CPRE Occasional Paper Series

SchoolNet: A Case Study of Implementation in Three Schools

Executive Summary

Between 2004 and 2006, researchers at the Consortium for Policy Research in Education (CPRE) studied the enactment and use of five high school reforms[1] in 15 schools across the country. These reforms were selected as representative of the types of external assistance found in high schools during previous CPRE research and included whole school reforms, targeted literacy initiatives, and data use strategies (see Gross & Goertz, 2005). To explore implementation of data use strategies, we studied how teachers and administrators in three high schools learned about and used their SchoolNet data management systems. Two schools were in their first or second year of implementation while the third school had a SchoolNet system for three years. The two early adopting schools were visited twice—in the spring of 2005 and 2006. The third school was visited once in 2005. Findings presented in this case study are based on 80 structured interviews with teachers, school and district administrators, and SchoolNet representatives; responses from two school-based surveys with 259 survey responses in 2005 and 173 responses in 2006; and SchoolNet literature about the reform.

SchoolNet is part of a growing industry that produces data systems and Internet programs to manage and make data accessible to teachers, parents, and school and district leaders. As its mission, SchoolNet seeks the use of data to increase academic achievement (SchoolNet, 2005a). SchoolNet offers modules that are intended to be user-friendly and can be tailored to meet the needs of a broad cross-section of district staff. As the reform evolves and needs are identified, SchoolNet offers an increasingly wide range of technical services and implementation supports (including professional development) to facilitate use of the system and foster data-driven practices. District leaders are the driving force in implementing SchoolNet. These leaders determine which SchoolNet products and services to lease or purchase, and then to whom, when, and how the data system will be introduced and used. In these initial decisions and subsequent implementation, SchoolNet serves as a supporting partner and advisor.

Interviews and survey data painted a complex portrait of SchoolNet implementation and use in the three study high schools between 2004 and 2006. For SchoolNet and leaders in the three district offices, thinking was still evolving regarding how to implement and foster use of SchoolNet throughout the school districts. SchoolNet representatives and administrators in each district viewed the full SchoolNet implementation as a lengthy process that would occur over years rather than months. District staff who worked closely with SchoolNet representatives shared a common understanding of the reform, how it supported district goals, and the overarching implementation plan. As end-users, teachers and other school-level staff typically did not have the same comprehensive understanding of the reform's role in furthering district plans, the full capabilities of the technology, or the initiative's value to their work. Teachers at the three schools reported their SchoolNet use to be relatively low, particularly when not mandated. By spring 2006, there were signs that SchoolNet use was moving in opposite directions at the two early adopting schools. While the reform's future was widely questioned by teachers and administrators at one school, SchoolNet use at the other school appeared to be growing.

[1] We use the term "reform" to refer to efforts by external organizations to support school improvement.

The SchoolNet data system and its individual products are essentially tools to facilitate teacher and administrator use of data in ways that will inform curricular and instructional decisions. While implementing the technology was labor-intensive and costly, fostering a culture in which teachers and administrators routinely accessed SchoolNet to analyze data to guide instructional practice proved to be an even more difficult process that required sustained commitment and focus. Our study identified three interrelated variables that seem to explain much of the enactment and use observed at the three high schools. First, the SchoolNet design relied heavily on each of the districts to direct this complex and lengthy implementation, and to supply (or fund) the necessary professional development and other supports. Second, the choices the three district offices made regarding SchoolNet implementation were therefore critical. These decisions were influenced by district understanding of what schools and teachers needed to use the system; commitment to SchoolNet as central to district efforts; and capacity to maintain the system and to institute carefully constructed mandates, supports, and monitoring. Finally, school leaders played a key role in facilitating or hindering the district expectations of SchoolNet use at each high school.

I. Introduction

Each year, more schools are identified as underperforming due to failure to make Adequate Yearly Progress (Education Week, 2006). To raise achievement, new performance expectations require teachers, schools, and districts to move beyond aligning curriculum, reallocating time, and other conventional approaches. However, the challenge of making improvements in schools, and in high schools in particular, is well documented (e.g., Siskin, 2003). Increasingly, schools and districts are purchasing school improvement services from external providers[2] to address such priorities (Millot, 2004).

To better understand this challenge, researchers at the Consortium for Policy Research in Education (CPRE) have examined the interactions between five reforms and 15 high schools over a two-year period. This project is particularly important because it makes the reform and its influences on schools simultaneous objects of investigation. The selected reforms represent the types of external assistance found in high schools during previous CPRE research and include whole school reforms, targeted literacy initiatives, and data use strategies (see Gross & Goertz, 2005). The five reforms were included based on two primary criteria: the reform sought to significantly influence instructional practices, and the reform showed some promise in schools. The five reforms included in this study are First Things First, High Schools That Work, the Penn Literacy Network, Ramp-Up to Literacy, and SchoolNet.

This case study grows out of that larger research project and examines the progress of one reform in a sample of three high schools at different points of implementation.[3] Here, we focus on the work of SchoolNet. This case study is *not* an evaluation of either the schools or the reforms. Rather, this document is part of a research project that examined the design components of various reforms, the ways in which those components were understood and enacted in schools, and explanations for those perceptions and the resulting implementation during the study period.

Overview of data use strategies. SchoolNet is part of a growing industry that produces data systems and Internet-based programs to manage and make data accessible to teachers, parents, and school and district leaders. Although the use of data to guide instructional and other decisions is not new (Wayman, 2005), the heightened focus on standards-based reform and assessment has prompted further interest among educators (Gross & Goertz, 2005). Analysis of student performance and curriculum data can support a variety of instructional and assessment practices such as identifying curriculum objectives, aligning lessons to content

[2] We use the term "provider" to refer to the external school reform organizations that offer reforms to schools and districts, such as SchoolNet.
[3] Case studies of the other four reforms can be found by visiting www.cpre.org.

standards, targeting and differentiating instruction to reflect individual student needs, and monitoring student progress (Supovitz & Klein, 2003.) Yet research indicates that the process of collecting, managing, analyzing, and acting on data is not easy and demands extensive preparation, collaboration, and leadership (Lachat & Smith, 2005; Massell, 2001; Supovitz & Klein, 2003; Wayman & Stringfield, 2006). Factors found to influence school and district data use include the types of data available to teachers, the technological capacity of the school, and the conditions and practices that support or inhibit data use. Conditions found to support data use include the presence of strong support from leaders, a district-wide culture that supports data use for continuous improvement, structure for teacher support and training, and time for teachers to meet and review assessment data to inform instructional decisions. Barriers can include a lack of training and cultural resistance. The availability of computer software and the internet to harness large and divergent streams of data and make them available to teachers, parents, and school and district leaders is relatively new (Wayman, Stringfield, & Yakimowski, 2004). Research on this area of data use is only beginning to emerge. Implementing these types of initiatives is both technically complex in terms of creating and maintaining accurate, reliable, and user-friendly data systems as well as in terms of altering the ways in which practitioners use such data to inform their practice.

This document offers the reader a richly descriptive discussion of SchoolNet use at three schools as part of a larger exploration of implementing reforms in high schools. We do not attempt to place our case study findings within the larger research framework on data use strategies briefly discussed here. For further review of this body of literature, readers can access the studies cited in the previous paragraph.

Methods. This case study examines the progress of SchoolNet in three high schools at different implementation points. The study draws from interview and survey data collected in the three high schools and districts, and from provider staff during the 2004-2005 and 2005-2006 school years. We also referenced provider literature about SchoolNet.

Using a purposive sampling strategy, we asked SchoolNet to recommend two schools in the early stages of the implementation process and one "mature" school that had the reform in place for three to five years. SN1[4] was in its first year of implementation and SN2 was in its second year of implementation at the time of our initial visit in 2005. The mature school (SN3) was chosen by SchoolNet as representative of a school where the reform had been in place for three years and offered a promising example of implementation.

Given the study's focus on the early years of implementation, our data collection efforts were concentrated in the early adopting schools. Data gathered from the mature school was intended to serve as a point of comparison. Thus, SN1 and SN2 were visited twice by the research team (in the spring of the 2004-2005 and 2005-2006 school years), while SN3 was visited only once (in the spring of the 2004-2005 school year). During each visit, interviews were conducted with teaching and administrative staff at the school. Staff members with both central and peripheral involvement with the reform were targeted and included the principal, assistant principals, subject matter department chairs, and teachers in the core subject areas (i.e., math, English, social studies, and science). In 2005, teacher interviews explored professional practice in general, initial exposure to SchoolNet, and experience with this reform. In 2006, teacher interviews conducted at SN1 and SN2 explored in greater detail specific practices associated with SchoolNet use and revisited information collected the previous year. Interviewed school leaders were asked how they supported and monitored SchoolNet use. These individuals also discussed interactions with the district office, satisfaction with SchoolNet, and prospects for the reform's continued use. In addition, we interviewed district staff with responsibility for selecting, supporting, or monitoring SchoolNet use in each of the school districts. These interviews explored the origins of the district-SchoolNet partnerships and their perspective on the reform's

[4] The high schools in this study range from early implementers to mature schools. After the provider abbreviation, the number 1 denotes a school that was in its first year of implementation, the number 2 a school that was in its second year of implementation, and the number 3 a school that was implementing for 3-5 years.

use and progress in the district. Finally, we interviewed SchoolNet staff to explore the reform's goals, theory of action, challenges, future plans, and the provider's perceptions of progress in the study schools. In total, our findings are based on 80 structured interviews lasting between 30 and 60 minutes each. (See Table 1.)

Table 1. **Summary of SchoolNet Interviews**.

	SN1	**SN2**	**SN3**	**Total**
School-Level Interviews *(Spring 2005)*	4	24	22	50
School-Level Interviews *(Spring 2006)*	11	9	0	20
District Interviews *(Winte 2006)*	2	2	2	6
SchoolNet Representative *(2005-2006)*	--	--	--	4
Total				80

In addition, a survey was conducted with all teaching staff in the spring 2005 at the three schools. This survey examined SchoolNet enactment and communication among staff in each of the schools. At SN1 and SN2, a second survey was administered in the spring of 2006. This survey examined attitudes about and uses of the district's SchoolNet system. Both surveys were administered in a group setting. Teachers who did not complete a survey at this time were mailed a follow-up survey. Survey findings discussed in this case study are based on 259 surveys from spring 2005 and 173 surveys from spring 2006, with school response rates ranging from 55 to 85%. (See Table 2.)

Table 2. **Summary of School Survey Responses**.

School	**Round**	**Number of Respondents**	**Total Teachers i school**	**Response Rate**
SN1	Round 1 *(Spring 2005)*	40	56	0.71
	Round 2 (Sprin 2006)	53	62	0.85
SN2	Round 1 *(Spring 2005)*	165	280	0.59
	Round 2	120	220	0.55
SN3	Round 1 *(Spring 2005)*	54	88	0.61

This case study uses a mixed-method design. Qualitative data were analyzed iteratively using a set of codes derived from existing research literature, as well as our previous and ongoing data collection and analysis. Simultaneously, survey data were analyzed in order to provide schoolwide measures of program use, teacher familiarity and comfort with the improvement program, perceptions of school change, and communication patterns among high school faculties. For this case study, basic descriptive statistics in the form of percentages were tabulated. Using interview and survey data, case studies were developed for each of the three schools. These findings were then aggregated, with analysis focused on factors explaining patterns and/or variation in implementation. It is these aggregate descriptions and analyses that are presented here.

Study schools. SN1 is based in a large Northeastern urban district characterized by a long history of low student performance, high poverty, and management difficulties. Under intense pressure to improved student performance, the district office has instituted many reforms and closely supervises curriculum and assessment. Given its size, schools are clustered into regions with oversight by regional superintendents. The district office has a large staff and has garnered extensive resources to implement SchoolNet. SN1 has had stable leadership for several years. This high school serves more than 1,000 students, over 90% of who receive lunch assistance. The school's diverse student body is approximately 50% African American, 25% Asian, 15% White, and 5% Hispanic. SN1 has struggled academically for several years. During our fieldwork, SN1 did not make Adequate Yearly Progress (AYP)[5] and was in Corrective Action.

SN2 is located in a Southwestern, rapidly growing, suburban district. This moderately-sized district is run by a small district office that maintains a close relationship with its schools characterized by a fair amount of autonomy. During the study period, the high school and its district were in the midst of widespread changes. These changes affected leadership, teaching staff, and student enrollment patterns. Turnover at the district office included the superintendent and heads of the technology and curriculum and instruction departments. The high school had witnessed a rapid succession of principals and the departure of other influential long-term building leaders. In the fall of 2004, a new principal was hired and in 2005 the long-serving assistant principal and instructional leader departed. Until the fall of 2005, SN2 was the district's only comprehensive high school and served close to 5,000 students. A second district high school was opened precipitating widespread changes in staff and student enrollment that included reducing the school's population by one third. The student body is roughly 28% African American, 38% Hispanic, and 33% White. Approximately 35% receive lunch assistance. While the school had met AYP in recent years, some subgroups had not.

The mature school, SN3, is based in a small, Midwestern district transitioning from rural to suburban. During our fieldwork, the district faced budget constraints and contended with the capacity limitations of a small staff in the district office. Leadership at both the district and high school had been stable for several years. The SN3 is the only high school for the district. The high school enrolls more than 1,500 students, 99% of whom are White. Only 4% receive lunch assistance. Like SN2, the school had met AYP but some subgroups had not. School staff described strained relations with the district office and voiced particular concerns regarding district budget decisions made during this period of fiscal uncertainty. Many school staff described the district office as highly directive although these high school staff were granted a fair amount of autonomy in choosing whether or not to use the district's SchoolNet system.

SchoolNet involvement. SchoolNet involvement in this research effort consisted of identifying schools that met our sample selection criteria, participating in structured interviews with CPRE researchers, and providing a remote demonstration of the SchoolNet system for our researchers. SchoolNet representatives were provided an opportunity to comment on the case study prior to submitting it for external review.

Limitations. The research presented here is not an evaluation and thus is not generalizable to other schools and districts. Evaluations require very different measures, samples, and methods. In contrast, this research used sampling and data collection methods designed to understand teacher and administrator experiences with the reform and their sense of the reform's progress in three schools. As a result, references to "change" or work related to the reform are based not on external measures such as classroom observations or student achievement, but instead reflect the perceptions of school, district, and improvement organization staff as expressed through interview and survey data. In addition, our findings heavily emphasize the experience of those schools that are relatively early in their implementation processes.

[5] Under the federal No Child Left Behind legislation, Adequate Yearly Progress (AYP) refers to the minimum improvement a school must demonstrate towards meeting state academic standards. If a school fails to make AYP for four consecutive years, it must institute *corrective actions* to improve the school (U.S. Department of Education, 2003).

Overview of the case study. This case study is divided into six sections. Following this introduction, the second section provides a brief overview of the SchoolNet design. The third section explores the ways in which the reform was interpreted and enacted in the three study schools. The fourth section documents individual and organizational outcomes that were attributed by school and district staff to the use of the reform program. The fifth section examines key factors associated with the reform, district role, and leadership that help to explain patterns or variation in reported program use across the three schools. Though findings are drawn from a small, non-random sample, it is our hope that the factors we identify will provide the reader with useful insights into the practitioners' perspective when considering implementation of reforms in other contexts. The final section of this case study briefly discusses several implications of our findings.

II. Reform Overview

SchoolNet is part of a growing industry that produces data systems and Internet programs to manage and make data accessible to teachers, parents, and school and district leaders. Founded in 1998, the for-profit company seeks the use of data to increase academic achievement (SchoolNet, 2005a). SchoolNet partners with school districts to provide Internet-based products, supports, and services that facilitate data and information access for teachers, administrators, and the community. The reform rests on a theory of action that data-driven decision making practices such as "analyzing data, organizing curriculum, tracking instruction, measuring performance, and reporting results" (SchoolNet, n.d., p. 2) will lead to increased academic achievement. Through such actions, teachers and administrators will gain increased familiarity with their students' strengths and needs, and tailor their responses to individual students. These efforts are expected to foster higher academic performance. The reform also can foster a virtual professional community where educators and administrators share instructional practices, guidelines, and lesson plans. In addition, SchoolNet offers the ability to streamline district data systems and programs. Designed as a content-neutral program, SchoolNet can accommodate and integrate other district initiatives (such as particular curriculum, textbooks, standards, and other data initiatives) under its umbrella.

SchoolNet's Internet-based products—or modules—are evolving and expanding as the provider conducts its work with districts. These modules are available for lease individually or in combination. The modules primarily discussed and used in the three districts in this study included Account, Align, Assess, Outreach, and the Data Warehouse.[6]

- The *Account* module tracks student performance and other data (SchoolNet, Inc., 2005b). The module allows administrators to generate reports to analyze assessment trends and efforts to meet School Improvement Plan (SIP) requirements and AYP. Using this module, administrators can examine data at the school, student group, and individual levels. For example, the user can quickly access individual student information and history with this module.

- The *Align* module enables the district to align and disseminate curriculum, instruction, and assessment throughout the district (SchoolNet, Inc., 2005c). The program gives teachers access to current student performance data, online curriculum resources, and can track class progress towards covering the curriculum. Some examples of uses for teachers include analyzing individual student progress on tests in order to differentiate instruction. Teachers can also review overall classroom performance on assignments. In addition, lesson plans and best practices can be shared electronically throughout the district.

[6] Modifications to SchoolNet modules are on-going. The following brief overview of SchoolNet modules and subsequent discussion of their use in the three schools are based on these products and services as they existed during the 2004-2006 study period.

- The *Assess* module centralizes and automates the "scheduling, dissemination, administration, and processing of benchmark tests" (SchoolNet, Inc., 2005d, p. 1). Among its many functions, Assess can align benchmark test items to state standards and allow dissemination of teachers' classroom assessments.

- The *Outreach* module provides districts with a mechanism to disseminate information about the district and schools to the community via the Internet (SchoolNet, Inc., 2005e). Using this module, teachers and administrators can create and maintain websites and communicate with students, parents, and teachers via discussion forums, electronic bulletin boards and other tools.

- The *Data Warehouse* integrates a district's data systems to enable users to easily access district data from one source (SchoolNet, Inc., 2005f).

The district determines who has access to what data. Thus, teachers typically only have access to student data for their class, whereas the principal has access to data for all students in the school. Parents have access to information about their child, but not other children.

SchoolNet also offers several types of services to support the development and use of the district's SchoolNet system. These services include an implementation procedure, technological support, and capacity building support in the form of consulting, professional development, and communication about the reform (SchoolNet, Inc., 2005g). SchoolNet technical services include data loading, data cleansing, integrating SchoolNet with existing data systems, hosting the district's Internet program, supporting network administration and related activities. The district determines which services and the scope of selected service to procure.

A partnership begins when someone from the school district contacts SchoolNet. This district staff person may hold a variety of leadership positions—the superintendent, an assistant superintendent, or other senior staff from the technology or curriculum and instruction departments. While SchoolNet does not require buy-in from any particular district or school staff members, the contractual nature of the partnership between SchoolNet and the district requires senior district officials to approve the partnership. Once a contract is signed, the account is assigned to a provider liaison[7] who leads the effort from the SchoolNet side.

Under the direction of the school district, SchoolNet plans, builds, and implements customized products. The district determines which modules to purchase and for what purposes, the sequencing of the rollout, and the types of training to be delivered. A project team composed of district-identified staff and the SchoolNet liaison guide the planning and implementation for the district and its schools. Typically, SchoolNet uses a five-step implementation process to roll out its products beginning with a needs assessment. Based on this analysis, SchoolNet and the district project team outline the program goals, benchmarks, and responsibilities for SchoolNet and the district. A plan is developed that includes decisions about curriculum, professional development, and rollout. SchoolNet then builds the customized systems and prepares the supporting professional development materials requested by the district. The system is rolled out once it is approved by the district's steering committee.

The district determines the scope of technical assistance and supports to be provided by SchoolNet, the district, or a third party. Supports provided are tailored to the specifications outlined in SchoolNet's contract

[7] We use the term "provider liaison" to refer to the individual employed by SchoolNet who managed the district's account. They coordinated and supplied guidance, technical assistance, and general implementation support to the district engaged in the reform.

with the district that identifies which modules and what services have been selected. Technical assistance provided by SchoolNet is coordinated by the provider liaison assigned to the district account. Typically, the SchoolNet team provides support remotely or staff members are brought into the district as needed. SchoolNet finds that conducting a comprehensive assessment of the district's capacity needs to implement the reform can be difficult "Due to the way that school districts procure things, they often don't really allow us to get in and do some of the needs analysis and discovery until they've procured us." As a result, the planned supports may not fully address the districts' needs.

The district also determines the professional development offered to facilitate implementation of the reform. Depending on the scope of services procured by the district, SchoolNet's professional development representatives may help the district assess data, curriculum, professional development, assessment and school leadership capacity to enact a data-driven approach to instruction (SchoolNet, Inc., 2005h). As the reform has evolved, professional development plans are developed earlier in the planning stage, in concert with building the district's data management system. With an eye towards scale and containing costs, SchoolNet architects target professional development expenditures for a typical school building at $1,000 or less. The SchoolNet model primarily relies on district and school staff to spread the reform through a turnaround training model. Typically, SchoolNet offers a brief workshop for a subset of district staff and school-building representatives identified by the district office. Armed with SchoolNet reference materials, these individuals then train school-based colleagues and serve as on-site resources. The trainings explore concepts of data-driven school improvement planning, site navigation, and support for the adoption process. As the reform has evolved, SchoolNet has offered an increasingly formalized certification process for these trainers. Districts can also purchase other services such as workshops and refresher sessions, site visits, on-site support days, and on-line assistance for all teachers and staff.

III. Enactment

A. Awareness

A data system such as SchoolNet has the capability to perform a vast number of operations. As a district-focused reform, exposure, training, and other supports to foster SchoolNet use were hierarchically differentiated in the three schools and their districts. Interviewed district office staff who were involved in building and managing the SchoolNet system conveyed extensive knowledge of what the system could do and how SchoolNet use fit into district priorities and ongoing work. A second level of awareness was held by school-level staff who received training either directly from SchoolNet or from district reform leaders. These school-based individuals were introduced and trained to use the SchoolNet system in preparation either to complete administrative tasks required by their position (such as school administrators and members of the special education department), and/or to serve as turnaround trainers and on-site advisors. A third level of awareness was held by the remaining teachers at the schools who were trained by the turnaround trainers. These teachers had the least exposure and preparation to use SchoolNet. Thus, while all teachers were aware of the SchoolNet reform, many had limited exposure. In spring 2005, survey respondents had participated in an average of 1.8 to 2.4 training sessions across the three schools. Typically, teachers' SchoolNet awareness was limited to areas of the program for which they had received training. Interviewed teachers often could not identify or distinguish between individual SchoolNet modules available at their school, although this was not considered in and of itself to be an impediment to use.[8] Consequently, it is not surprising that most teachers

[8] There are a few factors that help explain teacher difficulty differentiating between SchoolNet modules. First, as noted in the previous section, data access was determined according to staff positions. Thus, most teachers had access to fewer SchoolNet modules. Second, the SN1 district made particular efforts to integrate other programs and vendors into their SchoolNet system in a way that would appear seamless to the end-user. Finally, when districts built their tailored SchoolNet system, sometimes modules were renamed by the district.

contacted at the three schools reported a limited understanding of SchoolNet's capabilities, and how the system fit into district priorities and plans, as well as to their own work.

B. Participation and Enactment of Components

The three district offices envisioned the full SchoolNet rollout as occurring over years rather than months. At the time of our study, each district office had leased and provided school faculties with access to the Account module. Other modules purchased were at varying stages of implementation in different schools within each district. A long-term SchoolNet client, the SN3 district had all of SchoolNet's modules but had concentrated their initial implementation efforts at the lower grades. For example, while the elementary schools were actively using SchoolNet's benchmark module "Assess," the district was still exploring how to link the high school's mid-term and final exams to this module. The SN2 district had contracts for SchoolNet's Account, Align, and Assess but only Account was fully operational in the schools. Changes in district leadership stalled efforts to implement Align. District staff interviewed did not expect Assess to be implemented at all given the district testing coordinator's preference for another benchmark system. In the large SN1 district, SchoolNet was introduced to schools in cohorts over a few years in concert with upgrading the schools' technological infrastructure. SN1 teachers first gained access to Account and later to Align and a version of Outreach. The early focus for SN1 teachers and staff was on performing basic operations such as accessing students' academic histories, grades, and performance on benchmark and state standardized tests to provide remediation or enrichment. According to one SchoolNet representative, these operations amounted to only 10% of the tools and functions that the system could offer teachers.

In the three schools, a majority of teachers contacted were not involved in implementing SchoolNet and did not regularly use the modules available. At the mature school, SN3, less than one fourth of survey respondents described themselves as "involved" or "very involved" in the SchoolNet reform. Reported use of the system was also low. The vast majority of respondents reported that they logged into their SchoolNet account "never" (70%) or "a few times a year" (17%). SN3 teachers considered the school's slow, inefficient computers to be a barrier to use, and more broadly questioned the value of SchoolNet programs to their work given the high cost to lease and implement the SchoolNet system during a budget crisis. Interviewees also cited the voluntary nature of the SchoolNet training, little support to use the system, and limited student data available on the SchoolNet system to explain the low use. At the two early adopting schools, involvement levels were slightly higher in the first year of the study.[9] That year, when one third of SN2 teachers had Internet access in their classrooms, 19% of respondents reported logging into their account at least weekly. Explanations for low use included limited access to technology and the fact that teachers did not have a concrete sense of how SchoolNet would benefit them. At SN1, where all classrooms had Internet access, 30% of survey respondents reported logging into their SchoolNet account on a weekly basis. SN1 explanations for low use focused on the lack of direct support for using the system software and little opportunity to tie the data they received to everyday practice. In these two schools, two tiers of use were evident among teachers. Some teachers accessed their SchoolNet account directly while others relied on school administrators to generate hard copies of reports which they then reviewed. In these cases, teachers had less incentive or opportunity to access the system themselves. For example, limited Internet access coupled with teacher difficulties using the SchoolNet system prompted the former SN2 assistant principal and technology coordinator to create and disseminate Excel spreadsheets of SchoolNet-generated achievement data to teachers in 2004-05.

[9] In 2005, 36% of SN2 and 42% of SN1 respondents describing themselves as involved or very involved in the reform.

By spring 2006, there were signs that SchoolNet use was moving in opposite directions at the two early adopting schools. During the 2005-06 school year, all SN2 teachers had Internet access and 31%[10] of survey respondents reported logging into their SchoolNet account at least weekly. Interviews with school leaders and teachers revealed growing dissatisfaction with SchoolNet. The sharpening criticism coincided with the departure of key SchoolNet champions at the school and district office who in 2004-05 had guided and encouraged teacher use of SchoolNet-generated data. Negative assessments of the reform were also fueled by persistent problems obtaining accurate, timely data from the district's SchoolNet system.[11] In the fall 2005, the newly appointed assistant principal responsible for SchoolNet advised teachers to stop using the system altogether. By the spring, several interviewees reported relying on other available data systems for similar—although not identical—data because these alternative sources were considered more accurate and up-to-date. There were a couple of exceptions to reported declines in SchoolNet use at SN2. Department heads described using SchoolNet more than other teachers and the special education department continued to use SchoolNet to gather information for annual student reviews, but always as one of several student data sources.

In contrast, SchoolNet use appeared to be increasing at SN1 in 2006, and that use was occurring in ways desired by district administrators.[12] Close to one quarter of survey respondents reported retrieving data about their students from SchoolNet at least weekly. Increased use was in large part attributed to district requirements that teachers in the core content areas[13] complete benchmark reports using SchoolNet-generated data. These reports were part of a system-wide effort to track student performance and foster greater accountability for results at all levels of the school district hierarchy. Teachers submitted these reports to the principal who in turn was required to provide regular school-level updates to the regional district office. The SchoolNet system did not appear to generate much interest among teachers beyond performing those functions required by the district. Both survey and interview data indicate SN1 teachers less frequently used other areas of the SchoolNet system. For example, only 7% of SN1 respondents reported locating curriculum resources and 14% reported accessing information on standards through SchoolNet at least weekly. One department chair reported: "I have a feeling most teachers wouldn't even look at it at all if they didn't have to."

C. Reform Coordination and Technological Support

In the three districts, SchoolNet implementation was managed by a team composed of senior district staff with responsibility for technology, curriculum and instruction, assessment, and professional development. SchoolNet served as a "strategic partner." For the SN1 and SN3 districts, SchoolNet was a central, integrated component of the district's goals for curriculum and assessment and was supported at the highest levels. There was also close collaboration between the technology and the curriculum and instruction departments. The SN1 district project team met at least monthly and smaller teams organized to address particular issues. In the small SN3 district office, communication occurred on a daily basis between the technology and curriculum and instruction departments. In contrast, collaboration across district departments in support of SchoolNet was less consistent in the SN2 district office. This district's SchoolNet project team was heavily impacted by turnover with only one of the original team members remaining by 2006. While support for the initiative remained strong in the technology office, the curriculum and instruction department was perceived

[10] At SN2, changes in SchoolNet use over time cannot be inferred by comparing 2005 and 2006 survey results due to widespread staff changes in the school (including an overall reduction of the faculty by one third).
[11] It was unclear where data accuracy problems originated. District administrators agreed that the data was not up to date contending the data was as current as what they received.
[12] In 2005, 30% of SN1 survey respondents reported logging into SchoolNet on a weekly basis. A year later, 41% reported logging in with the same frequency.
[13] The core content areas include English, math, and science. Benchmark reports using SchoolNet-generated data were not required in social studies. The district used a different benchmark assessment system for this content area.

to be less committed in the wake of new leadership. The provider liaison was faced with building a new district SchoolNet committee in order to get the project back on track.

Building and maintaining the SchoolNet system were major undertakings for the three districts and SchoolNet. The two offices worked in close partnership to build the data management system. Integrating the system with other district data initiatives, preparing the data, and addressing district needs and priorities were activities that occurred during this period. Implementing the SchoolNet system into schools sometimes required additional technological investments. During this study, both the SN1 and SN2 districts expanded the technological capacity throughout the school system including ensuring every classroom had high-speed Internet access. All SN1 classrooms had Internet access during our fieldwork. At SN2, Internet access expanded from one third of the school's teachers to universal access by 2005-06. The school's technological capacity was considered a problem at SN3 where teachers cited old, slow computers as a significant barrier to their use. For example, teachers described SchoolNet training sessions in which the technology did not work properly, leaving participants unable to work with the software or even view a demonstration.

In all three districts, the district office inputted the data into SchoolNet. SchoolNet received a nightly update of data from the SN1 district but the other two districts updated data less frequently. SchoolNet hosted the district's site for the SN1 and SN2 districts. SchoolNet also transferred data automatically into its system from other vendors contracted by the SN1 district. SchoolNet's ability to integrate systems had significant appeal to SN1 district interviewees who said the district had little experience conducting such integration.

D. Professional Development and Teacher Support

Consistent with SchoolNet's typical strategy for spreading the reform, the three district offices coordinated professional development offerings for the school system. For the SN1 and SN3 districts, SchoolNet professional development was a collaborative effort of multiple departments with the technology and curriculum and instruction departments taking the lead. In both districts, concerted efforts were made to link SchoolNet use to other initiatives and incorporate SchoolNet training with other professional development. For example, the SN3 district's professional development sessions always included training in the relevant technology component. Thus, as one SN3 district administrator noted, "…if you're going to focus on layered curriculum, which is really instructional, you learn the Align tool." In the SN1 district, SchoolNet training was also incorporated into existing professional development sessions and days such as mandatory summer professional development sessions for principals.

The SN2 district's approach to SchoolNet professional development differed from the other two districts in ways that may have sent a weaker message about the relative importance of and expectations for incorporating SchoolNet use into teachers' responsibilities. First, the district targeted SchoolNet training efforts at school administrators under the premise that these leaders would recognize the value of SchoolNet and take the initiative to foster school-level use of the reform. The district's technology office then waited for requests from school leaders to provide SchoolNet professional development to faculty and staff beyond the initial introduction to the system. Second, SchoolNet professional development was no longer a close, cross-departmental effort by the second year of our study. While the technology department continued to champion the reform and assumed the lead in providing requested training, the new curriculum and instruction office was perceived to be increasingly disengaged and ambivalent about the reform's value. Finally, there was little mention in interviews of efforts to incorporate SchoolNet use into other district initiatives and related professional development by the spring 2006.

Turnaround training. Initially, all three districts in the study relied on a train-the-trainer model to prepare teachers to use the SchoolNet modules. According to district interviewees, the rationale for this approach included the lower cost, the opportunity to develop the district's SchoolNet capacity, and, in one case, the belief that the district office would do a better job of training their faculty. In each case, the district identified

teams of teachers, department chairs, and/or administrators from each school to receive SchoolNet training in preparation for them to introduce SchoolNet to their entire faculty. The SN1 team (composed of the principal, department chairs, and technology coordinator) attended a two-day training that focused on how to use the system from a teacher's perspective; how to create reports by school, grade, and department; and how to use data to monitor school progress. This training was led jointly by the district, SchoolNet, and a third party contracted to assist with the training. The SN1 team then introduced the SchoolNet modules during in-school professional development time offered a few times during the academic year. Department heads acted as the point persons for teachers in each department.

These initial sessions for selected turnaround trainers were perceived by many interviewees to be insufficient. For example, SN1 district administrators believed these trainings did not foster the level of school use desired:

> *I think from a high school perspective, it was unreasonable for us to think that a team of three or four people could go back and turnaround train on these big comprehensive high schools. It was just too much to expect.*

When the SN3 district office required a small group of teachers from each school to participate in an initiative that introduced SchoolNet, there was resistance from the high school representatives. Furthermore, this small group did not return to SN3 to provide the level of training and expertise envisioned. There was little consensus among SN3 staff interviewed regarding even when or to what degree the reform had been introduced.

School-level critiques of SchoolNet training highlighted a few common challenges of this professional development model. At all three schools, trainers reported they did not believe they received sufficient training to carry out this task. The professional development sessions were described as passive by many SN1 and SN3 school staff who reported they were *shown* various SchoolNet applications but were unable to actually try the modules themselves. Many teachers similarly described insufficient preparation for trainers as well as technological problems and inadequate attention to how teachers could use SchoolNet-generated information in their work.

Additional professional development. The role of the district office in providing SchoolNet-related professional development to teachers did not decline once the turnaround trainers returned to their schools. Often the district role expanded in terms of both professional development and related technical assistance. During the study period, SN3 district staff led teacher workshops and served as the teachers' point of contact rather than a school-based colleague. This district office also created additional SchoolNet training opportunities by partnering with a local university to provide courses for certification credit on integrating technology into curriculum. Although to a lesser extent, the SN2 district role in professional development also was maintained. In the spring 2006, the SN2 faculty identified district staff as leading their trainings rather than school-level staff. Despite expressed dissatisfaction with SchoolNet, SN2 interviewees spoke highly of these district-led trainings.

Teacher support. Additional assistance provided to teachers included individualized support, technological resources, and materials. In response to unsatisfactory implementation at the SN1 district's high schools, the district's technology staff began visiting high schools to provide additional on-site support including three-hour drop-ins to answer faculty questions. The SN3 district head of curriculum and instruction used a similar strategy, meeting with teachers to discuss how SchoolNet could help them assess students, differentiate instruction, and develop layered curriculum. The SN3 district also offered logistical assistance to teachers in the form of free dial-up into the network and laptops to use at home. SN2 teachers described "cheat sheets" developed by the district and distributed during training sessions as a valuable step-by-step guide they later referenced when accessing the SchoolNet system from their own computers.

The three districts provided individualized assistance through a combination of approaches. The SN1 department heads and the technology coordinator were the primary point people for assistance with SchoolNet at the school level. In addition, SN1 teachers could directly contact a help desk staffed by SchoolNet and financed by the district. At SN2, teachers were expected to first turn to their school-based SchoolNet resource person and then, if necessary, contact a help desk staffed by the district. Direct communication between school-level staff and SchoolNet was rare at SN2 and SN3. If the district office could not answer a question from the school, the district contacted the provider liaison who then fielded the question to the SchoolNet organization. The answer then was transmitted back to the district, which relayed the information to the school.

At SN1 and SN2, teachers interviewed were able to identify individuals in their schools who they could go to with questions about SchoolNet, but in neither case was a formal school-level staff position created that focused exclusively on implementation. At both schools, the building-level "experts" often used the program to generate data *for* teachers rather than assisting teachers in using the system themselves. School administrators identified the school-based trainers as the go-to people for SchoolNet assistance; however, teachers were often not certain who the trainers at the school were. SN2 teachers primarily contacted their department heads or a school administrator. At SN3, no lead person in the building was consistently identified as the person to go to with questions about SchoolNet.

E. Monitoring

In the study schools, SchoolNet monitored implementation at the district level through regular communication with district office staff and the clear specification of implementation responsibilities for SchoolNet and the district. Communication was weekly if not daily between the three districts and the SchoolNet liaisons. SchoolNet staff had limited direct contact with teachers in the three schools. Thus, the SchoolNet liaisons relied heavily on the district's project team to tell them what was working well at the school level.

SchoolNet offers tools to their partner districts to assess teacher use but "exactly how they implement those assessments with their teachers, we don't necessarily know" (SchoolNet Representative). Use of SchoolNet modules can be counted via log-in reports that track such information as the number of web pages modified, reports generated in a particular module, and lessons created or modified during a specified time period. However, reports that count how many people log into the system, particularly when such log-ins are required, provide minimal descriptive detail regarding how teachers and other staff use the SchoolNet systems in their work.

According to district interviewees, the three district offices monitored SchoolNet use with varying consistency through user log-in reports and an assortment of other approaches. SN3 district staff also described a working list of teachers grouped according to who "the users are and who aren't the users and what they're doing and how it fits with our goals." This district also required every school to report their progress towards the district-identified goal selected by the school for focus. Thus, SN3 was expected to report on the school's progress implementing the web-based module, Outreach. As a secondary source of information, the SN2 district technology office relied on anecdotal evidence from the volume of questions they received. Among the three districts, SN1 district staff described the most rigorous current and planned monitoring of SchoolNet use. To facilitate and streamline data analysis, SN1 district staff and SchoolNet created benchmark reports—the standardized method for schools to analyze data and provide evidence of change described earlier. Besides prompting teachers' data analysis, the completed benchmark report also provided a more robust picture of how schools (and individual teachers) in fact used the SchoolNet system to meet required tasks. In addition, the district contracted with a third party to formally evaluate SchoolNet in the district in compliance with the government technology grant requirements that funded the initiative, and

administrators were considering conducting a formal teacher survey to learn what teachers found valuable about SchoolNet.

During 2004-2005, faculty at the three schools perceived little to no school-level monitoring of SchoolNet implementation or use. The following year, that perception persisted among SN2 interviewees despite the fact that the provider liaison was providing the district with log-in reports. Interestingly, these SN2 teachers did believe the district's other data systems were monitored. The SN2 principal and the new assistant principal also noted they informally gauged SchoolNet use via feedback from teachers. By 2005-2006, monitoring was evident to SN1 staff interviewed. Some of these teachers reported receiving feedback from the principal regarding their benchmark reports and steps taken to address student weaknesses, while others said they simply submitted reports without receiving feedback. One teacher reported that the SN1 principal visited classrooms to observe teachers working on the standards on which their students did not perform well.

F. Fidelity and Adaptation

Fidelity to an established SchoolNet design is neither expected nor desired. The SchoolNet system is built to district specifications, thus modifications are the norm and are ongoing as needed. In addition, SchoolNet products themselves and the recommended implementation process are evolving "every couple of months" (Provider Liaison). SchoolNet encourages discussions between their staff and the districts, viewing these conversations as a rich source of ideas for product development.

Given SchoolNet's flexibility in implementation, it was not surprising that SchoolNet staff did not express particular concern regarding fidelity to a SchoolNet model beyond those modifications that could destabilize the program or breach expectations for use outlined in the contract. When SchoolNet hosted the site, the district was generally not physically able to make major changes to the modules. Typically, the district requests product modifications from SchoolNet. In response, SchoolNet corrects specific problems or incorporates minor refinements into updated versions of their modules. One district administrator noted that SchoolNet had made a few, but not all, major modifications they requested.

Modifications at the three schools centered on ways of using SchoolNet-generated information that extended beyond what was covered in training sessions and the ways in which teachers received the data. Neither of these modifications was viewed by SchoolNet representatives as particularly problematic. Provider liaisons were occasionally surprised, but not concerned, by the ways the district and schools used the data. As envisioned by SchoolNet, teachers access data themselves at their computer. This was not always the case in SN1 and SN2 where teachers used data generated by school administrators. However, the provider liaisons did not consider teacher reliance on reports generated by an administrator to be a significant adaptation to the reform. One provider liaison said:

> *Every building does it a little bit differently depending on the leadership. SchoolNet encourages every teacher to log in. In some cases, it's the SchoolNet-certified person who gets reports in the hands of teachers every week. So there's still that quick access to data. It's a personal decision. But I don't encourage that.*

IV. Outcomes

A. Level of Understanding

According to survey data, teacher and administrator understanding of SchoolNet varied significantly across the three schools and did not correspond to the length of time the reform had been present in the school. At the mature school, SN3, half of the respondents felt they "understood the purpose of the design." At SN2,

76% of survey respondents agreed with this statement in 2005 and 83% agreed in 2006.[14] At SN1, the percentage of faculty who believed they understood the purpose of SchoolNet increased over the two years from just over half of the respondents in the spring 2005 to two thirds a year later. However, with the exception of an assistant principal at SN2 in 2005, none of the school-level interviewees across the three schools conveyed a complete understanding of all that SchoolNet offered or how the products related to one another. An SN3 district administrator observed a fundamental challenge teachers faced in understanding how data analysis could inform curriculum and instruction:

> *If you want to use SchoolNet really well, you need to know how assessment can drive your instruction. You need to know not only how to analyze that data, you need to know what to do with it next, and you have to have the resources.*

At SN2, teachers described the reform's purpose as providing one-stop shopping for student data. Several SN2 teachers recognized SchoolNet terms such as Align, Account, and Assess but did not understand how to use the tools in practice. One SN2 administrator responded, "They're there, but I don't know what we do with them." SN2 and SN3 teachers described the Align program as a tool to link district standards and curriculum by housing an on-line database. These teachers tended to view Align as a repository for lesson plans rather than as an alignment mechanism. SN1 district and provider staff interviewed believed high school teachers and the principals were confused during the SchoolNet rollout by the presence of multiple data systems and did not understand which modules should be used for which purposes. To address this confusion, programs from other vendors were integrated into the SchoolNet system.

B. Perceived Value of the Reform

There was a striking disparity in the overall value district- and school-level staff placed on SchoolNet. District staff interviewees were enthusiastic about the reform. In contrast, school-level staff members were more often ambivalent or critical of SchoolNet and its capacity to facilitate their work. This lower level of support for the reform at the school level was evident despite a generally favorable predisposition to data-driven instruction conveyed in interviews and survey data. School-level critiques focused on the fundamentals of using SchoolNet-generated data such as problems obtaining accurate and up-to-date information, the time demands required to use this type of system, and occasionally how to use data to inform their practice. Attributes of SchoolNet identified as valuable by school staff were often consistent with those noted by district staff.

District administrators involved in selecting SchoolNet appeared to remain strong proponents. All district interviewees valued the SchoolNet system's capacity to link data use to instructional planning and provide access directly to teachers via the Internet in a user-friendly format. Such access was believed to offer teachers the opportunity to develop data-driven decision making skills. In addition, SN1 district interviewees valued the SchoolNet system's capacity to operate as an open container, integrating this large district's many vendors into one system with SchoolNet operating as the general contractor. The provider liaison for SN1 added that the SchoolNet system also enabled the district to track a highly transient student population, allowing quick access to student information. As noted earlier, commitment to SchoolNet spanned multiple departments in the SN1 and SN3 districts according to interviewees. In particular, collaboration between the technology and curriculum and instruction offices was described as extensive. In the SN2 district office, the value placed on SchoolNet did not appear to be uniform across the departments and had fluctuated during a period of extensive turnover. While the SN2 district technology office highly valued the reform, pointing to neighboring districts as evidence of its potential, the new curriculum and instruction department was perceived to have less, and intermittent, interest in SchoolNet.

[14] Again, changes in SchoolNet use over time at SN2 cannot be inferred by comparing 2005 and 2006 survey results due to widespread staff changes in the school (including an overall reduction of the faculty by one third).

Survey and interview data indicate that there was considerable school-level support for the *idea* of data-driven instruction at all three schools but it was not clear the extent to which these educators recognized some of the specific problems data-driven reform was supposed to solve. Teachers viewed data as an important tool for improving instruction and supporting students, and generally felt they possessed the necessary technical skills to use data effectively in their classrooms. Yet, few teachers cited lack of transparency or accountability as a major concern in their schools. Similarly, few teachers or administrators suggested that poor academic performance was attributable to a lack of instructional focus, or to any other problem that might reasonably be assumed to arise from a lack of information about student performance.

According to school survey and interview data, general support for data-driven instruction often did not translate into support for SchoolNet. Dissatisfaction with the modules, partial awareness of the system's capabilities, and limited classroom-level Internet access (a significant concern at SN3 and SN2 in 2004-2005) contributed to this skepticism. In 2005, few respondents believed the changes called for by SchoolNet were helping or would help their students to reach higher levels of achievement.[15] Generally speaking, those individuals who received the most training and exposure to SchoolNet voiced more optimism about its potential value for the school. At SN2, for example, a relatively small number of individuals received significant professional development around SchoolNet. These individuals became frequent users (at least of the database function), and were generally the biggest supporters of the reform in 2004-2005.

School-level critiques of SchoolNet centered on the time demands necessary to use the system, the accuracy and timeliness of SchoolNet-generated data, and the difficulty of interpreting and acting on data analysis. At SN2 in 2006, difficulties accessing the system and questions about data quality fundamentally undermined the value interviewees placed on SchoolNet. This response by a SN2 teacher was typical: "When you don't have access to something that you can use on a regular basis from the beginning, when it becomes ...a distraction from what you have to do, you tend to ignore it after awhile." Another problem teachers faced was how to interpret the data. For example, teachers found it difficult to generalize from particular items to bigger concepts. An SN1 teacher noted:

> *You're looking at a screen at a bunch of numbers and a bunch of questions. And the screen tells you, this percent of the group did not do too well, and they got questions 1, 6, and 9 wrong. So how are you going to go in the next day and fix that problem? . . . Should I go in the next day and teach that one fact? I don't know if that would be a great use of time. I mean, theoretically, it helps me... [but] I don't think it really could help me. And many teachers I talk to share that.*

Faculty assessments varied regarding how user-friendly they found their SchoolNet system. Some described the system as very usable. One SN1 staff person shared the district's appreciation for a streamlined data system: "I think it's nice that [the data] is all in one big package, that they only have to go to one site. They don't have to go all over the place to find out what's going on." Other teachers found the SchoolNet system more difficult to use. "I think it's really difficult to use. I think it's not user-friendly at all. The filters are difficult." Such mixed reviews may in part be explained individual users' degree of comfort with technology.

Those SchoolNet attributes that were identified by school staff as valuable also were valued by the district interviewees. School-level interviewees suggested that access to academic histories helped them better understand their students' strengths and weaknesses. Faculty also valued SchoolNet as "a great instrument for data collection" that facilitated the move towards institutionalizing how data were analyzed throughout the school district. A SN2 teacher said:

[15] In 2005, 18% of SN3 respondents, 24% of SN2 respondents, and 19% of SN1 respondents believed the changes called for by SchoolNet were helping or would help their students to reach higher levels of achievement. A year later, the 28% of SN2 respondents and 26% of SN1 respondents agreed with this statement.

Once I got the information it was very helpful . . . when I went back in and really looked at what the principal had sent me, because I could kind of see where gaps were, and I started working a little bit more on those gaps with those students.

Finally, some school staff valued SchoolNet in terms of compliance. These teachers and administrators viewed data-driven reform as an external mandate reinforced by the federal No Child Left Behind (NCLB). In this context, SchoolNet was considered a tool to help them comply with the law.

C. Changes in Teacher Behavior and Practice

SchoolNet's theory of action assumes that regularly "analyzing data, organizing curriculum, tracking instruction, measuring performance, and reporting results" (SchoolNet, n.d., p. 2) will lead to increased academic achievement. Implicitly this presumes teachers and administrators will tailor curriculum and instruction to meet their students' individual learning needs. The reform also seeks to foster a virtual professional community where educators and administrators share instructional practices, guidelines, and lesson plans via SchoolNet's Internet-based modules.

While survey data indicate that most respondents did not believe SchoolNet required them to make major changes in their classroom practice, more reported employing some data-driven instructional practices. Between 17% and 35% of survey respondents believed SchoolNet required them to make such major changes.[16] Although reported changes in teacher practices associated with SchoolNet were limited, more survey respondents reported employing some data-driven instructional practices, indicating broader support for data-driven strategies. For example, 46% of SN3 respondents indicated that they used student performance data to tailor instruction at least one or twice a month. In 2005, 46% of SN2 and 39% of SN1 respondents reported using data to tailor instruction frequently (once or twice a week or more) in 2005. Similarly, 39% of SN1 respondents reported tailoring their instruction to individual student needs on a regular basis in 2005.

Interview data of changes in teacher practice offers a somewhat mixed assessment of changes in teacher practice. In 2005, interviewees attributed few changes in instructions, beliefs or other behaviors to SchoolNet use at the high schools. For example, only two teachers at SN2 reported that access to student performance data allowed them to identify specific content areas on which to focus. One SN3 teacher reported experimenting with the lesson plan and website tools and another commented that teachers had greater access to student data. No SN1 teachers reported changes in their practice in 2005. A year later, SN1 and SN2 interviewees offered more examples of how their teaching was affected. For example, some teachers from both schools described accessing student performance data to tailor instruction. "Now I can focus on the standards the students are weak at, and leave the ones they're good at, and get to identify the students who really don't know anything," said an SN1 teacher. Such reports were more evident among teachers already sympathetic to data-driven practices using computers. One SN2 teacher noted that access to the data through SchoolNet made teachers less dependent on the school's administrative staff for this information: "We are able to get information on our own without having to involve other people to step up for us." Despite only 35% of SN1 survey respondents reporting SchoolNet required them to make major changes, the SN1 principal estimated that SchoolNet had impacted about half of the faculty. Reported changes in teacher practice prompted by examining SchoolNet generated-data included reinforcing identified areas in warm-up activities and project work; using the benchmarks as a guide to select areas of concentration; and identifying areas for re-teaching and implementing alternative strategies.

[16] In 2005, 29% of SN3, 18% of SN2, and 22% of SN1 survey respondents believed SchoolNet required them to make major changes in their classroom practice. A year later, 17% of SN2 and 35% of SN1 respondents agreed with this statement.

Finally, it should be noted that SN1 and SN3 district administrators interviewed believed more change had occurred at the elementary schools than at the high schools in their districts. Administrators attributed this higher impact at the lower schools to the district office's intense focus on supporting the reform implementation and pressure to comply with accountability requirements.

D. Changes in Other Staff Behavior and Practice

Other changes associated with SchoolNet at the three sites included heightened district efforts to upgrade the schools' technology infrastructure in order to use the system, collaboration and an orientation towards data-driven analysis in the district office, and increased use of data to guide decisions among school leaders charged with accessing and distributing SchoolNet data. For SN1 and SN3 district administrators interviewed, the close collaboration between the technology and curriculum and instruction departments, and their collective focus on data collection and analysis linked to instructional goals were considered important developments. An SN3 district administrator noted that SchoolNet was infused into everything they did, which resulted in a more systematic approach to decision making. In the SN2 district office, a technology staff member believed SchoolNet specifically required the curriculum department to think differently about data. Finally, the SN1 district's systemic effort to cultivate data-driven analysis and instruction required school leaders to play a key role in facilitating a standardized approach to collecting and analyzing school-level data on a routine basis. Principals both enforced these data expectations by ensuring teachers completed the benchmark reports and then communicated school-level progress to other principals and district administrators. As part of this process, the district held regular, facilitated conversations among the district's principals that focused on the SchoolNet-generated data compiled in the standardized benchmark reports.[17]

At the three high schools, there was more evidence that SchoolNet had facilitated changes in the practice of department chairs, assistant principals, or others charged with accessing, organizing, and distributing data to teachers than was found among teachers. The increased access to data these school-level leaders possessed appeared to facilitate a deeper focus and the capacity to share their understanding with teachers. For example, an English department chair reported using the software to analyze student performance in this content area, which in turn was used to develop the curriculum for the upcoming year. During 2004-2005, members of SN2's instructional leadership team (all of whom were SchoolNet-trained) participated in weekly meetings to review student performance data and develop action plans based on the team's findings. While it is unclear the degree to which the SchoolNet system was the impetus for these individuals to seek out data, it does seem that SchoolNet enhanced their capacity to use it well.

E. Changes in Communication Networks and Staff Relationships

There were few reports of substantive communication between teachers sparked by analysis of SchoolNet-generated data. While one SN3 district administrator reported a reliance on data to be the "conversation norm" in the district office and the elementary schools, there was no indication that these types of conversations were occurring at SN3. Several SN1 interviewees identified time constraints as a significant barrier to such communication. The principal observed that teachers simply did not have the necessary time to meet and discuss SchoolNet-generated findings on a consistent basis. Instead, most discussions were characterized as requests for assistance by teachers. As noted in the previous section, members of the SN2 instructional leadership team led by the assistant principal described increases in the quantity and quality of their routine conversations about data to identify resource and staff development needs in 2005. By the following year, however, the communication described by SN2 interviewees centered on difficulties accessing SchoolNet-generated data, or viewing it in a timely manner.

[17] The district contracted with a third party to facilitate these conversations.

F. Perceived Effects on Students

There were few instances in which school-level staff believed SchoolNet had had an impact on student behavior or performance. For example, when asked whether "the changes called for by SchoolNet are helping or will help my students reach higher levels of achievement," between 18% and 28% of survey respondents agreed with this statement in the three schools.[18] Interview data were fairly pessimistic. In fact, the persistent inaccuracies in the SN2 district's SchoolNet system were believed to have had a negative impact in some cases. In 2006, the assistant principal reported creating classes based on data pulled from the district's SchoolNet system: "When we benchmarked in October, we found 60% of those students were incorrectly identified. So, it actually has had an enormous impact, but just a negative one."

Given the current level of SchoolNet use at these three schools, it is understandable that teachers perceived very few connections to student outcomes. Many teachers were not fully aware of SchoolNet's capabilities, had received little professional development, and many did not access the SchoolNet system themselves. It seems logical that teachers would be most likely to attribute changes in student outcomes to other factors such as changes in instruction. If teachers did not view SchoolNet as influencing their instruction, there was little reason to expect that they would credit the reform with influencing student outcomes.

G. Perceived Sustainability

Typically, districts form an initial contract with SchoolNet that lasts two to three years. Most districts continue to lease the SchoolNet system beyond this initial contract. School and district interviewees believed that in the foreseeable future the SN1 and SN3 districts would continue to use the SchoolNet system while interviewees viewed the reform to be in jeopardy in the SN2 district.

Across the three schools, provider, district, and school interviewees believed district leadership commitment and the extent to which SchoolNet had become embedded in district operations were critical contributors to the reform's sustainability. Some noted that evidence of positive changes in student performance would also be important to continued leadership support and the reform's future. In the SN1 and SN3 district offices, SchoolNet had strong and sustained senior leadership support. In both cases, SchoolNet was also highly integrated into the district's current work and future plans. An SN1 district office administrator perceived the only risk to SchoolNet's future would be a shift away from the senior academic leadership's current press for action plans that relied on SchoolNet-generated information. The SN3 district had had stable leadership composed of individuals who had been involved with SchoolNet from the beginning. One SN3 district administrator believed that if SchoolNet did not last a similar system would be put in place to support data-driven decision making. SchoolNet did not hold this level of sustained prominence in the SN2 district according to district and school interviews. When new district leaders inherited SchoolNet in 2005, they were not convinced of the reform's value. They witnessed difficulties implementing Align and perceived a slow response from SchoolNet to correct problems. Furthermore, this district office now lacked the close collaboration evident in the other two districts. Thus, SN2 district technology staff believed a continued partnership with SchoolNet use would ultimately become "a technology versus curriculum decision" rather than a joint agreement.

Within the district office, responsibility for sustaining the reform was believed to lie with the technology and curriculum and instruction departments. These departments needed to provide on-going support to schools and sustain the commitment of senior district leaders. From the data side, responsibility for maintaining the

[18] Survey respondents who believed SchoolNet called for changes that were helping or would help their students reach high levels of achievement included: 18% of SN3 respondents in 2005; 24% of SN2 respondents in 2005 and 28% in 2006; and 19% of SN1 respondents in 2005, and 26% in 2006.

reform fell to the technology office while the curriculum and instruction office was responsible for long-term use of data in the context of curriculum and assessment.

Teachers' predictions for the reform's future varied. Some SN1 teachers saw the reform "dying out after awhile" while other SN1 teachers believed the initiative would be sustained. These teachers cited the availability of new modules as evidence of continued district commitment and speculated about what would sustain leaders' commitment to SchoolNet. For example, the SN1 technology coordinator noted that as long as the district office "sees that it's helping improve instruction, improve test scores, they'll continue with it." In the spring 2006, most SN2 teachers and administrators interviewed did not believe SchoolNet would be sustained. One teacher described SchoolNet as a fad that would eventually be replaced.

On its own, the SchoolNet system did not generate widespread teacher enthusiasm in the three schools. At SN3, it seemed clear that if put to a faculty vote, the reform would likely be eliminated. Several factors appeared to be central to sustained school-level use of SchoolNet. First, school leaders played an important role in requiring teachers to use the system and providing needed supports. Second, the schools needed the technology in place to support widespread use of the modules. Teachers were unlikely to experience the potential benefits of the system if they were unable to use it themselves and instead relied on others to access it for them. Third, there was a strong sense that more training and support was needed if teachers were to use SchoolNet to inform their instructional practices. Teachers needed time to learn how to use the system, and then analyze data and develop plans to incorporate findings into their practice. Finally, the data generated by SchoolNet had to be accurate.

V. Explanatory Variables

The SchoolNet reform and its implementation at the three schools were viewed differently according to one's vantage point. While the district office administrators interviewed viewed the reform as a means to meet district goals for instruction, student performance, and accountability in a manner consistent with the goals expressed by the SchoolNet architects, teachers were less convinced of the reform's value in their work. School-level interviewees frequently did not describe a comprehensive understanding of the reform's role in furthering district plans or in the full capabilities of the technology. Reported teacher use, particularly where not mandated, was relatively low. Three key variables seem to explain much of the enactment and use observed in the study schools. These variables include characteristics of the reform's design, the district's role in directing and support school-level implementation, and school leadership. Often an interaction between these variables was evident. SchoolNet's reliance on the district to lead the reform rendered district decisions about how to guide and support implementation paramount. Similarly, district requirements of school leaders to foster SchoolNet use in the building likely influenced the freedom principals exercised in determining how much emphasis to place on SchoolNet with their staff.

A. Design Factors

Systematically analyzing data, organizing curriculum, tracking instruction, measuring performance, and interpreting results as envisioned by SchoolNet are complicated undertakings that can take years to achieve. As was evident in this study, the provider and their partner school districts are still in the relatively early stages of grappling with how to implement and use these kinds of systems on a wide scale. The challenge is two-pronged. First, technology products that actually work and can perform desired tasks must be created and refined as the needs and tools change. The second difficulty is that of fostering practices throughout a district that enable data analysis that is relevant and useful. As the SchoolNet reform has matured, provider representatives have reached similar conclusions, arguing that altering the culture is more difficult than building the technology. The three schools in this study faced challenges both with the technology and with adopting the data management and analytic practices envisioned by the district and SchoolNet.

As a reform predicated on the use of a technology tool, the reliability and efficiency of that tool was critical. Teachers and administrators needed the data generated by the SchoolNet system, upon which data-driven decision making was expected to take place, to be accurate and up-to-date. At SN2, the unreliability of the data greatly weakened teacher use and interest in SchoolNet. To voluntarily use the system, school staff in this study also needed to believe that the SchoolNet modules were efficient uses of their time. They needed to be convinced that this system was faster and easier than accessing other available data systems or simply walking to a file cabinet. Despite professional development, many school-level interviewees remained quite skeptical.

In addition to the inherent technological and data management challenges posed by this kind of reform, three characteristics of SchoolNet's implementation approach provide further explanation for the findings observed in this study. First, the reform targeted the district as its point of entry and on-going collaboration. This was a logical focus, given the systemic data demands of the reform. However, this decision had implications for implementation. By focusing the reform work at this level, district decisions and responsibilities around the reform assumed paramount importance in directing the roll out and continued sustainability throughout the school system. Also, with SchoolNet knowledge and awareness of priorities and progress centered at the district office, the provider relied on this office for information about school-level use. SchoolNet liaisons who oversaw the district partnership typically had little direct communication with teachers in the three schools to learn how they were using the products, where they encountered obstacles, and where they found value.

Second, the flexibility to tailor SchoolNet products and services to district demands lent further strength to an already powerful district role. Such malleability enabled SchoolNet to adapt their products to the needs and demands of their partner districts. "We need to be flexible to essentially support whatever kind of performance or quality model that the school district is pursuing," noted a SchoolNet representative. As such, the design offered an evolving selection of products, supports, and services from which districts essentially build their SchoolNet reform. In the three study sties, this paved the way for considerable district discretion regarding what components of the reform to implement and the ways to go about implementing them. The ramifications of district decisions about selected supports and services were often not fully apparent for quite a while as was evident when the SN1 district administrators realized they needed to revamp their approach to fostering teachers' SchoolNet-use, instituting mandatory reports and dramatically increasing on-site support to all high schools in the district.

Third, SchoolNet's professional development for these districts was a short, turnaround training session supplied by district or school staff. While this approach was attractive as a low-cost method to introduce a large number of teachers to the reform, it also passed training costs indirectly to the district or school, which did or did not invest the level of resources needed to achieve deep changes in teacher practice. Evidence of these challenges was found in the three schools: trainers often did not feel prepared and the sessions were described as brief and primarily required only the passive participation of teachers. While teacher interviews revealed considerable school-level support for the idea of data-driven instruction, the specific problems data-driven reform were supposed to address and how such practices could be operationalized through SchoolNet were often much less clear. The disconnect articulated by teachers between general support for data use and less clarity regarding specific problems that use of SchoolNet data could address suggests that for many teachers, the professional development they had received had yet to fully prepare them to adopt the meaningful data-driven practices using SchoolNet that were sought by the district.

B. District Role

Ultimately, the district determined what SchoolNet data teachers had access to, what teachers were asked to do with that information, and how they were trained and supported in these efforts. The nature of the district's

commitment to the reform and how it fits into district priorities was different across the three schools in ways that seemed to influence both the strategies selected to foster school-level use, and the intensity with which these strategies were instituted. Also, district methods of supporting, monitoring, and mandating participation had differing impacts on use found at the three high schools. The district-school relationship itself may have had some influence on teachers' willingness to adopt the reform as we observed at SN3.

In the SN1 and SN3 districts, SchoolNet was a core strategy to realize district goals for improving student performance and aligning curriculum. The technology and the curriculum and instruction departments were described as united in their commitment to this initiative. SchoolNet views collaboration between these two departments as critical to implementation: "Without that shared vision, it's almost impossible to implement" (SchoolNet Representative). In the SN1 and SN3 districts, substantial district resources were garnered from multiple departments to support implementation of the reform. Finally, district administrators involved in the initial selection of the reform continued to support the initiative. In contrast, the loss of this collaboration weakened the focused push from the SN2 district to foster SchoolNet use at the high school. With ambivalence emanating from the SN2 district office, school leaders felt little pressure to continue to use the reform in the school.

District strategies to facilitate school-level use of the reform were a combination of mandates, supports, and monitoring. Those strategies characterized by more detailed instructions and more substantive applications of SchoolNet-generated data appeared to more closely prompt the kinds of analytic practices envisioned by the district office and SchoolNet. The standardized benchmark reports required of SN1 teachers accompanied by increased on-site support from the district's technology office illustrates this point. Not only were the requirements and supports more fully articulated, they were instituted throughout the school system. The district held expectations of principals for data reporting, analysis, and planning. In turn, the principal required teachers to complete the classroom benchmark reports that would inform this building-level analysis. SchoolNet use was also monitored through the review of these reports. While the SN3 district office appeared to offer a wide array of supports to facilitate teachers' SchoolNet use, teacher use at the high school was largely voluntary in 2005. Where it was required, district expectations for use were less specified. It is not surprising that in the context of fiscal uncertainty and strained relations between SN3 and its district office, a reform that did not generate a lot of teacher buy-in on its own encountered the strong faculty resistance evident during our 2005 visit.

Implementing the SchoolNet system even on a superficial level is a major investment of financial and human resources. The districts shaped the course of the reform by determining which products, supports, and services to provide. The district offices made such decisions within the context of competing priorities and available financial and human capacity. As a dynamic and tailored implementation process, the ability of the district to identify, fine-tune, and deliver needed supports was critical to deepening implementation and use once the design was rolled out to schools.

C. Leadership

Designed to operate on a district-wide scale, implementation of SchoolNet in the three schools was a top-down process. The role of school-level formal leaders as intermediaries in the implementation played a critical role in supporting or discouraging SchoolNet use at the three schools. At each level of the system, enactment of the reform called for managers to both monitor and support SchoolNet use by their subordinates. However, the specific roles of school and other formal leaders in supporting SchoolNet were left to districts to determine.

School leaders were key conduits to realizing district ambitions for SchoolNet use among teachers. These leaders influenced SchoolNet implementation in two ways. First, leaders played a critical role in ensuring that

school staff accessed and used SchoolNet. Second, leaders provided support to teachers and/or administrators interested in accessing and using data.

Among the schools in our sample, SchoolNet use was clearly associated with steps taken by school leaders to ensure compliance. Where such steps were absent, there was little evidence of teacher use. At SN1, we found that the accountability structure put in place required the principal to meet regularly with other principals and district staff to review student performance data in a variety of areas. Principals were thus required to review data on an ongoing basis, and were held publicly accountable for improving performance. In response, the principal required that teachers in the designated subject areas use SchoolNet to review the performance of their students on regular benchmark assessments. Department heads were charged with facilitating this process. Teachers were required to complete assessment forms documenting the relative strengths and weaknesses of their students, and outlining strategies for improvement, thus ensuring wider teacher access to SchoolNet data. Conversely, the SN2 and SN3 district offices placed few demands on school leaders to foster teachers' SchoolNet use. When both schools were headed by school leaders who did not highly value the reform, these individuals did not encourage teachers to use the system, and few teachers reported voluntarily accessing the system.

Support for teachers' SchoolNet use was the other critical function of school leadership in implementation. This was best illustrated by the case of SN2, where leadership turnover at the school (coupled with district staff turnover) resulted in a dramatic shift in the overall level of support for SchoolNet use. During our first year of data collection, school administrators and department heads made important contributions. Despite some ambivalence regarding SchoolNet, the new principal organized professional development around the review of student performance data, and encouraged the school's site-based management committee (which was charged with developing a school plan, schedule, and budget) to review performance data as part of the planning process. The widely respected assistant principal supported teachers by accessing and printing reports from SchoolNet for teacher review and some department heads provided follow up support for teachers who had attended professional development. One year later, the assistant principal responsible for SchoolNet was no longer at the school. Both her replacement and the principal began to actively discourage teachers from using the system. This turnover in leadership positions and the resulting drop in support coincided with the significant reduction in SchoolNet use described in the 2006 interviews with school staff.

VI. Summary

This case study is one part of a larger study of high school improvement. It provides an account of the design, teacher and administrator understanding, enactment, and perceived effects of one high school improvement effort and its manifestation in three high schools. This work is *not* an evaluation of the high schools, the school districts, or SchoolNet. Instead, we focused on specific experiences enacting and using SchoolNet and explored variables that help explain why implementation proceeded as it did in these three schools during the study period. Also, this case study does not draw conclusions regarding whether SchoolNet should be more or less involved in shaping the course of implementation in their partner districts. For many school districts, a highly-tailored approach to implementation that allows considerable district discretion is very appealing. Such an approach permits districts the flexibility to integrate their preferred content into the SchoolNet system, and direct attention and resources to areas they deem to be a priority. What this case study does suggest is that considerable district discretion was accompanied by considerable responsibility and effort on the part of district and school leaders in order to generate widespread and deep use of the SchoolNet system by school-level educators.

In particular, the experiences of these three high schools and districts implementing SchoolNet offer four key areas for further consideration for providers of data use reforms and those schools and districts engaged in or exploring the adoption of such strategies.

As a large-scale technology reform, SchoolNet implementation and use relied on the sustained investment of human and material resources. While the upfront investment to build a data system and computer infrastructure is significant, it was only the beginning in the three high schools and districts implementing their SchoolNet system. Accurate and relevant data collection, management, and analysis were practices that needed to be developed and maintained over time. This necessarily involved the collaboration of multiple district offices, schools, and individuals in a system-wide initiative such as SchoolNet. Furthermore, fostering teacher use of the data in ways that guided individual instructional practice placed large demands on teachers' time to explore possible uses of the data and demanded intensive, well-developed, long-term support.

Implementation strategies and supports sometimes threatened core reform goals. In crafting both a design and an implementation plan, SchoolNet providers and their district customers contended with the district's funding and capacity constraints and competing priorities. When incentives were strong to contain implementation costs, lower investments risked undermining key goals for the SchoolNet system. For example, SchoolNet and some district staff identified SchoolNet's turnaround training as an attractive, low-cost strategy that also built local capacity around the reform. However, this approach also ran the risk of diluted exposure as reform ideas traveled through intermediary trainers in the three high schools. When the intermediary lacked a deep understanding of and/or appreciation for the design, these individuals were more likely to foster superficial use of the reform.

A combination of carefully constructed mandates, supports, and monitoring jumpstarted reform use when teacher buy-in was low at one school. While initial skepticism was high among SN1 teachers, mandated activities that were well-constructed and made meaningful use of the SchoolNet system in combination with comprehensive and responsive supports, and ongoing monitoring prompted teacher use of the system. The benchmark reports required of SN1 teachers and the principal led school staff to begin analyzing SchoolNet-generated data in specific ways desired by the district. This requirement was accompanied by additional on-site assistance and monitoring.

As a systemic reform, SchoolNet needed strong and sustained support from formal leaders. SchoolNet use in the three schools relied heavily on formal leadership efforts to champion the reform, encourage school-level use, and coordinate enactment with district priorities. Absent these efforts, teachers were less likely to use SchoolNet. As the case of SN2 illustrates, enacting this kind of reform in a period of uncertainty without consistent commitment from leaders can threaten the reform's long-term prospects.

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