Mountain Middle School
Case Report from the
U.S.A. Exemplary Technology-Supported Schooling Case Studies Project

Mountain Middle School: Integrating Technology into the Curriculum to Support Standards-Based Achievement and Project-Based Learning*

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For further information on the *U.S.A. Exemplary Technology-Supported Schooling Case Studies Project*, including additional case reports and papers with cross-case analysis, go to http://www.education.umn.edu/edutech/exemplary

*All names in this case report are pseudonyms

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Mountain Middle School*: Integrating Technology into the Curriculum to Support Standards-Based Achievement and Project-Based Learning

Case Overview

During the 2000-2001 school year, Mountain Middle School had 1,366 students in grades 6-8. It is located in Colorado in an upscale community bordering a major metropolitan area; only 7% of the student population received free or reduced lunch assistance. Approximately 14% of the students are non-white.

The school had a long tradition of focusing on curriculum standards. Students and their teachers at Mountain Middle School used technology to support students' achievement of these standards. This ranged from the use of tool software for students' work on research projects and in the eighth grade Inquiry class, to drill and practice programs for students who were below standard in subjects such as math. The school had several centers designed to support enriched learning opportunities or remediation. The TREK Center allowed students to pursue areas of interest for enrichment or acceleration with the support of technology and media. The Proficiency Center was designed to provide struggling students with individualized or small group instructional experiences that would assist them in working towards basic levels of proficiency in core subjects. The New Start Center provided support for students who were at risk of failing core subjects due to lack of performance.

In 2001, the school achieved Colorado State Assessment Program (CSAP) scores that exceeded state and local district averages in all categories.

Implementation Context

History of the Innovation

The interest in integrating technology into the curriculum has a 12-year history at Mountain Middle School. From the start, Mountain Middle School's staff believed that technology should not be pursued as a set of skills but that it should be integrated within the context of curriculum to support student achievement.

The principal at that time (who is now the district's Director of Middle Schools) strongly believed in the ability of technology to support student achievement and promoted this vision among teachers and parents. The school was one of the first in the state to appoint a full time staff member to integrate technology into the curriculum. This technology integration philosophy continues today and is fully supported by the current principal.

In 1993, the Clear Ridge School District hired a District Technology Coordinator to manage technology resources across schools in the district and to develop a district-wide technology plan. The initial plan, written in 1995 with the help of administrators, teachers, parents, and

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students from across the district, focused on the integration of technology into the curriculum and use of technology to support student achievement.

Over the past 5 years, the emphases on standards and technology have converged in this district. The 1995 District Technology Plan targeted student achievement through the use of technology. The Clear Ridge District Technology Plan 2001, released in December 2000, has a tighter focus on the integration of technology into the curriculum and its use to support standards-based achievement, particularly achievement on the standards-based state test. It identified specific technological and professional development solutions that addressed these goals and ways the accomplishment of these goals would be evaluated. Specifically, goal 1 of the 2001 District Plan was to "enhance student achievement and learning by engaging students in curriculum-integrated technology use rich in standards, thinking, and application of skills". Goal 2 was to "use technology to support increased performance on the CSAP and school report cards".

Correspondingly, in their recent technology plan Mountain Middle School had to identify the learning goals for their students for the 2000-2001 school year and describe how they would use technology to meet those goals. Their target was to use technology to achieve an 80% proficiency rate for 8th-graders in language arts, science, and mathematics.

School Culture, Professional Community

Mountain Middle School is located near the new Denver Tech Center; consequently, a large number of the parents in this community were professionals, many in the high tech industry. According to the school's Student Achievement Specialist, about 85-90% of the students had computers at home; many even had 2 or 3. Of these students, approximately 75-80% had Internet access and most had their own email accounts.

The importance of student achievement permeated the culture in the Clear Ridge School District. This value was embedded in the very titles of the positions, buildings, and programs throughout the district. While some districts have "Assistant Superintendents for Curriculum and Instruction" and some schools have "Technology Coordinators", the District had an "Assistant Superintendent of Performance Improvement" and the staff members responsible for educational technology at Mountain and other district schools were called "Student Achievement Specialists". What in some school districts is called the "Resource Center" was called the "Student Achievement Resource Center" in this district.

The culture of achievement was also very strong at Mountain Middle School and the school's principal was very much a leader in creating this culture. Over 18 months starting in 1999, she met once a week with the Building Council—a team of teachers, administrators, classified staff, and parents—to come up with a shared vision statement. The first component of this vision was the expectation that students will master and excel in the core academic program. More specifically, the expectation was that the curriculum would be differentiated in a way that addresses the diverse needs of students, that technology would be integrated to enhance curriculum and instruction, and that the instructional program would promote growth and achievement of all students. These expectations were reinforced through the hiring, evaluation, and professional development practices in the school. For example, the principal relayed a story

about a candidate for a teaching position at Mountain who commented that standards-based education was "just a buzz word". She said, "He didn't have a shot because he didn't match the culture of what this building is all about and where we want it to be."

The principal actively promoted the integration of technology into the curriculum in support of standards-based achievement. She often acted as an opinion leader in modeling the use of technology. As she put it: "I think sometimes it's leadership that helps them get there by saying 'if we all do this together', with me being one of the learners." The Shared Vision statement the Building Council wrote featured technology as an important part of this statement. She commented on how the shared vision statement focused staff efforts on technology integration:

> It almost becomes your Bible, your mantra for your building, because it's what you fall back on when people are being resistant: "But we all agreed to this, we all said we were going to integrate technology."

Even before the vision statement spelled out the use of technology to support instruction, there had been a widespread expectation that teachers, who were provided with access to technology and support resources, would use technology.

Mountain Middle School benefited from a considerable amount of parental support. For example, many parents participated in volunteer tutoring in the Proficiency Center. And the Parent-Teacher Council Organization (PTCO) was a strong supporter of technology in the school. It raised $80,000 through magazine sales during the year prior to our visit (1999-2000). From its fund-raising efforts, the PTCO has made an annual line-item commitment in their budget of $20,000 a year for technology at Mountain Middle.

The extent of professional development to effectively use technology also made an impact on school culture. As described by the principal, it was more like a situation where "a whole staff can kind of hold hands and jump into the fray together, and where everybody's taking risks, and where everybody's learning together". She went on to say, "I think those are probably the most powerful staff development times I've seen, when a whole building changes."

As a result of this collaborative process and the material and human resources at Mountain Middle School, there has been a large-scale, near-unanimous integration of technology into teaching, creating a school culture oriented around the use of technology to support standards-based student achievement.

Technology and Technology Support Structure

As a consequence of district, school, and parental funding, Mountain possessed significant technological and professional resources. According to the principal, Mountain had over $74,000 in the 1999-2000 school year to spend on technology, between funds from the District, the School's budget, and PTCO contributions. In the 2000-2001 school year, Mountain Middle School had 300 (for the most part networked, multimedia) computers distributed in 2 large computer laboratories for core courses, 3 labs for specialized use such as the Proficiency Center, the media center, other special rooms, and teachers' classrooms. Teachers could schedule the computer labs (each containing about 30 computers) for occasional use. Even when the labs were

being used by classes, small groups of students or individuals could drop in to use a station if room remained. About half of regular classrooms had 3-4 computers in them. In addition, throughout the school there were laser printers, color printers, scanners, devices for digital image and video processing, a CD-writer, and several video projectors.

Almost all of Mountain's computers (93%) were high-end multimedia computers and a large majority of them (83%) were networked and had fast access to the Internet. All the teachers used email accounts and all the students managed personal file folders that were password protected for their work. This allowed students to work at just about any station in the school and store their work in their personal folder on the school server. Access to student and teacher files was made possible through a series of servers and the *Apple Share* network (using Apple Macintosh hardware) throughout the school. These files were not accessible outside of the school building.

The computers were well supplied with software. Most of the software (an estimated 75%) that was used by teachers and students was "tool-based" software, such as presentation software, spreadsheets, word processors, and Internet browsers. The rest of the software was content specific software, such as "Geometer's Sketch Pad" and Riverdeep Learning Systems "Destination Math". In addition, they had mathematical programs, tutorial programs, drill and practice programs, simulations, educational games, presentation software, and music and video composition software. They could also request the purchase of specialized software to support their teaching. Other technologies were also used, such as probeware in science and hand-held calculators in math.

But the technology resources at Mountain were not just the abundant amount of hardware and software. Even more important were the people and the values they held about technology. In addition to the leadership and modeling the principal provided, in the 2000-2001 school year Mountain had both a full time "Student Achievement Specialist" and a Technology Assistant, or hardware specialist. The Student Achievement Specialist (SAS) at Mountain provided a systematic teacher professional development program that included instruction on how to use computers and various software packages, and how to integrate technology into the curriculum, and peer coaching. She also provided one-on-one support to teachers as they planned their lessons and implemented them in the computer labs. The teachers acknowledged that the Student Achievement Specialist was key to successful implementation at Mountain. The Director of Middle Schools described the SAS as critical to technology integration at the school:

> She is someone who can see the instructional implications of what technology can do. She also has a winning personality. She is someone who people like, they trust, she's bright, she helps people see connections where they would never have seen them before. She's a crucial piece of this.

The principal offered that she saw the SAS as key to sustaining Mountain Middle School's teachers' technology integration efforts.

The SAS was in charge of teacher professional development related to technology at the school. She used a 3-tiered approach, developed by the district's technology coordinators. Some of her workshops were at the "Tier 1" level, focusing on basic hardware and software operation. But most of her monthly meetings and workshops—and her primary mission in the school—centered on "Tier 2" activities, the integration of technology into the curriculum. This level was referred

to as the Vanguard, and nearly all of Mountain's teachers had participated in this program. Beyond this, there was "Tier 3", a system of teacher peer-coaching that she directed. At Mountain, this coaching project had five teachers in it. Each had been prepared to help another teacher, a "coachee," plan lessons, which they then observed and provided feedback on. In turn, the coached teacher observed the coach teach. The SAS's responsibilities also included the purchase of hardware and software. And she chaired a group of teachers and staff that wrote the building technology plan.

We were able to see the SAS work with teachers to find technological strategies that addressed the goals of the lessons in the class sessions we observed. The SAS and classroom teacher worked together to select appropriate software and to make sure that the teacher was comfortable with its use. During the lesson, the SAS demonstrated the use of the software, either in front of the whole class or by circulating among the students and responded to their technical questions, while the teacher responded to substantive questions.

A full-time Technology Assistant supported the SAS and was responsible for maintaining the hardware and the network. The SAS and the Technology Assistant were continuously in the computer laboratories supporting the teachers and students, as well as trouble shooting software and hardware problems. Together, they made a support network that was very valued by school's teachers; as one teacher put it, "We have wonderful computer support people, just the best. I've worked in three different schools in this district and they're top notch." Another teacher said, "They are amazing."

Context Beyond the School

Ten years ago, discussions within the district and at Mountain Middle School were focused on identifying the outcomes or proficiencies that were desired of students and on figuring out how to support their achievement of them, according to Director of Middle Schools, who was Mountain's principal at the time. As a part of this focus, groups of teachers from across the District's schools worked together to develop standards in almost every one of the academic and enhanced core, or elective, areas.

This work preceded the Colorado State Standards formulation. In recent years, the Colorado Department of Education has developed detailed, model standards and grade level expectations for reading and writing, mathematics, science, history, geography, and foreign languages, among other areas. The district's work was also long before Colorado Student Assessment Program (CSAP) was adopted in the 1998-99 school year. The Colorado Student Assessment Program tests students on their achievement of the State's standards. The phased in program of annual assessment began with tests of 7th-grade reading and writing. The tests have scaled up by grade level each year so that by 2002, the 8th graders will be tested on reading, writing, mathematics, and science. According to district administrators, much of the state's work on standards was based on the early work in the district and at Mountain.

The expectation that teachers teach to standards and focus on students' achievement of them was familiar to this district's teachers because of the activities undertaken a decade ago. This emphasis continues at Mountain and the school allocates its resources to this goal.

Improvement in Teaching & Learning

Curriculum and Assessment Aspects of the Improvement

When the state switched to a standards-based proficiency test, the CSAP, the district and its schools began to express its focus on high student achievement in terms of working toward student outcomes on this measure of the state curriculum standards. Correspondingly, the District's goals for technology use began to be expressed in these terms. The Director of Middle Schools explained:

> The school district and the parent community are very concerned with high student performance, student achievement. They're committed to the importance of education and that the children should do well… When we write our proposals, our yearly goals, around what we expect to accomplish with technology, it has always been aligned with student achievement, and then as standards became that definition of student achievement, that was the alignment [to the goal for technology].

In the district technology plan, an entire appendix is dedicated to "Strategies for Supporting CSAP with Technology." In sections labeled reading, writing, math, and science the major skill or standard is listed followed by points on how technology could help students work toward meeting the standard, specific software and hardware that could be used, and suggested methods for their use.

Besides suggestions in the district's technology plan, there were other resources provided to the teachers to improve their pedagogical and technological skills in service of student performance and achievement. For example, a staff member in a full time role called the Performance Assessment Specialist met with teachers to incorporate standards into their instructional units. She worked with teachers, individually and in professional development workshops, to review their lessons and think through the standards that they want the students to accomplish. She also analyzed the CSAP test results to identify students' strengths and weakness to derive implications for teachers' lesson planning. She and the principal sent out notes to 450 8th-graders reviewing their CSAP scores, telling them where they were doing well and where they needed to work harder.

When discussing the role of technology in the Proficiency Center, the principal commented on the ability of the software to differentiate the instruction around the needs of individual students. The SAS described additional added value benefits she saw in the technology:

> Technology can make things possible that nothing else can—writing for a larger audience; the creation of a web site so that other people can read what you're doing. . . using spreadsheets to solve problems.

More often, the comments made by administrators, staff, teachers, and even students suggested that technology was an added resource—an important resource, but just one more in an arsenal of resources that supported standards-based student achievement. The principal commented that, "It's really enhancing the teaching of the standards . . . rather than just replacing something that they could already do in their classroom."

Through a combination of expectations and resources, the focus on standards was widely adopted by teachers. One teacher described how her daily lesson planning was orientated to standards. “If you look in my plan book, everyday has the standard that I meet in that day and I circle it in highlighter.”

Teacher Practices and Outcomes

Teachers were supported and expected to work towards the students’ achievement of the standards, and to integrate technology in support of that goal. The principal estimated that only 15% of the teachers were not as far along in their use of technology as she would have liked. The SAS estimated that over 80% of the teachers used technology in their instruction on a regular basis and that all the teachers used technology for their personal productivity. These estimations of widespread use were corroborated by comments from teachers, such as one who in the focus group said, “I don’t think I would dare plan a year’s worth of curriculum without integrating technology. In this school that would just not be okay anymore.” A 6th-grade teacher shared that she thought the teaching staff at Mountain was quite motivated to use technology and stay up date about it:

> We’re hard workers; we’re driven to excel. We always want to be on the latest of what’s new with technology. We’re all well-rounded individuals and we have a drive to succeed and that rubs off on the kids as well…We’re competitive but in a way where there’s no problem sharing ideas and sharing activities.

Teachers' use of technology in instruction included graphing calculators, spreadsheet, and word-processing applications. Teachers at Mountain also received some hands-on assistance from the Student Achievement Specialist, especially if they were trying out new software or integrating technology into a lesson for the first time. All teachers had access to students and parents through e-mail.

The statements about technology most often made by teachers were that the use of technology enhances the curriculum. They described that it served as an alternative way for kids to express themselves and it allowed students to carry out research in a slightly different way. The majority of the teachers indicated that they always tried to make technology one of the choices for students. Another 6th-grade teacher summed up the attitude toward technology that we observed in many of Mountain’s teachers:

> Technology, I kind of feel, is a way to enhance my curriculum. Because that’s a conflict, I think. Does curriculum drive your instruction or does technology drive your instruction? And of course, this being a standards-based school, I have to say my curriculum does.

Her comment underscored how a particular pedagogical approach using technology or a technology application was not to drive Mountain’s teachers’ instructional decision-making. Rather, the teachers were encouraged to think about what they were teaching and to select the best approach and tools. They were encouraged to make technology a part of those choices, but not in a prescriptive way.

The principal talked about how the next major instructional focus at Mountain needed to be teachers' engaging in backward planning from the standards. She described how she wanted teachers to think through lesson planning.

> …[start with] here's what I want kids to know now, or I've built my assessment based on what kids need to know to meet the standards. Now, how do I build my lesson to get them there? It's [backward planning] just a different view of doing that, and so I think technology, if the teacher has that end in mind, then the technology can be just one of the tools to enhance them getting there.

Moving teachers toward backward planning is a major goal for next year for the principal and the Performance Assessment Specialist, who is developing teacher workshops around this theme.

The annual teacher evaluation process included an analysis of the technology proficiencies that the teacher targeted and his or her integration of technology into lessons. Teachers' performance evaluation was also based on the application of their knowledge to increase student achievement.

Student Practices and Outcomes

While observing classes—both within the computer labs and other classrooms—we saw students using technology in a variety of ways. In several classes we saw how the Internet was a valuable tool during student research. For example, in a 6th-grade language arts class students used the Internet to explore and evaluate various poetry websites. They then used an HTML editor to write their own poems for Internet publication. Students in a 6th-grade science class used the Internet to gather information on the Alaskan Tundra ecosystem. This was followed by a variety of productivity tools to create a product that illustrated what they had learned, such as a newspaper, mural, or research proposal. Students in an 8th-grade social studies class used the Internet to study court cases pertaining to one of the Bill of Rights that they selected, search for newspaper articles that pertained to this amendment, and construct a poster that explained how the amendment affects the lives of their classmates.

In the homeroom class called Inquiry, which is a time for remediation and extension taken by all eighth graders, students regularly selected from among technology resources and tools to carry out their work. Teams of four teachers worked together to organize this class for their students, and tended to give students a great amount of flexibility in how they carried out and completed assignments. Often students could choose to work either independently or in group activities or projects. These Inquiry class periods were times when students regularly used computers to aid their learning. For example, one teacher described how a student used a video camera and video editing software to make a report on tennis. During this class some students used technology to receive additional help on a topic they had trouble understanding. For example, by using the content-oriented software that the school had for math and other topics.

Students also used technology to process information they were studying, or to communicate with others. For example, students in an 8th-grade class used "Blackboard", an intra-net collaboration environment, to share, read, and comment on each other's papers. In an 8th-grade math class students used "Geometer's Sketch Pad" to construct geometrical shapes and dynamically explore their properties.

Mountain was a magnet school for the ESL (English as a Second Language) students in the District; ESL learners constituted 15% of the students in one of the classes we observed. These students get additional help with their language; again, technology plays a support role. The principal described a project in which the two ESL teachers worked with their students to put together a PowerPoint slide presentation and introduce themselves to their parents for parents' night. She commented that, "the pride in the kids, the pride in the parents…was great."

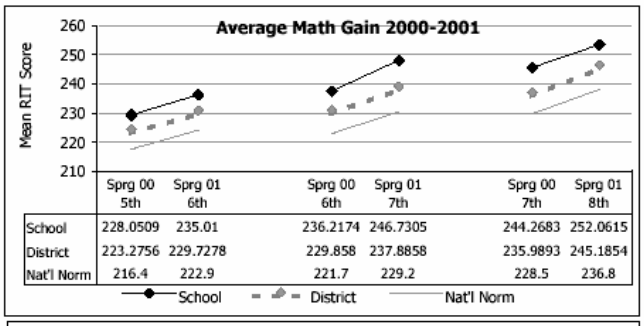
Technology, in combination with other resources, was configured to help Mountain Middle School students achieve. In the Proficiency Center parent volunteers provided one-on-one help to students who had been identified as being deficient in one or more areas of the Colorado Standards. Together, they worked on structured activities that addressed the standards. For example, one of the programs, "Excel at Algebra" allowed the resource staff to set where they want students to start and then students worked through the material at their own pace. The "River Deep" program worked the same way. A diagnostic test placed students into the program wherever their math or science skill levels might need to be built up.

Student performance in Mountain Middle School's technology-rich environment is illustrated in Table 1. The chart at left shows Achievement-level Test gains in Math and Reading by the same group of students at Mountain during the year of the site visit and one year prior. On average, Mountain students clearly perform better than other students do in the district, or nationally. The chart at right shows the percentage of students at Mountain who made a proficient score on the Colorado Student Assessment Program (CSAP), broken down by subject and length of time that students have been at the school or in the district. The percentage of students reaching proficiency on the CSAP was consistently higher among those students who had been at Mountain Middle School or in the Clear Ridge school district for at least a year, compared to those who had attended for less than 12 months.

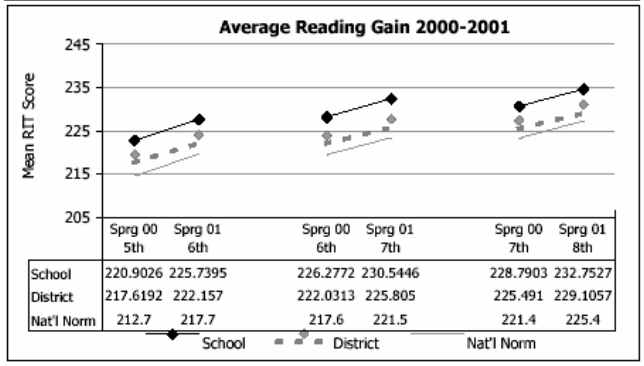
Table 1. 2000-2001 Achievement Growth: Impact of Continuous Time in the District

ACHIEVEMENT LEVEL TEST (ALT) GAIN

Student achievement growth is best measured with year-to-year test performance changes for intact groups of students who receive continuous instruction at a school. ALT's are designed to measure student growth in this way. Below, changes in average ALT scores depict average annual student growth. Line slopes show the amount of growth for school (solid black), district (dashed grey), and national ALT user norm group (solid grey).



	Sprg 00 5th	Sprg 01 6th	Sprg 00 6th	Sprg 01 7th	Sprg 00 7th	Sprg 01 8th
School	228.0509	235.01	236.2174	246.7305	244.2683	252.0615
District	223.2756	229.7278	229.858	237.8858	235.9893	245.1854
Nat'l Norm	216.4	222.9	221.7	229.2	228.5	236.8



	Sprg 00 5th	Sprg 01 6th	Sprg 00 6th	Sprg 01 7th	Sprg 00 7th	Sprg 01 8th
School	220.9026	225.7395	226.2772	230.5446	228.7903	232.7527
District	217.6192	222.157	222.0313	225.805	225.491	229.1057
Nat'l Norm	212.7	217.7	217.6	221.5	221.4	225.4

COLORADO STUDENT ASSESSMENT PROGRAM (CSAP)

We are unable to calculate student growth over time on our state test. However, we can examine results by the length of time students have been at the school or in the district. The table below indicates the percent of students Proficient or above on the CSAP according to the length of time that they have received instruction at their school.**

School Performance
Time in School

	0-12 months	1 year +
Reading Gr. 6	72%	87%
Reading Gr. 7	80%	88%
Reading Gr. 8	71%	86%
Writing Gr. 7	62%	74%
Math Gr. 8	52%	69%
Science Gr. 8	66%	72%

District Performance
Time in School

	0-12 months	1 year +
Reading Gr. 6	64%	78%
Reading Gr. 7	66%	80%
Reading Gr. 8	68%	79%
Writing Gr. 7	45%	62%
Math Gr. 8	34%	56%
Science Gr. 8	43%	64%

State Performance
Time in School

	0-12 months	1 year +
Reading Gr. 6	60%	66%
Reading Gr. 7	66%	65%
Reading Gr. 8	55%	68%
Writing Gr. 7	44%	42%
Math Gr. 8	27%	41%
Science Gr. 8	38%	53%

***NOTE: Most students with severe multiple disabilities and/or significant English language limitations do not take the CSAP and are not included in the calculations above.*

(Taken from http://www.ccsd.k12.co.us/admin/assessment/profiles/middle/WMS.PDF)

While it is impossible to isolate the impact of the school and district technology program in these test results, they do show that students at Mountain, on average, perform better than their counterparts in other schools in the district. It also appears that the longer a student attends Mountain Middle School, the more likely they will attain proficiency on the CSAP.

Lessons for the Future

Noteworthy Outcomes

Technology was important in the Clear Ridge School District and at Mountain Middle School, but it played a supportive role to their instructional focus. The technology access was so seamless and the focus so much on student achievement that technology appeared to be taken for granted in this community of frequent computer users. The Director of Middle Schools confirmed that technology was seen as a support to their purpose, and not an end unto itself:

> I don't view it [technology] as a change agent that we've introduced children to technology and then it's infused into the community. I just think that we reflect the community; the school reflects the community that it's part of. . . . This [district technology] plan also talks a lot about how [we] are going to be able to do the things that we know are right with kids for learning. Use technology to do that and within that embed the standards . . . and move toward where we need to be . . . And so the focus of

> the [technology] plan is how do we take technology and really give it a tight purpose toward the ends of student achievement.

The principal saw a great potential for technology to address the individual needs of children. She saw this as a particular advantage for students in the Proficiency Center.

Overall, the school's focus on student achievement appeared to be very productive. At Mountain Middle School a higher percentage of students scored proficient than either in other district or state schools on the Colorado Student Assessment Program (CSAP). The staff at Mountain Middle felt they could not isolate the impact of technology on these scores, but did emphasize that technology was an important resource in their school, and that it played a part in students' success.

Added Value from Technology

Students, teachers, and parents have benefited from the use of technology at Mountain Middle School to support standards-based student achievement. Students said that it would be "a lot harder" for them to get the information they need to do their schoolwork. The teachers at Mountain had acquired many technology skills and regularly used word processors, spreadsheets, email, and presentation software in their own professional work, as well as their instruction. Parents benefited from the technological skills that their students brought home with them and the knowledge that their children were doing "great things" with computers, to quote one parent. The Director of Middle Schools stated that technology "allows the school to remain in the mainstream of what this community's about and what our world's about".

Key Implementation Features

At Mountain Middle School the staff was focused on its goal of helping students meet or exceed proficiency on the curriculum standards. This intense focus, including on how technology could contribute to this goal, was cultivated at both the district and school levels.

The district leaders helped to frame the goal and provided expectations of how schools could plan for it. They described the systemic relationships to coordinate and provided resources to do so, including funding, planning guides and forms. At the building level the principal, the Performance Achievement Specialist, and Student Achievement Specialist (SAS) led the efforts to use Mountain's technology resources to help students achieve the standards. The critical resources identified by the teaching staff included their abundant access to technology and most importantly the instructional support provided by the SAS. It was also clear that the consistent messages about standards and student achievement of them focused teachers' efforts.

Challenges

The staff at Mountain Middle School described three general areas of work that they saw for themselves in the coming school years. The principal and SAS were planning to work with teachers on "backward planning" of lessons in relation to curriculum standards.

The Director of Middle Schools wanted technology to play an important role in promoting data-driven, instructional decision-making, which would influence how they approached standards-based instruction in the future at Mountain and The District:

> I'm also seeing a great deal of technology being used in data analysis, and the blending of enabling teachers to interpret data; to understand the instructional importance of that data, towards student achievement; to begin to ask questions of that data, as far as how they would plan for instructing students; is impacting instruction. . . . I see teachers using more technology to inform instruction and then, with that informed base, doing a better job of determining how technology can then be used in the instructional experience.

Mountain Middle School also hoped to deploy wireless technology in its classrooms. With the money provided by the PTCO, the principal and the SAS said the school planned on purchasing Apple iBooks and Airport system. These laptops, when placed in a rolling cart and outfitted with wireless network capability resulted in a portable lab. They thought that these additional resources would reduce the access problems to equipment in the computer labs and enable teachers to use computers in their own classrooms. Both the principal and the SAS felt that this capability would increase the integration of computers into the classroom work.