Case Studies of High-Performing, High-Technology Schools: Final Case Report on School J

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Case Report on School J

Education Trust High-Poverty: No  
Education Trust High-Minority: Yes  
Location: Urban  
Grades Served: PK–5

Methods and Data Sources

The North Central Regional Educational Laboratory (NCREL) study of high-performing, high-technology schools was based on a mixed methodology case study research design (Creswell, 2003; Yin, 2003; Greene, Caracelli, & Graham, 1989; Tashakkori & Teddlie, 1998). The research team elected to use quantitative methods to build on findings from previous studies of what educational technology schools use (Anderson & Ronnkvist, 1999), how schools use educational technology (Becker, Ravitz, & Wong, 1999), and conditions under which educational technology have helped raise student achievement (Mann, Shakeshaft, Becker, & Kottkamp, 1999; Chang, Henriquez, Honey, Light, Moeller, & Ross, 1998; Wenglinsky, 1998). On the other hand, qualitative methods enabled exploration of characteristic uses of educational technology in high-performing schools that may contribute to the academic achievement of low-income, African-American, and Latino students.

Previous studies in both the qualitative and quantitative literature have generally proceeded from a specific use of educational technology to a consideration of its effects on some measure of student achievement, ranging from instruments designed by teachers or researchers to standardized tests. The NCREL study proceeds from success on state achievement tests at the school level to an exploration of educational technology in successful schools. The initial research questions for the case studies were:

- What effects on student achievement do administrators and teachers in high-performing, high-technology schools attribute to educational technology?
- What types of educational technology do administrators, teachers, and students use in high-performing, high-technology schools?
- What educational technology practices do administrators and teachers in high-performing, high-technology schools employ?
- What educational technology policies do administrators and teachers in high-performing, high-technology schools implement?
- How does the technology capacity of high-performing, high-technology schools affect administrator, teacher, and student use of educational technology?
- What resources, strategies, and structures do schools use to become high-performing and high-technology; to what extent are these integrated with other school improvement efforts?

The NCREL research team defined “high-performing” to mean that students’ reading and mathematics performance on statewide achievement tests was in the top third among all schools.
in the state at the same grade level during the 1999–2000 school year. This definition was chosen to be consistent with No Child Left Behind requirements for adequate yearly progress in both subjects. The NCREL definition represents a subset of schools identified by The Education Trust in which students’ reading or mathematics performance was in the top third among all schools in the state at any grade level in 2000 (Jerald, 2001). The research team used Education Trust definitions of “high-poverty” and “high-minority” without modification to identify high-performing schools with predominantly low-income, African-American, or Latino student populations. The research team identified all schools that met the NCREL criteria for high-performing and The Education Trust criteria for high-poverty or high-minority in 10 states were selected on the basis of geographic distribution and size of low-income, African-American, or Latino student populations.

The research team then surveyed principals of qualifying schools to identify those that used educational technology most intensively, regardless of how they used technology (Sweet, Rasher, Abromitis, & Johnson, 2004). Based on the results of the principal survey, the research team defined “high-technology” to mean schools that reported 50 percent or more of all teachers use technology for professional purposes and assign their students to use technology every school day, and 75 percent or more of all teachers use technology for professional purposes and assign their students to use technology at least once per week. Due to the large number of qualifying schools in one of the 10 states, the criteria was set at 90 percent or more of all teachers using and assigning technology every school day in that state. The research team then conducted telephone interviews with the technology coordinators of all schools that met these criteria and eliminated schools in which the technology coordinator did not corroborate the levels of technology use and assignment reported by the principal.

The research team identified 41 schools that met all criteria for high-performing, high-technology schools with predominantly low-income, African-American, or Latino student populations. In order to encourage administrators and principals to be as forthcoming as possible, the research team pledged that the schools would remain anonymous in all research reports. Twenty of the eligible schools accepted an invitation to participate in case studies. After site visits were conducted, the research team decided to combine one middle school and high school for analysis because they were both located in the same building in a small rural district and respondents in these schools indicated extensive interdependence. In addition, some elementary teachers, also located in the same building, were interviewed and observed during the first site visit because respondents indicated extensive interdependence with the middle school. As a result, the NCREL study included 19 cases of high-performing, high-technology schools with predominantly low-income, African-American, or Latino student populations.

A member of the research team visited each school during the winter of 2002. Open-ended interview protocols provided qualitative data, while classroom observation protocols and survey instruments contained a mix of open- and close-ended items that provided both qualitative and quantitative data. Principals were asked to schedule at least six teachers for 30-minute interviews and 20- to 25-minute classroom observations. Technology plans and school improvement plans were collected during the winter site visit whenever they were available and other documents were collected when offered. Surveys were distributed to all administrators and teachers in each school after site visits were completed. Principals were briefed by telephone on data collection
procedures and asked how many printed administrator and teacher surveys should be mailed to the school. Response rates were calculated based on the number of surveys principals requested, and at least two subsequent telephone calls were made to each teacher to improve response rates.

A case report was drafted based on the triangulation of interview, observation, survey, and documentary (Yin, 2003; Greene et al., 1989). The draft case report addressed each of the original research questions and identified primary and secondary characteristics of each school based on each question. In general, attributes that were reported by a majority (at least one half) of respondents in the school were classified as primary and attributes reported by a substantial minority (at least one fourth) were classified as secondary. Attributes reported in multiple data sources were assumed to be more reliable than those reported in one data source. The draft case report was returned to the principal of each school for review and revised based on comments received from the school.

A member of the research team made a follow-up visit to each school during the spring of 2003. The primary purpose of the second site visit was to observe classroom uses of technology in more depth than was possible during the initial site visit. The research team asked principals to schedule three teachers for a 40- to 45-minute lesson observation, with 30-minute interviews before and after the lesson. The interview before the observation provided a context for the lesson and identified curriculum objectives, instructional and assessment strategies, and planned uses of educational technology. In the interview after the observation, teachers interpreted the lesson and the extent to which curriculum objectives were met, instructional and assessment strategies were effective, and uses of educational technology contributed to lesson outcomes. All lessons that included teacher or student use of educational technology were written up as classroom vignettes and appended to the case report. Finally, the research team prepared a summary for each school based on the revised case report, classroom vignettes, and all data that had been collected from the school.

This report includes the summary, revised case report, and classroom vignettes for one of the 19 high-performing, high-technology schools with predominantly low-income, African-American, or Latino student populations. This school will be designated as School J in this report, which is based on the following data collected from the school:

- Seven teachers and one administrator were interviewed during the first site visit.
- Six classrooms were observed during the first site visit.
- A school improvement plan was collected during the site visits.
- Twelve teachers (40 percent) returned a survey.
- One administrator (50 percent) returned a survey.
- The school returned a technology infrastructure inventory.
- Three lessons were observed during the second site visit.

**Case Background**

School J is a neighborhood elementary school located near the center of a midsize city. The local district serves the surrounding area as well as the city, providing educational services that
include preschool, elementary (PK–5), K–8, middle school (6–8), high school (9–12), and special centers for district-sponsored or cooperative programs (6–12). The staff in the district is predominately white. Somewhat less than one third of students in the district receive free or reduced-price lunches. A majority of the student population of the district is white, although approximately one third of the district’s students are African American. Other groups make up less than 5 percent of the student population.

School J draws most of its student population from the immediate geographic region, an established and diverse urban neighborhood, and many children walk to school. The population in the area has decreased somewhat and the housing remains affordable, which makes the area a frequent “starter” neighborhood for young professionals. The school serves the largest housing project in the area, and many senior citizens also live in the area. Because the immediate community is older, the school is a part of the history of the neighborhood, and it has a good reputation. Many parents, now working in the center city, attended School J when they were children. As with other community schools, families can be found on School J’s playground on the weekends using the ball fields and playground equipment.

School J is a public elementary school that serves more than 500 students in grades PK–5. The student population of School J is substantially more diverse than the district as a whole; about two thirds of School J’s students are African American and the school also has more Asian and multiracial students than the district. Approximately two thirds of School J’s students are eligible for free or reduced-price lunches, twice the proportion for the district as a whole. The state allows any student who would be a minority in a school to attend a different school. About 30 students who reside “out of zone” attend School J by choice; many of these are children of parents who work in the center city. The student population also includes twice the national average of gifted children.

Case Summary

School J has amassed an impressive record of academic achievement covering multiple years. The U.S. Department of Education has designated School J an “A+ School” for three consecutive years. The school also has earned the highest rating on the state’s accountability report card for four consecutive years. The school is known for its high expectations for every student and its strong focus on reading. Students are expected to read during free time, including before school as they gather either in the media center or cafeteria. A branch library is located in the cafeteria so that students may read while eating breakfast. There is no recess at School J. Every available moment during the school day is dedicated to instruction or silent reading. School J houses two after-school programs; one program is academic and the other provides after-school care. The academic program, which focuses on reading, operates from October to April and is attended by students who have scored in the lowest quartile on the previous year’s state achievement test.

The curriculum at School J is aligned with the state standards and teachers use a variety of materials to ensure that all students learn to read, including reading skills, multicurricular instruction, and reading assessment software. The reading skills software program has a strong emphasis on phonics and word skills. The multicurricular instruction software assesses students’ reading and mathematics skills, and delivers interactive curriculum at an appropriate level. The
reading assessment software program helps students choose books at an appropriate reading level and then assesses comprehension of those books. Technology is integrated into the curriculum at School J and is mainly used for assessment and skills development.

Each student spends at least 30 minutes a day using multicurricular instruction software; 15 minutes on reading and 15 minutes on mathematics. Student progress is reviewed monthly in meetings of grade-level teachers. Students in the afternoon program spend an extra 45 minutes on reading activities in the multicurricular instruction software application. In addition, students whose test scores are close to advancing one level on the state test are permitted to use the multicurricular instruction software in the computer lab before school.

The teachers at School J are highly collaborative and consider their own competence as significantly contributing to student achievement. In interviews, several teachers cited the importance of having a reading resource teacher available to work with them. Teachers also are committed to the use of technology, citing communicating with staff and parents/guardians and creating instructional materials as some of the professional uses that have had the greatest effect on their practices. Most teachers also mentioned they most frequently use technology for the aforementioned purposes.

The administrators at School J also are supportive of technology use. When surveyed regarding their priorities for teacher and student technology use, the administrator reported using more technology in the curriculum, instruction, assessment, and testing; improving students’ basic skills; making school improvement decisions more data driven; and publicizing student and school accomplishments among their high priorities. The administrator reported that use of technology for communicating with staff, parents/guardians and other administrators, and keeping administrative records, have had the greatest effect on their practices.

Teachers and administrators use technology to analyze test scores to improve the curriculum and instruction as well as setting achievement goals. Data analysis also serves to identify achievement gaps among groups of students and provide assistance. For example, the after-school program is attended by students who have scored in the lowest quartile in the previous year’s state achievement test. There is a firm belief at the school that multicurricular instructional software meets students at their level and moves them up via targeted instruction. Teachers reported that the multicurricular instruction software and reading assessment software are the two software titles that have the greatest effect on student achievement, and these are the two most frequently assigned. Teachers mentioned that student use of technology to remediate and master skills, analyze information, and explore concepts were among some of the student uses of technology that have contributed to their achievement.

Factors such as technology support staff, beneficial discipline policies and scheduling, the availability of grant funds, acquisition and maintenance of new hardware and software, and the general adequacy of technology resources were all cited by interview respondents as contributing to technology use at the school. Some obstacles mentioned were burdensome grant expectations, inadequate funding, and occasionally malfunctioning technology.

Teachers and administrators try to keep parents and the community involved with School J. School J enjoys a close relationship with the employees of a nearby office. Employees of this
office are allowed one hour a week to volunteer at a school, and since the office is physically close to School J, many choose to volunteer there. The volunteers provide individual tutoring, support for a broadcast team, and various duties designated by the teachers.

**Academic Achievement**

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<tr>
<th>Research Question: What effects on academic achievement do administrators and teachers in School J attribute to educational technology?</th>
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<tr>
<td><strong>Primary Characteristics</strong></td>
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<td>One half of administrators and teachers who were interviewed mentioned classroom materials and supplies, and a supplementary enrichment program as characteristics of School J that contribute to student achievement. Respondents singled out small-group instruction in the classroom, facilitated by a reading resource teacher, as contributing to student achievement. About two thirds of interview respondents referred to software when asked about student uses of technology that contribute to academic achievement. One half mentioned content-specific strategies. Teacher survey respondents most frequently listed education software for multicurricular instruction and reading assessment among the three software titles with the greatest effect on student achievement. Literacy was by far the most commonly reported purpose for use of this software, followed by mathematics. More than one half of survey respondents reported assigning students to use computers at least weekly to improve computer skills, remediate skills not learned, master skills just taught, analyze information or solve problems, learn to work collaboratively, and as free time or a reward for good behavior. Nearly two thirds of survey respondents ranked remediating skills not learned among the three purposes of student technology use with the greatest effect on achievement.</td>
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</table>
When asked what characteristics of School J as a whole have the greatest effect on student achievement, four (50 percent) administrators and teachers who were interviewed mentioned classroom materials and supplies, and a supplementary enrichment program. Three respondents (37.5 percent) mentioned teacher competence, money or grants, software, and communication with staff and parents. Two respondents (25 percent) referred to classroom management, scheduling, direct instruction, student-grouping strategies, content-specific strategies, and computers in the classroom.

Respondents specifically mentioned the reading resource teacher working in the classrooms with students who have the greatest needs, the emphasis on skills development through the use of two reading skills software series, multicurricular instruction software and a reading assessment software application. A characteristic that runs through many of these factors is that School J focuses its resources on meeting the individual needs of all students. This characteristic is indicated by a high degree of consensus among respondents regarding the importance of human resources such as the reading resource teacher, curriculum resources such as the reading skills series, and technology resources such as multicurricular software, as well as how these resources are funded.

Teachers and administrators emphasized that the direct, individualized instruction provided by classroom teachers and the reading resource teacher working together is the main reason that School J has performed so well on the state achievement test. It seems clear, however, that teachers view technology as being among the most important resources they use to help students progress. When asked what student uses of technology at School J have the greatest effect on the student achievement, five respondents (62.5 percent) referred to software. Three respondents (50 percent) mentioned content-specific strategies. Two respondents (25 percent) mentioned meeting individual needs, practice for testing, and the Internet. Much of the value of technology to School J derives from its ability to provide data that teachers monitor and use to determine how to meet individual student needs. As one respondent described the role of technology, “When the students work on either mathematics or reading, we can print out and see what areas they’re having trouble with and help them on those specific skills. I think that’s where it affects the students the most.”

The strong support for education software at School J rests on the belief that multicurricular instruction software has the capability to meet students where they are and move them to the next level through targeted instruction. One respondent noted that students are “able to learn skills ahead of time before I teach them in a classroom or learn skills that are way above their grade levels, or even make up some skills that they were missing from the previous grades.” Because respondents see that capability as a strong contributor to student achievement, student time on the computer has been integrated into the school day in all classrooms. Another respondent observed, “I think because it has shown to be effective that teachers feel that it is an important part of their daily routine and regimen and curriculum that developing and maintaining technology is a process that we think through.”

Very strong support for education software that assesses and develops reading skills also was reflected in the survey results. Teachers who returned a technology inventory survey most frequently reported that multicurricular instruction software (n=9) and reading assessment...
software (n=8) as one of the three software titles that has had the greatest effect on student achievement. The next most common response was a Web browser (n=2). Teachers also were asked to report what students use these software titles to do, and the reported uses were coded by researchers into categories. Teachers most frequently reported that the software with the most significant effect on student achievement assesses literacy (n=9). By far the most common purposes reported for most significant software related to literacy (n=18). The next most common category of purposes was mathematics (n=9).

The technology inventory survey also asked teachers to indicate how often they assign their students to use educational technology for each of 16 specified purposes. Nine respondents (75 percent) reported assigning students to use computers daily to improve computer skills. Eight respondents (66.7 percent) reported assigning students to use computers daily to remediate skills not learned. Seven respondents (58.3 percent) reported assigning students to use computers at least weekly to master skills just taught, and analyze information or solve problems. Six respondents (50 percent) reported weekly computers assignments as free time or a reward for good behavior, and to learn to work collaboratively. Four respondents (33.3 percent) reported weekly computer assignments for the purpose of exploring concepts, models, or simulations, and three (25 percent) for learning to work independently. The purposes for which respondents least frequently assigned students to use computers were expressing themselves in writing, conducting research or gathering information, creating multimedia presentations, creating publications, communicating with people outside the classroom, presenting information to an audience, and publishing their work on the Web; more than 75 percent of respondents reported assigning students to use technology for each of these purposes monthly or less.

The survey then asked teachers to select the three purposes from the list of 16 that have the most significant effect on student achievement, ranking them in order from one to three. Seven respondents (58.3.6 percent) ranked remediate skills not learned in the top three, but only one respondent (8.3 percent) placed it first. Five respondents (41.7 percent) ranked master skills just taught in the top three, and each of them placed it first. Four respondents (33.3 percent) ranked analyze information or solve problems in the top three purposes and three respondents (25 percent) ranked explore concepts, models, or simulations in the top three.
Technology Use

**Research Question:** What kinds of educational technology do administrators, teachers, and students in School J use?

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<tr>
<th>Primary Characteristics</th>
<th>Secondary Characteristics</th>
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<tbody>
<tr>
<td>Survey respondents most frequently reported using computers and printers. Survey</td>
<td>Teacher survey respondents reported using projectors, digital cameras, and scanners.</td>
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<tr>
<td>respondents reported using most hardware daily in a home office or classroom.</td>
<td>Teacher survey respondents reported using e-mail and multicurricular instruction software.</td>
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<tr>
<td>Survey respondents most frequently reported using Web browsers, word processors,</td>
<td>Teacher survey respondents most frequently reported assigning students to use Web</td>
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<tr>
<td>software suites, and reading assessment software. Survey respondents using most</td>
<td>browsers and word processors.</td>
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<td>software daily or weekly in the classroom or at home.</td>
<td>There is significant student use of productivity tools and the Web, although it may not</td>
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<td>Technology use during the school day emphasizes daily student work on education</td>
<td>include all students and appears to be much less frequent than use of assessment and</td>
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<td>software for assessing and developing skills in both the classroom and the computer</td>
<td>instruction software.</td>
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<td>laboratory.</td>
<td>Some students worked in pairs or small groups on a computer in one half of the</td>
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<tr>
<td>Survey respondents most frequently reported assigning students to use computers and</td>
<td>observed classrooms.</td>
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<tr>
<td>printers on a daily basis in the classroom or computer laboratory.</td>
<td>Student use of computers in the observed classrooms was equally likely to include more</td>
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<tr>
<td>Survey respondents most frequently reported assigning students to use education</td>
<td>than half of the students as it was to include few or no students.</td>
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<tr>
<td>software for multicurricular instruction and reading assessment.</td>
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<tr>
<td>Survey respondents reported assigning students to use most software on a daily basis</td>
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<td>in the classroom or computer laboratory.</td>
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<td>Most student technology use in the observed classrooms consisted of one student</td>
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<td>working independently at a computer.</td>
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<td>Classroom observations of teacher and student technology use were generally consistent</td>
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<td>with data reported by survey respondents.</td>
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The administrator who returned a technology inventory survey reported daily use of a computer and printers, monthly use of a camera, and less than monthly use of a projector. Software titles reported by the administrator included daily use of a word processor and e-mail client, and monthly use of a
Web browser. The administrator also reported less than monthly use of presentation software, a spreadsheet, and a database. In the interview, the administrator also mentioned that a team of teachers is piloting an electronic grade book. The use of the computer for this type of record keeping is expected to free up the teachers’ time so they have more time to focus on their teaching.

Teachers who returned a technology inventory survey most frequently reported using a computer (n=12) and printer (n=11). Teachers reported little use of other hardware; three teachers reported using a projector, and two reported using a camera and scanner. Most hardware was used daily (n=21) in a home office (n=21) or the classroom (n=16). Among software titles, teachers most frequently reported using a Web browser (n=13), word processor (n=9), software suite (n=8), and reading assessment software (n=6). Teachers also reported using e-mail and multicurricular instruction software (n=5). Teachers reported using most software daily (n=21) or weekly (n=21); only 12 titles were reported used monthly or less. Teachers reported that almost all of their software use occurs in the classroom (n=41) or at home (n=19); only three titles were reported used in the computer laboratory, and none in the library.

Classroom observations of teacher technology use were generally consistent with data reported by survey respondents. Most teacher technology use at School J takes place during planning and preparation time. Teacher technology use during the classroom observations was limited, consistent with the school’s emphasis on student use of technology as part of the disciplined and busy environment during the school day. Teachers used a computer in two observations (33.3 percent) during the winter site visit. Teacher use of a presentation station (a television monitor or projector connected to a computer for display) and a camera was recorded in one class each (16.7 percent). Teachers used a Web browser in two of the observations (33.3 percent).

Teachers who returned a technology inventory survey most frequently reported assigning students to use a computer (n=11) and printer (n=8). Most student hardware use was assigned daily (n=10) in the classroom (n=14) and computer laboratory (n=10). Among software titles, teachers most frequently reported assigning students to use a multicurricular instruction program and reading assessment program (n=10). Teachers also reported assigning students to use a Web browser and word processor (n=4). Multicurricular assessment educational software and a productivity software suite were each reported twice, and no other type of software was reported more than once. Teachers reported that students use software daily (n=18) in the classroom (n=31) or the computer laboratory (n=20); only four titles were reported used in the library and only one at home.

Classroom observations of student technology use were generally consistent with data reported by survey respondents. Students used computers in five observations (83.3 percent) during the winter site visit. Among other technologies, students used a presentation station (a TV monitor or projector) in two observations (33.3 percent), and a camera in one observation (16.7 percent). Student use of technology during the observations did not follow any single pattern; although one student per computer was most common, being observed in five classes (83.3 percent), pairs of students working at a computer were observed in two classes (33.3 percent), and groups of three and four students per computer were each observed in one (16.7 percent). Students used a Web browser in two observations (33.3 percent), and educational software for reading assessment, reading instruction, and mathematics instruction were each observed in one class (16.7 percent).
The primary student use of technology mentioned in the interviews was multi-curricular instruction and reading assessment software to develop skills, primarily in reading but also mathematics. These programs are all used in conjunction with classroom teaching of the same content. Sometimes some students use computers to review, while at other times students may actually be introduced to a topic by the software before they are introduced to it in class. Teachers view these technology-based reading activities as being motivating to the students. One respondent observed, “That having the [reading assessment software] really enhances the students’ desire to read, even though initially I was kind of hesitant because I thought it would be limiting and that I wouldn’t want to read anything unless it was in [the reading assessment software]. But now the [reading assessment software’s] library is so extensive that almost anything they want to read we have [a reading assessment software] test on it. They’re just highly motivated to read and also be able to comprehend; not just to be flipping pages, but to know what they’ve read and do a good job. I think that’s a real motivator for them.”

Although use of assessment and instruction software in the reading program is clearly the most emphasized student use of technology at School J, there is strong evidence of student use of productivity tools and the Web as well. In the interviews, teachers mentioned that students use the Internet to gain information and use word processors. In one class, students create books about a family member using a variety of media. A technology course with the media specialist constitutes one fourth of fifth-grade students’ special area classes. Students used the computer laboratory for Internet research during classroom observations. Examples of this use include a physical education unit on nutrition, and an accelerated fifth-grade unit on countries. The teacher in the accelerated program reported that using the computer was a strong motivation for her students, as they prefer researching a topic on the computer rather than in an encyclopedia or reference books.

Observed uses of other technologies included an accelerated teacher using a scanner and computer to help students learn to scan and a first-grade teacher used an audio player to play a tape from a reading skills program series story for the entire class to hear. Some teachers who returned a survey reported that technology aided them in researching and planning their lessons, as well as communicating with others both at School J and within the community. One teacher mentioned personally using the computer to gain ideas and lessons. One teacher mentioned accessing information about standards and benchmarks. The computer also is used to prepare and print materials. One teacher mentioned grading papers at home so that time at school can be used for direct instruction of the students.

Overall, students at School J are engaged with technology on a daily basis. Students are likely to be engaged with education software every day and with basic application software such as word processors and Web browsers less frequently. As one respondent observed, “Essentially every day those students are engaged in some form, it may be researching on the Web, it may be word processing on paper, it surely is the [multi-curricular] software. Most at some point in the course of a week and usually a day, they’re taking [reading assessment software] tests. They are in the computer laboratory, in a special area learning typing skills and computer skills and components of technology, the very basics of technology. So it just doesn’t go a day or a week that they aren’t engaged technologically.”
**Educational Technology Practices**

**Research Question:** What *educational technology practices* do administrators and teachers in School J employ?

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<tr>
<th>Primary Characteristics</th>
<th>Secondary Characteristics</th>
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<td>All interview respondents referred to communicating with colleagues and parents among the professional uses of technology with the greatest effect on their practice and student achievement. One half mentioned tracking student data, and assessing or documenting learning.</td>
<td>One third of interview respondents referred to meeting individual needs, the Internet, instructional resources, and professional development resources among the professional uses of technology with the greatest effect on their practice and student achievement. One fourth mentioned practice for testing and software.</td>
</tr>
<tr>
<td>Survey respondents most frequently reported a word processor among the three software titles with greatest effect on their practice. The most frequently reported purposes for using these titles related to communication, instructional materials, instruction, and creating written documents.</td>
<td>Survey respondents reported a software suite, Web browser, and education software for multicurricular instruction and reading assessment among the three software titles with greatest effect on their practice.</td>
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<tr>
<td>Almost all survey respondents reported using technology to communicate with teaching colleagues. Most respondents use technology at least weekly to create instructional materials, communicate with parents or guardians, keep administrative records, and present information to students.</td>
<td>One third of survey respondents reported using technology at least weekly to publish class information on the Web.</td>
</tr>
<tr>
<td>Two thirds of survey respondents ranked communicating with teaching colleagues among the three professional purposes of technology use with the greatest effect on their practice. One half ranked communicating with parents or guardians among the top three.</td>
<td>Two fifths of survey respondents ranked creating instructional materials among the three professional purposes of technology use with the greatest effect on their practice. One third placed presenting information to students and keeping administrative records in the top three.</td>
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When asked about the professional uses of technology that have the greatest effect on their practice and student achievement, all eight (100 percent) of the administrators and teachers who were interviewed mentioned communication with staff, parents, or others. Five respondents (62.5 percent) mentioned tracking student data, and four respondents (50 percent) mentioned assessing or documenting learning. Several factors were mentioned by three respondents (37.5 percent): meeting individual needs; the Internet; finding, creating, or updating instructional resources; and finding professional development resources. Two respondents (25 percent) referred to practicing standardized tests and software. No other factor was mentioned by more than one respondent.

The administrator who returned a technology inventory survey reported using a word processor for purchasing materials and services, an e-mail client for communicating with colleagues and
parents, and a spreadsheet for analyzing student data have had the greatest effect on administrative practice. When asked to rank the top three technology uses from a given list of administrative purposes, the administrator ranked communicating with staff at school first, communicating with fellow administrators second, and keeping administrative records third. In the interview, the administrator primarily emphasized daily use of e-mail to communicate with teachers and administrative colleagues. The administrator discussed occasional use of a digital camera and Web publishing software relating to the school Web site.

Although student use of assessment and instruction software dominates technology use during the regular school day and in the after-school program, only a subset of School J teachers who returned technology inventory surveys reported that this software has had the greatest effect on their teaching practice. Respondents most frequently reported a word processor (n=8) among the three software titles that have had the most significant effect on their teaching practice. Teachers also reported a software suite and Web browser (n=5), among these titles, as well as multcurricular instruction (n=4) and reading assessment (n=3). Teachers also were asked to report what they use this software to do, and the reported uses were coded into categories. Multiple purposes for a software title were each coded into the appropriate category. There was no dominant purpose for use of these titles among teachers at School J. The most commonly reported purposes related to communication (n=8), instructional materials (n=8), instruction (n=7), and creating written documents (n=6).

The technology inventory survey also asked teachers to indicate how often they use technology for each of 10 specified professional purposes. Eleven teachers (91.7 percent) who returned a survey reported daily use of technology to communicate with teaching colleagues. Ten respondents (83.3 percent) reported using technology daily or weekly to create instructional materials. Eight respondents (66.7 percent) said they use technology at least weekly to communicate with parents or guardians, and keep administrative records. Seven respondents (58.3 percent) reported at least weekly use to present information to students. Four respondents (33.3 percent) reported at least weekly use to publish class information on the Web. The purposes for which teachers reported using technology least frequently were publishing student work on the Web, gathering information for planning lessons, and accessing information on best practices; more than 75 percent of respondents reported using technology for these purposes monthly or less.

The survey then asked teachers to select the three purposes from the list of 10 that have the most significant effect on their practice, ranking them in order from one to three. Eight respondents (66.7 percent) ranked communicating with teaching colleagues among the top three purposes with the most significant effect on their practice. Six respondents (50 percent) ranked communicate with parents or guardians among the top three purposes, and five (41.7 percent) ranked create instructional materials in the top three. Four respondents (33.3 percent) put present information to students and keep administrative records in the top three purposes. Two respondents (16.7 percent) ranked publish student work on the Web in the top three. None of the other purposes was ranked in the top three by more than one respondent.

In the interviews, teachers described how thoroughly assessment and instruction software is integrated at School J. Each student at School J spends 30 minutes per day on the computer using a multcurricular instruction application’s individualized instructional modules, 15 minutes in
reading and 15 minutes in mathematics. As students progress, the software takes them to the next level. Teachers can print out student progress reports weekly or more frequently, if needed. At monthly meetings of grade-level teachers with the administration, progress of students is reviewed and plans made to help individual students. The students in the after-school program spend an additional 45 minutes on the multicurricular instruction software’s reading program. A select group of students, whose test scores are close to advancing one level on the statewide standardized test, can use the computers in the computer laboratory before school to work on the multicurricular software as well. They often spend 20–30 minutes before school working on the multicurricular software’s reading and mathematics activities. Students also use computers in the classroom for reading comprehension tests with the reading assessment program.

Six observations were conducted during the winter site visit at School J; one first-, one second-, one fourth-, and three fifth-grade classes were observed. Three observations took place in classrooms, one in the computer laboratory, and one in the library. Mathematics and computers or technology were each the dominant subject in two of the observations, and language arts and physical education were each the dominant subject in one of the observations. Four different types of activity structures were observed, with adult-led large group being the most common. However, individual work was the dominant activity structure in one half of the observations.

Student use of assessment and instruction software at School J appears to be shaped to a great degree by an interesting strategy of direct instruction in small groups. The small-group instruction is facilitated by a certified reading resource teacher who works with groups of children where the learning need is greatest, as identified collaboratively by the school staff. This practice was frequently mentioned by respondents who were interviewed and seems to create an atmosphere of flexibility that may sometimes be missing in schools that emphasize direct instruction. In the interviews, teachers commented on the flexibility of being able to work with groups of six children at a time through the use of the resource teacher and also utilizing computers in other teachers’ classrooms. One respondent described the practice this way: “That person comes, they have group of six. So the nice thing about it is I’ll have a group of six. The other teacher will have a group of six. A group of six will be on the computer working at that time. So everybody is busy doing something. Another group of six will move to another classroom and use their computers and kind of get it done in that same amount of time and so everybody’s working on something and nobody’s being unattended.”

Educational Technology Policies

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<th>Research Question: What educational technology policies do administrators and teachers in School J implement?</th>
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<td><strong>Primary Characteristics</strong></td>
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<td>There were no district, state, or federal policy benefits or obstacles identified by a majority of respondents.</td>
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The administrator technology inventory survey asked respondents to indicate the priority of 20 given objectives for educational technology for their school in a scale of one to five, with one being the lowest priority and five being the highest priority. The administrator at School J who returned a survey gave the highest priority to using more technology in curriculum and instruction, using more technology in assessment and testing, improving students’ basic skills, making school improvement decisions more data driven, and publicizing student and school accomplishments.

Most respondents at School J did not report any policy benefits or obstacles. Two (25 percent) of the administrators and teachers who were interviewed referred to meeting individual needs as a benefit of school or district policy. Two respondents (25 percent) also said there were none or they were unsure of any school or district policy benefits. No other response was mentioned by more than one respondent. The district provides technical support, manages the systems, maintains servers and firewalls, and provides information to parents about student access to state Web sites. Although the role of the district was generally viewed favorably, there were some negative comments. Some respondents maintain that the district has too many controls, the firewalls prevent access, and the server crashes and students are then unable to work. One respondent concluded that, “I don’t think that the district policies have helped us at all.” The administrator who was interviewed mentioned money or grants as a state policy benefit, and plans or standards as both a benefit and an obstacle. The administrator also mentioned money or grants as a federal policy benefit, but said that grant expectations are burdensome.

School J’s own policy regarding student use of time before school seemed to be the most important and most favorably viewed policy, although it is not necessarily thought of as such. As one respondent explained it, “We have a media center here which is the main media center and then we have what we call the branch library in the cafeteria. It consists of a huge cart of books and a computer and a kid [to check out books to other students]. Every morning when students come to school here if they’re early, they have to go one or two places. They either have to come to the media center or they have to go to the lunchroom. If they eat breakfast, they go to the lunchroom. If they don’t eat breakfast, they come to the media center. The policy of the school is that every child must have a book to read to start the day and if they come to school early, they sit and read. They don’t talk to their friends or anything like that—they sit and read. So if a child comes to school and they eat breakfast and they don’t have a book, there is a branch library there and somebody to check their book out for them. I think kids having to have a book with them to read at all times and if they have a few minutes certainly has added to their achievements.”

Overall, there appears to be a strong policy about behavior in the school that provides a backdrop for student technology use. One respondent reported that, “There’s a statement, a letter that goes home to my parents at the beginning of the year. Any behavior that interferes with teaching and learning will not be tolerated. And that sounds very harsh and very dictatorial, it’s not. The children, I think, appreciate a classroom where they’re not distracted and our support from our administration allows that.” This respondent expanded on some of the strategies used: “I tell the children, we’re doing this in front of your classmates, but your misbehavior took place in front of your classmates. I’m sorry if you’re offended by the lack of privacy but you made that choice. And so that greatly reduces the number of behavior incidences in my classroom. Getting work
turned in, I have had a line before my classroom. I’ve had to do that some years when the kids chronically do not return assignments. I got the rest of the class going on something and I had my wall of woe and they lined up on the wall and I made them call their mom and dad.”

School J also has a school improvement plan and it is viewed positively by those who mentioned it. According to one respondent, “I think one area that keeps our feet to the fire is our own school improvement plan. We involve our parents and community, but our teachers really are the force behind developing the school improvement plan, writing the school improvement plan, and implementing the school improvement plan each year. So each year we tweak what we’re doing in the way of instruction. We look at our data, we look at our needs assessment, the climate of our school and decide within that, how can we change? How can we improve? That’s a document but we’re accountable to that document.” School J has a goals committee whose annual task is to update the school improvement plan.

Technology Capacity

**Research Question:** How does the technology capacity of School J affect administrator, teacher, and student use of educational technology?

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<th>Primary Characteristics</th>
<th>Secondary Characteristics</th>
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<td>Technology is accessible to both teachers and students, with an average of four computers and one printer in almost every classroom. About 40 percent of classroom computers at School J are newer models capable or running current software. Almost 90 percent are connected to the Internet. The school has a computer laboratory in the media center with 31 computers and two printers. About one half of the computers are newer models and all are connected to the Internet. School J has invested in a variety of application and education software titles. The greatest numbers of education software titles were mathematics skills, science, and social science programs. Most respondents expressed favorable views of technology resources, accessibility, and support. Only one respondent viewed technology resources as inadequate.</td>
<td>More than one third of interview respondents referred to Internet research as a characteristic of School J’s technology environment that contributes to student achievement. One fourth mentioned each of the following: incentives rewards, or games; communication with staff, parents, or others; technology aids job, life, or future school skills; technology motivates students or is fun for students; and technology is used for typing, editing, or writing.</td>
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School J is wired and e-mail is available to teachers and staff. Classrooms have between six and eight computers, one or two printers, a TV and VCR, an overhead projector, and one or two
audio players. All of the observed classrooms at School J had four computers that were used to run the multicurricular instruction software for individualized instruction in reading and mathematics, and two older computers that were used for the reading assessment software. At least one classroom has a laser printer. School J’s media center includes a computer laboratory with an LCD projector, two printers, and a scanner. Teachers may sign up for class time in the computer laboratory. The media center also had a broadcast studio, which was used by the same two or three students each day and had five or six additional students rotate in once a week.

On the technology infrastructure inventory survey, School J reported having an average of 6.3 computers per administrative or teacher office, 4 computers per classroom, 3 computers per library, and 31 computers in the school’s only computer laboratory. Almost one half of all computers are newer models capable of running current software, and these are distributed relatively evenly among the different locations, with the exception that the libraries have only one of these newer models. All of the computers in the administrative or teacher offices and the computer laboratory are connected to a local area network (LAN) and the Internet. Nearly all (89 percent) of the computers located in classrooms are connected to a LAN and the Internet. The school reported having 11 printers in offices, three printers in the library, two printers in the computer laboratory and 26 printers in classrooms. All but eight of these printers are laser printers, including 24 of the 26 printers located in classrooms. The school reported having servers for an integrated learning system, LAN, e-mail, the Web, and video.

On the software inventory section of the survey, School J reported owning a total of 72 different software titles; 18 application software titles and 53 education software titles. The application software titles included two software suites, 14 reference titles, and two media titles (one for print creativity and one for digital imaging). The education software titles included representatives from a number of coding categories, with the greatest number of titles falling into the mathematics skills, science, and social science categories. It is interesting to note that, although specific multicurricular instruction and reading assessment software programs appear to account for the preponderance of student technology use at School J, there are numerous other education software titles available.

All of these technology resources are generally viewed as being accessible. One respondent noted that, “The media center is open 45 minutes before school starts. It essentially stays open till 6 o’clock at night because it is used by the after-school program afterward.” Teachers also depend on the reliable tech support at School J. During one classroom observation, the reading assessment program was up and running on only one computer and many students were ready to use it. The teacher had a student go to the media center to tell the technical support person that they needed help. The support person immediately came into the classroom and got the program working on all the computers.

The only comments regarding inaccessibility of technology resources involved teachers’ access to server information from home. Teachers value being able to work on lesson plans and student data off site; however, when the district put a firewall on all networks, it became impossible for School J teachers to access their school computers from home. The district is working on solving this problem, but it will still be more cumbersome than it was previously to access school computers from their homes. Overall, the technology capacity of School J appears to be
sufficient to support a high level of comfort with technology among administrators, teachers, and students. In the observed classrooms, both teachers and students were very comfortable with technology, and students were self-directed on the computers, even at the first-grade level.

When asked what characteristics of School J’s technology environment facilitate use of technology in ways that contribute to student achievement, Internet research by students and other ways that technology aids learning were each mentioned by three interview respondents (37.5 percent). Two respondents (25 percent) referred to each of the following: incentives, rewards, or games; communication with staff, parents, or others; technology aids job, life, or future school skills; technology motivates students or is fun for students; and technology is used for typing, editing, or writing. No other factor was coded for more than one respondent.

**Resources, Strategies, and Structures**

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<tr>
<th>Research Question: What resources, strategies, and structures does School J use to become a high-technology school, and to what extent are these integrated with other school improvement efforts?</th>
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<td><strong>Primary Characteristics</strong></td>
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<td>More than one half of teacher interview respondents referred to direct instruction, a grouping strategy, classroom materials and supplies, a supplementary enrichment program, and hardware other than computers as resources, strategies, or structures they use in their classrooms that contribute to student achievement. The reading resource teachers, paid from Title I funds, are highly valued for the direct instruction in small groups that their presence in classrooms enables.</td>
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When asked about their classroom learning environment and the resources, strategies, and structures they have used to create that environment, four (57.1 percent) of the teachers who were interviewed mentioned direct instruction, a grouping strategy, classroom materials and supplies, a supplementary enrichment program, and hardware other than computers. Three respondents (42.9 percent) referred to classroom management. Two respondents (28.6 percent) mentioned class size, physical space, print resources, a computer laboratory, computers in general, other instructional practices, and communication with staff, parents, or others.

Respondents were generally favorable about the resources they had and believe they have the resources they need. One resource that appeared to be highly valued by a number of respondents was the reading resource teacher. This person is a certified teacher, rather than being an aide. A certified resource teacher allows for flexibility in scheduling so that more small-group direct instruction can take place, ability groups in reading can be instructed together, and also that students who need the most help can be identified and supported. One respondent described the
resource teacher as “a commitment the school’s made even as money got tighter. We would let
go of other things to make sure we had that person and having a good amount of time with
them.” Another respondent observed that “our resources have gone to things that directly impact
student achievement: more teachers, smaller class size, materials, technology, direct instruction;
with the direct instruction program specifically at reading and mathematics manipulatives.”

The administrator who was interviewed referred to parent involvement, a school improvement
plan or unified vision, and money or grants as resources, strategies, and structures that have
contributed to School J’s overall learning environment. The administrator mentioned community
resources or support, teacher commitment to technology, and money or grants as resources,
strategies, and structures that have contributed to School J’s technology environment.
Administrators at both School J and the district are generally viewed as supportive of
technology. Some respondents reported that School J was a pioneer in the district in the use of
technology. They wired their own local area network before the use of computers was
widespread in the district, and secured Internet access through a donation from a
telecommunications provider. One respondent observed that technology has “been embraced
here, embedded here and it’s believed in here, but not just in the last four or five years. This has
been the last 10 or 12 years at least and before that. So it’s a way of work and technology is part
of the environment here.”

In terms of funding, School J receives Title I money and appreciates the flexibility of those
funds. Respondents observed that the district provides some, but not enough, dollars for
upgrading technology. According to one respondent, a half-cent referendum that just passed will
“raise millions of dollars for capital outlay projects in schools. One piece of that has to be spent
on technology so we’re real excited that we’ve been maintaining the computers that we have,
maintaining the programs that we supported, that we’re going to now really be able to have the
upgrades and implement some of the new strategies and pieces of our technology environment.”
The primary resource problem affecting technology at School J is the lack of state funds.
According to respondents, categorical money for technology in FY02 became flexible, and
superintendents were able to use it for items other than technology. As a result, School J did not
receive any computer upgrades in FY02 and will not in FY03.

Classroom Vignettes

Three classroom observations involving teacher and student technology use were made at School
J. Two observations were made of classes whose dominant subject area was language arts, with
an emphasis on reading; the first was of 14 first-grade students, and the second was of an after-
school program attended by 10 fourth-grade students. A third observation was made of a class of
nine accelerated fifth graders; this lesson was primarily focused on computers and technology,
with some secondary emphasis placed on mathematics. In each of the three observations, both
computers and other technologies were used by both teachers and students alike in support of the
day’s lesson for each class.

In each case, teachers were interviewed before the lesson to establish a context for the lesson
observation that follows and an understanding of how instructional strategies and technology will
be integrated to facilitate student learning. Teachers also were interviewed following each
observation to provide a lesson interpretation and understanding of the role of technology in achieving specific lesson outcomes. All three classroom observations are detailed below.

First-Grade Language Arts Lesson

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<td>Teacher Hardware Used:</td>
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<td>Student Software Used:</td>
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The two teachers who led this language arts lesson indicated in an interview before the lesson was conducted that it was designed to reinforce the pronunciation of sounds such as “ph,” “wr,” “oi,” and “oy.” The teachers used three reading skills software applications as resources informing the development of this lesson and connecting it to specified school and district standards relating to the instruction of language arts. The teachers indicated a plan to combine multiple instructional strategies, including direct and small-group instruction, and would utilize computer assisted technology and software such as a reading assessment and a multicurricular instruction program to reinforce the day’s concepts and ideas. Students would use a tape recorder to learn audibly the pronunciation of different words, a computer for more hands-on work in reading and interacting with passages, and workbooks to model the pronunciation of words and offer reading passages for students to practice with both in groups and individually.

The observed first-grade classroom had two kidney-shaped tables, but the student desks were mostly in clusters of four, with a few single desks situated apart from the others. There were 14 students in the classroom; four students were in the accelerated program on the day of observation, and two students were absent. The classroom was equipped with six desktop computers, two audio players, and one printer, overhead projector, video player, and television. Students moved between the computers, the kidney-shaped table, the floor, and their desks as they worked through their morning activities. The walls were covered with visual prompts, student work, bulletin boards, and posters. Trade books, manipulatives, and textbooks were readily available. This classroom was well equipped and colorful. During the lesson, the teachers was briefly observed using both a computer and an audio phone; students were observed using computers at a rate of one student per computer for a duration of approximately 5–15 minutes. Both teacher and students were observed using the reading assessment software and students also used the multicurricular instruction software.

The first-grade classroom had a reading resource teacher present during the 45-minute observation. The observation began with one teacher handing out paper books and worksheets based on reading skills software reading. One group of students read aloud from the book they were provided with and, during this process, the teacher provided consistent feedback to students based on the reading and pronunciation skills they display. When finished, the teacher asked students to answer comprehension questions related to the text. Meanwhile, the other teacher
directed a group of five students at the computers working with the reading assessment program. The students used this software application to practice their pronunciation of words, and the teacher offered feedback to her students based on their work with this application. Another group of students worked together on the floor, practicing their reading and pronunciation skills with a partner; in some situations, students chose to work independently on their reading while seated at their desk or a table.

After 10 minutes, the students rotated groups; during the course of the observation each reading group was rotated to each of the three stations in the classroom (direct instruction, computer use, and individualized practice). Once every student had been rotated through each group, students were asked to work independently at their desks completing a worksheet designed to evaluate whether students understand the content of the day’s lesson. Finally, the teacher brought the entire class back together on the floor, and played a story for the children on the audio recorder; this story emphasized the particular sounds that the lesson was focused on. Students repeat the sounds aloud as prompted by the tape. The lesson concluded with the teacher reviewing the worksheet completed by all students, reinforcing the day’s lesson, and offering the students another opportunity to practice speaking words aloud.

After the lesson, the classroom teacher felt confident that it effectively reinforced specific patterns and sounds previously taught as intended. Utilizing multiple instructional methods allowed students to hear sounds, see them in written form, and then perform them for themselves both verbally and in written form. The teacher felt strongly that, in addition to enabling teaching students to conceptualize the day’s topics from each of these perspectives, using these varied instructional methods also helped her to differentiate instruction based on students’ individual learning styles. The classroom teacher indicated that technology was integral to the lesson because software both helped teach the lesson and provided a convenient way to gauge student achievement. The teacher noted that the software used in this lesson is linked to content-area standards and lesson objectives, and the teacher generates reports from it on a weekly basis to identify areas of progress and deficiency to help guide the planning of future lessons.

### Fourth-Grade Language Arts Lesson (After-School Program)

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<td>Grade:</td>
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<td>Teacher Hardware Used:</td>
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<td>Student Hardware Used:</td>
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The next classroom observation was made of 10 fourth graders in an after-school program designed to assist students with reading and mathematics content. This program was open to third-, fourth-, and fifth-grade students who were chosen to attend based on low performance on the state achievement test. Students selected to participate in this program attended two hours a
day, two days a week during the months of October through February. The program offered separate classes for each grade level, with approximately 12–15 students enrolled in each class.

The purpose of the class observed on this day was to review specific concepts the students have been exposed to in both the reading and mathematics content areas and to offer practice in areas that students have not yet mastered. The teacher indicated before the observation that the lesson would be closely tied to state standards because the after-school program is a direct response to student performance on the state achievement test. Prior to the observation, the teacher reported that a variety of instructional strategies and technology would be incorporated into the lesson. Students would work with the multicurricular instruction application completing reading and mathematics sessions, which would allow the teacher to calibrate the tutorial to the current level that each student is at and record student performance in the progress of carrying out the lesson. In addition, students would work on a reading assignment using reading skills software and complete reading cards. Small groups of six or fewer students, facilitated by the teacher, would learn how to distinguish key points from less important details in a reading passage.

Ten students were present in the classroom for the observed lesson. The classroom was laid out in rows of individual student desks with additional kidney-shaped tables that could accommodate a teacher and six students. The classroom was rich in printed material and student work on the walls, and nearly every surface of the classroom was covered with something related to learning. The classroom was equipped with six desktop computers, one printer, one video player, and one television. During the lesson, the teacher was observed using a computer for a five-minute time period. About every two of four students were observed using a computer for more than 15 minutes; students also were observed using a Web browser application as well as the state’s computerized program designed to help students prepare for the state assessment test. No other student or teacher technology use was noted.

The teacher used direct instruction in reading with a group of six students while the other four students worked individually on reading activities in the multicurricular instruction application at a computer. Talking while at the computers was discouraged, and the teacher expected those students to work quietly while she instructed the group at the table. While working with the group of six students on a reading activity, students first were asked to work independently on a review for the state assessment test. Then, students were given a story to read to themselves at first and, then aloud as a group. In doing so, the teacher occasionally asked students to pause for a moment so she could correct pronunciation, ask a probing question related to the reading passage, share an anecdote connected to the story, and so on. When finished reading, students were asked to complete a worksheet related to the reading. When the students finished, the teacher reviewed the answers with the group; when an incorrect answer was suggested by a student, the teacher once again reviewed that section of the text with the class to assist them in deciphering the correct answer. While this lesson was intended to help students master the reading content of the state assessment test, this activity also was designed to teach students the strategy behind taking the test. When it was apparent to the teacher that students were guessing at their answers, she reminded the group of the inappropriateness of guessing during the test. Instead, she encouraged them to return to the passage and quickly search for something that will inform their answers. At other points in the lesson, the teacher probed the students about their strategy for answering certain questions if they were to come across them again on the actual test.
During the process of leading this small-group activity, the teacher maintained an active watch over the four students working with multcurricular instruction software at the computer stations; she assisted them when they experienced technical problems with the computers and/or Internet connections, answered questions when asked, and made sure that the students were on task. After 45 minutes, the students changed locations, so that all students would receive about 45 minutes of direct instruction and about 45 minutes of individual computer work.

After the observation, the teacher reported that some students demonstrated progress based on the group reading activity, but most still had a way to go. The teacher indicated that the story used for this activity was particularly hard, which made it difficult for students to retain the information long enough to answer questions about it later. Hence, a significant part of the teacher’s effort during this time was spent on the strategy of returning to the passage to search for the information that will help students formulate an appropriate answer. In the future, the teacher stated that it would be more effective for students to review their answers with a partner prior to facilitating a large group discussion.

Fifth-Grade Computer/Technology Lesson

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At School J, each grade level has an accelerated class one day a week and the students from that grade spend the entire day with the accelerated teacher. The observed lesson was delivered to a class of nine gifted fifth graders. The goal of this lesson was to teach students how to use the Internet to conduct research and to learn to scan pictures onto the computer. According to this teacher, gifted students have an intrinsic need and propensity for working independently, and perform best when they can work at their own pace without being delayed by those students who require more time to complete the task at hand. Hence, the primary instructional strategy used during this lesson was to model the activity and then provide students with an opportunity to do the activity. The teacher indicated that students’ mastery of the lesson content would be assessed through direct observation and a worksheet that students would be required to complete.

The fifth-grade accelerated class began in a room adjacent to the computer lab and then moved into the computer lab. There were nine fifth-grade students present. Students were very comfortable with the computer lab and its resources, which included 24 desktop computers, two printers, one digital projector, and one scanner. The classroom included some student work and a few visual prompts on the walls. Some trade books and reference books were available. This room was next to the computer lab and the media center, and additional resources were readily available. The accelerated classroom also had tables which accommodated five or six students. During the observation, the teacher was observed using a computer for slightly less than five
minutes. Students were observed using a computer for more than 15 minutes, with one student working per computer, and a scanner. Students were also observed using a Web browser, digital imaging, and scanning utility application.

After receiving direct instruction on the instructional task which required students to conduct research on a country, students moved next door into the computer lab to begin their research. All were very comfortable with the computers and began moving to the Internet immediately. The teacher had students working in pairs or individually at computers in the lab while she instructed two students at a time in scanning pictures. Students worked at their own pace on the research and when they finished with their research, they went back into the adjoining classroom or stayed at the computer playing games. Students interacted with each other during the research, sharing information that they located online and helping one another. During this process, the teacher closely supervised students and offered assistance and direction as needed. The mostly male students in this class were very active and moved about the room frequently. The teacher was tolerant of the activity, but redirected students who disrupted others.

In an interview after the lesson, the teacher reported great confidence that the lesson conveyed the main concepts, ideas, and operations that were intended. The activities used were effective in allowing students to independently locate the information they were asked to find and, in the case of scanner use, explore software they were previously unfamiliar with. The teacher reported, however, that some students demonstrated impatience with the computer, such as clicking many times on an icon when there was a delay in opening a file or an application. The teacher indicated that based on the observation and worksheet assessments, all but two students demonstrated a clear competency with Internet research and scanning during the lesson.
References


