condition from the mix, three of the four schools had at least one other condition that was not evident in a Magnitude Coding.

Table 4.2.

**Magnitude of Policy Deconstruction Categories By School.**

<table>
<thead>
<tr>
<th>Category</th>
<th>School 1</th>
<th>School 2</th>
<th>School 3</th>
<th>School 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assessment and Evaluation</td>
<td>10</td>
<td>12</td>
<td>8</td>
<td>7</td>
</tr>
<tr>
<td>Consistent and Adequate Funding</td>
<td>2</td>
<td>8</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Curriculum Framework</td>
<td>3</td>
<td>6</td>
<td>4</td>
<td>9</td>
</tr>
<tr>
<td>Empowered Leaders</td>
<td>4</td>
<td>3</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Engaged Communities</td>
<td>3</td>
<td>0</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>Equitable Access</td>
<td>6</td>
<td>3</td>
<td>7</td>
<td>17</td>
</tr>
<tr>
<td>Implementation Planning</td>
<td>1</td>
<td>0</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Ongoing Professional Learning</td>
<td>7</td>
<td>14</td>
<td>7</td>
<td>28</td>
</tr>
<tr>
<td>Shared Vision</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Skilled Personnel</td>
<td>2</td>
<td>0</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>Student-Centered Learning</td>
<td>8</td>
<td>5</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Support Policies</td>
<td>3</td>
<td>1</td>
<td>3</td>
<td>13</td>
</tr>
<tr>
<td>Supportive External Context</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Technical Support</td>
<td>9</td>
<td>14</td>
<td>9</td>
<td>5</td>
</tr>
</tbody>
</table>

Figure 4.12 is a chart that graphically displays the information in Table 4.2. It is evident that three conditions are consistently emphasized by all schools: Assessment and Evaluation, Ongoing Professional Learning, and Technical Support. Equitable Access follows close on that order. Policies, however, are sixth in the frequency of items addressed. In connecting policy and practice, this becomes an interesting point of data. A low magnitude of implementation planning also seems to indicate a lack of connection between policy and practice.
Figure 4.12. Magnitude of essential conditions by school.

The Magnitude Coding provides an inflated number in certain areas; for instance, a school may have addressed “Ongoing Professional Learning” many times in its Technology Plan, and therefore has a very high Magnitude Coding but may not be doing more professional development in reality than another school; Magnitude Coding only means it was addressed that many times in a plan. An indication of likely emphasis on one element does not indicate any level of success. The Magnitude Coding was converted to rank order for each condition. The reason for the conversion was to reduce the effect of redundancy in written plans but still honor the apparent emphasis intended. Although this study is not intended to rank schools for competitive purposes, this quantification is a way to mitigate skew. Therefore, each essential condition was assigned a rank order among the four schools based on magnitude. The school with the highest magnitude was assigned a 4, the school with the second highest magnitude for the same condition was assigned a 3, the next lowest magnitude was assigned a 2, and the lowest
magnitude was assigned a 1 for that condition. Repeating this for each essential condition, and tallying those rank order numbers, each school’s tally is presented in Table 4.3.

Table 4.3

*Rank Order Tally of Magnitude Codes for Each School*

<table>
<thead>
<tr>
<th>Rank Order Tally</th>
<th>School 1</th>
<th>School 2</th>
<th>School 3</th>
<th>School 4</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>33</td>
<td>32</td>
<td>37</td>
<td>36</td>
</tr>
</tbody>
</table>

For the second portion of this question, principals and this researcher evaluated the essential conditions of the NETS against each campus’ Technology Plan. The reason the researcher provided a second rating was to determine if there was general consistency in how principals rated across the four schools, a sort of member checking. The maximum rating possible is 28 (fourteen conditions, two points per condition). The results are presented in Table 4.4.

Table 4.4

*Essential Conditions Rubric Ratings (summed scores)*

<table>
<thead>
<tr>
<th></th>
<th>Principal Rating</th>
<th>Researcher Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>School 1</td>
<td>21</td>
<td>16</td>
</tr>
<tr>
<td>School 2</td>
<td>19</td>
<td>19</td>
</tr>
<tr>
<td>School 3</td>
<td>24</td>
<td>17</td>
</tr>
<tr>
<td>School 4</td>
<td>28</td>
<td>18</td>
</tr>
</tbody>
</table>

With the exception of School 2, this researcher’s ratings were proportional to the principals’ ratings. It is this researcher’s opinion that the principal at School 2 tends to be very critical, or very honest, about self-analysis. Obviously this researcher’s rating for School 2 was proportionally higher relative to other schools. School 2 had the second highest Magnitude Coding tallies of all four schools. This indicates that perhaps the principal’s rating on the NETS
Essential Conditions rubric may be underestimated. In order to mitigate the skew, an average of the principal’s and researcher’s ratings was calculated and presented in Table 4.5.

Table 4.5

*Essential Conditions Rubric Ratings (summed scores and average rating)*

<table>
<thead>
<tr>
<th>School</th>
<th>Principal Rating</th>
<th>Researcher Rating</th>
<th>Average Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>School 1</td>
<td>21</td>
<td>16</td>
<td>18.5</td>
</tr>
<tr>
<td>School 2</td>
<td>19</td>
<td>19</td>
<td>19</td>
</tr>
<tr>
<td>School 3</td>
<td>24</td>
<td>17</td>
<td>20.5</td>
</tr>
<tr>
<td>School 4</td>
<td>28</td>
<td>18</td>
<td>23</td>
</tr>
</tbody>
</table>

In later correlations, the researcher considers principal ratings *as well as* a combined average of principal rating and researcher rating.

Table 4.6 breaks down those average rubric ratings by category. Not surprisingly, the category Consistent and Adequate Funding was ranked by all principals. In order to have a 1:1 program, there must be a commitment for that funding. Ongoing Professional Learning was the second highest ranking across schools. Equal Access comes in at a surprising third. For any school with a 1:1 program, policy should be very high in this category. There appears to be a conflict between the interview responses and the policy evaluation in the areas of Support Policies and Assessment and Evaluation; interviewees perceived there to be no or little policy for 1:1 programs, and most responses about Assessment and Evaluation were minimal. During an interview with one technology director the participant was answering about how the success of the program is evaluated. The researcher said, “You have an evaluation section in your technology plan,” to which the technology director asked with surprise, “We do?” One superintendent answered the question about how one knows if the program is successful with a twelve-second pause before answering, “You know, that’s a pretty good question, one that needs to be answered. I don’t know exactly how you evaluate that.” Only one of the twelve
interviewees could point to the evaluation section of the Technology Plan to discuss how to evaluate success of a 1:1 program.

Table 4.6

*Essential Conditions Rubric Ratings by Category*

<table>
<thead>
<tr>
<th>Category</th>
<th>School 1</th>
<th>School 2</th>
<th>School 3</th>
<th>School 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shared Vision</td>
<td>1</td>
<td>.5</td>
<td>1</td>
<td>1.5</td>
</tr>
<tr>
<td>Empowered Leaders</td>
<td>.5</td>
<td>1</td>
<td>1</td>
<td>1.5</td>
</tr>
<tr>
<td>Implementation Planning</td>
<td>1</td>
<td>1.5</td>
<td>2</td>
<td>1.5</td>
</tr>
<tr>
<td>Consistent and Adequate Funding</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Equitable Access</td>
<td>1.5</td>
<td>2</td>
<td>1.5</td>
<td>2</td>
</tr>
<tr>
<td>Skilled Personnel</td>
<td>1</td>
<td>1</td>
<td>.5</td>
<td>2</td>
</tr>
<tr>
<td>Ongoing Professional Learning</td>
<td>2</td>
<td>2</td>
<td>1.5</td>
<td>2</td>
</tr>
<tr>
<td>Technical Support</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>1.5</td>
</tr>
<tr>
<td>Curriculum Framework</td>
<td>1.5</td>
<td>1.5</td>
<td>1.5</td>
<td>2</td>
</tr>
<tr>
<td>Student-Centered Learning</td>
<td>1.5</td>
<td>1.5</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Assessment and Evaluation</td>
<td>2</td>
<td>1.5</td>
<td>1.5</td>
<td>2</td>
</tr>
<tr>
<td>Engaged Communities</td>
<td>1.5</td>
<td>.5</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Support Policies</td>
<td>1.5</td>
<td>1.5</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Supportive External Context</td>
<td>.5</td>
<td>.5</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Summed total</td>
<td>18.5</td>
<td>19</td>
<td>20.5</td>
<td>23</td>
</tr>
</tbody>
</table>

Both measures of the current status of the NETS essential condition—the Magnitude Coding and the Rubric Rating—revealed certain information. After accounting for skew, each rank order tally was then averaged with the average essential conditions rubric rating to derive scores reported in Table 4.7. The purpose for finding a score that combined the two methods was for later use in correlations. Turning qualitative analysis into quantitative numbers provides a way to assess schools against surveys that are addressed in subsequent Research Questions. It is not *per se* a rating for a school; it is merely a way to quantify information derived from a qualitative analysis as discussed in Chapter 3.
Table 4.7

*Average of Magnitude Coding Rank Order Tally and Essential Conditions Rubric Rating*

<table>
<thead>
<tr>
<th></th>
<th>School 1</th>
<th>School 2</th>
<th>School 3</th>
<th>School 4</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Final combined score</strong></td>
<td>25.75</td>
<td>25.5</td>
<td>28.75</td>
<td>29.5</td>
</tr>
</tbody>
</table>

Research Question 3

The current status of the level of technology usage in four Texas high schools is explored in Research Question 3. Data from the Texas STaR survey from each campus and a LoTI survey of the staff are used in this analysis.

The STaR survey assesses four key areas: Teaching and Learning; Educator Preparation and Development; Leadership, Administration and Instructional Support; and Infrastructure for Technology. Only the first key area, Teaching and Learning, will be used for the Research Question 3 analysis because it is the only STaR category that surveys use of technology. Teachers self-report on this survey according to the rating scale where 1 = early tech; 2 = developing tech; 3 = advanced tech; 4 = target tech. A total score can range from 6 to 24. The school ratings for this area are revealed in Table 4.8.

Table 4.8

*STaR Results for Teaching and Learning in Four Schools*

<table>
<thead>
<tr>
<th>School</th>
<th>TL1</th>
<th>TL2</th>
<th>TL3</th>
<th>TL4</th>
<th>TL5</th>
<th>TL6</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Patterns of Classroom Use</td>
<td>Frequency/Design of Instructional Setting</td>
<td>Content Area Connections</td>
<td>Technology Applications (TA) TEKS Implementation</td>
<td>Student Mastery of Technology Applications</td>
<td>Online Learning</td>
<td></td>
</tr>
<tr>
<td>School 1</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>3</td>
<td>19</td>
</tr>
<tr>
<td>School 2</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>18</td>
</tr>
<tr>
<td>School 3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>17</td>
</tr>
<tr>
<td>School 4</td>
<td>3</td>
<td>4</td>
<td>4</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>20</td>
</tr>
</tbody>
</table>

73
The Levels of Teaching Innovation Profile measures “three critical components pivotal to digital-age literacy and innovative teaching practices” (Survey Profile, page 3): Levels of Teaching Innovation (LoTI), Personal Computer Use (PCU), and Current Instructional Practices (CIP). See Appendix D for descriptions of LoTI survey levels. Teachers respond to questions that indicate level of innovation or use or practice. Each category is tallied and averaged; results are reported by level. These levels are not labeled the same; LoTI level is reported on an interval scale of 0 to 6 but includes 4a and 4b, whereas PCU and CIP are reported on an interval scale of 0 to 7. The LoTI survey results for Personal Computing Use are reported for all schools in Table 4.9.

Table 4.9

<table>
<thead>
<tr>
<th>School</th>
<th>PCU level</th>
</tr>
</thead>
<tbody>
<tr>
<td>School 1</td>
<td>4</td>
</tr>
<tr>
<td>School 2</td>
<td>4</td>
</tr>
<tr>
<td>School 3</td>
<td>3</td>
</tr>
<tr>
<td>School 4</td>
<td>4</td>
</tr>
</tbody>
</table>

In terms of Personal Computer Use, 58% of teachers are in the upper half of proficiency levels. Compared to Research Question 2, if Professional Development is strong in this area it stands to reason that the CIP result would be high. Table 4.11 breaks down the levels for all survey respondents combined.
Table 4.10

*PCU Level Combined Schools Percentages*

<table>
<thead>
<tr>
<th>PCU Intensity Level</th>
<th>Combined Schools percentages</th>
</tr>
</thead>
<tbody>
<tr>
<td>PCU Intensity Level 0</td>
<td>2%</td>
</tr>
<tr>
<td>PCU Intensity Level 1</td>
<td>4%</td>
</tr>
<tr>
<td>PCU Intensity Level 2</td>
<td>12%</td>
</tr>
<tr>
<td>PCU Intensity Level 3</td>
<td>24%</td>
</tr>
<tr>
<td>PCU Intensity Level 4</td>
<td>22%</td>
</tr>
<tr>
<td>PCU Intensity Level 5</td>
<td>21%</td>
</tr>
<tr>
<td>PCU Intensity Level 6</td>
<td>13%</td>
</tr>
<tr>
<td>PCU Intensity Level 7</td>
<td>2%</td>
</tr>
</tbody>
</table>

School-for-school, instructional practices—technology integration—are similar in both the STaR Teaching and Learning, and LoTI Current Instructional Practices. The LoTI category Personal Computer Use is relatively higher in School 1, but Schools 2, 3, and 4 share relatively similar ratings when comparing to Current Instructional Practices and STaR Teaching and Learning survey results.

**Research Question 4**

The current status of the level of teaching innovation in four Texas high schools is examined in the fourth research question. The measure for teaching innovation comes from the third component of the LoTI survey, which evaluates teaching innovation from teacher responses. On a scale of 0 to 6 (including 4a and 4b), individually the schools ranked on the lower half of teaching innovation.

Table 4.11

*Levels of Teaching Innovation*

<table>
<thead>
<tr>
<th>School</th>
<th>LoTI Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>School 1</td>
<td>3</td>
</tr>
<tr>
<td>School 2</td>
<td>3</td>
</tr>
<tr>
<td>School 3</td>
<td>2</td>
</tr>
<tr>
<td>School 4</td>
<td>3</td>
</tr>
</tbody>
</table>
The level of teaching innovation parallels the reported level of personal computer usage as reported on the LoTI survey: if the teachers have a higher level of personal computer usage, in parallel they have a higher level of teaching innovation.

The LoTI survey’s individual questions provided interesting information with regard to instructional innovation. School results are reported in Table 4.13.

Table 4.12

LoTI Level Combined Schools Percentages

<table>
<thead>
<tr>
<th>Level</th>
<th>Combined Schools percentages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level 0: Non-use</td>
<td>0%</td>
</tr>
<tr>
<td>Level 1: Awareness</td>
<td>5%</td>
</tr>
<tr>
<td>Level 2: Exploration</td>
<td>30.5%</td>
</tr>
<tr>
<td>Level 3: Infusion</td>
<td>32.5%</td>
</tr>
<tr>
<td>Level 4a: Integration (Mechanical)</td>
<td>10%</td>
</tr>
<tr>
<td>Level 4b: Integration (Routine)</td>
<td>18%</td>
</tr>
<tr>
<td>Level 5: Expansion</td>
<td>3%</td>
</tr>
<tr>
<td>Level 6: Refinement</td>
<td>1%</td>
</tr>
</tbody>
</table>

Collectively 68% of the teachers were functioning in the lower half of the teaching innovation scale. With the emphasis on Ongoing Professional Development in policy (Research Question 2), one might expect higher teaching innovation. This information might inform the kind of professional development being offered: less on the tool, more on instructional uses for the tool.

Research Question 5

Question 5 asks “What is the relationship between the NETS Essential Conditions rating and the STaR survey ratings?” The STaR surveys have four categories. Their results from the Texas Education Association are provided in Table 4.13.
Table 4.13

*STaR Survey Ratings for 2012-2013*

<table>
<thead>
<tr>
<th></th>
<th>School 1</th>
<th>School 2</th>
<th>School 3</th>
<th>School 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teaching and Learning</td>
<td>19</td>
<td>18</td>
<td>17</td>
<td>20</td>
</tr>
<tr>
<td>Educator Preparation and Development</td>
<td>22</td>
<td>17</td>
<td>15</td>
<td>18</td>
</tr>
<tr>
<td>Leadership, Administration, Instructional Support</td>
<td>19</td>
<td>24</td>
<td>18</td>
<td>20</td>
</tr>
<tr>
<td>Infrastructure for Technology</td>
<td>24</td>
<td>24</td>
<td>22</td>
<td>18</td>
</tr>
</tbody>
</table>

Two approaches were taken to answer Research Question 5. In the first method used to compare the NETS essential conditions to the STaR survey, the essential conditions have been correlated to an appropriate STaR category, as shown in Figure 4.13. The STaR categories head each column; the essential conditions that correspond to each of the four STaR categories are in boxes below the column heading.

![Figure 4.13. STaR and NETS essential conditions correlates](image)

Quantified data from the NETS essential conditions in Table 4.2 and the averaged rubric ratings in Table 4.4 were disaggregated into STaR categories shown in Figure 4.13. The sums of
disaggregated data for each school for NETS Magnitude from Table 4.2, for Essential Conditions rubric ratings from Table 4.4, and from STaR survey results in Table 4.13 are presented in Figure 4.14.

Figure 4.14. STaR and NETS essential conditions correlates with totals by school.

From the totals in Figure 4.14, a stacked line chart was created to overlay data points for the NETS Essential Conditions Magnitude Coding, the NETS Essential Conditions rubric rating, and the STaR survey data for each school. Figures 4.15, 4.16, 4.17, and 4.18 represent Figure 4.14 in by individual school. The figures show that responses on three measures—a STaR survey, a policy analysis, and a policy rating—have consistent patterns. For example, what the policy says about Teaching and Learning, what the principals perceive the policy says about Teaching and
Learning, and how the teachers rated Teaching and Learning are consistent. For each school, this is generally true for each of the four STaR categories and corresponding essential conditions.

Figure 4.15. School 1 – Relationship of NETS and STaR responses.

Figure 4.16. School 2 – Relationship of NETS and STaR responses.
Whether looking at the data across measurement instruments or by category, the three measures are generally consistent. This is important because the teacher’s responses reflect strengths in categories where the policy addresses certain conditions more deliberately. In no case does
teacher reflection of a category as measured by STaR stand in direct opposition to the corresponding category in policy.

Slight differences do exist. Figures 4.15, 4.16, 4.17, and 4.18 show that actual policy content and perceptions by principals about that policy (rubric ratings) are consistent except with regard to Educator Preparation and Development, which is rated to be stronger than STaR responses indicate it is. Overall, however, for each school the responses for all measures are at least consistent regardless of data collection method. Based on this method of examining the data, the STaR data, the Magnitude Coding, and the NETS Rubric rating show consistent relationships between policy and practice from a qualitative standpoint.

The second method used to answer Research Question 5 was to run a bivariate correlation. The ideal relationship would be that the stronger the policy is (as measured by the presence of NETS essential conditions), the stronger the STaR survey result would be. In this case, the researcher quantified the policy with five different methods. Each of the five methods was correlated against eleven categories of the STaR: each of the six subcategories of teaching and learning, the four broad categories of the STaR survey, and a total score for the STaR survey. The IBM statistical software SPSS was used to calculate the bivariate correlation. The results provided a Pearson Correlation and a statistical significance result. A strong correlation would be r=.95 or better, with a statistical significance of p<.05.

Correlations were run on each of the data in Figure 4.19. The heading depicts dependent variables; the subtext depicts independent variables. Results in bold reveal four possible relationships.
As was indicated in Research Question 1 and graphically represented in Figure 4.12, policy emphasis was not high. Professional Learning receives relatively high ratings, but there is unlikely the four statistically significant correlations (p<.05) are valid even though four of 55 relationships returned p ≥ .95.

Based on the variation by chance one can expect in correlation of a sample size this small, it is unlikely the four statistically significant correlations (p<.05) are valid even though four of 55 relationships returned p ≥ .95.

Of the 55 possible relationships, only four returned correlations—two direct, two indirect—but not all four from the same NETS essential conditions method of quantifying. The two positive correlations were between Magnitude Coding of NETS and Teaching and Learning: Frequency/Design of Instructional Setting and Content Implementation (r=.979, p<.021). Interestingly, Design of Instructional Setting and Content Implementation for Technology r=-.964, p<.036 for Technology r=-.981, p<.009 for Technology r=-.991, p<.009. The negative (indirect) relationships occurred for two different methods for quantifying the NETS and two different categories of STaR. By chance alone, one would expect .15.6 of the 55 possible relationships to fall under the NETS category of Student-Centered Learning, an area Connections (r=.979, p<.021). Interestingly, Design of Instructional Setting and Content Implementation for Technology r=-.964, p<.036 for Technology r=-.981, p<.009 for Technology r=-.991, p<.009.

Figure 4.19. Bivariate correlation between NETS essential conditions and STaR survey.
no relationship between Teaching and Learning (STaR category) and the NETS Essential Condition Ongoing Professional Learning. The data indicates that while responses are consistent (shown by method 1), there are only two positive statistically significant relationships between the NETS essential conditions and the STaR Survey responses, out of 55 possible correlations.

Research Question 6

The final research question asks “What is the relationship between the NETS Essential Conditions ratings and LoTI levels?” Even though 58% of teachers are reporting in the upper half of Personal Computer Use levels and 81% in the upper half of Current Instructional Practices, 68% are functioning in the lower half of Teaching Innovation levels. With emphasis on professional development, LoTI levels would reasonably be high. A bivariate correlation was run between the NETS essential conditions quantified five different ways and the LoTI survey individual components as well as a total score, represented in Figure 4.20.

![Table 4.1](https://example.com/table4.1.png)

Table 4.1 shows that Ongoing Professional Development is high, so one might reasonably expect a correlation to Personal Computer Use or Current Instructional Practice.

For these 20 possible combinations, no correlations were returned that were statistically significant at the p<.05 level.

Figure 4.20. Bivariate correlation variables between NETS essential conditions and LoTI levels.
Student-Centered Instruction and Shared Vision are low in Table 4.1, which may be why there is no correlation.

Biases and Limitations

The findings of this study may be affected by the following limitations. The nature of this study is exploratory and includes four schools. Therefore, the results of this study are not transferable to other settings, though the outcomes may be similar to other cases (Onwuegbuzie & Johnson, 2008).

This study is meant to be descriptive of the cases in the study. The researcher’s perceptions and those of current leadership or current teachers can change from day to day, and another study of the same cases may result in slightly different results. Participant misperception of questions or categories can certainly skew the data provided to the researcher in interviews or ratings or surveys. This study is descriptive only of the settings as they existed during the duration of the study and for this researcher.

The findings in this study might imply that lack of statistically significant correlations between policy and practice might be a result of errors in coding. Another possible implication is that there were self-selection errors in the data since all teacher participation in the LoTI survey was voluntary. There is a bias in the sample of schools where district leadership voluntarily agreed for schools to participate. Indeed, the schools that willingly participated would create a biased set, as they were all willing to reveal strengths and weaknesses of their programs.

A limitation of this study is that the sample size for schools is small. Little variation in dependent variables would also be a reason for not finding statistically significant results. It is possible that there are other significant factors that do relate and need to be explored.
The importance of policy or its connection to practice was not addressed with participants in this study. Such a preparatory exercise may provide different results in another study. According to Guba (1984), certain elements of policy may be emphasized while others are not, either for political or social or economic reasons.

Policy may not be the challenging issue for 1:1 programs. It may be that policy is undercommunicated by a large factor (Kotter, 1995) and thus the leadership is not putting resources or focus on areas that policy indicates will be emphasized. The fact that site observations revealed almost no indication of a 1:1 program at all illustrates the undercommunication at least in a visual and obvious representation to faculty, students, and community where the physical campus itself is concerned. Failure to communicate policy may also lead to fragmented focus (Scot, 2005; Franklin & Bolick, 2007) or “rogue” policies such as was indicated by the case where the principal said the program was all in his head.

Finally, a significant variable may actually be found in some area of policy, such as attention to student-centered instruction, if it were the area of strong emphasis. Because a strong magnitude of attention in policy typically also was revealed in responses to teacher practice (measured by STaR or LoTI instruments), it may be that a relationship between policy and practice could be found in the categories if the magnitude were greater—that is, if the policy had greater emphasis on that category.

Summary

This chapter reported the data collected for the research study. It described the participants and provided data to answer four descriptive questions and two correlational questions. The next chapter discusses the findings, provides a summary, explains implications, and suggests recommendations for further research studies.
CHAPTER 5
DISCUSSION OF FINDINGS

This study examined the 1:1 technology policies of four Texas high schools and their relationship to practice. Four research questions examined the current status of the policies in these schools, the current status of the NETS essential conditions, the level of technology usage, and the level of teaching innovation in these schools. Two questions examined relationships between the essential conditions and the teacher-reported technology and innovation levels.

Qualitative data included interviews, rubric ratings, surveys, and site observations. Interviews were analyzed using coding methods described in *The Coding Manual for Qualitative Researchers* (Saldaña, 2013). Policy documents were also examined using qualitative methods. Additionally, qualitative coding of interviews and policies, and survey responses were quantified to examine using quantitative methods.

Two positive statistically significant relationships at \( p > .05 \) were found between the policies and the practices in this study. The descriptive study revealed information about policy and practice that can be useful in future studies. An interpretation of the findings, implications of this research, and recommendations for further study are presented in this chapter.

Interpretation of Findings

The National Education Technology Plan (U.S. Dept. of Education, 2010, p. v) states that educational policies for learning powered by technology must be strategic and coherent. It urges educational leaders to be clear about the outcomes we seek. Findings of this study—identified elements of policy inputs and relationships to outcomes—may assist in our efforts to provide effective learning powered by technology. Although it would have been ideal to find strong quantitative correlations between policy and practice, the
qualitative results of this exploratory study are equally helpful. The findings are presented here in two sections: findings that may explain a lack of correlation between policy and practice, and findings that indicate a qualitative relationship between policy and practice.

Findings that may explain lack of correlation between policy and practice.

A framework for this research was presented in Chapter 1 (Figure 1.1). This study looked specifically at NETS essential conditions as inputs for policy because these are generally accepted standards in education. Theoretical and philosophical inputs can be classified under one of the fourteen categories of the NETS essential conditions. As a result of the study, some findings emerged that may explain a lack of correlation between policy and practice.

The first major finding in this study was a lack of ability for leadership to identify policy that drives practice. This finding was gleaned from the interviews conducted with campus principals, district superintendents, and district technology directors. Interviewees struggled with the notion of policy for their respective 1:1 programs. The technology director of one school said, “I think you’d be surprised if you found anybody who has a policy concerning technology integration. I may be—I would be surprised.” Interviewees failing to easily speak about their policies does not mean policies were not present at some level and in some form—whether they were informal or adopted by the board, whether they were called plans instead of policies, or whether they were published in district documents or campus handbooks, all of the districts have policy about their 1:1 program. Clearly, it was not neatly packaged in such a way that they could readily direct the researcher to a specific document. The technology plan for each campus, adopted by the Board, was the most comprehensive document conveying policy in each district. The researcher specifically asked interviewees to identify policy documents that codify what is communicated to staff or community stakeholders. One principal of a school that is touted as a
very successful model, whose school has actually been recently visited by the President of the United States and provides professional development internationally, pointed to his head and said, “It’s all up here.” This statement was significant in that it revealed an obvious disregard for documented policy. “It’s all [in my head]” indicates that a program’s success lies with an individual leader. In fact, the superintendent and technology director in this district tactfully confirmed that this principal looks only to himself for guidance that in ideal circumstances is provided by policy. Program sustainability, or the ability to create cultures to sustain practices, is at risk if the success of a program lies with one person.

Figure 5.1. Lack of referenced policy.

Major educational studies on policy (as discussed in Akiba & LeTendre, 2009) show that it has to be reviewed and refined by stakeholders in order to align policies with practice. Policies are necessary (Hope, 1998; Kotter, 1995), and in order to connect teaching, learning, and technologies (Weston & Bain, 2010) they must be strategic and coherent. For a school system, they can be neither strategic nor coherent for a system if they involve only one individual.

However, not all cases in the study were as extreme as the one claiming that policy resides in his head. One principal replied to Interview Question 1 by saying:

There’s nothing formal. There are expectations. But those expectations allow teachers autonomy within the program. We ask them to use [technology in the classroom]. We
don’t tell them how. So, do we use it enough? No. Are we all growing at the same rate?
No. Do we have a policy? We have an expectation. I don’t think it’s any more than that. I
think it’s an expectation we support.

Perhaps this is what the principal meant who said “It’s all up here.” Perhaps the reference was to
an expectation that he enforces. Still the leaders largely struggled to articulate policy and its
role in their program. Interviews with principals, superintendents, and technology directors were
mostly consistent in stating that policy does “not exist” for 1:1 programs. “We don’t really have
a written policy for the program itself,” one technology director said. The superintendent in the
same district responded:

I don’t know if we have a policy per se. You know, we have practices. … [w]e don’t
have a policy in place—a written policy. We have several guidelines that … we follow
as far as implementation of the 1:1.

One superintendent said there was no policy “specific just to the 1:1,” but then contradicted
himself when one sentence later he said, “We included it in our district improvement plan.”

A general lack of understanding about the necessity and usefulness of program policy
was evident in all four cases, though certain respondents recognized and conveyed that a lack of
policy had been a frustration or concern of theirs. One superintendent responded in a way that
illustrated a blurring of lines between policy, vision, and expectations:

I don’t know. … I do think that people have to have a vision of where they want to go
with this. I mean, it wasn’t, we didn’t just start out and we’re just going to do whatever.
My vision was to get us to be cutting edge. … But I also, I don’t ever want to harness my
people “this is the way I want it done.” I want to use whatever talent they have. And so
the parameters are really more of what I’m looking for rather than specifics of “this is
what I want you to do with this.” Because they come up with ways that I might never
ever dream of.

A failure to identify policy for the 1:1 program was consistent across the cases studied.

However, this principal wrestled with the notion that a specific policy may be too limiting of
teachers’ practices. The point is well taken that outlining connections between philosophies and
practices may in fact limit use of instructional technology strategies too narrowly. Perhaps it is in an effort to avoid imposing limitations that leaders are reluctant to specify guidance through policy. This general failure to identify policy was central to the study, as uncertainty had an affect on other aspects of the study as well.

The second major finding in this study was a lack of perceived relationship between policy and practice among the leadership explored in Interview Question 8. The first finding—a failure to identify policy—largely prevented leadership from subsequently identifying a relationship to practice. Responses were confused, as was illustrated by the superintendent of School 2 who said, “It’s very important and there needs to be a relationship. … Without a formal written document as far as 1:1 goes, yes, I mean, we do. There is a relationship for us.” The understandable confusion likely arises from a weakness in policy articulation coupled with an understanding that policy is supposed to relate to practice. The principal of School 2 said, “Policy has no connection to [practice]. … If everybody knew [the expectation] and people still are not using [1:1 technology], then there’s no connection between policy and practice.” Yet this principal understood the need for a connection. This principal continued, “For this to move forward and become what it’s supposed to be, then we have to find that connection.” “I think there’s supposed to be a connection, and I really do think there is,” said the Superintendent of School 1. He elaborated:

I don’t think you can have one piece out here. I think it all has to be basically one step in the process, each one of those is a different step in the process. You gotta have your policy and procedure in place and you gotta have the implementation on every campus.

The principal of School 1 said, “I think [a relationship between policy and practice] would have helped us. That’s part of what we’re lacking now. We’re seeing a decline of use because we don’t have the foundation of the policies in place.”
In their estimation, any current relationship is between vision and practice, not between policy and practice. When interviewees were able to clearly distinguish the difference between policy, vision, and expectations, they conveyed a lack of connection between policy and practice. In the end, participants mostly concluded that there should be a connection between policy and practice, but that there is not currently a connection. A lack of statistical correlation between policy and teacher-reported practices would substantiate the leaders’ perceptions.

A third finding, which is also largely dependent on the first finding, is that communicating policy to stakeholders is perceived by leaders to be occurring even though their ability to identify policy is questionable. Nobody, however, identified this disconnect in the interview. In contradiction to the difficulty in readily identifying policy, in all four cases the interviewees stated that policy is communicated to stakeholders, except one interviewee, the technology director of School 1, who said he felt that communication was not happening well. Further discussion revealed that content of the communication to stakeholders is usually not about the reasons why the program exists, nor is the communication clearly describing specific program outcomes. Only the principal of School 2 discussed communicating policy philosophy to the stakeholders:

We held parent meetings. We told them what we were gonna do, why we were gonna do it, what the expectations were, how we were going to support family values, what advantages was it going to give kids. You know, about 54% of our adult population has a high school diploma in [this town], and so the first thing we did was assure our people who have never had access that they were going to gain access. For the first time you had a level playing field. So we addressed our poverty population that way. We addressed people who were not very motivated toward going to college that we were going to support that here.

Unlike this case, according to other interviewees the communication with stakeholders was about the tool and consequences if rules were broken regarding proper care and use of the tool—the more limited acceptable user policy. The communication with stakeholders (community,
parents, students, and teachers) that does occur is not about the program policy itself, although it should be (Clausen, Britten, & Ring, 2008; Harvey & Rand Corp., 1995).

This principal of School 2 also pointed to high teacher turnover and lack of continuity in professional learning as a communication weakness in that school’s program. Teacher turnover as it relates to communication of policy may be an issue in every school. (Teacher turnover is a significant factor that was not measured in this study.) The consistency in communicating philosophy and theory to stakeholders may turn out to be a critical component of 1:1 programs because it would prevent those elements from being lost over time. Following interviewees’ unsure answers when asked what document they would point to if asked for a policy, a lack of ability to discuss policy content with stakeholders was evident in these cases.

A fourth major finding of this study was an inability to identify specific research-based theoretical foundations in the policy (Amory, 2010; ACOT, 1991; Delacruz, 2009; Scot, 2005). Interviewees were prompted to talk about theoretical and philosophical foundations of their programs. Although some said that discussion occurred among stakeholders in planning meetings, during the interviews not one participant articulated details about those theories. No participant talked about constructivist epistemology or multiple intelligences or transformational theories or any other specific theory. The technology director from School 1 did say that the theoretical discussion “kinda started coming from instruction. It didn’t really come from the need for technology.” Based on several instructional workshops and discussion about the LoTI survey that preceded the district’s 1:1 program by two years, the teachers were concluding that they could not teach without technology; however, the director stopped short of saying that LoTI requires constructivist practices even though this district now instructs from a theoretical basis in constructivism.
The principal of School 2 was the one participant who most cogently discussed underlying philosophies to stakeholders. He said:

We’re using our data to say we’re in trouble and we have to address that through instructional practices. And it was the only thing we could use as leverage to low [performing] teachers. We’ve invested in this and we’ve invested in kids. ... I think we’ve kind of gotten away from that, some of those things that were best practices.

The issue for schools with 1:1 programs was no longer a lack of access; in fact, this principal pointed to data that showed the gap in access had been closed and they now actually surpass other schools in terms of student access to educational resources. The technology director of School 4 said that change in leadership was a hurdle: the new superintendent had a different focus than the former superintendent, and their philosophies about 1:1 programs differed significantly.

Although the interviewees said that theory and philosophy was discussed during the planning phase for their 1:1 programs, not one shared which theory or any specific philosophies. Furthermore, whether or not discussion occurred, specific theories and philosophies are not stated in policy documentation for these schools. Harris (2005), Scot (2005), and Nagel (2009) discuss these types of policy-philosophy disconnections in their works.

![Diagram showing theoretical/philosophical inputs, policy, and practice]  

*Figure 5.2. Lack of theoretical and philosophical inputs.*

A fifth major finding of this study was a lack of meaningful measurement of practice (Figure 4.11). Interview Question 9 asked how the leadership would know if a 1:1 program was
successful. While each of the Board-adopted technology plans were required to be based in the NETS and were required to include assessment and evaluation measures, most measures were not tied to the NETS essential conditions. Almost all leaders were aware of the National Education Technology Standards, and even said their personnel were trained to understand the NETS, but the NETS have limited or no reference in policy. The inspection of practice was not tied back to the inputs of policy. One principal said, “Without anything specific to inspect, we’re still guiding movement as opposed to inspecting progress. And I think that would be a key piece as we continue to progress down this 1:1 implementation.” While policy should guide movement, inspecting progress—that is, inspecting practice—should necessarily grow from the inputs to those policies. Ways to measure the relationship between policy and practice were lacking. Interview Question 9 asked how leaders would know if their 1:1 program was successful. Long pauses for thought followed this question in almost every interview. After being asked this question, one superintendent paused for twelve seconds before responding, “You know, that’s a pretty good question, one that needs to be asked. I don’t know exactly how you evaluate that.” A technology director pointed out that the practices a technology department might use to say a program is successful would be different from practices a principal might use. This illuminated the point that a program policy is an umbrella under which many departments and roles must interact. Evaluation of practices must be tied to the policy inputs—which in the case of 1:1 programs is usually the NETS essential conditions. No school specifically referenced this connection.
Figure 5.3. Lack of evaluating practices.

The responses to Question 9 varied, and in fact the leadership in most districts had conflicting answers to the same question. “The best way I can tell you it’s successful is without looking at data. You can walk around the school and you can see it in use,” said the technology director at School 2. The principal in the same campus specifically looks at data:

I can show you some of the most phenomenal teachers I’ve ever met in my life, and show you results of their performance before and after using technology. I can show you double-digit growth that may not have been double-digit if we didn’t have the technology to complement everything else.

The superintendent of School 4 said it’s all about data, and elaborated about “an autopsy of scores” from state standardized tests, while the technology director in School 4 said:

That is the piece that I will admit we did not or have not planned for, is how do we evaluate this? Personally, I know what I want to see. … I know when I walk onto a campus or into a classroom, I know what I want to see. … But there has to be something. And we have nothing in place. We have no evaluation in place and that’s a shame.

The principal of School 3 said, “It’s difficult to measure the success except to point out that it’s now a part of our culture.” The superintendent of School 3 said, “I think as much as anything it comes from feedback from what our kids think and what the community sees.” The technology director of School 3 said, “That’s a good question. That’s an excellent question. I’m still looking for that. Our test scores don’t seem to be any worse or better.” The wide range of responses to this question from leadership at the same school made it quite evident that nobody has a good
grasp on measuring practices in their schools—not what to measure, not how to measure. And none looked back to policy statements as a reference for practical expectations.

Interview participants could articulate few reasons for teachers or schools to be successful with the 1:1 programs. There were, of course, ethical reasons, or “doing what’s best for kids,” or in order to keep his/her job. Only two individuals cited any specific, measurable reason: “college and career readiness” and “improved academic achievement.” Kotter (1995) and Guba (1985) and Clausen, Britten, and Ring (2008) explain that both the policy and its communication are important so teachers have a “clear and compelling statement of where all this is leading” (p. 63). The lack of meaningful measures to evaluate the 1:1 program was a fifth major finding.

A sixth finding that was evident from the interviews was that leadership at the same school does not all interpret policy similarly. As a result, what is communicated to stakeholders (community, teachers, students), what is assessed, how assessment occurs, and how assessment data are used will differ among the leadership at the same school.

Finding that indicates a qualitative relationship between policy and practice.

The remainder of this section will look at what extent inputs are present in policy and provide discussion about their relationship to practice, which is the seventh finding. In interviews, policy documents, and survey data, it was evident that the 1:1 program philosophy emphasizes ongoing professional learning. Policies addressed professional training multiple ways. Data showed that teachers had abundant opportunities for training (Figure 4.3, Figure 4.7, Figure 4.9, Table 4.1). However, leaders primarily indicated that teachers are trained for how to operate the hardware or software tool, not in theory-based practices, such as constructivist instructional strategies. But constructivist-based professional training is occurring in at least two
of the districts because this researcher has witnessed it firsthand, even though it was not articulated or even recognized as theory-based during interviews. One of the implications is that although theoretically-based practices may be occurring, they are occurring by accident. It is not a purposefully-driven approach, it is not articulated, and therefore it is not evaluated in practice. It is important to focus on research-based instructional practices that incorporate technology and not focus exclusively on operating the tool. As one principal said, after months of preparing teachers to use the tool, their knowledge was surpassed by their students within 15 minutes of students receiving laptops. On the other hand, knowing how to teach with a constructivist-based approach or through multiple intelligences would be an enduring skill that outlasts a technology skill.

Figure 5.4. Philosophy-policy-practice connections for ongoing learning.

Even though the kind of professional training that occurred might not have been theory-based, training was heavily addressed in policy and was addressed as input in the interviews; training is reflected in LoTI survey CIP levels of 4 or more for the majority of teachers, and STaR results of ongoing professional learning in the top third of ratings. This pattern seems to indicate that inputs, policy, and practice are consistent for professional development.

A communicated expectation that the technology would be used at certain frequencies was revealed in this research. While this may seem like a simplistic expectation, research has shown that some 1:1 programs do not have any communicated expectation, or do not allow
students to take the technology home (Shapley et al., 2010). In fact, one school in the study actually had this very practice in the early years of its 1:1 program.

Figure 5.5. Philosophy-policy-practice connections for technology access.

All campuses believed 24/7 access was important, it was supported by statements in policy documents, and the Infrastructure for Technology rating from the STaR survey reflected these philosophical input and policy characteristics.

In spite of the general agreement among interviewees that there is no policy guiding the 1:1 programs, the leaders would say that they communicated policy with parents. It is this researcher’s belief that the leaders were referring to acceptable use policies—what consequences may occur if a child makes an unacceptable choice about technology use. The leader was not referring to a guiding policy for the program. Much like professional development, even though the content of communication with stakeholders was about something other than guiding policy, interviewees revealed that communicating with stakeholders is valued; policies revealed communication with stakeholders was an established expectation; and interviews revealed multiple opportunities for stakeholder communication.
This study sought to explore what inputs are present in 1:1 program policy. From a qualitative perspective, it appears that some inputs and policy components do have consistent patterns appearing in practice. The data shows that the National Education Technology Standards Essential Conditions of Ongoing Professional Learning, Assessment and Evaluation, Technical Support, and Equitable Access are the most present components of policy. Two conditions are present but not with fidelity:

1. Professional learning is focused on tool instead of instruction, and
2. Assessment and Evaluation are not measuring items based in policy, nor are they necessarily valid or reliable measurement instruments, nor are they evaluating items that are truly measurable (Zucker, 2004). As discussed in Chapter 4, most measures are vague and unspecific (Figure 4.11).

Two conditions are present in policy and practice with fidelity—that is, according to policy’s intent:

1. Technical support as defined by the NETS essential condition description seems to be a legitimately measured category, and
2. Equitable access is 100% achieved in all four schools (Table 4.1, Table 4.9, Table 4.14). These two conditions are not only articulated in policy, they were similarly recognized in interviews and evident in surveys that evaluated these items.
Penue’s 2006 metaanalysis showed that successful programs have extensive professional development, access to tech support and positive teacher attitudes toward student technology use. Certainly this study showed extensive attention to professional development and access to tech support. It may truly be that an overwhelming number of studies showing the necessity of these elements to success causes leaders to focus on these elements. Therefore, when they are written into policy, when they are understood to be supported through funding and opportunity, and when they are communicated as important to the program, then they are realized in practice.

Perhaps to oversimplify the study, if the policy heavily emphasized a certain NETS essential condition, the participants also emphasized that same element in their interviews or it was evident in survey responses of teachers. Or to say it another way, an essential condition that had a high magnitude of treatment in policy was more likely to be evident in practice, even though in this study it resulted in practice with fidelity in two of the four pattern occurrences. This pattern between a high magnitude of treatment in policy and corresponding evidence in practice was the seventh finding.

Summary

This study sought to determine the status of the NETS essential conditions, level of technology usage, level of teaching innovation, and underlying philosophies of 1:1 policies; then to determine the relationship between policies and level of technology usage and the relationship between policies and level of teaching innovation. While only two positive quantitative correlational relationships were established out of 75 possible correlations, this descriptive case study did reveal five findings that contributed to better understanding of reasons for the disconnect between policy and practice, and one finding that indicates a pattern among input magnitudes, policy, and practice. The study revealed to what extent essential conditions of the
NETS are present in policies of four Texas high schools. These findings provide a place to begin future conversations and other areas to study so educators can determine predictive relationships between policies and practice in 1:1 programs.

Implications of This Research

This study provides valuable insights into policies for 1:1 programs and their relationship to practice in four Texas high schools. It contributes to the literature (Hunt, 1995; Clark, 2002; Wojtylewski, 2006) by exploring the relationship between policy and practice in Texas high schools with 1:1 programs. Unlike other policy studies of public schools, this study looks specifically at whether policy inputs have a relationship to practice. One of this study’s qualitative findings, the sixth finding, indicates that there may be predictive relationships between the magnitude of policy elements and practice; Zucker (2004) in fact suggests that ensuring that policy content reflects philosophy and outcomes is necessary for 1:1 programs. Urrea (2011) suggests that policy in experience is the appropriate approach. Another finding of this study indicates that leadership’s lack of communication of the policy may impede a relationship between policy and practice, suggesting that indeed policy in experience can make a difference (discussed also in Claussen, Britten, and Ring, 2008).

This study has implications for policy’s role in 1:1 programs, a topic that many studies and publications emphasize, including NCREL (1998) and Consortium of School Networks (2011). Researchers could refine the study to develop a predictive model for practice in 1:1 programs based on policy content and communication. Understanding the importance of theoretical and philosophical inputs—what the program is meant to achieve and why—as articulated and supported in policy could help in realizing certain practices, adding to Scot’s (2005) findings in Julian County, VA schools. Furthermore, implications are strong for the value
of leadership alignment with regard to a program’s purpose and intended outcomes of practice (Weston & Bain, 2010; Amory, 2010).

Recommendations for Further Study

More conversation is needed about the relationship between policy and practice at a local level in which this research was conducted. Leaders in this study struggled to identify policies for their 1:1 programs or to articulate consistent purposes and resulting practices. The development of policies seemed to be an area of weakness of the first order, which in turn affects goals, processes, practices, and outcomes. Based on findings in this study, further exploration into the construction of 1:1 policy on the order of Wotylewski’s 2006 or Hunt’s 1995 study of technology policy formulation in Illinois public schools would be wise, with an emphasis on 1:1 program policy rather than user policy.

Claussen, Britten, and Ring (2008) studied the failure to communicate a vision and its effect in implementation. Because such a disconnect exists among leaders in the same district about policy content and expected practices, further examination of policy communication would be relevant in this specific context. Examining whether communicating elements of policy frequently and effectively results in a relationship to practice would be important for a 1:1 program.

A study that explores whether policy pushes practice or merely reflects practice would be of interest as well. Gerschner and Schneider (2001) showed that changes in behavior precede rather than follow changes in belief and understanding. Whether behaviors are preceding belief and understanding in 1:1 programs is an important point to understanding a connection between policy and practice at the local level. Perhaps educators do not know how to create the ideal program policy, but a model of continuous improvement to arrive at a policy for program
sustainability may be an option. It was evident in interviews during this research that participants
were provoked to pursue follow-up conversations with other school leaders. It was not my
intention but it is my hope that this research will, at a minimum, spur those conversations locally.
APPENDIX A

INTERNAL REVIEW BOARD DOCUMENTATION
Sample Research Request Letter to Superintendent

XXX Independent School District

October 23, 2012

Dear Mr. Superintendent,

I am a doctoral student at the University of North Texas in Denton, Texas, and am a school district administrator at [a certain] High School in [a certain] ISD, which has a 1:1 campus like [your district]. I am asking for your help in my dissertation research. My case study only involves four campuses, and I am requesting that [your district] be among that four.

My study examines philosophies of 1:1 technology policy and the level of policy implementation in classrooms. I hope the outcome of this study will lead to a better understanding of the content of 1:1 policy and how it may relate to 1:1 program implementation.

I would like to conduct these activities in the period from December 15, 2012 to March 15, 2013, to be specifically determined by you or designee:

1. LoT1 survey (from www.lot1connection.com), an online survey that requires high school teachers to respond to questions about level of technology integration, personal computer use, and current instructional practices. The survey takes about 20 minutes. Your district would receive the results of this survey. Researcher will pay costs associated with this survey. If your campus has completed this survey in the past 12 months, I am requesting access to the data.

2. Interview of superintendent, campus principal, and technology director. Researcher wishes to conduct a face-to-face interview that involves nine questions and should last no more than 20 minutes.

3. Campus principal’s rating of 1:1 policy on a rubric based on the National Educational Technology Standards (NETS) which contains 15 responses.

4. Observation of campus for not more than 4 hours. Researcher is requesting permission to walk through the building (accompanied or unaccompanied) to look for indications of policy implementation in oral, written, or graphic form.

I am very grateful for your commitment to a vision of providing the best technology-rich educational opportunities available for students, and for sharing your practices and processes with the educational community.

If you have any questions regarding the study, you may contact me at (xxx)xxx-xxxx or by email at xxxxx@xxx.com. You may also contact my doctoral chairperson, Dr. Jane B. Huffinan, at xxx@xxxx.edu.
If you will grant permission to conduct these activities, please sign below and return this letter to Cindy Bauter, either digitally at xxxxx@xxx.com or by fax at (xxx)xxx-xxxx.

Thank you,

Cindy Bauter
Educational Administration doctoral student
University of North Texas

I am granting approval to serve as a data collection site for the research described in this letter.

________________________________________  ____________________________
Superintendent Signature                              Date
University of North Texas Institutional Review Board

Informed Consent Form

Before agreeing to participate in this research study, it is important that you read and understand the following explanation of the purpose, benefits and risks of the study and how it will be conducted.

Title of Study: A CASE STUDY OF 1:1 TECHNOLOGY POLICIES IN TEXAS HIGH SCHOOLS AND THEIR RELATIONSHIP TO PRACTICE

Investigator: Cynthia Bauter, University of North Texas (UNT) Department of Educational Administration.

Purpose of the Study: You are being asked to participate in a research study that involves understanding the relationship between inputs of philosophically-based 1:1 policies and the level of policy implementation 1:1 classrooms.

Study Procedures: You will be asked to complete a nine-question interview that will last about 20 minutes. The interview will be audio recorded, and your responses will be transcribed. You will have an opportunity to review the transcript before its use in the study.

Foreseeable Risks: No foreseeable risks are involved in this study.

Benefits to the Subjects or Others: We expect the project to benefit you by helping your district make informed choices about professional development.

Compensation for Participants: None

Procedures for Maintaining Confidentiality of Research Records: Your personal information will be maintained in research records. To the extent possible, your identity will be maintained confidentially in all publications of the research.

Questions about the Study: If you have any questions about the study, you may contact Cynthia Bauter at xxx@xxx.com.

Review for the Protection of Participants: This research study has been reviewed and approved by the UNT Institutional Review Board (IRB). The UNT IRB can be contacted at (940) 565-5940 with any questions regarding the rights of research subjects.

Research Participants’ Rights:

Office of Research Services
University of North Texas
Last Updated: July 11, 2011

Page 1 of 2
Your signature below indicates that you have read or have had read to you all of the above and that you confirm all of the following:

- Cynthia Bauter has explained the study to you and answered all of your questions. You have been told the possible benefits and the potential risks and/or discomforts of the study.
- You understand that you do not have to take part in this study, and your refusal to participate or your decision to withdraw will involve no penalty or loss of rights or benefits. The study personnel may choose to stop your participation at any time.
- You understand why the study is being conducted and how it will be performed.
- You understand your rights as a research participant and you voluntarily consent to participate in this study.
- You have been told you will receive a copy of this form.

____________________________
Printed Name of Participant

____________________________   ________________
Signature of Participant         Date

For the Student Investigator:

I certify that I have reviewed the contents of this form with the subject signing above. I have explained the possible benefits and the potential risks and/or discomforts of the study. It is my opinion that the participant understood the explanation.

____________________________   ________________
Signature of Student Investigator   Date
University of North Texas Institutional Review Board

Informed Consent Form

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Investigator: Cynthia Bauter, University of North Texas (UNT) Department of Educational Administration.

Purpose of the Study: You are being asked to participate in a research study that involves understanding the relationship between inputs of philosophically-based 1:1 policies and the level of policy implementation 1:1 classrooms.

Study Procedures: You will be asked to rate policy documents using a rubric based in the National Education Technology Standards that includes 15 response items. This exercise should take about 15 minutes.

Foreseeable Risks: No foreseeable risks are involved in this study.

Benefits to the Subjects or Others: We expect the project to benefit you by helping your district make informed choices about professional development.

Compensation for Participants: None

Procedures for Maintaining Confidentiality of Research Records: Your personal information will be maintained in research records. To the extent possible, your identity will be maintained confidentially in all publications of the research.

Questions about the Study: If you have any questions about the study, you may contact Cynthia Bauter at xxx@xxx.com.

Review for the Protection of Participants: This research study has been reviewed and approved by the UNT Institutional Review Board (IRB). The UNT IRB can be contacted at (940) 565-3940 with any questions regarding the rights of research subjects.

Research Participants' Rights:

Office of Research Services
University of North Texas
Last Updated July 11, 2011
Your signature below indicates that you have read or have had read to you all of the above and that you confirm all of the following:

- Cynthia Bauter has explained the study to you and answered all of your questions. You have been told the possible benefits and the potential risks and/or discomforts of the study.
- You understand that you do not have to take part in this study, and your refusal to participate or your decision to withdraw will involve no penalty or loss of rights or benefits. The study personnel may choose to stop your participation at any time.
- You understand why the study is being conducted and how it will be performed.
- You understand your rights as a research participant and you voluntarily consent to participate in this study.
- You have been told you will receive a copy of this form.

Printed Name of Participant

Signature of Participant Date

For the Investigator or Designee:

I certify that I have reviewed the contents of this form with the subject signing above. I have explained the possible benefits and the potential risks and/or discomforts of the study. It is my opinion that the participant understood the explanation.

Signature of Investigator or Designee Date
University of North Texas Institutional Review Board

Informed Consent Notice

Before agreeing to participate in this research study, it is important that you read and understand the following explanation of the purpose, benefits and risks of the study and how it will be conducted.

Title of Study: A CASE STUDY OF 1:1 TECHNOLOGY POLICIES IN TEXAS HIGH SCHOOLS AND THEIR RELATIONSHIP TO PRACTICE

Investigator: Cynthia Bauter, University of North Texas (UNT) Department of Educational Administration.

Purpose of the Study: You are being asked to participate in a research study that involves understanding the relationship between inputs of philosophically-based 1:1 policies and the level of policy implementation in 1:1 classrooms.

Study Procedures: You will be asked to complete survey that takes about 20 minutes. The survey will ask you to create a username and ID, and to provide demographic information, and has a series of questions to rate on a Likert scale.

Foreseeable Risks: No foreseeable risks are involved in this study.

Benefits to the Subjects or Others: We expect the project to benefit you by helping your district make informed choices about professional development.

Compensation for Participants: None

Procedures for Maintaining Confidentiality of Research Records: Your personal information will be maintained in research records. To the extent possible, your identity will be maintained confidentially in all publications of the research.

Questions about the Study: If you have any questions about the study, you may contact Cynthia Bauter at xxx@xxx.com.

Review for the Protection of Participants: This research study has been reviewed and approved by the UNT Institutional Review Board (IRB). The UNT IRB can be contacted at (940) 565-3940 with any questions regarding the rights of research subjects.

Research Participants’ Rights:

Office of Research Services
University of North Texas
Last Updated: July 11, 2011
Your participation in the survey confirms that you have read all of the above and that you agree to all of the following:

- Cynthia Baxter explained the study to you and you have had an opportunity to contact him/her with any questions about the study. You have been informed of the possible benefits and the potential risks of the study.
- You understand that you do not have to take part in this study, and your refusal to participate or your decision to withdraw will involve no penalty or loss of rights or benefits. The study personnel may choose to stop your participation at any time.
- You understand why the study is being conducted and how it will be performed.
- You understand your rights as a research participant and you voluntarily consent to participate in this study.
- You understand you may print a copy of this form for your records.
APPENDIX B

RUBRIC FOR DETERMINING PRESENCE OF ALIGNMENT TO NETS ESSENTIAL CONDITIONS

Reproduced with permission from International Society for Technology in Education (ISTE).
### Essential Conditions

Necessary conditions to effectively leverage technology for learning

<table>
<thead>
<tr>
<th>Condition</th>
<th>Statement included in policy that indicates presence of this element.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2=explicitly stated 1=implied 0=no evidence</td>
</tr>
<tr>
<td><strong>Shared Vision</strong> Proactive leadership in developing a shared vision for educational technology among all education stakeholders including teachers and support staff, school and district administrators, teacher educators, students, parents, and the community</td>
<td>2   1   0</td>
</tr>
<tr>
<td><strong>Empowered Leaders</strong> Stakeholders at every level empowered to be leaders in effecting change</td>
<td>2   1   0</td>
</tr>
<tr>
<td><strong>Implementation Planning</strong> A systemic plan aligned with a shared vision for school effectiveness and student learning through the infusion of information and communication technologies (ICT) and digital learning resources</td>
<td>2   1   0</td>
</tr>
<tr>
<td><strong>Consistent and Adequate Funding</strong> Ongoing funding to support technology infrastructure, personnel, digital resources, and staff development</td>
<td>2   1   0</td>
</tr>
<tr>
<td><strong>Equitable Access</strong> Robust and reliable access to current and emerging technologies and digital resources, with connectivity for all students, teachers, staff, and school leaders</td>
<td>2   1   0</td>
</tr>
<tr>
<td><strong>Skilled Personnel</strong> Educators, support staff, and other leaders skilled in the selection and effective use of appropriate ICT resources</td>
<td>2   1   0</td>
</tr>
<tr>
<td><strong>Ongoing Professional Learning</strong> Technology-related professional learning plans and opportunities with dedicated time to practice and share ideas</td>
<td>2   1   0</td>
</tr>
<tr>
<td><strong>Technical Support</strong> Consistent and reliable assistance for maintaining, renewing, and using ICT and digital learning resources</td>
<td>2   1   0</td>
</tr>
<tr>
<td><strong>Curriculum Framework</strong> Content standards and related digital curriculum resources that are aligned with and support digital-age learning and work</td>
<td>2   1   0</td>
</tr>
<tr>
<td><strong>Student-Centered Learning</strong> Planning, teaching, and assessment center around the needs and abilities of students</td>
<td>2   1   0</td>
</tr>
<tr>
<td>Assessment and Evaluation</td>
<td>Continuous assessment, both of learning and for learning, and evaluation of the use of ICT and digital resources</td>
</tr>
<tr>
<td>---------------------------</td>
<td>-------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Engaged Communities</td>
<td>Partnerships and collaboration within communities to support and fund the use of ICT and digital learning resources</td>
</tr>
<tr>
<td>Support Policies</td>
<td>Policies, financial plans, accountability measures, and incentive structures to support the use of ICT and other digital resources for learning and in district school operations</td>
</tr>
<tr>
<td>Supportive External Context</td>
<td>Policies and initiatives at the national, regional, and local levels to support schools and teacher preparation programs in the effective implementation of technology for achieving curriculum and learning technology (ICT) standards</td>
</tr>
</tbody>
</table>

| Type of policy | District Technology Plan |

APPENDIX C

TEXAS SCHOOL TECHNOLOGY AND READINESS (STaR) CHART

Reproduced with permission from the Texas Education Agency.
<table>
<thead>
<tr>
<th>Focus Area: Early Tech</th>
<th>Teaching &amp; Learning</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Levels of Progress</strong>:</td>
<td><strong>TL1</strong></td>
</tr>
<tr>
<td>Teachers primarily use technology to supplement instruction, improve productivity, and develop higher-order thinking skills and provide opportunities for collaboration with content experts, peers, parents, and community.</td>
<td>Patterns of Classroom Use</td>
</tr>
<tr>
<td>Most teachers use created and strategic weekly assignments with technology and other resources to reinforce instruction in the classroom, library, or lab.</td>
<td>Most teachers use technology for basic skills without connections with content objectives.</td>
</tr>
<tr>
<td>Teachers use technology to access, communicate, and present information.</td>
<td>Most teachers use technology to support content objectives.</td>
</tr>
<tr>
<td>Students use software for skill reinforcement.</td>
<td>Most teachers use technology to support content objectives.</td>
</tr>
</tbody>
</table>

**Target Tech**

Teachers seamlessly integrate technology in a student-centered learning environment where technology is used to solve real-world problems in collaboration with business, industry, and higher education.

Learning is transformed as students propose, assess, and implement solutions to problems.

Most teachers and students have access to appropriate technology and digital resources, anywhere, anytime, wherever and whenever they need them.

Content Area Connections

**Technology Applications (TA) TEKS Implementation (TExES Chapter 126)**

**Student Mastery of Technology Applications (TA) TEKS**

**Online Learning**

**Correlation to Teacher Standard Chart**

Patterns of Classroom Use

Frequency/Design of Instructional Setting Using Digital Content

Content Area Connections

Technology Applications (TA) TEKS Implementation (TExES Chapter 126)

Student Mastery of Technology Applications (TA) TEKS

Online Learning
<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td><strong>Content of Professional Development</strong></td>
<td><strong>Models of Professional Development</strong></td>
<td><strong>Capabilities of Educators</strong></td>
<td><strong>Access to Professional Development</strong></td>
<td><strong>Levels of Understanding and Patterns of Use</strong></td>
<td><strong>Professional Development for Online Learning</strong></td>
</tr>
<tr>
<td>Most teachers have completed professional development in technology literacy skills, including the Internet, district information systems, and basic software applications</td>
<td>Our campus provides large group professional development sessions that focus on skills development and basic technology integration.</td>
<td>Most of the teachers on my campus demonstrate one of the SBE Technology Applications Standards.</td>
<td>Less than 5 hours of technology professional development available per school year for all teachers.</td>
<td>Most teachers understand technology basics and how to use teacher productivity tools.</td>
<td>Most teachers have participated in professional development on the use of online learning.</td>
</tr>
<tr>
<td>Most teachers have completed professional development on the integration of technology specific to their content area and to increase productivity to accomplish a variety of instruction and management tasks.</td>
<td>Our campus provides large group professional development sessions that focus on increasing teacher productivity and building capacity to integrate technology effectively into content areas, and include follow-up to facilitate implementation.</td>
<td>Most of the teachers on my campus demonstrate two to three of the SBE Technology Applications Standards.</td>
<td>9-18 hours of technology professional development available per school year for all teachers.</td>
<td>Most teachers adapt technology knowledge and skills for content area instruction.</td>
<td>Most teachers have participated in professional development on the customization of online courses or content for appropriate subject area.</td>
</tr>
<tr>
<td>Most teachers have completed professional development on the integration of technology and use of proven strategies that facilitate the development of higher order thinking skills and collaboration with experts, peers, and parents.</td>
<td>Our campus provides on-going professional development utilizing multiple staff development models including training, observation/assessment, study groups and mentoring.</td>
<td>Most of the teachers on my campus demonstrate four SBE Technology Applications Standards.</td>
<td>19-29 hours of technology professional development available per school year for all teachers.</td>
<td>Most teachers use technology as a tool in and across content areas to enhance higher order thinking skills.</td>
<td>Most teachers have participated in professional development to teach online.</td>
</tr>
<tr>
<td>Most teachers participate in or mentor others in the development of strategies for creating new learning environments that empower students to think critically to solve real-world problems and collaborate with experts across business, industry and higher education.</td>
<td>Our campus promotes anytime, anywhere learning available through a variety of delivery systems including individually guided activities, inquiry-action research, and involvement in a developmental-improvement process.</td>
<td>Most of the teachers on my campus demonstrate all of the SBE Technology Applications Standards.</td>
<td>30 or more hours of technology professional development available per school year for all teachers.</td>
<td>Most teachers create new interactive, collaborative, customized learning environments.</td>
<td>Most teachers customize online content and have taught or are teaching content units or courses online.</td>
</tr>
<tr>
<td>L.1</td>
<td>L.2</td>
<td>L.3</td>
<td>L.4</td>
<td>L.5</td>
<td>L.6</td>
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</tr>
<tr>
<td><strong>Leadership and Vision</strong></td>
<td><strong>Planning</strong></td>
<td><strong>Instructional Support</strong></td>
<td><strong>Communication and Collaboration</strong></td>
<td><strong>Budget</strong></td>
<td><strong>Leadership and Support for Online Learning</strong></td>
</tr>
<tr>
<td>Campus leadership has basic awareness of the potential of technology in education to lead to student achievement</td>
<td>Campus has few technology goals and objectives incorporated in the Campus Improvement Plan</td>
<td>Campus has limited instructional support for the integration and use of technology in content areas</td>
<td>Campus has limited use of technology to communicate with teachers and parents</td>
<td>Campus has limited discretionary funds for implementation of technology strategies to meet goals and objectives outlined in the Campus Improvement Plan</td>
<td>Grades K-8: Campus leadership has basic understanding about the use of online learning</td>
</tr>
<tr>
<td>Campus leadership develops a shared vision and begins to build buy-in for comprehensive integration of technology leading to increased student achievement</td>
<td>Campus has several technology goals and objectives that are incorporated in the Campus Improvement Plan</td>
<td>Campus provides regular access to instructional support for the integration and use of technology in content areas</td>
<td>Campus uses technology for communication and collaboration among colleagues, staff, parents, students and the larger community</td>
<td>Campus discretionary funds and other resources are allocated to advance implementation of some technology strategies to meet goals and objectives outlined in the Campus Improvement Plan</td>
<td>Grades K-8: Campus uses online learning and educators collaborate on the integration of online learning into the curriculum</td>
</tr>
<tr>
<td>Campus leadership communicates and implements a shared vision and obtains buy-in for comprehensive integration of technology leading to increased student achievement</td>
<td>Campus has a technology-rich Campus Improvement Plan along with a leadership team that sets annual technology benchmarks based on SDEE Technology Applications Standards</td>
<td>Teacher cadres have been established to create and participate in learning communities that stimulate, nurture, and develop the technology to maximize teaching and learning</td>
<td>Current information tool and systems are used at my campus for communication, management of schedules and resources, performance assessment, and professional development</td>
<td>Campus discretionary funds and other resources are allocated to advance implementation of most of the technology strategies to meet the goals and objectives outlined in the Campus Improvement Plan</td>
<td>Grades K-8: Online learning is encouraged and supported through professional development; goals for the online learning are being developed for the Campus Improvement Plan.</td>
</tr>
<tr>
<td>Campus leadership promotes a shared vision with policies that encourage continuous innovation with technology leading to increased student achievement</td>
<td>Campus leadership team has a collaborative, technology-rich Campus Improvement Plan that is grounded in research and aligned with the district strategic plan that is focused on student success</td>
<td>Educational leaders and teacher cadres facilitate and support my use of technologies to enhance instructional methods that develop higher-level thinking, decision-making, and problem-solving skills</td>
<td>Campus uses a variety of media and formats, including telecommunications and the school website to communicate, interact and collaborate with all education stakeholders</td>
<td>Campus discretionary funds and other resources are allocated to advance implementation of all the technology strategies to meet the goals and objectives outlined in the Campus Improvement Plan</td>
<td>Grades K-8: Online learning is facilitated and supported through professional development and integrated into the Campus Improvement Plan.</td>
</tr>
<tr>
<td><strong>Leadership and Vision</strong></td>
<td><strong>Planning</strong></td>
<td><strong>Instructional Support</strong></td>
<td><strong>Communication and Collaboration</strong></td>
<td><strong>Budget</strong></td>
<td><strong>Leadership and Support for Online Learning</strong></td>
</tr>
<tr>
<td>Students per Computer</td>
<td>Internet Access Connectivity/ Speed</td>
<td>Other Classroom Technology</td>
<td>Technical Support</td>
<td>Local Area Network</td>
<td>Wide Area Network</td>
</tr>
<tr>
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</tr>
<tr>
<td>Ten or more students per Internet-connected multimedia computer</td>
<td>Connectivity to the Internet available at the campus level is less than 50% of the rooms, including the library</td>
<td>Shared use of technologies such as computers, digital cameras, classroom phones, flash drives, portable digital devices, probes, interactive white boards, projection systems, classroom sets of graphing calculators</td>
<td>One technical staff to more than 759 computers</td>
<td>LAN/WAN provides teachers and students access to print/file sharing and rooms shared resources</td>
<td>Access to online learning, state-based with still images and audio</td>
</tr>
<tr>
<td>Between 5 and 9 students per Internet-connected multimedia computer</td>
<td>Direct connectivity to the Internet available at the campus in at least 50% of the rooms, including the library</td>
<td>Dedicated computer per educator with shared use of technologies such as digital cameras, classroom phones, flash drives, portable digital devices, probes, interactive white boards, projection systems, and classroom sets of graphing calculators</td>
<td>At least one technical staff to 501-750 computers</td>
<td>At least half the rooms connected to the LAN/WAN with access for teachers and students to print/file sharing, multiple applications and district servers</td>
<td>Scheduled access to online learning with rich media such as streaming video, podcasts, applets, animation, etc.</td>
</tr>
<tr>
<td>Four or less students per Internet-connected multimedia computer</td>
<td>Direct connectivity to the Internet available at the campus in at least 50% of the rooms, including the library</td>
<td>Dedicated computer per educator with shared use of technologies such as digital cameras, classroom phones, flash drives, portable digital devices, probes, interactive white boards, projection systems, and classroom sets of graphing calculators</td>
<td>At least one technical staff to 351-500 computers</td>
<td>Broadband access to the campus with most rooms connected to the LAN/WAN with access for teachers and students to print/file sharing, and district-wide resources on the campus network.</td>
<td>Simultaneous access to online learning with rich media such as streaming video, podcasts, applets, animation, etc.</td>
</tr>
<tr>
<td>All students have 1 to 1 access to Internet-connected multimedia computers when needed</td>
<td>Direct connectivity to the Internet available in all rooms with adequate bandwidth</td>
<td>Fully equipped classrooms with readily available technology to enhance student instruction, including all the above as well and emerging technologies</td>
<td>At least one technical staff to 350 or less computers</td>
<td>At rooms connected to a robust LAN/WAN that allows for easy access to multiple district-wide resources for students, teachers, and administrators, such as video streaming, desktop videoconferencing, online assessment and data access</td>
<td>Simultaneous access to online learning with rich media such as streaming video, podcasts, applets, and animation, and sufficient bandwidth and storage to customize online instruction</td>
</tr>
</tbody>
</table>

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Texas Campus STaR Chart Summary

Using the Texas Campus STaR Chart, select the cell in each category that best describes the campus.
Enter the corresponding number in the chart below using this scale:

1 = Early Tech  2 = Developing Tech  3 = Advancing Tech  4 = Target Tech

### Key Area I: Teaching and Learning

<table>
<thead>
<tr>
<th>TL1 Patterns of Classroom Use</th>
<th>TL2 Frequency/Design of Instructional Setting</th>
<th>TL3 Content Area Connections</th>
<th>TL4 Technology Applications (TA, TEKS Implementation)</th>
<th>TL5 Student Mastery of Technology Applications</th>
<th>TL6 Online Learning</th>
<th>*Total</th>
</tr>
</thead>
</table>

### Key Area II: Educator Preparation and Development

|------------------------------------------|----------------------------------------|-----------------------------|--------------------------------------|-----------------------------------------------|----------------------|-------|

### Key Area III: Leadership, Administration and Instructional Support

<table>
<thead>
<tr>
<th>L1 Leadership and Vision</th>
<th>L2 Planning</th>
<th>L3 Instructional Support</th>
<th>L4 Communication and Collaboration</th>
<th>L5 Budget</th>
<th>L6 Leadership and Support for Online Learning</th>
<th>*Total</th>
</tr>
</thead>
</table>

### Key Area I: Teaching and Learning

<table>
<thead>
<tr>
<th>INF1 Students per Computers</th>
<th>INF2 Internet Access and Connectivity Speed</th>
<th>INF3 Other Classroom Technology</th>
<th>INF4 Technical Support</th>
<th>INF5 Local Area Network/Wide Area Network</th>
<th>INF6 Distance Learning Capacity</th>
<th>*Total</th>
</tr>
</thead>
</table>

### Key Area Summary

Copy your Key Area totals in the first column below and use the Key Area Rating Range to indicate the Key Area rating for each category.

<table>
<thead>
<tr>
<th>Key Area</th>
<th>*Key Area Total</th>
<th>Key Area STaR Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>I. Teaching and Learning</strong> (6-8 Early Tech)</td>
<td>9-14 Developing Tech</td>
<td>15-20 Advanced Tech</td>
</tr>
<tr>
<td><strong>II. Educator Preparation and Development</strong> (6-8 Early Tech)</td>
<td>9-14 Developing Tech</td>
<td>15-20 Advanced Tech</td>
</tr>
<tr>
<td><strong>III. Leadership, Administration &amp; Instructional Support</strong> (6-8 Early Tech)</td>
<td>9-14 Developing Tech</td>
<td>15-20 Advanced Tech</td>
</tr>
<tr>
<td><strong>IV. Infrastructure for Technology</strong> (6-8 Early Tech)</td>
<td>9-14 Developing Tech</td>
<td>15-20 Advanced Tech</td>
</tr>
</tbody>
</table>

Campus Name: ________________________________  County/District/Campus Number: ________________________________

School Year: ________________________________  Completion Date: ________________________________

Completed by: ________________________________  Email: ________________________________

Please go to the online Texas Campus STaR Chart (www.tea.state.tx.us/starchart) to enter the campus results and print reports.)
APPENDIX D

LEVEL OF TEACHING INNOVATION (LoTI) SURVEY FRAMEWORK

Reproduced with permission from LoTi Connection, Inc.
<table>
<thead>
<tr>
<th>LoTt Level</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Level 0:</strong> Non-Use</td>
<td>At a Level 0 (Non-Use), the instructional focus ranges anywhere from a traditional direct instruction approach to a collaborative student-centered learning environment. The use of research-based best practices may or may not be evident, but those practices do not involve the use of digital tools and resources. The use of digital tools and resources in the classroom is non-existent due to (1) competing priorities (e.g., high stakes testing, highly-structured and rigid curriculum programs), (2) lack of access, or (3) a perception that their use is inappropriate for the instructional setting or student readiness levels. The use of instructional materials is predominately text-based (e.g., student handouts, worksheets).</td>
</tr>
<tr>
<td><strong>Level 1:</strong> Awareness</td>
<td>At a Level 1 (Awareness), the instructional focus emphasizes information dissemination to students (e.g., lectures, teacher-created multimedia presentations) and supports the lecture/discussion approach to teaching. Teacher questioning and/or student learning typically focuses on lower cognitive skill development (e.g., knowledge, comprehension). Digital tools and resources are either (1) used by the classroom teacher for classroom and/or curriculum management tasks (e.g., taking attendance, using grade book programs, accessing email, retrieving lesson plans from a curriculum management system or the Internet), (2) used by the classroom teacher to embellish or enhance teacher lectures or presentations (e.g., multimedia presentations), and/or (3) used by students (usually unrelated to classroom instructional priorities) as a reward for prior work completed in class.</td>
</tr>
<tr>
<td><strong>Level 2:</strong> Exploration</td>
<td>At a Level 2 (Exploration) the instructional focus emphasizes content understanding and supports mastery learning and direct instruction. Teacher questioning and/or student learning focuses on lower levels of student cognitive processing (e.g., knowledge, comprehension). Digital tools and resources are used by students for extension activities, enrichment exercises, or information gathering assignments that generally reinforce lower cognitive skill development relating to the content under investigation. There is a pervasive use of student multimedia products, allowing students to present their content understanding in a digital format that may or may not reach beyond the classroom.</td>
</tr>
<tr>
<td><strong>Level 3:</strong> Infusion</td>
<td>At a Level 3 (Infusion), the instructional focus emphasizes student higher order thinking (i.e. application, analysis, synthesis, evaluation) and engaged learning. Though specific learning activities may or may not be perceived as authentic by the student, instructional emphasis is, nonetheless, placed on higher levels of cognitive processing and in-depth treatment of the content using a variety of thinking skill strategies (e.g., problem-solving, decision-making, reflective thinking, experimentation, scientific inquiry). Teacher-centered strategies including the concept attainment, inductive thinking, and scientific inquiry models of teaching are the norm and guide the types of products generated by students. Digital tools and resources are used by students to carry out teacher-directed tasks that emphasize higher levels of student cognitive processing relating to the content under investigation.</td>
</tr>
<tr>
<td><strong>Level 4a:</strong> Integration (Mechanical)</td>
<td>At a Level 4a (Integration: Mechanical) students are engaged in exploring real-world issues and solving authentic problems using digital tools and resources; however, the teacher may experience classroom management (e.g., disciplinary problems, internet delays) or school climate issues (lack of support form colleagues) that restrict full-scale integration. Heavy reliance is placed on prepackaged materials and/or outside resources (e.g., assistance from other colleagues), and/or interventions (e.g., professional development workshops) that aide the teacher in sustaining engaged student problem-solving. Emphasis is placed on applied learning and the constructivist, problem-based models of teaching that require higher levels of student cognitive processing and in-depth examination of the content. Students use of digital tools and resources is inherent and motivated by the drive to answer student-</td>
</tr>
<tr>
<td>LoTI Level</td>
<td>Description</td>
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<tr>
<td>Level 4b:</td>
<td>At a Level 4b (Integration: Routine) students are fully engaged in exploring real-world issues and solving authentic problems using digital tools and resources. The teacher is within his/her comfort level with promoting an inquiry-based model of teaching that involves students applying their learning to the real world. Emphasis is placed on learner-centered strategies that promote personal goal setting and self-monitoring, student action, and issues resolution that require higher levels of students cognitive processing and in-depth examination of the content. Students use of digital tools and resources is inherent and motivated by the drive to answer student-generated questions that dictate the content, process, and products embedded in the learning experience.</td>
</tr>
<tr>
<td>Integration</td>
<td></td>
</tr>
<tr>
<td>(Routine)</td>
<td></td>
</tr>
<tr>
<td>Level 5:</td>
<td>At a Level 5 (Expansion), collaborations extending beyond the classroom are employed for authentic student problem-solving and issues resolution. Emphasis is placed on learner-centered strategies that promote personal goal setting and self-monitoring, student action, and collaborations with other diverse groups (e.g., another school, different cultures, business establishments, governmental agencies). Students use of digital tools and resources is inherent and motivated by the drive to answer student-generated questions that dictate the content, process, and products embedded in the learning experience. The complexity and sophistication of the digital resources and collaboration tools used in the learning environment are now commensurate with (1) the diversity, inventiveness, and spontaneity of the teacher's experiential-based approach to teaching and learning and (2) the students' level of complex thinking (e.g., analysis, synthesis, evaluation) and in-depth understanding of the content experienced in the classroom.</td>
</tr>
<tr>
<td>Expansion</td>
<td></td>
</tr>
<tr>
<td>Level 6:</td>
<td>At a Level 6 (Refinement), collaborations extending beyond the classroom that promote authentic student problem-solving and issues resolution are the norm. The instructional curriculum is entirely learner-based. The content emerges based on the needs of the learner according to his/her interests, needs, and/or aspirations and is supported by unlimited access to the most current digital applications and infrastructure available. At this level, there is no longer a division between instruction and digital tools and resources in the learning environment. The pervasive use of and access to advanced digital tools and resources provides a seamless medium for information queries, creative problem-solving, student reflection, and/or product development. Students have ready access to and a complete understanding of a vast array of collaboration tools and related resources to accomplish any particular task.</td>
</tr>
<tr>
<td>Refinement</td>
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<tr>
<td>CIP Level</td>
<td>Description</td>
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</tr>
<tr>
<td>CIP Intensity Level 0</td>
<td>A CIP Intensity Level 0 indicates that the participant is not involved in a formal classroom setting (e.g., pull-out program)</td>
</tr>
<tr>
<td>CIP Intensity Level 1</td>
<td>At a CIP Intensity Level 1, the participant’s current instructional practices align exclusively with a subject-matter based approach to teaching and learning. Teaching strategies tend to lean toward lectures and/or teacher-led presentations. The use of curriculum materials aligned to specific content standards serves as the focus for student learning. Learning activities tend to be sequential and uniform for all students. Evaluation techniques focus on traditional measures such as essays, quizzes, short-answers, or true-false questions, but no effort is made to use the results of the assessments to guide instruction. Student projects tend to be teacher-directs in terms of identifying project outcomes as well as requirements for project completion. No effort is made to differentiate instruction. The use of research-based best practices focuses on basic classroom routines (e.g., providing homework and practice, setting objectives and providing feedback, students summarizing and note taking, providing adequate wait time).</td>
</tr>
<tr>
<td>CIP Intensity Level 2</td>
<td>At a CIP Intensity Level 2, the participant supports instructional practices consistent with a subject-matter based approach to teaching and learning, but not at the same level of intensity or commitment as a CIP Intensity Level 1. Teaching strategies tend to lean toward lectures and/or teacher-led presentations. The use of curriculum materials aligned to specific content standards serves as the focus for student learning. Learning activities tend to be sequential and uniform for all students. Evaluation techniques focus on traditional measures such as essays, quizzes, short-answers, or true-false questions with the resulting data used to guide instruction. Student projects tend to be teacher-directed in terms of identifying project outcomes as well as requirements for project completion. No effort is made to differentiate instruction. The use of research-based best practices focuses on basic classroom routines (e.g., providing homework and practice, setting objectives and providing feedback, students summarizing and note taking, providing adequate wait time).</td>
</tr>
<tr>
<td>CIP Intensity Level 3</td>
<td>At a CIP Intensity Level 3, the participant supports instructional practices aligned somewhat with a subject-matter based approach to teaching and learning, an approach characterized by sequential and uniform learning activities for all students, teacher-directed presentations, and/or the use of traditional evaluation techniques. However, the participant may also support the use of student-directed projects that provide opportunities for students to determine the “look and feel” of a final product based on their modality strengths, learning styles, or interests. Evaluation techniques continue to focus on traditional measures with the resulting data serving as the basis for curriculum decision-making. The use of research-based best practices expands beyond basic classroom routines (e.g., providing opportunities for non-linguistic representation, offering advanced organizers).</td>
</tr>
<tr>
<td>CIP Intensity Level 4</td>
<td>At a CIP Intensity Level 4, the participant may feel comfortable supporting or implementing either a subject-matter or learning-based approach to instruction based on the content being addressed. In a subject-matter based approach, learning activities tend to be sequential, student projects tend to be uniform for all students, the use of lectures and/or teacher-directed presentation are the norm as well as traditional evaluation strategies. In a learner-based approach, learning activities are diversified and based mostly on student questions, the teacher serves more as a co-learner or facilitator in the classroom, student projects are primarily student-directed, and the use of alternative assessment strategies including performance-based assessments, peer reviews, and student reflections are the norm. Although traditional learning activities and evaluation techniques are used, students are also encouraged to contribute to the assessment process when appropriate to the content being addressed. The amount of differentiation is moderate based on the readiness level, interests, and</td>
</tr>
<tr>
<td>CIP Level</td>
<td>Description</td>
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<td>-----------</td>
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</tr>
<tr>
<td><strong>CIP Level 5</strong></td>
<td>At a CIP Intensity Level 5, the participant’s instructional practices tend to learn more toward a learner-based approach. The essential content embedded in standards emerges based on students “need to know” as they attempt to research and solve issues of importance to them using critical thinking and problem-solving skills. The types of learning activities and teaching strategies used in the learning environment are diversified and driven by student questions. Both students and teachers are involved in devising appropriate assessment instruments (e.g., performance-based, journals, peer reviews, self-reflections) by which student performance will be assessed. Although student-directed learning activities and evaluations are the norm, the use of teacher-directed activities (e.g., lectures, presentations, teacher-directed projects) may surface based on the nature of the content being addressed and at the desired level of student cognition. The amount of differentiation is substantial based on the readiness level, interests, and learning styles of the students. The use of research-based best practices delves deeper into complex classroom routines (e.g., students generating and testing hypotheses, implementing cooperative learning, students identifying similarities and differences).</td>
</tr>
<tr>
<td><strong>CIP Intensity Level 6</strong></td>
<td>The participant at a CIP Intensity Level 6 supports instructional practices consistent with a learner-based approach, but not all the same level of intensity or commitment as a CIP Intensity Level 7. The essential content embedded in the standards emerges based on students “need to know” as they attempt to research and solve issues of importance to them using critical thinking and problem-solving skills. The types of learning activities and teaching strategies used in the learning environment are diversified and driven by student questions. Students, teacher/facilitators, and occasionally parents are all involved in devising appropriate assessment instruments (e.g., performance-based, journals, peer reviews, self-reflections) by which student performance will be assessed. The amount of differentiation is substantial based on the readiness level, interests, and learning styles of the students. The use of research-based best practices delves deeper into complex classroom routines (e.g., students generating and testing hypotheses, implementing cooperative learning, students identifying similarities and differences).</td>
</tr>
<tr>
<td><strong>CIP Intensity Level 7</strong></td>
<td>At a CIP Intensity Level 7, the participants current instructional practices align exclusively with a learner-based approach to teaching and learning. The essential content embedded in the standards emerges based on students “need to know” as they attempt to research and solve issues of important to them using critical thinking and problem-solving skills. The types of learning activities and teaching strategies used in the learning environment are diversified and driven by student questions. Students, teacher/facilitators, and occasionally parents are all involved in devising appropriate assessment instruments (e.g., performance-based, journals, peer reviews, self-reflections) by which student performance will be assessed. The amount of differentiation is seamless since students completely guide the pace and level of their learning. The use of research-based best practices delves deeper into complex classroom routines (e.g., students generating and testing hypotheses, implementing cooperative learning, students identifying similarities and differences).</td>
</tr>
<tr>
<td>PCU Level</td>
<td>Description</td>
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<td>-----------</td>
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</tr>
<tr>
<td>PCU Intensity Level 0</td>
<td>A PCU Intensity Level 0 indicates that the participant does not possess the inclination or skill level to use digital tools and resources for either personal or professional use. Participants at Intensity Level 0 exhibit a general disinterest toward emerging technologies relying more on traditional devices (e.g., use of overhead projectors, chalkboards, paper/pencil activities) than using digital resources for conveying information or classroom management tasks.</td>
</tr>
<tr>
<td>PCU Intensity Level 1</td>
<td>A PCU Intensity Level 1 indicates that the participant demonstrates little fluency with using digital tools and resources for student learning. Participants at Intensity Level 1 may have a general awareness of various digital tools and media including word processors, spreadsheets, or the internet, but generally are not using them. Participants at this level are generally unaware of copyright issues or current research on the impact of existing and emerging digital tools and resources on student learning.</td>
</tr>
<tr>
<td>PCU Intensity Level 2</td>
<td>A PCU Intensity Level 2 indicates that the participant demonstrates little to moderate fluency with using digital tools and resources for student learning. Participants at Intensity Level 2 may occasionally browse the internet, use email, or use a word processor program; yet, may not have the confidence or feel comfortable using existing and emerging digital tools beyond classroom management tasks (e.g., grade book, attendance program). Participants at this level are somewhat aware of copyright issues and maintain a cursory understanding of the impact of existing and emerging digital tools and resources on student learning.</td>
</tr>
<tr>
<td>PCU Intensity Level 3</td>
<td>A PCU Intensity Level 3 indicates that the participant demonstrates moderate fluency with using digital tools and resources for student learning. Participants at Intensity Level 3 may begin to become “regular” users of selected digital-age media and formats (e.g., internet, email, word processor, multimedia) to (1) communicate with students, parents, and peers and (2) model their use in the classroom in support of research and learning. Participants at this level are aware of copyright issues and maintain a moderate understanding of the impact of existing and emerging digital tools and resources on student learning.</td>
</tr>
<tr>
<td>PCU Intensity Level 4</td>
<td>A PCU Intensity Level 4 indicates that the participant demonstrates moderate to high fluency with using digital tools and resources for student learning. Participants at Intensity Level 4 commonly use a broader range of digital-age media and formats in support of their curriculum and instructional strategies. Participants at this level model the safe, legal, and ethical uses of digital information and technologies and participate in local discussion forums that advocate the positive impact of existing digital tools and resources on student success in the classroom.</td>
</tr>
<tr>
<td>PCU Intensity Level 5</td>
<td>A PCU Intensity Level 5 indicates that the participant demonstrates a high fluency level with using digital tools and resources for student learning. Participants at Intensity Level 5 are commonly able to use an expanded range of existing and emerging digital-age media and formats in support of their curriculum and instructional strategies. Participants at this level advocate the safe, legal, and ethical uses of digital information and technologies and participate in local and global learning that advocate the positive impact of existing digital tools and resources on student success in the classroom.</td>
</tr>
<tr>
<td>PCU Level</td>
<td>Description</td>
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</tr>
<tr>
<td>PCU Intensity</td>
<td>A PCU Intensity Level 6 indicates that the participant demonstrates high to extremely high fluency level with using digital tools and resources for student learning.</td>
</tr>
<tr>
<td>Level 6</td>
<td>Participants at Intensity Level 6 are sophisticated in the use of most, if not all, existing and emerging digital-age media and formats (e.g., multimedia, productivity, desktop publishing, web-based applications). They begin to take on a leadership role as advocates for technology infusion as well as the safe, legal, and ethical uses of digital resources in the schools. Participants at this level continually reflect on the latest research discussing the impact of digital tools on student success.</td>
</tr>
<tr>
<td>PCU Intensity</td>
<td>A PCU Intensity Level 7 indicates that the participant possesses an extremely high fluency level with using digital tools and resources for student learning.</td>
</tr>
<tr>
<td>Level 7</td>
<td>Participants at Intensity Level 7 are sophisticated in the use of any existing and emerging digital-age media and formats (e.g., multimedia, productivity, desktop publishing, web-based applications). Participants at this level set the vision for technology infusion based on the latest research and continually seek creative uses of digital tools and resources that impact learning. They actively participate in global learning communities that seek creative uses of digital tools and resources in the classroom.</td>
</tr>
</tbody>
</table>
APPENDIX E

INTERVIEW GUIDE
The following questions will be the guide for interviews of principals, superintendents, and technology directors.

1. Please talk about the creation of your 1:1 policy. (Who was involved? What was the process? Was there a scholarly discussion of theory or philosophy? Commonly accepted standards? How long did it take/how many revisions? Did you borrow other policy(ies) to start with?)

2. Are you aware of the NETS from ISTE? If so, what role did they play in formulation of policy? Are they specifically addressed in policy?

3. How is your policy communicated to stakeholders (teachers, students, parents, community members)?

4. To what extent or in what ways does 1:1 policy shape professional development?

5. What influences or incentives does the school have to implement this initiative successfully?

6. What incentives does the teacher have to implement the policy in her classroom?

7. What specific procedures did you adopt to implement the policy?

8. Can you talk about the relationship between the 1:1 policy and levels of instructional implementation in the classrooms?

9. How do you know if your 1:1 program is successful?
REFERENCES


