Professional Competency Continuum

PROFESSIONAL SKILLS FOR THE DIGITAL AGE CLASSROOM

DIMENSION 3

Part of the series:
Technology in American Schools: Seven Dimensions for Gauging Progress

Milken EXCHANGE on education technology

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3 Professional Competency Continuum

PROFESSIONAL SKILLS FOR THE DIGITAL AGE CLASSROOM

Milken EXCHANGE on education technology

"The biggest mistake we could make...is to assume that the challenge is to prepare teachers to do the usual things better."

John Goodlad

Educational Renewal: Better Teachers, Better Schools

"As a catalyst to change in classroom practice, learning technology can help educators promote active and participatory student learning. But the key to success isn't in the computers, probeware, graphing calculators or access to networks and the Internet. It is liberated educators, whose understanding and creative use of technology can help them to achieve undreamed-of levels of excellence for themselves and for their students."

Lowell Milken,
President and Co-Founder of the Milken Family Foundation

7:58 a.m.

Ms. Robinson, a middle school teacher in a 15,000-student Midwestern district, walks into her classroom and slips her laptop into the docking station on her desk. She logs on to the district intranet and—within seconds—up on the screen pops her instructional management system, enabling her to review the progress of students who are working independently on a skills maintenance program. Next, she pops open a calendar program. By clicking the computer mouse once on each student's name, she "drags" the names into an on-screen conference schedule, setting up meetings between students and their teacher-interns to go over their progress with the skills maintenance program.

Next, Ms. Robinson pulls up the daily schedule for the Green Team, a teaching and learning group consisting of 100 students and 7 professional staff members, on which she serves as team leader. Green Team staff members fall into three categories: Two team members are intern teachers—teachers with three or fewer years of experience; three are resident teachers with at least three years of experience and who are in the process of developing instructional specialties (one of the residents has a background in working with special needs students, a second is building up her assessment ability, and a third is specializing in counseling in addition to serving as the group's community connections coordinator); and two are master teachers, like Ms. Robinson, who typically have advanced degrees and significant experience in instructional design and curriculum development. Each teacher on the Green Team also has specific academic discipline responsibilities. The Green Team has built a reputation in the school for selecting and retaining excellent staff.

Ms. Robinson reviews the Green Team's schedule and adds suggestions to a couple of entries, including requests for conferences with teacher-interns to discuss particularly challenging activities in the coming week.

After responding via e-mail to several students involved in community service projects outside the school, Ms. Robinson reminds all of her students that their two-week work plan is due by the end of the school day and must be approved by the Green Team community connections coordinator. One aspect of these community projects is the authentic assessment of students' work by outside people. The community has become the client, and students have begun striving to meet client expectations through higher quality work.

Students on the Green Team frequently work on collaborative projects. One group is building a Web-based interactive tour of the town as it existed in 1900 for the local historical society. Each group is multi-disciplinary, consisting of students who are strong in social sciences, graphic arts and computer science. The local history group needs some members with strong writing and language skills who can edit the content the other group members have been compiling, so Ms. Robinson posts their request to the student project board.

Ms. Robinson's calendar-alarm flashes a message on her screen, reminding her of her online video discussion with a group of teacher-interns from around the district. The discussion is about strategies for developing self-direction habits in students, an area in which the Green Team has done significant literature and action research. Before logging in to the discussion, Ms. Robinson checks her morning schedule. She has a two-hour curriculum development meeting with the Red and Blue Teams; after lunch is her advanced geometry class in which the group is finishing a content strand. She sends off a quick message to the community connections coordinator requesting an item for the Green Team's meeting. Several of the geometry students are to begin working on projects with local architectural firms, and she wants to discuss approaches and schedules in their Wednesday planning meeting, an early-release day that was created through adjustments to the daily school schedule.

Ms. Robinson then loads her agenda for the online video discussion, opens her browser, and watches the thumbnail video images of the teacher-interns appear on her screen.

PREFACE

The preceding scenario is not real. All technologies described, as well as the organizational contexts in which they are used, are available, as is the research base that establishes their credibility. Yet circumstances like the one described above are rarely—if ever—encountered. Even in school districts that have made significant investments in technology, there has been little measurable impact on classroom practice and even less impact on the underlying organization of the school.

Over the past year, the Milken Exchange on Education Technology has investigated this incongruity. The investigation has led to the creation of a "systems approach" to advancing the effective use of technology in classrooms, schools and districts—called the *Seven Dimensions for Gauging Progress*.

Since its inception, the Exchange has participated in a host of projects with states and districts who use the Seven Dimensions model to evaluate the impact that education technology has had on classrooms and learning. The findings from each of these projects reveal a common challenge: Teachers lack opportunities to acquire and apply the skills and experience necessary to take advantage of new technologies like those described in the preceding scenario.

Introduction

The structure of most public schools works against successful professional development for teachers. Teachers are too often isolated in classrooms with little time for collaboration with their peers, action research or professional reflection—activities considered central to professional development in schools of the 21st century.

Professional development in the use of technology in the classroom is particularly complex because the focus of attention is not on the technology, but on improving student learning through improvements in instructional practices. Education technology plays a role in improving learning through instructional practice, but only when professional development involves the following:

1. Educators must become proficient in the use of technology tools;
2. Educators must be skilled in the use of a variety of models of curriculum design and learning strategies supported by technology;
3. Educators must develop new organizational and management strategies to support innovative learning in technology-rich environments;
4. Educators must use technology to support new, collaborative, professional practices;
5. Administrators must be prepared to lead significant change initiatives that support classroom teachers in developing the proficiencies described above. In doing so, they must take an active role in the professional development of all staff under their responsibility.

This document is an attempt to provide educators with a framework for envisioning what competencies they may need to be successful in a technology-supported classroom, and with a continuum of progress towards those competencies. The intention is not to pass judgment on teachers and their strategies, but to provide a resource for determining opportunities for professional growth, and for accessing strategies to assist them in realizing those opportunities.

SEVEN DIMENSIONS FOR GAUGING PROGRESS

The education system today is faced with significant pressure to change. Shifts in the global economy, family structures, demographics and workforce requirements are all adding to that pressure. But change is not easy. Most schools must find their own roads toward change, roads that are not clearly marked or well-traveled.

Over the course of the past two years, experts in the field of education and technology have contributed to the Milken Exchange's exploration of ways to assess the progress of education and learning technologies. The result of that effort is a framework of progress indicators to help schools develop technology programs that appropriately mirror the global, digital society.

The *Seven Dimensions for Gauging Progress* identify the elements that must be working interdependently if schools are to bring technology-enriched learning opportunities to students.

The Seven Dimensions are intended to serve educators, policy-makers, schools and state-level legislators as:

A vision for stakeholders (education community, parents and the general public) that will help define their expectations for investments in K-12 learning technologies;

An assessment tool for schools, districts and states to use in measuring their own progress toward the vision;

A tool to help stakeholders strategize how to bring technology and telecommunications into their school systems in ways that improve student learning;

An accountability system for decision makers to track the return on public investments in education technology; and

A research agenda that will help guide studies of how and under what conditions particular technologies are effective tools for learning.

The Seven Dimensions represent a synthesis of the educational philosophies of a number of respected professionals. The Dimensions model should help policymakers answer the question, "What is the return on the public's investment in K-12 learning technology?" As this publication goes to press, schools, districts and states across the country are researching and testing the merits of the Seven Dimensions model in answering that question.

The framework is comprised of 7 interdependent dimensions:

1. Learners
2. Learning Environments
3. Professional Competency
4. System Capacity
5. Community Connections
6. Technology Capacity
7. Accountability

THE PROFESSIONAL COMPETENCY CONTINUUM

The professional development strategies outlined in this document are an attempt to fully develop one dimension of the *Seven Dimensions for Gauging Progress:* Professional Competency. The Milken Exchange will do subsequent publications of other dimensions and their relevant strategies in the coming year.

The Professional Competency Continuum will appear in two forms. The first is this print document, which gives an overview of the Continuum and the philosophy behind the project. The second will be on the Exchange's Web site, www.milkenexchange.org. This site will include the contents of the print document, as well as an interactive version of the Continuum that allows educators to conduct an online assessment of their professional competency in the use of education technology. The online assessment will also provide advice, specific recommendations and resources for improving professional competency to support student learning.

The Professional Competency Continuum has been developed with input from a number of respected experts in the field of education and learning. These leaders identify five key areas to target for improvements to professional development (see box at right).

- Core Technology Skills
- Curriculum, Learning and Assessment
- Professional Practice
- Classroom and Instructional Management
- Administrative Competencies

Stages of Progress

In each key area, this document provides a snapshot of three stages of progress. This Continuum is based on the "stages of instructional evolution" identified in the research from the Apple Classrooms of Tomorrow[1] program:

STAGE I - ENTRY	STAGE II - ADAPTATION	STAGE III - TRANSFORMATION
At this stage, educators, students and the community are aware of the possibilities that technology holds for improving learning—but learning, teaching and the system remain relatively unchanged. Educators at this level lack access to technology and the requisite skills to implement and sustain significant changes in practice.	Technology is thoroughly integrated into the classroom in support of existing practice. Educators at this stage have developed skills related to the use of technology, but have primarily applied these skills to automate, accelerate and enhance the teaching and learning strategies already in place.	At this stage, technology is a catalyst for significant changes in learning practice. Students and teachers adopt new roles and relationships. New learning opportunities are possible through the creative application of technology to the entire school community.

The descriptions of these levels within the Continuum are, of course, generalizations. Each educator finds himself or herself in a unique situation not easily defined by the above stages. Despite this, educators will likely find one of the stages to be more similar to their situation than others, and can build from there. In our the Web-based assessment instrument, a set of questions will assist educators in identifying stages that best describe them. The authors suggest that, while the Transformation stage provides students with learning opportunities never before possible, there is significant merit in accelerating and enhancing teaching and learning at the Adaptation stage. Through thoughtful and effective application, the investment in technology is warranted at both the Adaptation and Transformation stages.

CORE TECHNOLOGY SKILLS

Are the faculty and staff proficient, knowledgeable and current with contemporary technology?

How it is...

In a 5th grade classroom in a Midwestern elementary school, Mrs. Blakely is attempting to integrate technology into the social studies curriculum. The class is involved in a unit on the westward expansion in the United States. Twenty of her 25 students are using the simulation program *Oregon Trail*®. Working in pairs, one student operates the keyboard while a second takes notes as they encounter situations, make decisions, and experience the results of those decisions. The remaining six students are gathered around the teacher's computer, the only machine in the classroom that is connected to the Internet. The teacher is attempting to assist them in locating information about the Oregon Trail that might provide the resources for the written reports they are completing. They are searching in the online directory Yahoo!® under "Oregon Trail." The only resources they locate are online software sites that sell the simulation software the other students are already using. One pair of students approaches the teacher announcing that the simulation program's instructions say that their progress can be saved as a text file and opened in a word processor, which might save them the trouble of taking notes for the journal assignment they will be doing. But their attempts to save the notes have resulted in an onscreen message stating that they do not have "saving privileges." Neither they nor the teacher know how to solve this problem.

"Keep writing," suggests the teacher. Meanwhile the group at the Internet station has located the Portland Trailblazers basketball team's Web site.

"At least we found something in Oregon!" cries one of the students. A second pair of simulation game players approaches the teacher to report a frozen computer screen. As the teacher unsuccessfully attempts to restart the frozen computer, she notices that the Internet research team has begun cruising NBA.com. Mrs. Blakely makes a mental note to revert to her traditional teaching strategies tomorrow.

DIMENSION 3

PROFILE: CORE TECHNOLOGY SKILLS

Many excellent teachers view the use of technology as inefficient or unpleasant simply because they do not have basic skills of usage and trouble-shooting. If teachers are not effective users of technology, it is unlikely that they will recognize how technology might be used well inside classrooms. Nor will they be able to overcome the minor technical glitches that occur in any use of technology, thereby reinforcing that inefficiency. This category, "Core Technology Skills," addresses the "baseline" technology skills that educators need to function in technology-rich classrooms. While many of these competencies have been described as short term and fairly mechanical[2], they are nonetheless crucial to establishing the comfort level necessary for educators before they can begin to consider issues related to curriculum and instruction.

- The educator has a firm understanding of the principles of operation of the computer system and peripherals. This understanding has translated into the ability to adapt quickly to new technologies as they become available.
- The educator is familiar with technologies specific to the discipline she teaches and is able to use these technologies successfully to support student learning.
- The educator has mastered the use of basic software applications and is able to generalize these skills quickly to learn new applications.
- The educator has sufficient skill and experience to make efficient and effective use of complex electronic information resources.
- The educator understands the power of computer networks and is able to use those networks to facilitate communications, professional growth and student learning.
- The educator is familiar with multimedia and presentation technologies and is able to guide students in the application of these technologies to the create of knowledge products.

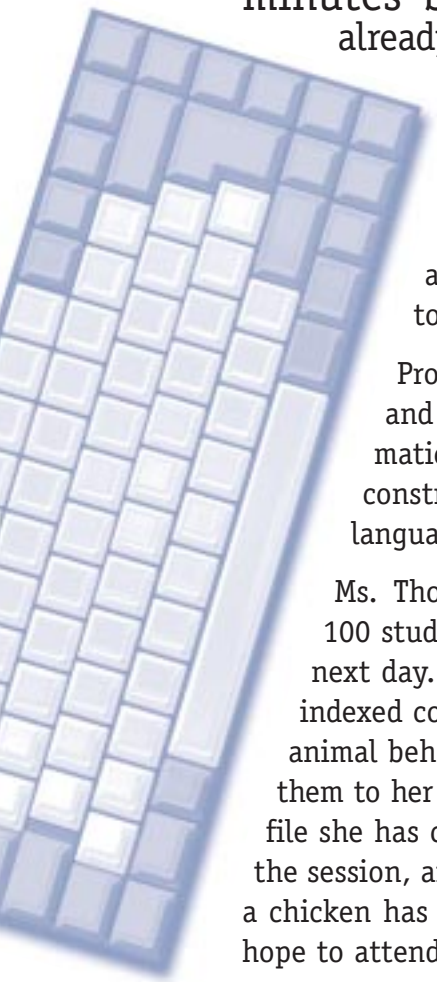
CORE TECHNOLOGY SKILLS

	Stage I - Entry Educators, students and the community are aware of the possibilities, yet learning, teaching and the system remain relatively unchanged by technology.	Stage II - Adaptation Technology is thoroughly integrated into existing practice.	Stage III - Transformation Technology is a catalyst for significant changes in learning practices.
HARDWARE/ COMPUTER	The educator is able to operate the computer at a basic level. This includes starting and ending sessions, using basic software applications, and making simple connections.	The educator understands and is able to use the management functions of the operating system. Peripherals (projectors, scanners, external storage devices) are connected, and necessary drivers are installed. The educator recognizes common problems and seeks assistance from the appropriate sources. The educator is able to recommend upgrades and system additions as solutions for recurring problems.	The use of computers and peripheral devices has become transparent. The educator stays abreast of new technologies related to his or her field and plays an active role in purchase decisions. The ability to transfer his or her skills from current tools to new tools allows the educator to learn more quickly and independently.
HARDWARE/ OTHER	The educator may be aware of technologies that would support learning in assigned areas of instruction, but lacks either the skill or access to make use of these technologies. No mechanism is in place in the school or district to bring new technologies to the attention of individual educators.	The educator makes use of technologies specific to his assigned teaching area on a limited basis (e.g., graphing calculators in math, MIDI keyboards in music, scanners and digital cameras in the visual arts). These technologies are used to support instruction that is similar to that which existed in the classroom prior to the introduction of technology.	The educator uses technology throughout the curriculum, often in unique and creative ways. The educator actively seeks out new technology solutions when there is evidence that these technologies are likely to improve student learning. Instructional strategies are often altered significantly as a result of the technologies; for example, rather than relying on rote learning of textbook-based materials in social science, the teacher uses the Internet to involve students in research using firsthand resources, often resulting in the generation of new interpretations of the information accessed. The educator at this stage often introduces other staff to the new technologies.
APPLICATIONS	At this stage the primary tool used by the educator is a word processor. If the school is networked, e-mail may also be used. The educator may use simple programs such as a daily calendar and is aware of a variety of other programs like spreadsheets, graphics programs, etc. Use of computer applications may be viewed as fairly inefficient due to the general inexperience of the educator.	The educator is comfortable with a host of applications including word processing, databases and spreadsheets (where appropriate). Integration of these applications can be accomplished at a basic level. The educator may be proficient in other applications (graphics manipulation programs, desktop publishing programs, etc.). At this stage the educator considers computer applications to be a central tool for personal and professional tasks.	The educator is a sophisticated user of computer applications. The primary means of skill development shifts from workshop or training sessions to the use of manuals and "just in time" training resources. The time spent learning new applications decreases as the educator learns to cross-apply skills learned in previous applications. At this stage the educator can act as a resource to others in the use of applications and teaches colleagues in formal and informal settings.

	Stage I - Entry Educators, students and the community are aware of the possibilities, yet learning, teaching and the system remain relatively unchanged by technology.	Stage II - Adaptation Technology is thoroughly integrated into existing practice.	Stage III - Transformation Technology is a catalyst for significant changes in learning practices.
INFORMATION TOOLS	The educator knows how to browse the World Wide Web, but is not well versed enough in search strategies to make efficient use of this resource. E-mail is used primarily as a local (school, district and personal) communications tool. The educator has only a cursory knowledge of the software used. Advanced features and efficiency measures have not been mastered.	The educator understands and uses efficient search methods. Bookmarks and similar indexing technologies organize his or her resources. A variety of online information resources (e.g., ERIC) are understood and used where appropriate. Lesson plans are created that demonstrate a deep understanding of the appropriate role of online resources.	The use of information tools is central to the educator's professional life. The educator conducts research and guides others in researching and evaluating online information to support the curriculum.
NETWORK TOOLS	The educator uses technology, primarily e-mail, to communicate across the network. He/she uses the correct terminology when discussing network components, but does not have a strong conceptual base for understanding how the network works. Files are stored and retrieved from file servers, provided that the configuration (e.g., mapping of network drives) has been done in advance. The educator recognizes when the network is not functioning properly and reports problems to the appropriate support personnel.	The educator navigates network environments comfortably. Little time is wasted in locating and using network resources that are related to current classroom instruction. He/she uses collaborative network software for group work and to access primary sources outside of the school. Multimedia content and other files can be sent or retrieved. Simple network problems are identified and solved independently. Sophisticated problems are recognized and reported to the appropriate technical support staff.	The educator uses network resources transparently as an integral part of everyday teaching. He/she guides students in both typical and unique uses of the network to support learning. The educator at this stage often serves as a resource to others on the use of network resources. Contact with experts and primary resources through the network is a regular occurrence in his/her classroom. The educator plays an active role in the identification and deployment of new network applications.
MULTIMEDIA/ PRESENTATION TOOLS	The educator is aware of a variety of multimedia tools for presentation, assessment and student production but lacks the training and/or access to use these tools effectively. He/she may have rudimentary skill using a single tool (e.g., PowerPoint or Hyperstudio), but presentations or projects are linear and one-dimensional.	The educator uses a variety of tools to create multimedia presentations and integrates those tools into learning plans for students. He/she is familiar with processes for organizing, planning, outlining and storyboarding multimedia projects. The educator is familiar with a variety of related peripherals including digital cameras, scanners and projection devices. Most student projects at this stage are computer-based versions of products that reflect current practice. A 5th grade report on the President of the United States, for example, becomes a Hyperstudio presentation of the same information used for a traditional report.	The educator uses a variety of multimedia tools and learns new tools easily by generalizing skills between applications. He/she is familiar with multimedia file formats and is able to move content seamlessly between applications. The educator guides students in applying multimedia technologies to products of value to audiences outside the classroom.

CORE TECHNOLOGY SKILLS

How it could be...



At Riverwoods Elementary School, Ms. Thompson enters the classroom five minutes before the scheduled beginning of the day and discovers that the class is already in full swing. Each of the six computers around the perimeter of the class is on and hosting small groups of students as they log in, register their lunch preferences, or complete unfinished work from the day before. One machine has frozen and Ms. Thompson heads over to help out, but before she can reach the offending machine, one of the students has called over a nearby Triple S (Student Support Specialist) to solve the problem. Triple S status is a highly coveted position in the school, achieved by attending before and after school classes for six weeks and interning with an experienced Triple S for three weeks. Once Triple S status has been achieved, the student is awarded an identifying badge and password that permits special—though limited—access to the network.

Problem solved, Ms. Thompson heads toward her own desk where she slips her portable computer into the dock and logs on to the school network. She checks her e-mail, moving first to the folder where a filter she created has automatically deposited student assistance requests from the night before. Several of the requests are for help with constructing hypotheses, the first assignment in the students' current research project managed by the science and language arts teachers.

Ms. Thompson posts a message on the Red Team's bulletin board—which serves as the communicative center for its 100 students and seven teachers—for a review session on constructing hypotheses, to be held in Room 100 at 10 a.m. the next day. Ms. Thompson then accesses the district video server, where licensed archival video material has been stored and indexed corresponding to the school's curriculum. She recalls that an episode of the PBS series *Nature*℠ used some excellent animal behavior experiments that she could show in teaching about the formation of hypotheses. She locates the clips, links them to her presentation software, and drops a few slides from her "experimental method" library of slides into the presentation file she has created. Ms. Thompson then e-mails the students who requested help, informing them of the time and location of the session, and drops in a video frame (an individual still picture) from the *Nature*℠ episode that shows an experiment in which a chicken has been taught to play a computer game. She notices that e-mails are beginning to arrive from other students who hope to attend the session. Each receives a message and a chicken in reply.

STRATEGIES FOR CORE TECHNOLOGY SKILLS

This sampling of advice from our panel of staff development experts will assist teachers in developing competencies in the area of Core Technology Skills:

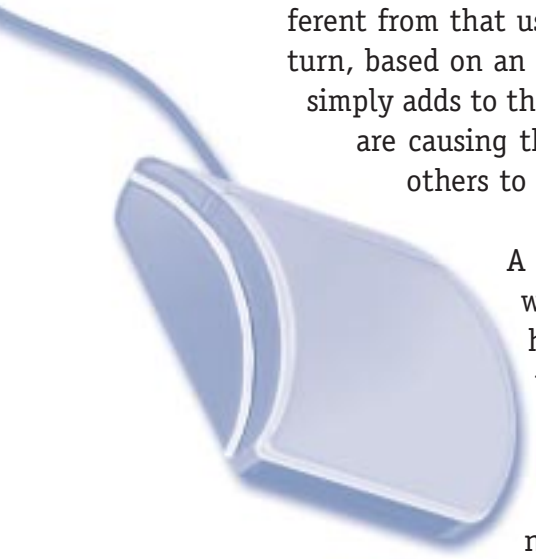
- Carefully describe the base level of skills that are necessary for all staff. Be discriminating. Remember that skills appropriate for a teacher in the fine arts may not match those necessary for a math teacher.
- Be efficient. Core technology training is often best made available at the district or regional level. This allows the training to be customized for various experience levels while still remaining cost efficient.
- Build capacity through training. When possible, train one particularly interested teacher in a school, department or teaching team and allow this teacher to train others. These trainers will become on-site resources.
- Use students as a training resource. Many teachers have found that the quickest way to learn new features of a software package is to assign a student to investigate, master the feature and then train the class—including the teacher!
- Look into online tutorials. For the intermediate user, online tutorials can provide a convenient, self-paced learning environment. In addition to commercial sources, many colleges, vendors and school districts have excellent tutorials that are publicly available. Use your browser's search engine to search for the topic you wish to learn, and type: "tutorials." For greater efficiency, use resources that have been reviewed or evaluated by others.
- Encourage educators to join a professional association related to instructional technology. They are often great resources for inexpensive training, and many sponsor online opportunities like those discussed above.
- Once educators have mastered entry level skills, technology training should be embedded in content training whenever possible. Rather than topics like "Introduction to Hyperstudio," include a multimedia skills component within training in science or social studies. Training such as "Understanding and Presenting Data" that *includes* Hyperstudio is more likely to provide educators with the context necessary to use their new skills in the classroom.
- Training is not a substitute for support. Attempts to train educators in core technology skills to a level of expertise that allows for total independence are likely to result in wasted time and frustration. Most educators do not wish to become technical support specialists.

CURRICULUM, LEARNING AND ASSESSMENT

Has the teacher's fluency with technology translated into unique and relevant learning opportunities for students?

How it is...

In a classroom in a rural town in the Northeast, students are involved in the "Laptop for Every Student" program. The 7th grade students are using an Internet site—to which the school has subscribed—that features an online series of math lessons. The math teacher has prepared the lesson for the day, but things have begun inauspiciously. The lesson consists of a geometry worksheet that the teacher has typed into a Microsoft Works document. Each student has been provided a copy of the worksheet via the school network. Their assignment for the 90-minute block-scheduled period is to access the online site, work through the content of a geometry lesson located there, and then complete an online worksheet based on the material they reviewed. The first problem encountered by several students is the terminology used in the Web site, which is quite different from that used on the worksheet—not surprising, as the worksheet is one the teacher has used for years which is, in turn, based on an even older textbook version. For the students who are already struggling with the academic concepts, this simply adds to their confusion. The teacher stops the entire class and begins to explain the differences in terminology which are causing the confusion. But many of the students keep working, and the hum of activity makes it difficult for the others to listen.



A second problem has arisen in a back corner of the room. In preparing the lesson for the day, the teacher was unaware of the impact of having several application windows open on the screen. One of her students has arranged the Web site tutorial in a window on the left side of the computer screen and has opened the worksheet in a window on the right. Rather than completing the worksheet in a traditional fashion, the student is simply highlighting and dragging text, adding her own typed commentary where needed. The net result of this approach is that the entire operation, intended to fill the 90-minute math period, can be completed in a fourth of that time. This has left the student with sufficient time to share this "technique" with the other students, and it has now spread throughout the class.

DIMENSION 3

CURRICULUM, LEARNING AND ASSESSMENT

Curriculum, learning and assessment define the most crucial teacher competencies for the successful use of technology in learning. These three important areas of professional development are combined in a single section because they must be addressed consistently in a successful instructional program.

Curriculum:

Refers to academic content, frequently organized as sets of intended outcomes that describe what is to be taught.[3] In current practice, content is often described through standards for student learning, with benchmarks associated with these standards.[4] As such, there is often overlap between the curriculum, the teaching and learning strategies, and the method of assessing whether the content has been learned.[5]

Learning:

Includes teaching and learning strategies, which form the context for delivery of the curriculum. Instructional strategies such as problem-based learning, authentic learning and constructivism, due to their high reliance on a base of rich and diverse materials, are usually associated with technology-rich environments. More traditional approaches to instruction that are primarily skills-based and rely more heavily on direct instruction also benefit from technology support.[6]

Assessment:

Addresses how technology use can allow students to demonstrate performance against equitable standards and reflect upon what they have learned.

PROFILE: CURRICULUM, LEARNING AND ASSESSMENT

- The educator is skilled at identifying opportunities within the curriculum for improved student learning through technology and is capable of designing technology-enriched learning activities that support the curriculum.
- The educator has a variety of instructional strategies for teaching and learning with technology and is able to match specific strategies with the learning needs of individual students.
- The educator understands the possibilities for new roles for educators that might better support learning in the technology-rich classroom and has mastered specific strategies for adopting these roles.
- The educator understands the possibilities for new roles for students in the technology-rich classroom and has explicit strategies for supporting students as they adopt these roles.
- The educator is skilled in the design and implementation of a variety of assessment strategies, including performance and product-based assessments that are often more relevant in the technology-rich classroom.

CURRICULUM, LEARNING AND ASSESSMENT

	Stage I - Entry Educators, students and the community are aware of the possibilities, yet learning, teaching and the system remain relatively unchanged by technology.	Stage II - Adaptation Technology is thoroughly integrated into existing practice.	Stage III - Transformation Technology is a catalyst for significant changes in learning practices.
CURRICULUM	The educator is aware of the value of technology in the instructional program, but tends to use technology as a reward or as an end in itself. Educational software, when used, is often used out of context. The educator occasionally uses software and online services that are topically related to the curriculum being addressed, but little in-depth attention is paid to specific educational objectives of the software or the impact of its use. This software may be used in a lab rather than in the classroom under the direction of a "computer educator" or aide.	The educator regularly applies technology that supports the existing curriculum standards. These applications typically reflect presentations of content or student activities that are similar to those found in the classroom prior to the introduction of technology.	The educator has become skilled at involving students in developing technology-enriched learning activities that are authentic, multidisciplinary and directly related to district, state and national academic standards. Strategies are aligned with standards both for efficiency of instruction and maximum student engagement.
TEACHING/LEARNING STRATEGIES	Instruction is highly teacher-centered and often non-interactive. Students work as individuals. Tasks are usually subject-specific and structured as exercises without real-world referents. Collaborative learning is used only occasionally.	Learning is more active. Technology is used in many ways to support existing instruction and to make that instruction more engaging. Learning is often project-based, but seldom results in products for outside audiences.	Technology is now interwoven into many learning situations. Learning is often multidisciplinary. Students have opportunities to exercise problem-solving skills within a classroom context. Instruction is grounded in the concept of a learning community. Learning activities are highly interactive and responsive to student needs. Instruction is oriented towards constructing meaning and solving problems of consequence.
NEW ROLES FOR EDUCATORS	The educator assumes the primary responsibility for classroom direction. The common mode of instruction is the transmission of information from the educator to the student. The educator begins to experiment with lessons that allow for limited student direction. Educator practices new roles, but does not yet adopt those roles on a regular basis.	The educator uses facilitation strategies with increasing frequency. New roles are confined to specific units of study. The educator guides, facilitates and allows for increased student independence, but still operates within the organizational confines of his or her previous classroom experience.	The educator acts primarily as a facilitator and allows students to construct their own meaning by modeling, mediating, explaining when needed, and providing options, without controlling. The educator considers himself or herself to be a learner and often receives instruction from and collaborates with students and other staff.

	Stage I - Entry Educators, students and the community are aware of the possibilities, yet learning, teaching and the system remain relatively unchanged by technology.	Stage II - Adaptation Technology is thoroughly integrated into existing practice.	Stage III - Transformation Technology is a catalyst for significant changes in learning practices.
NEW ROLES FOR STUDENTS	Students have little ownership in the learning program. The teacher allows for student collaboration and self-direction in isolated, controlled situations.	Students work collaboratively and independently. Students begin to rely on each other when questions arise. Students frequently take on the role of teacher and instruct other students. While learning activities are still consistent with the teacher's previous experience, students often adopt roles that simulate those of practicing professionals.	Students have opportunities to explore new ideas based on interest as well as curriculum. Students often work with mentors, who coach them in the habits and practices of professionals. Students assume the role of teacher in several areas of the curriculum. Students serve as independent learners, problem solvers and producers of knowledge throughout the curriculum and create products that are valued by audiences outside the classroom.
ASSESSMENT	Traditional assessments are used as a primary means of measuring progress. Pen and pencil assessments are used frequently and are summative. Limited use is made of portfolios. Assessment is seen as separate from instruction. The teacher—without student input—normally creates instruments of assessment.	Assessment is viewed as an integral part of instruction. Portfolio assessment is common. Assessments of student products are introduced with associated rubrics. Students view assessment as valuable to personal improvement.	Assessment is viewed by students as an integral and valuable part of learning. Many assessment tasks actually produce a product that is of value to the student, the teacher or a broader audience. Product assessments are performed on products created for audiences outside the classroom.

CURRICULUM, LEARNING AND ASSESSMENT

How it could be...

It is Poetry Week at Oak Middle School. The Green Team language arts classes have been doing an in-depth study of poetry in its many forms—including books, literary journals, CD-ROMs of modern poets reading and commenting on their own work, and e-mail discussions with poets who share their insights on the criteria for a good poem. Students are now breaking into project groups for additional study.

One group has decided to create an online journal of poetry. They are soliciting poems from students around the nation and plan to post a "juried" selection to their Web site. The participating students have split into teams for the project. The "jury" team is using the criteria provided by the poets, the Green Team language arts specialist and the district's benchmarks for creative writing. A second team is writing Web content for a series of background pages on different forms of poetry. A design team is working on the structure for the Web site, creating a user interface with consistent graphic elements and navigation tools. Finally, a communications and marketing team begins drafting the message soliciting student contributions, as well as thank-you messages and requests for permission to use work by the poet-mentors involved in the early stages of the project. Membership in each team was decided jointly by the students and their faculty sponsors. The team assignments factor in student interest, strengths and the district's requirement that every student demonstrate ability across the academic standards. If a student lacks professional communication performance, for example, he/she might be assigned to the "communications group" in order to strengthen those skills. Those lacking creative writing performance might be assigned to the content creation group, etc. The district rubrics and requirements in each of these areas are contained in the school's intranet and are regularly accessed and reviewed by both students and teachers.

STRATEGIES FOR CURRICULUM, LEARNING AND ASSESSMENT

This sampling of advice from our panel of staff development experts will assist teachers in developing competencies in the area of Curriculum, Learning and Assessment.

- Attend to the associated skills described in the "Core Technologies" section prior to attempting serious integration. It is not necessary to have mastered all skills, or even a majority of the skills, prior to beginning the integrative process; but educators must achieve a basic comfort level.
- Educators must establish a solid knowledge base related to local, state and national curriculum standards. Technology integration is a process of refinement and enhancement of curriculum standards and is not easily undertaken without a fluent understanding of curriculum and its relation to instruction.
- Establish a vision for successful use of technology. Without a clear picture of how teaching and learning might be different when supported by powerful technologies, the educator may just automate existing practice. Give teachers an opportunity to observe powerful usage in other classrooms. Visits and video examples can be useful for this purpose.
- The building administrator needs to create a culture that values experimentation and the development of a variety of instructional approaches. Teachers should be encouraged to experiment with promising instructional practices without fear of retribution, should the practice prove ineffective at the end of a pilot period. Action research should be encouraged, and failures should be valued as educational.
- Develop collaborative processes that encourage teachers to take a problem-solving approach to curriculum development. Planning for integration should be a collaborative process of identifying areas of the curriculum where data suggest that improvement is needed, and then devising solutions for that improvement, monitoring the implementation of those solutions and revising as needed.
- The district should provide mechanisms that ensure efficient integration efforts. Working groups should be established that allow educators with similar responsibilities to work collaboratively in designing and evaluating integration strategies. Communication mechanisms (e.g., intranets) should be established to clearly define areas where successful integration can be highlighted and shared.

PROFESSIONAL PRACTICE

Are educators using technology and communications networks to advance their own professional practice?
Are educators knowledgeable and current with technology in their fields of study?

How it is...

In a high school physical science classroom in the southwestern United States, Mr. Guerrera has received some bad news. The district substitute teacher shortage has hit an all-time low. The most reliable of the few remaining substitute teachers—and Guerrera's favorite—has accepted a position in a neighboring district. Mr. Guerrera had been selected to attend a two-day workshop on the use of data probes and associated software for his physical science curriculum, and was counting on Joe, his substitute, to take over his classes. Other than the two annual staff development days featuring speakers on general topics and open to all teachers in the small K-12 district, this would have been his only staff development opportunity, and the only one related to his discipline he would have attended in over three years. The only other science teacher on the high school staff, Ms. Simons, attended this workshop the previous year. Upon her return from the workshop, however, she had some trouble getting the probe software to work and, as a result, the probes sit gathering dust on a shelf in the small equipment room connecting their two classrooms. This would have been Mr. Guerrera's chance to learn new strategies for teaching, as well as to decipher the probe software. Now, with no substitute, he is unsure if he can attend the workshop.

Mr. Guerrera has felt more and more out of touch with his profession in the four years since coming to this small rural district. The district has few financial resources to send teachers out for professional development, pay for professional journals or even release teachers to work together on collaborative curriculum efforts. As there are only two teachers with similar assignments on the staff, and both have the same background and preparation, opportunities for shared professional growth are limited. The professional isolation is unnerving and, in fact, has been mentioned as one of the prime factors for the departure of the science teacher whom Mr. Guerrera replaced.

DIMENSION 3

PROFESSIONAL PRACTICE

Technology has the potential to transform the professional environment for educators. It offers educators the same opportunities for improved personal and professional productivity that exist in other professions. The information- and presentation-intensive environments that educators work in may demand even more significant and varied use of technology than other professional environments. The application of network technologies to research, collaborative planning and professional development is also central to this area. Historically, classrooms have been considered as professionally isolating environments. Technology provides an opportunity for educators to break that isolation and, if implemented within the context of a well-managed change process, may serve as a catalyst for movement toward more collaborative organizational structures throughout the school and district.

PROFILE: PROFESSIONAL PRACTICE

- Technology has had a significant impact on the personal and professional productivity of the educator.
- The educator is able to use technology to participate in increased levels of professional collaboration.
- The educator is able to use technology to communicate with students, parents, educators and the wider community more effectively.
- The educator is skilled in the use of technology to access a wide variety of professional resources.
- The educator is sufficiently knowledgeable to play a significant role in the identification and acquisition of technology resources in support of learning.

PROFESSIONAL PRACTICE

	Stage I - Entry Educators, students and the community are aware of the possibilities, yet learning, teaching and the system remain relatively unchanged by technology.	Stage II - Adaptation Technology is thoroughly integrated into existing practice.	Stage III - Transformation Technology is a catalyst for significant changes in learning practices.
TECHNOLOGY FOR PROFESSIONAL PRODUCTIVITY	The educator is aware of the possibilities for the use of technology to support professional practice, but lacks either the requisite skills or access to become an effective user. Preliminary attempts to integrate technology will likely be frustrating and lack efficiency.	Having mastered the skills associated with basic application and communications software, and with reliable access to technology at home and at school, the educator regularly applies technology to personal and professional productivity. The educator at this stage finds it difficult to function professionally when technology is not available. Technology is viewed as improving efficiency.	At this stage, productivity and communications tools significantly enhance the professional practices of the educator. A range of collaborative technologies, from e-mail and listservs to chat boards and two-way video, allow for higher levels of professional discourse and access to expertise previously unimaginable. The educator at this level serves as a resource, assisting others in acquiring technology skills in both formal and informal settings.
COLLABORATIONS	Collaboration is limited to traditional methods, e.g., team planning, staff meetings and committee work. Collaborations across school or district boundaries are rare. The educator at this level may recognize the potential value of collaborative technology (e-mail, listservs, chat boards, discussion boards, two-way audio and video technologies) but lacks either the requisite skill or access to actively use these technologies.	At this level the educator is a successful user of several collaborative technologies, usually e-mail, listservs and newsgroups. These resources are used primarily to automate previous practice, e.g., to send and receive notices of meetings and committee work, to share drafts of professional documents, etc. The educator may be involved in pilots or experiments with more advanced collaborative technologies, but these technologies are not used on a day-to-day basis.	The educator both participates in and initiates online collaborations. Resources are co-developed, shared and discussed with peers and experts (independent of the locations of participants) and greatly improve the professional practice of the educator. These collaborations also serve as models for students and similar collaborations have begun for everyone in the learning community.
COMMUNICATIONS	The educator recognizes the possibilities for the improvement of communications through the use of technology, but lacks adequate access and the requisite skills. Current communications are almost exclusively paper-based and infrequent, e.g., weekly or monthly parent newsletters. Communications with community or professional resources outside of the school environment are infrequent.	At this stage technology has become indispensable in the communications process. The teacher uses technology—e.g., document processing and publishing software—to communicate with parents and the school community at large. Daily communications using easily accessed technology such as "homework hotlines" built into voicemail systems may also be used. The teacher uses e-mail, but primarily within the school and district.	Technology has transformed communications throughout the school. E-mail communications are regularly exchanged between educators, parents, the extended community, outside experts and students. The educator provides content to an intranet, with several communications vehicles and collaborative features available to everyone in the school community. Students communicate online with experts outside of the school. The school and classroom are open to the community, nation and world.

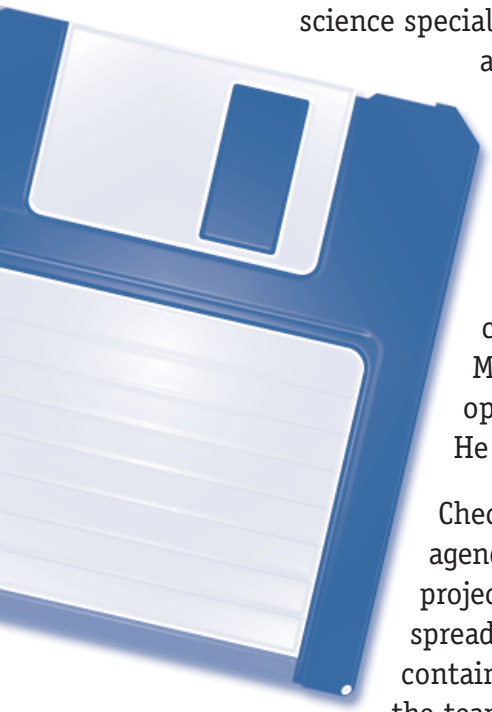
	Stage I - Entry Educators, students and the community are aware of the possibilities, yet learning, teaching and the system remain relatively unchanged by technology.	Stage II - Adaptation Technology is thoroughly integrated into existing practice.	Stage III - Transformation Technology is a catalyst for significant changes in learning practices.
PROFESSIONAL RESOURCES	The educator is aware of professional associations, publications and conferences related to instructional technology but may not have sufficient confidence or access to technology to become involved with these resources at any significant level.	The educator regularly accesses online and print resources to improve both skill levels and integration practices related to instructional technology. He/she attends professional conferences on education technology as available.	The educator at this level not only accesses professional resources on instructional technology but creates and contributes to those resources. The nature of resources migrates from unidirectional information resources to collaborative resources where the educator not only receives information, but also contributes to collaborative discussions that benefit others. The educator at this level often serves as a professional resource to others through publications, presentations, mentorships and online collaborations.
RESOURCE ACQUISITION	The educator is aware of school and district procedures through which technology resources are assigned. The educator plays a passive role in the acquisition of technology, i.e., he/she uses the resources available but does not seek out new resources. Often technology is used at this stage without careful consideration of its instructional value.	The educator understands the processes for resource acquisition in the school and district, acquires technology resources and participates in acquisition processes. The educator uses print and online methods for locating technology and funding sources. The educator is familiar with and able to integrate assistive technologies for special needs students.	The educator plays a major role in the identification and acquisition of technology resources in the classroom and school. He/she is active in seeking out grants and other funding opportunities and has been successful in obtaining funding from these sources. The educator is aware of—and frequently participates in—partnerships that generate additional resources for the instructional program.

PROFESSIONAL PRACTICE

How it could be...

With his last student conference completed, Mr. Narwal has scheduled 60 minutes of professional development time before his 2 p.m. team meeting. He sits at his computer and starts his Web browser, which automatically opens to his "portal page," his online entry point to the school intranet. An icon showing an overstuffed mailbox suggests it is time to check his e-mail. Mr. Narwal has a self-imposed rule against answering e-mail during professional development time, but because he posted student portfolio items the day before, he is expecting a number of parent responses to the new work and decides to attend to those. He responds to five e-mails from parents, and thanks them for their generally positive responses.

Returning to his home page, Mr. Narwal scans the short list of projects with which he is currently associated. Two of the projects have "new entry" notices flashing. The first, an investigation of assessment strategies for financial simulations, is a joint effort by a group of social science specialists and teachers in the Anytown District. The group has been joined by other specialists from faraway districts and some professors, who heard about the financial simulations project through a chat room at the local state university's school of management. The group is submitting final edits for an instrument that will evaluate the financial simulation site.



The second project with flashing notices is a follow-up to a cooperative learning training session. Mr. Narwal is serving as mentor for several teacher-interns who completed an initial training session and had observed him—via Internet-broadcast video—implementing specific cooperative grouping strategies in his classroom team investigations of firsthand American history resources. Attached to the message waiting for Mr. Narwal is a video of one of the interns teaching a similar lesson using the same strategy. Mr. Narwal pops open a notation program and—while watching the video—attaches voice commentary to portions of the lesson. He sends the annotated file to the intern and to a second intern he is mentoring.

Checking his watch, Mr. Narwal notices that he has just a few minutes before the team meeting. He reviews the agenda, recalling that he is to report the results of a research project that he and two of his colleagues conducted. The project examined how using a new online curriculum site affects student independent study. Mr. Narwal locates the spreadsheet file containing the data from the first student trials, graphs it and drops the data into a second sheet containing the previous year's independent study program. He then drops both spreadsheets into the shared folder for the team, undocks his portable computer and heads down the hall for the meeting.

STRATEGIES FOR PROFESSIONAL PRACTICE

This sampling of advice from our panel of staff development experts will assist teachers in developing competencies in the area of Professional Practice:

- **Start small.** Select a single collaborative technology. E-mail is a typical starting point. Begin by simply communicating with colleagues and friends.
- **Be patient.** In the beginning, almost any use of technology is less efficient than the same operation done the "old way." It may seem easier at first to simply use a word processor to do newsletters rather than dealing with the complexities of a desktop publishing program. The time invested, however, will eventually pay off not only in improved productivity, but also in access to new capabilities that add to the professionalism of the finished product.
- When exploring online collaboration, **begin with topics that have immediate value,** even if those topics are not directly related to teaching duties. For example, participating in online auction environments (from home, of course!) gives teachers valuable experience with bulletin boards, e-mail and chat areas, and makes them more comfortable using these technologies in the classroom.
- **Use e-mail and classroom Web pages to communicate with parents.** Parents who lack access to these technologies can be encouraged to use resources in libraries or, if available, after hours in their local schools. Schools and districts need to establish policies and infrastructure that facilitate school-parent communication.
- In order for staff to have access to powerful collaborative technologies, **districts must provide the appropriate software and infrastructure.** Intranets with powerful communications and collaboration tools are beginning to appear in many districts across the country. All districts should be moving in this direction.

CLASSROOM AND INSTRUCTIONAL MANAGEMENT

Are teachers creating and managing learning contexts and physical environments that require students to take on more independent roles through technology and telecommunications?

How it is...

In a high school classroom in the Southeast, Mrs. Janowicz is frustrated trying to get sufficient access to technology for all of her students. The school has what seems to be a significant amount of technology resources. There are two computer labs in the 400-student high school, and each classroom has three machines, one of which is connected to the Internet. The computer lab is tightly scheduled with most slots taken up by business and composition classes. Mrs. Janowicz can seldom find slots for both of her freshman history classes on the same day. She has computers in her room, but if students are working on them, they are not paying attention to her. The computers are also a distraction to the rest of the class. Even if this was not a problem, what would she do with the other students while part of the class uses the few classroom computers? If she asks the students to do computer-based research at home, this causes a problem for the half of the class that has no Internet access from home.

Mrs. Janowicz also has access to a wonderful computer-based simulation that she would love to use with her class, but two concerns prevent her from using it. First, the school owns only two copies of the program and—for technical and copyright reasons—she has been told that it can't be put on the network. Second, she has no strategy for grading the work done on the simulation. She worries that the students will not take it seriously if grades are not given for the work or that, if they work in pairs, it will be impossible to ensure that both students equally share in the work. She decides to use the simulation as a bonus activity for students who finish their work early.

DIMENSION 3

CLASSROOM AND INSTRUCTIONAL MANAGEMENT

Classroom management refers to "the provisions and procedures necessary to establish and maintain an environment in which instruction and learning can occur."[7] In most professional development programs that support technology, little attention is given to classroom and instructional management. Discussions with teachers who are about to enter technology-rich classrooms often center around management issues. While the complexity of the classroom environment increases significantly with the introduction of technology, so do the opportunities for creating an exciting and purposeful environment for learning. However, educators should not be expected to "reinvent the wheel." Many successful management strategies exist, and these strategies are crucial for overcoming the concerns of competent, responsible educators who value their students' time and hold themselves accountable for tracking students' progress.

PROFILE:
CLASSROOM AND INSTRUCTIONAL MANAGEMENT

- The educator is skilled in the organization of classroom technology resources and orchestration of activity within that environment.
- The educator is aware of how to locate and access technology resources that will support instructional strategies.
- The educator is skilled in the use of technology to track student progress through the curriculum and manage curricular resources.

CLASSROOM AND INSTRUCTIONAL MANAGEMENT

	Stage I - Entry Educators, students and the community are aware of the possibilities, yet learning, teaching and the system remain relatively unchanged by technology.	Stage II - Adaptation Technology is thoroughly integrated into existing practice.	Stage III - Transformation Technology is a catalyst for significant changes in learning practices.
ORGANIZATION AND USE	The overall practice of the educator is not impacted by technology. If technology is used at all in instruction, it is typically used for a specific purpose in a highly structured fashion. Technology at this stage may be more abused than used—e.g., used as a reward, with instructional software unrelated to the curriculum, or with software that appears topically related to instruction but does not actually support the objectives of the curriculum. The organization and use of technology at this stage may be directed by a "computer teacher" or laboratory aide rather than by the classroom teacher.	The educator has become skilled at organizing technology resources in support of existing classroom instruction. In classrooms that were previously oriented towards whole group instruction, organizational structures more supportive of small group work may now be present. The classroom is now more supportive of "different students doing different things at different times."	The organization of the classroom is the shared responsibility of teachers and students. Technology is sufficiently available. Students are increasingly self-directed, resulting in the use of technology resources with minimal teacher direction. Students routinely identify the technology tool most appropriate to an assignment and use multiple tools with minimal guidance. The room is usually organized according to constructive, knowledge-building principles. The teacher and students may frequently reorganize the classroom environment in response to a change in activities.
ACCESS AND LOCATION	Access and location of technology is of minimal concern to the educator at this stage. Most technology resources are configured in computer labs where teachers either sign up for occasional use or are assigned limited blocks of time on a weekly basis. A single classroom computer may be used with each child taking a turn regardless of need, as a "filler" after finishing assignments early or as a reward. If there is a computer in the classroom, it is often located in the back of the room in a study carrel.	Technology has moved closer to the point of instruction. Resources are located primarily in the classroom and are more closely controlled by the classroom teacher. Students have more frequent access to technology for learning, but usually through teacher-designed and directed activities. Technology resources are often arranged with teacher supervision of the learning activity as a primary goal.	Decisions related to location and access to technology resources are the shared responsibility of the teacher and the student. There are sufficient resources available. The educator has created a learning environment where access to technology resources is efficient and convenient.
INSTRUCTIONAL MANAGEMENT	The educator is aware of the possibilities for instructional management through technology, but lacks the requisite skills and access to make it part of the classroom learning environment.	The educator makes use of technology-based tools for instructional management. These tools are used to support existing practice and are typically used as prescribed by the vendor. These tools may range from self-designed databases and spreadsheet applications to sophisticated instructional management systems. The teacher has the sole responsibility for managing student progress, but uses technology successfully to support this.	The educator is sufficiently sophisticated with technology to use a variety of applications to support instructional management. Due to the high levels of student self-direction, instructional management is a shared responsibility, and access to the tools used for this purpose is also shared.

STRATEGIES FOR CLASSROOM AND INSTRUCTIONAL MANAGEMENT

This sampling of advice from our panel of staff development experts will assist teachers in developing competencies in the area of Classroom and Instructional Management:

- Develop a vision for the use of technology before making decisions to deploy technology resources. Many schools, for example, commit all of their technology resources to computer labs, only to find that the eventual goals for student learning are better supported by putting technology in the classroom.

- Provide positive models of classroom management. Classroom management issues are one of teachers' top concerns as they begin to use technology. The availability of these models through visits or video is crucial as teachers develop an understanding of the different organizational strategies that may be necessary in a technology-rich classroom.

- Model curricular "units" should always include a section that addresses management concerns. Include descriptions for grouping, classroom organization, scheduling and movement.

- Provide instructional management tools. Instructional management refers to the use of technology to collect and manage data including: student standards for learning, resources available to support this learning, and assessment data that defines student progress towards these standards. Simply providing an Instructional Learning System package that tracks student progress within the software of that system is not sufficient. Teachers need tools to assist them in maintaining a comprehensive picture of student achievement. These tools should also allow for student participation in the goal setting and assessment processes. Finally, these tools should be flexible enough to accommodate the wide variety of materials and instructional approaches found in the classrooms of excellent teachers.

CLASSROOM AND INSTRUCTIONAL MANAGEMENT

How it could be...

Ms. Parsons' American History classroom looks very different than it did when the technology arrived three years ago.

In order to facilitate the change from a teacher-centered lecture environment to one that was student-centered and project-based, she had to look outside of the high school where she had spent 25 years as a social science teacher. Surprisingly, she found the inspiration for her management strategy in an unexpected place—a primary classroom. Ms. Parsons used a 2nd grade classroom that she "visited" via Web-based video as a model for the physical and organizational changes she has made to her own classroom over the past two years. Her goals for the reorganization were: to allow for more student-centered work, increase opportunities for collaborative work, diversify the resources that students had available for research and learning, and to maximize the use of the limited technology resources in her classroom. The "learning center" style elementary classroom she visited online impressed her immediately, and she worked to model its structure in her own school.

Ms. Parsons' redesigned classroom has four areas, each taking up about a quarter of the room: a technology center, a group work area, a research/writing center, and a "conversation pit." Both centers are separated from the others by portable office walls that were found languishing in the district's warehouse. The technology center is home to two of the six computers assigned to Ms. Parsons' room. These computers are surrounded by several peripheral devices which—just two years before—Ms. Parsons would have found intimidating. These include a flatbed scanner, a digital camera, a color printer and a video recorder. The research and writing center on the other side of the room features one computer connected to two printers (laser and color), as well as a cart with portable computers and word processing devices for individual writing projects.

The group work area features several round tables and—as its name suggests—is intended for small groups of students to meet and work collaboratively. Three computers are located in this area as well, and they are often the focal point for group work. The conversation pit, which opens into the group work area, allows for a comfortable meeting space that can accommodate an entire class in a pinch. The pit is normally one of the most popular spots for group work and informal reading or homework.

The arrangement of the class has evolved over the last two years, with suggestions from students and experience guiding the changes. The room now reflects the collaborative nature of the assignments and the diversity of activity for which Ms. Parsons is striving. She has noticed that since making the changes, behavior problems have all but disappeared. Her classes are controlled and highly focused on group work, to the point where behavioral interruptions or fidgeting students are dealt with by peers even before she is able to discern the problems. Ms. Parsons takes detailed notes on what is happening inside her classroom in preparation for her next step: to share her observations, planning strategies and vision through an online professional development forum designed to help other teachers learn from her experience.

ADMINISTRATIVE COMPETENCIES

Are administrators modeling the effective use of technology, developing and supporting systemic change processes to maximize support for learning, and facilitating appropriate professional development processes?

How it is...

Ms. Williams, an experienced principal in a large, elementary school in the northwestern United States, has always been supportive of education technology. She is impressed at the sight of young children using computers with such apparent ease. Parents, too, have commented positively upon visiting the school and seeing the students in action on the computers. As to the nature of the action on the computers, Ms. Williams has deferred to the judgement of individual teachers or the computer lab aide—a para-professional—who monitors the activity and often selects the software to be used during a given class's computer time. Lately, Ms. Williams has been uneasy. She has noticed that much of what goes on in the lab does not seem to relate to classroom instruction but—lacking strategies to offer as an alternative—she feels unjustified intervening. She regularly approves her teachers' attendance at technology workshops offered at the district and a nearby county educational service center, hoping that the sessions might result in better technology use.

In the office, the computer is the domain of the school secretary, who considers herself somewhat of a "techno-wizard." If reports or communications need to go out, Ms. Williams will usually draft them on her yellow legal pad, then turn it over to the secretary for translation into electronic format. Ms. Williams knows that the district system contains far more data than she typically makes use of, but she is not comfortable enough with the system to access or create any report other than those that are directly sent out from the district office. She does not even check her own e-mail, but rather allows her secretary to operate the e-mail program and print out any messages needing Ms. Williams' direct attention.

DIMENSION 3

ADMINISTRATIVE COMPETENCIES

According to Michael Fullan, "The principal is central, especially to changes in the culture of the school."[8] Many of the opportunities for significant change in the way that schools innovate through technology are directly linked to change in the school culture. If teachers are expected to try new approaches to learning and to stretch the limits of what is possible when applying technology to learning, they must feel that they are operating within an environment that values experimentation and learns from failure. If students are to work collaboratively, the school culture must model and value collaboration. If technology is to be woven transparently into the daily activities of classrooms, the use of that technology should be modeled by professionals throughout the school community.

PROFILE: ADMINISTRATIVE COMPETENCIES

- Administrators at the building and district level model the effective use of technology in support of learning and administrative functions.
- Administrators are able to initiate and support professional development processes that reflect attention to principles of adult learning.
- Administrators are competent in leading and managing systemic change processes at the classroom, school and/or district levels.
- Administrators maintain a solid knowledge of the applications of technology to student learning.

ADMINISTRATIVE COMPETENCIES

	Stage I - Entry Educators, students and the community are aware of the possibilities, yet learning, teaching and the system remain relatively unchanged by technology.	Stage II - Adaptation Technology is thoroughly integrated into existing practice.	Stage III - Transformation Technology is a catalyst for significant changes in learning practices.
MODELING EFFECTIVE USE	The practice of the administrator is not impacted by technology. If technology is used in the office, it is often considered the province of the clerical staff.	The administrator is a willing user of basic administrative and learning technologies, and his/her positive attitude is noted by staff and students. Administrative functions are streamlined, but the administrator may still rely on others to create procedures and design reports. E-mail and voicemail communications, if available, are used regularly.	The administrator is an excellent role model for the effective use of technology. Administrative functions of the school are streamlined and efficient. The administrator uses technology, not only as prescribed through standard procedures and reports, but to interpret and report data in new and creative ways. Communication with all stakeholders is supported through a variety of technologies including e-mail, voice technologies and a school intranet. Additionally, the administrator participates in and often initiates professional collaborations that are enabled and supported through technology. When new technologies are demonstrated to be of value for learning or efficiency, the administrator is an early adopter and effective promoter.
LEADING PROFESSIONAL DEVELOPMENT	The administrator views professional development primarily as "teacher training." He/she relies on district resource staff and interested teachers for software training, which is the primary source of professional development in instructional technology.	The administrator takes an active role in facilitating the professional development of staff related to technology. He/she conducts needs assessments and ensures that training offerings support the school curriculum and existing instructional practice.	The administrator considers professional development to be of critical importance. The definition of professional development is broad and includes a wide variety of teacher collaborative activity in addition to more conventional training. The administrator views professional development as a schoolwide initiative that encourages cohesive developmental goals. The administrator is able to create and sustain a culture that values experimentation with new approaches and learns from failures as well as successes.
LEADING AND MANAGING SYSTEMIC CHANGE	The administrator is familiar with systemic change theory and processes, but has not yet developed significant skill in leading and managing these processes.	The administrator is knowledgeable in the theory and process of systemic change. He/she is engaging the staff in systemic change on a regular basis, and the administrator is developing increased confidence in his/her ability to manage this process.	The administrator is fluent in the language and strategies of systemic change processes. He/she understands the major obstacles to change and has a wide range of strategies for overcoming those barriers. The administrator has created a community where experimentation is valued and supported and successes are publicly celebrated.
MAINTAINING A KNOWLEDGE BASE	While the administrator is aware of the existence of literature related to the effective use of learning technologies, he/she lacks the time, access or interest to familiarize himself or herself with this knowledge. At this stage the administrator may simply accept any use of technology that is not obviously detrimental to learning as acceptable, abdicating responsibility for evaluating classroom practice.	At this stage the administrator has a working knowledge of effective practices related to instructional technology. This knowledge may be limited, and there is often no strategy in place for staying abreast of new developments. Enough is known, however, to avoid ineffective practices and to discuss potentially effective ones with teachers.	The administrator is well-versed in the knowledge base on the effective use of technology in student learning. He/she is able to constructively evaluate classroom uses and prescribe modifications. The administrator has strategies in place that are constantly updated with new developments and ensures that his/her staff is provided timely information relevant to the learning needs of students.

STRATEGIES FOR ADMINISTRATIVE COMPETENCIES

This sampling of advice from our panel of staff development experts will assist teachers in developing competencies in the area of Administrative Competencies:

- Administrators need to attend to their own professional development related to core technology skills in the early stages of implementation. Teachers are likely to value the use of technology more if the administrator models effective use.
- Develop a vision for how the school or district might be improved through the effective use of technology. Visiting model sites and attending conference presentations by other administrators who have led successful, technology-supported change initiatives can assist in this process.
- Provide staff with non-negotiable reasons to use technology. Sending all announcements via e-mail, requiring that student information and assessment data be entered and accessed online, and providing efficient tools will allow this to happen.
- Develop sufficient familiarity with quality uses of technology not to be intimidated when observing the use of technology in classrooms. Use is not enough. Clear evidence of intentional use in support of curricular goals is crucial.
- Stay abreast of the literature related to successful use of instructional technology. Share examples and opportunities with the staff. Encourage staff members to substantiate their classroom technology uses with research and examples from the current literature.
- Assist teachers in seeking out community resources and partnerships both to support the acquisition of technology resources and to provide outside resources for technology-supported projects.

ADMINISTRATIVE COMPETENCIES

How it could be...

There is a joke that circulates among the staff at Hillcrest School that suggests that Ms. Franklin, the building principal, did not purchase a portable computer; she grew one. This derives from the fact that she is seldom seen in the halls of the school without her portable in hand or her carrying case slung over her shoulder. Ms. Franklin is also known for her extremely high energy level. Unlike her predecessor, who spent much of his time in his office dealing with arcane issues of scheduling, reporting and record-keeping, Ms. Franklin spends the majority of her time, and her boundless energy, in classrooms working with kids and teachers.

This does not mean Ms. Franklin overlooks administrative concerns. As a matter of fact, one of the first tasks Ms. Franklin applied herself to upon arriving at the school in midsummer several years ago was to master the district student management system. It was said that the district had never quite tapped into the potential of the management software; Ms. Franklin was determined to be the first to do so. Teachers were impressed upon their return with the amount of information related to the district curriculum and their own students' progress now available at the click of a mouse from their own desks.

Ms. Franklin has done most of the teacher training on the system, which focuses not on the software but on how teachers might use the software's data to improve their understanding of individual students and make better decisions about instruction.

One feature of the software used frequently is the student portfolio section. Ms. Franklin and the school leadership team received district approval for an alternative schedule that allows for a half-day per week for professional development. The staff was hesitant at first, envisioning afternoons spent sitting in an endless stream of workshops. They were pleasantly surprised, and significantly energized, when they discovered that Ms. Franklin's view of professional development is couched in problem solving and collaboration. One of the primary goals of these early-release days is for teachers with similar teaching responsibilities to review and discuss examples of student work. With the availability of the online portfolio system, examples of student work can be easily accessed and discussed.

This new focus on use of data and problem solving plays out in other ways as well. Virtually every teacher on the staff has been involved in one or more pilot or action research processes within the last two years. One of the first projects, piloted by a team that included Ms. Franklin, was an action research project using intensive computer-assisted instruction (CAI) for reading with at-risk primary students. In the past the approach would have been to buy enough hardware and software for the entire primary wing and begin implementing immediately. The team decided instead to pilot the new approach and, after a year-long action research study, discovered that the students who used the software actually did less well than those taught through traditional means. At the staff meeting where the results were presented, many expected finger pointing and recrimination. To their surprise, the meeting focused on the money that had been saved by piloting the CAI, the lessons that had been learned regarding use of technology with young children, and on plans for a “mini-grant” process for awarding new equipment to teachers interested in testing other approaches.

THE ROLE OF EDUCATOR IN PROFESSIONAL DEVELOPMENT

Joyce and Showers propose that educators must have:

> *"A pervasive staff development system (that) serves the needs of individuals, schools, and districts both by nourishing the professional growth of adults in the system and by directly addressing student learning."*[9]

Professional development is the responsibility of the entire educational system and not the sole responsibility of individual educators, as supported by current literature on professional development.[10] While competencies are described here in terms of individual educators, the strategies for professional development and the resources to which educators will be referred in the Web-based version of this document reflect the shared responsibility of all four entities of the school community:

School:

The primary focus of professional development should be "to unite the staffs of schools in studying ways to improve the school and implement procedures likely to make it better."[11] Professional development, therefore, should be based on the identified needs of the student population as interpreted by professionals directly responsible for their learning. The activity associated with the professional development plan would include not only well-designed training programs (as described in the next section), but also collaborative strategies not always associated with professional development, such as: collaborative planning, peer observations, action research and participation in study groups organized around a particular problem related to student learning.[12]

> *"Evidence abounds that we do far more by working as teams in a focused, problem-solving fashion than by working in isolation... students benefit immensely. The best news...is that the near absence of powerful elements such as teamwork is in one sense something to celebrate. Even reasonable attempts to increase it can inevitably produce better results."*[13]

District:

The responsibilities of the district for professional development include three primary elements:

- Through a comprehensive planning process that includes all members of the wider school community—staff, parents, business and government leaders, community members without children in the schools, etc.—develop a clear vision for student learning and a plan for achieving that vision.
- Offer well-designed training courses and other professional development resources that include instruction, collaboration and coaching in areas of common concern to several schools for purposes of efficiency.
- Provide consultation, planning and facilitation services to schools as they undertake professional development initiatives. The professional development should be aligned to the school improvement plans and education reform initiatives of the district.

State:

The state has several roles to play[14], including to:

- Support districts in the creation of a vision that describes powerful uses of education technology in support of learning;
- Make the powerful use of technology in support of learning a high priority in all state initiatives;
- Seek fiscal support for technology in schools;
- Set learning technology standards for preservice and inservice educators;
- Identify, promote and create valid models for technology integration and—where appropriate—professional development models to advance the effective use of technology across academic disciplines;
- Establish support structures for leadership, information and professional development;
- Require the allocation of significant resources towards professional development as part of any grant or funding initiatives;
- Support or develop sufficient network infrastructure to allow schools to connect to affordable high-speed networks allowing for collaboration across schools, districts and state boundaries.

Individual Educator:

While professional development is increasingly an organizational rather than individual concern, the individual educator must still assume responsibility for his own role within the professional development system. One comment that we hear often, particularly from teachers who have been successful in transforming their own classrooms through the use of technology, is that the attitude of the individual educator is key. Educators who embrace change, who are able to view themselves as learners, and who can share a vision of learning in a digital age seem to find the skills described in this document attainable. As is evident from this Continuum of skills: it is not about technology. It is about the use of technology to enable powerful new forms of learning. New forms of learning require significant changes in our beliefs about the nature of teaching and learning—both student learning and our own professional development.

NEXT STEPS

This document has been created as a starting point. Our purpose is to impress upon educators the wide range of skills that must be addressed in a comprehensive professional development system. During the next year, the Milken Exchange will be working with partners throughout the nation to research and document professional development programs and strategies based on this Continuum. We invite educators to use the Continuum to support their own efforts as well. Some suggested uses of this document and its companion Web site, which will be piloted during the summer of 1999 and available for use in the fall of 1999, follow:

Preservice Teacher-Educators:

The Milken Exchange is supporting ISTE (International Society for Technology in Education) as they develop Education Technology Standards for Teachers. These standards will likely be available in the early part of 2000. In the meantime, teacher training institutions may wish to review this Continuum, modify it as needed, and review the readiness of new teachers to teach in the digital-age classroom.

Individual Educators:

Use the Web site, www.milkenexchange.org, as a self-assessment tool and as a source of advice and resources for professional development. Many of the resources returned as the result of your self-assessment will lead you to projects around the country that provide opportunities to collaborate with other educators with similar needs and interests. The Continuum can also serve as a self-assessment tool to assist you in identifying areas where additional strengths might be developed.

Building Administrators and Staff Development Coordinators:

Use this Continuum as an organizational framework for the professional development you offer teachers.
Consider the following steps:

1. Review this Continuum and modify it for your purposes;
2. Conduct a work session that maps your current professional development offerings and activities to the Continuum;
3. Identify areas in which your system does not offer professional growth opportunities;
4. Work within your system and the continuing education and professional development providers to fill those gaps. Think broadly about what constitutes professional development. Processes like school improvement efforts and team problem solving may provide better professional development models than workshops and training sessions;
5. Be creative and think systemically. Reflect on your system's current professional development activities and align and integrate technology in ways that streamline, improve and transform professional growth. Integrating technology-rich activities into existing content training is a far more powerful means of promoting effective use of technology than offering generic workshops on “Integration of Technology in the Classroom.“
6. Remember that the goal is not to use the technology well. The goal is to improve student learning and to give students opportunities to develop skills and habits that will contribute to success and satisfaction as adults. Establish metrics that enable you to measure the impact of these professional growth activities on improvements in classroom practice, the school system’s shifts in learning designs, evolving roles of students, etc.

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ENDNOTES

1 Judith Sandholtz, Cathy Ringstaff and David Dwyer, *Teaching with Technology*, (New York, New York: Teachers College Press, 1997) pp. 37-47

2 Barbara Means, *Technology's Role in Education Reform,* (Washington, D.C.: Office of Educational Research and Improvement, 1995) p. S-4

3 George Posner, *A Guide to Curriculum Development,* (New York, New York: Longman, Inc., 1982), p. 8

4 Robert Marzano and John S. Kendall, *A Compendium of Standards Benchmarks for K-12 Education,* (Washington, D.C.: Office of Educational Research and Improvement, 1995)

5 Marzano and Kendall, *A Compendium of Standards and Benchmarks for K-12 Education*

6 Mann, Dale et al., *West Virginia Story: Achievement Gains from a Statewide Comprehensive Instructional Technology Program,* (Santa Monica, California: Milken Exchange on Education Technology, 1999)

7 Daniel L. Duke, *Classroom Management,* (Chicago, Illinois: University of Chicago Press, 1979), p. xii

8 Michael Fullan and Susan Stiegelbauer, *The New Meaning of Educational Change,* (New York, New York: The Teachers College Press, 1991), p. 286

9 Bruce Joyce and Beverly Showers, *Student Achievement through Staff Development,* (White Plains, New York: Longman Publishers, 1995) pp. 25-35

10 Dennis Sparks and Stephanie Hirsch, *A New Vision for Staff Development,* (Alexandria, Virginia: Association for Supervision and Curriculum Development, 1997), p. 11

11 Joyce and Showers, *Student Achievement through Staff Development*, p. 27

12 Sparks and Hirsch, *A New Vision for Staff Development*, p. 14

13 Mike Schmoker, *Results: the Key to Continuous School Improvement,* (Alexandria, Virginia: Association for Supervision and Curriculum Development, 1996) p. 16

14 Michael Fullan and Susan Stiegelbauer, *The New Meaning of Educational Change,* (New York, New York: The Teachers College Press, 1991), p. 286

TECHNOLOGY IN AMERICAN SCHOOLS: SEVEN DIMENSIONS FOR GAUGING PROGRESS

A DISCREPANCY ANALYSIS

The following is excerpted from a larger discrepancy analysis that was developed for schools to get quick assessments of their current status with learning technologies—not only where they stand across each of the Seven Dimensions, but the relative importance of each indicator to their school. To assist educators in evaluating the current status of their own practice, we have included here the analysis for three of the Seven Dimensions: Learners, Learning Environments and Professional Competency. The complete survey is available in print and electronic form on our Web site, www.milkenexchange.org.

While the developers suggest that schools will require a more serious in-depth analysis through surveys, site visits, focus groups and the tracking of student data correlated to interventions across the Seven Dimensions, this quick analysis will provide some insights into whether or not technology is being used effectively as a powerful teaching and learning tool in a school or individual classroom.

This design is a work-in-progress and is expected to evolve as the Milken Exchange uses the Seven Dimensions model with educators around the nation.

COMPLETING THE DISCREPANCY ANALYSIS

1. Complete the questionnaire for each of the three Dimensions. To complete the first column (labeled "Current Status") for each indicator description within a Topic area, circle a number from 1 through 5 to reflect your level of agreement that the indicator applies to the typical teacher, classroom or situation in your school.

- **1** *you strongly disagree that the indicator is descriptive of your school or your professional practice;*
- **2** *you disagree that the indicator is accurate;*
- **3** *you are neutral as to whether or not the indicator applies;*
- **4** *you agree that the indicator is descriptive of the typical teacher, classroom or situation in your school; or*
- **5** *you strongly agree that the indicator applies.*

2. Repeat the process in the column labeled "Relative Importance." In this column, you are asked to respond to whether or not the indicator is important to your district. If you score a "1" as an indicator, you strongly disagree that this indicator is important for your school. A "5" indicates that you strongly agree that it is important, etc. This column will probably contain most—if not all—"5s." It does, however, prevent a school from setting priorities in categories that are not relevant for them.

For example, a community served by a particular school may have a policy that students should not have contact with experts outside of the school. In this case, even if the "Current Status" suggests a low score on this indicator, it is unlikely to become a priority as it is in conflict with a district policy.

3. Total the points for all items under each Topic, then divide that total by the number of indicator questions in that block of questions. Record this in the appropriate box on the chart for each particular Dimension.

4. Graph the point that describes where your school or district is on that Topic by moving across the horizontal axis the number of points that you counted for "Current Status" scores. Move vertically to the number of points that you scored for relative importance. Plot that point and label the point by the name of the Topic being scored (e.g., Fluency, Strengthening Basics, etc.). Repeat for the other questions for each Indicator under the Topic within the three Dimensions as instructed.

INTERPRETING THE DISCREPANCY ANALYSIS

The score for each Topic in each Dimension will fall into one of four quadrants. You can get a good idea of where your school or district is positioned across each Dimension by analyzing patterns of where the Topics fall in the quadrants. The quadrants are labeled with Roman numerals on the chart. The definitions of the quadrants are as follows:

I This quadrant suggests that the Relative Importance of this Topic in the Dimension is high, but the Current Status score is low. This suggests that this is an area that needs emphasis in your technology or improvement planning process.

II This quadrant suggests that scores for both the Current Status and the Relative Importance are high. This may be cause for celebration!

III This quadrant denotes low scores in both the Relative Importance and the Current Status. This may be labeled as "Who cares?"

IV This quadrant suggests that the Current Status is high, but the Relative Importance is low. This may mean that you are doing a great job on some things that don't really matter. Perhaps you might recover some resources here.

1. Learners

Are the learners using the technology in ways that deepen their understanding of the academic standards and, at the same time, advance their knowledge of the world around them?

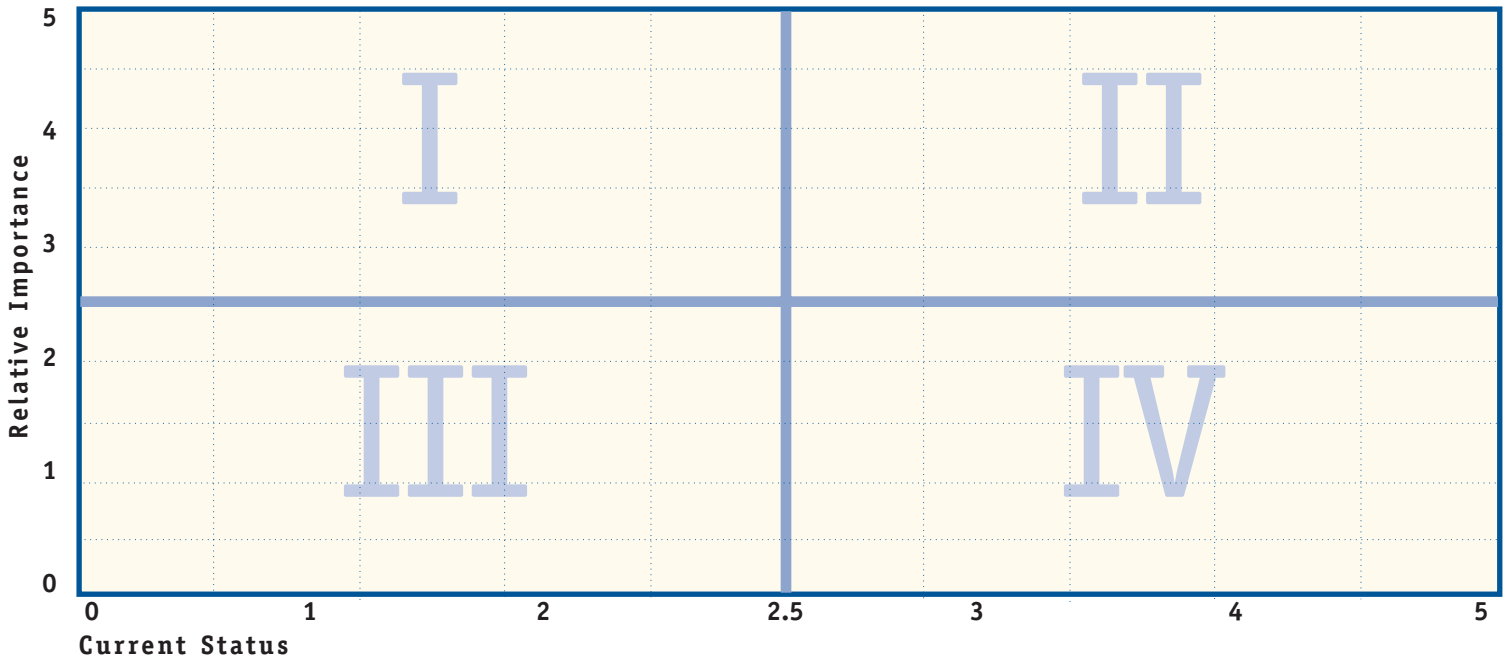
A. FLUENCY	Current status...	Relative importance...
Students are proficient in the use of technology hardware.	1 2 3 4 5	1 2 3 4 5
Students use technology to access and process information.	1 2 3 4 5	1 2 3 4 5
Students can select the appropriate technology or media for a given task.	1 2 3 4 5	1 2 3 4 5
Students have developed satisfactory troubleshooting skills to ensure efficiency in the use of technology.	1 2 3 4 5	1 2 3 4 5
Students are able to apply technology to learning in innovative ways.	1 2 3 4 5	1 2 3 4 5
Totals for Fluency	___/5=___	___/5=___
B. STRENGTHENING BASICS	**Current status...**	**Relative importance...**
There is evidence that student achievement is accelerated through the use of instructional technology.	1 2 3 4 5	1 2 3 4 5
There is evidence that technology has deepened understanding of content.	1 2 3 4 5	1 2 3 4 5
There is evidence that technology has improved the quality of student products.	1 2 3 4 5	1 2 3 4 5
There is evidence that technology has provided opportunities for increased problem-solving skills.	1 2 3 4 5	1 2 3 4 5
Totals for Strengthening Basics	___/4=___	___/4=___
C. HIGHER LEVEL ABILITIES	**Current status...**	**Relative importance...**
Students use interactive computer-based systems to solve problems.	1 2 3 4 5	1 2 3 4 5
Students are able to produce/build dynamic products.	1 2 3 4 5	1 2 3 4 5
Students are able to use technology to represent concepts visually.	1 2 3 4 5	1 2 3 4 5
Students are skilled in teaming and collaboration.	1 2 3 4 5	1 2 3 4 5
Technology has increased opportunities for communication and improved the quality of such communications.	1 2 3 4 5	1 2 3 4 5
Technology has increased the incidence of insightful, complex questioning.	1 2 3 4 5	1 2 3 4 5
Technology has improved the ability to forecast results.	1 2 3 4 5	1 2 3 4 5
Totals for Higher Level Abilities	___/7=___	___/7=___
D. MOTIVATION	**Current status...**	**Relative importance...**
Technology has increased active and independent student roles in learning.	1 2 3 4 5	1 2 3 4 5
Technology has resulted in increases in authentic student-designed projects.	1 2 3 4 5	1 2 3 4 5
Technology has resulted in increases in complex, interesting projects.	1 2 3 4 5	1 2 3 4 5
Totals for Motivation	___/3=___	___/3=___
E. RELEVANCY	**Current status...**	**Relative importance...**
Technology has increased opportunities for engagement in real world problems.	1 2 3 4 5	1 2 3 4 5
Technology has increased the opportunity for meaningful application of content.	1 2 3 4 5	1 2 3 4 5
Technology has increased student access to current/primary sources.	1 2 3 4 5	1 2 3 4 5
Totals for Relevancy	___/3=___	___/3=__
F. TRADE-OFFS	**Current status...**	**Relative importance...**
Students develop a sense of stewardship—an awareness of their role in shaping societal use of technology.	1 2 3 4 5	1 2 3 4 5
Students exhibit an awareness of appropriate technology usage and practices.	1 2 3 4 5	1 2 3 4 5
Students are knowledgeable about possible positive and negative impacts of technology in society.	1 2 3 4 5	1 2 3 4 5
Totals for Trade-offs	___/3=___	___/3=___

Discrepancy Analysis

Dimension 1—Learners: Point Totals

Topic	Current Status	Relative Importance	Topic	Current Status	Relative Importance
a. Fluency			d. Motivation		
b. Strengthening Basics			e. Relevancy		
c. Higher Level Abilities			f. Trade-offs		

Dimensions Graph



Dimensions Graph Interpretation

The definitions of the four quadrants—identified by Roman numerals—are as follows:

I. The Relative Importance is high, but the Current Status is low.
This suggests that this is an area that needs emphasis in your technology or improvement planning process.

II. The Relative Importance and Current Status are both high. This may be cause for celebration!

III. The Relative Importance and the Current Status are both low. This may be labeled as "Who cares?"

IV. The Relative Importance is low and the Current Status is high.
This suggests that you are doing a great job on some things that don't really matter.
Perhaps you might recover some resources here.

2. Learning Environments

Is the learning environment designed to achieve high academic performance by students through the alignment of standards, research-proven learning practices and contemporary technologies?

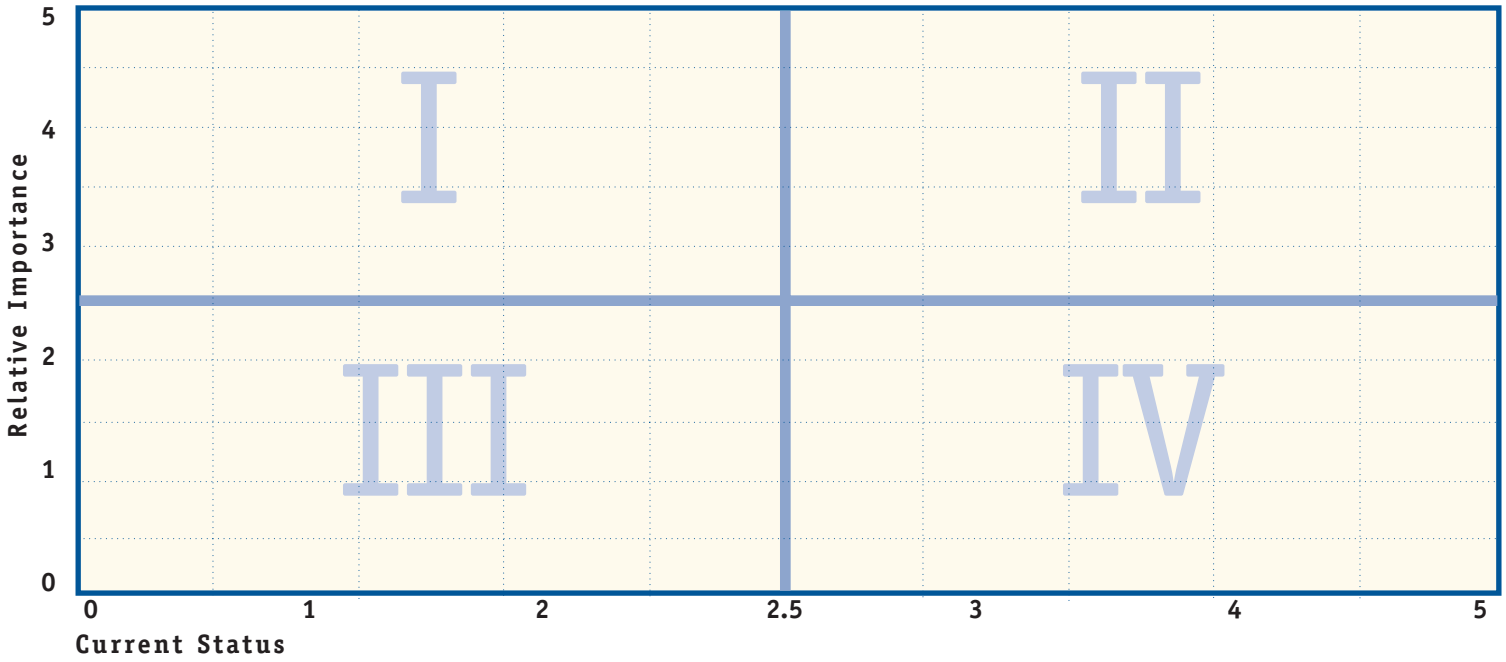
A. LEARNING CONTEXT	Current status...	Relative importance...
Teachers regularly use a variety of grouping strategies and use technology to support these strategies.	1 2 3 4 5	1 2 3 4 5
Technology resources are strategically located for the maximum convenience of teachers and learners.	1 2 3 4 5	1 2 3 4 5
A variety of technologies (e.g., scanners, digital cameras, computers, graphing calculators and video microscopes) are selected for use by students and teachers.	1 2 3 4 5	1 2 3 4 5
Activity during the school day includes strong elements of student direction, and technology serves as a tool to facilitate self-direction.	1 2 3 4 5	1 2 3 4 5
Technology facilitates the use of a wide variety of instructional strategies designed to maximize learning and meet individual needs.	1 2 3 4 5	1 2 3 4 5
Teachers and students operate in an open environment and are actively involved in communication and collaborative projects with people outside the classroom.	1 2 3 4 5	1 2 3 4 5
Totals for Learning Context	___/6=___	___/6=___
B. LEARNING CONTENT	**Current status...**	**Relative importance...**
Content supported by technology is carefully integrated with district curriculum and linked to state and local standards.	1 2 3 4 5	1 2 3 4 5
Technology-based learning is focused on important concepts and directly related to standards.	1 2 3 4 5	1 2 3 4 5
Most learning is organized into authentic tasks that solve real world problems.	1 2 3 4 5	1 2 3 4 5
Technology supports assessment that is largely performance-based, integrated within the learning activities and directly linked to standards and related curriculum.	1 2 3 4 5	1 2 3 4 5
Technology supports learning that is specifically targeted to the individual strengths and needs of students.	1 2 3 4 5	1 2 3 4 5
Totals for Learning Content	___/5=___	___/5=___
C. SCHOOL CULTURE	**Current status...**	**Relative importance...**
There is a culture of collaboration. Working in teams is the norm for teachers and students alike.	1 2 3 4 5	1 2 3 4 5
Technology is integrated through schoolwide initiatives that encourage congruence and coherence of effort.	1 2 3 4 5	1 2 3 4 5
Teachers are comfortable with and encourage student technology expertise in the classroom even when that expertise, in certain areas, is beyond their own knowledge.	1 2 3 4 5	1 2 3 4 5
There is a culture of experimentation in the school. Failures and successes are accepted and valued as learning mechanisms by administrators, teachers and students.	1 2 3 4 5	1 2 3 4 5
Success of both students and teachers is celebrated and shared with parents and the community on a regular basis.	1 2 3 4 5	1 2 3 4 5
Totals for School Culture	___/5=___	___/5=___
D. TECHNOLOGY ACCESS	**Current status...**	**Relative importance...**
Technology is present in sufficient volume to support quality use and to accelerate change in the learning process.	1 2 3 4 5	1 2 3 4 5
Hardware is sufficiently advanced to use advanced software and multimedia devices as appropriate.	1 2 3 4 5	1 2 3 4 5
The school has network and Internet access in all classrooms.	1 2 3 4 5	1 2 3 4 5
A wide variety of quality software applications is available and supports new modes of learning for students.	1 2 3 4 5	1 2 3 4 5
The school has positioned itself as a center for lifelong learning. Technology resources are accessed by a variety of community members for a variety of learning and productivity purposes.	1 2 3 4 5	1 2 3 4 5
Totals for Technology Access	___/5=___	___/5=___
E. INFORMATION & COMMUNICATION	**Current status...**	**Relative importance...**
Technology has transformed the communications process between the school and parents through e-mail, intranet and other vehicles for communication.	1 2 3 4 5	1 2 3 4 5
Teachers regularly learn and collaborate over the Internet. The district has a wide variety of professional development resources available to support school initiatives.	1 2 3 4 5	1 2 3 4 5
Teachers and administrators have significantly changed their professional practice through the use of technology. New means of collaborating, organizing and learning are used daily and are apparent to students.	1 2 3 4 5	1 2 3 4 5
Teachers and students initiate communications with experts on a regular basis to find, test or elaborate on knowledge areas.	1 2 3 4 5	1 2 3 4 5
The educator is skilled at adopting a variety of roles depending on the learning needs of students. Students serve as independent learners, problem solvers and producers of knowledge throughout the curriculum.	1 2 3 4 5	1 2 3 4 5
Totals for Information & Communication	___/5=___	___/5=___

Discrepancy Analysis

Dimension 2—Learning Environments: Point Totals

Topic	Current Status	Relative Importance	Topic	Current Status	Relative Importance
a. Learning Context			d. Technology Access		
b. Learning Content			e. Information & Communication		
c. School Culture					

Dimensions Graph



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This suggests that this is an area that needs emphasis in your technology or improvement planning process.

II. The Relative Importance and Current Status are both high. This may be cause for celebration!

III. The Relative Importance and the Current Status are both low. This may be labeled as "Who cares?"

IV. The Relative Importance is low and the Current Status is high.
This suggests that you are doing a great job on some things that don't really matter.
Perhaps you might recover some resources here.

3. Professional Competency

Is the educator fluent with technology and does he/she effectively use technology to the learning advantage of his/her students?

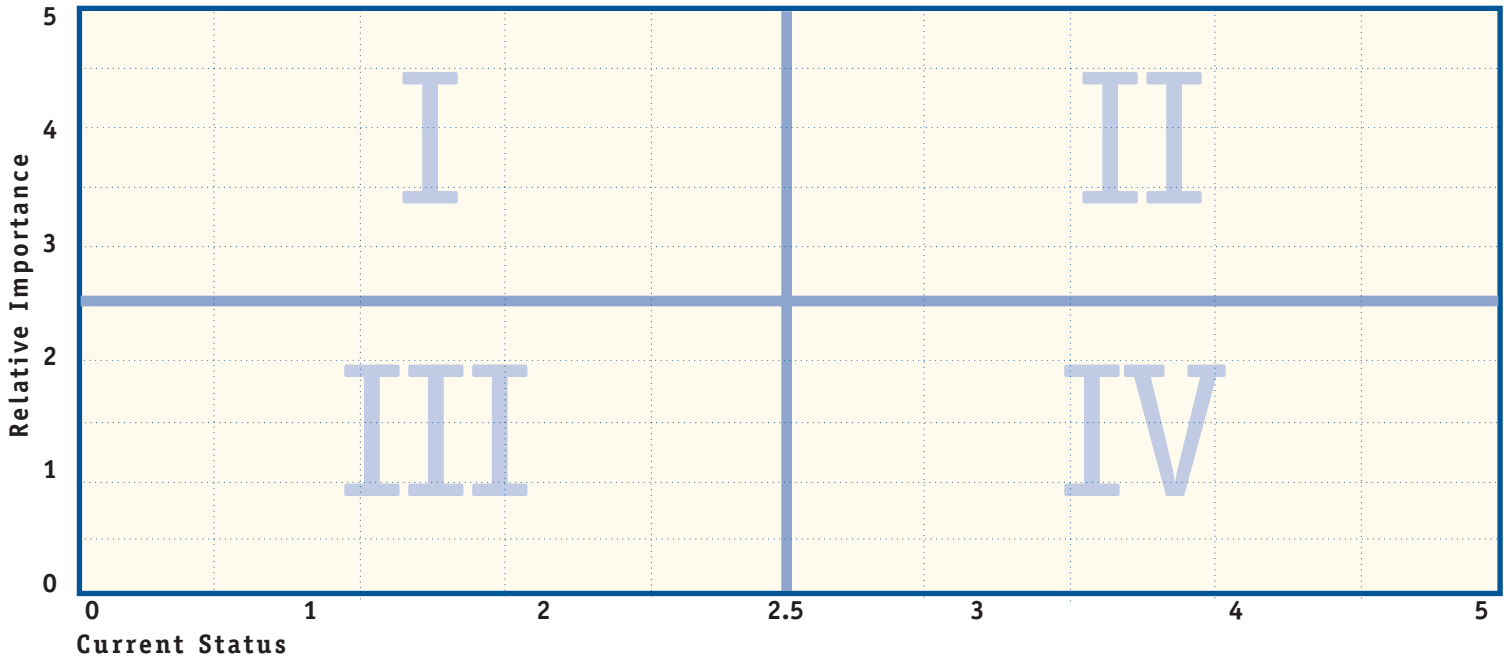
A. CORE TECHNOLOGY SKILLS	Current status...	Relative importance...
All staff are competent in the basic operation of computer hardware and operating systems.	1 2 3 4 5	1 2 3 4 5
All staff are competent in the use of non-computer technologies (e.g., digital cameras, graphing calculators, etc.) as appropriate for their work or teaching assignments.	1 2 3 4 5	1 2 3 4 5
All staff are competent in the use of basic application software (e.g., word processing, spreadsheet, graphics and presentation packages).	1 2 3 4 5	1 2 3 4 5
All staff are competent in the use of information tools (e.g., CD-ROM databases, Web search engines, automated card catalogs, etc.).	1 2 3 4 5	1 2 3 4 5
All staff are competent in the use of network tools (e.g., Web browsers, e-mail, "groupware" applications, file servers, etc.).	1 2 3 4 5	1 2 3 4 5
All staff are competent in the use of multimedia and presentation tools.	1 2 3 4 5	1 2 3 4 5
Totals for Core Technology Skills	___/6=___	___/6=___
B. CURRICULUM, LEARNING & ASSESSMENT	**Current status...**	**Relative importance...**
Educators have become skilled at involving students in the development of technology-enriched learning activities that are authentic, multidisciplinary and directly related to district, state and national standards.	1 2 3 4 5	1 2 3 4 5
Educators use technology to implement a variety of teaching and learning strategies in response to student needs.	1 2 3 4 5	1 2 3 4 5
Educators have adopted new roles as facilitators and co-learners.	1 2 3 4 5	1 2 3 4 5
Educators are skilled in establishing conditions in which students use technology to adopt roles as independent learners, teachers, problem solvers and producers of knowledge throughout the curriculum.	1 2 3 4 5	1 2 3 4 5
Assessment is integrated, ongoing and often product-based.	1 2 3 4 5	1 2 3 4 5
Totals for Curriculum, Learning & Assessment	___/5=___	___/5=___
C. PROFESSIONAL PRACTICE	**Current status...**	**Relative importance...**
Educators use technology to support professional productivity.	1 2 3 4 5	1 2 3 4 5
Educators use technology to engage in professional collaborations.	1 2 3 4 5	1 2 3 4 5
Educators use technology to enhance professional communications.	1 2 3 4 5	1 2 3 4 5
Educators use technology to access and facilitate professional growth opportunities.	1 2 3 4 5	1 2 3 4 5
The educator participates in a network of community members and draws students into this network when there is an opportunity to support learning goals.	1 2 3 4 5	1 2 3 4 5
Educators and students are aware of the ethical issues related to the use of technology and consider these issues in daily practice.	1 2 3 4 5	1 2 3 4 5
Educators use technology to access professional resources.	1 2 3 4 5	1 2 3 4 5
Educators play a major role in the identification and acquisition of technology resources for their classroom and school and are able to actively seek grants and funding opportunities.	1 2 3 4 5	1 2 3 4 5
Totals for Professional Practice	___/8=___	___/8=___
D. CLASSROOM & INSTRUCTIONAL MANAGEMENT	**Current status...**	**Relative importance...**
Teachers are skilled at organizing learning activities within technology-rich classroom environments.	1 2 3 4 5	1 2 3 4 5
Teachers are skilled in the physical organization of learning environments wherein access to technology resources is both efficient and convenient, and transitions between activities and locations are easily made.	1 2 3 4 5	1 2 3 4 5
Teachers use a variety of applications to support instructional management.	1 2 3 4 5	1 2 3 4 5
Totals for Classroom & Instructional Management	___/3=___	___/3=___
E. ADMINISTRATIVE COMPETENCIES	**Current status...**	**Relative importance...**
The administrator is a skilled user of technology and has capitalized on this skill to improve the administrative efficiency of the school.	1 2 3 4 5	1 2 3 4 5
The administrator considers professional development to be a central responsibility and has created an environment that includes a wide variety of teacher collaborative activity in addition to more conventional training.	1 2 3 4 5	1 2 3 4 5
The administrator is fluent in the language and strategies of systemic change processes. He/she understands the major obstacles to change, and has a wide range of strategies for overcoming these barriers.	1 2 3 4 5	1 2 3 4 5
The administrator is well-versed in the knowledge base related to the effective use of technology in support of student learning.	1 2 3 4 5	1 2 3 4 5
Totals for Administrative Competencies	___/4=___	___/4=___

Discrepancy Analysis

Dimension 3—Professional Competency: Point Totals

Topic	Current Status	Relative Importance	Topic	Current Status	Relative Importance
a. Core Technology Skills			d. Classroom & Instructional Mgmt.		
b. Curriculum, Learning & Assessment			e. Administrative Competencies		
c. Professional Practice					

Dimensions Graph



Dimensions Graph Interpretation

The definitions of the four quadrants—identified by Roman numerals—are as follows:

I. The Relative Importance is high, but the Current Status is low.
This suggests that this is an area that needs emphasis in your technology or improvement planning process.

II. The Relative Importance and Current Status are both high. This may be cause for celebration!

III. The Relative Importance and the Current Status are both low. This may be labeled as "Who cares?"

IV. The Relative Importance is low and the Current Status is high.
This suggests that you are doing a great job on some things that don't really matter.
Perhaps you might recover some resources here.

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