PART I

21st-Century Schools

*A New World for Administrators,
Teachers, and Students*

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Leading 21st-Century Schools

What School Leaders Need to Know

People in the 21st century live in a technology- and media-suffused environment, marked by access to an abundance of information, rapid changes in technology tools, and the ability to collaborate and make individual contributions on an unprecedented scale. To be effective in the 21st century, citizens and workers must be able to exhibit a range of functional and critical thinking skills related to information, media and technology.

—Partnership for 21st Century Skills
(http://www.21stcenturyskills.org)

My vision of school/classroom 2.0 is, more than anything else, about conversations. Traditional schools involved teachers and textbooks delivering information to students, and students reflecting that information back. To better serve their future, today's classrooms should facilitate teaching and learning as a conversation—two-way conversations between teachers and learners, conversations between learners and other learners, conversations among teachers, and new conversations between the classroom and the home and between the school and its community.

—David Warlick

WHAT YOU WILL LEARN IN THIS CHAPTER

♦ Reasons school leaders must take an active leadership role to transform their schools and districts into 21st-century places for education.

♦ New ways to think about 21st-century skills, new literacies, and learning.

♦ Changes that are already upon us and drivers for these changes.

♦ Newly refreshed National Educational Technology Standards for Administrators standards (NETS·A) from the International Society for Technology in Education (ISTE, 2009).

♦ What leadership for systemic change involves.

KEY WORDS IN THIS CHAPTER	
Web 2.0	**Web 2.0** is the second generation of the Internet. It differs from Web 1.0 in that it is more interactive, allowing users to add and change content easily, to collaborate and communicate instantaneously in order to share, develop, and distribute information, new applications, and new ideas.
21st-Century Skills	**21st-century skills** include critical thinking and problem solving, creativity and innovation, and communication and collaboration (see http://www.21stcenturyskills.org).
New Literacies	Literacy in the 21st century is no longer just reading, writing, and arithmetic. **New literacies**, which are necessary for everyone to learn in order to survive and thrive in the 21st century, include information literacy, media literacy, and information, communication, and technology (ICT) literacy.
Distributed Cognition	**Distributed cognition** is a theory that defines knowledge and cognition as being distributed across members of a group (and the tools and processes the group may use) rather than residing only in an individual. The classic example is that knowledge of how to run an aircraft carrier is distributed among the crew, and the captain cannot and does not run the ship alone.
NETS for Administrators	**National Educational Technology Standards for Administrators (NETS·A)** were first developed in 2002 and refreshed in 2009 under the auspices of the International Society for Technology in Education (ISTE). The goal of NETS·A is to provide administrators with guidelines for effective technology use in their schools and districts.

INTRODUCTION

This chapter introduces you to many of the perspectives, goals, themes, and features offered throughout the book. We also introduce you to changes in our current students and future teachers, as well as to changes in ideas about literacy and learning that are impacting the need for administrators to take leadership and action today in order to transform their schools and districts into 21st-century places for education. We discuss changes that are already upon us and consider drivers for these changes. Finally, we introduce you to the spectrum of new standards that will serve as a road map for near-term change for school leaders, why these standards are important, and how they can be addressed using Web 2.0 tools.

> To be a successful leader in the 21st century, school leaders need to be open to change, know how to manage change, and be risk takers.

WHY CHANGE?

In order to be a leader in the 21st century, school leaders need to know a lot and possess many skills. In Michael Fullan's (2001) book, *Leading in a Culture of Change,* understanding change is one of six aspects of a framework he proposed for leadership in a complex and constantly changing environment. About change, Fullan cautions that

> Leading in a culture of change means creating a culture (not just a structure) of change. It does not mean adopting innovations, one after another; it does mean producing the capacity to seek, critically assess, and selectively incorporate new ideas and practices— all the time, inside the organization as well as outside it. (p. 44)

One of the main purposes of this book is to provide school leaders with knowledge you can use to critically assess and selectively incorporate 21st-century learning tools into your organization, especially Web 2.0 tools. Web 2.0 is the second generation of the Internet. It differs from Web 1.0 in that it offers more interactivity, allowing users to add and change Internet content easily and to collaborate and communicate instantaneously in order to share, develop, and distribute information, new applications, and new ideas. You have certainly heard about blogs, wikis, and podcasts. These are just some of the many Web 2.0 tools you will learn more about in this book.

Given the ubiquitous nature of the Internet in our lives today, many free and readily available Web 2.0 tools are going to be critical in educating 21st-century students. Therefore, school leaders must be savvy about what Web 2.0 technology is and what it can offer. School leaders working

in the 21st century need to be prepared to "talk Web 2.0" with their staff and students if they are going to be able to lead in 21st-century schools where, we will argue in this book, technology will influence both what and how students learn and teachers teach.

Everyone knows that managing change is complex and requires much knowledge and skill, but you may ask why leaders of 21st-century schools also need to be risk takers. If you think about the changes that occurred in the 20th century and consider the pace of change that occurred in the last half of that century, it is easy to see how difficult it is to predict what life will be like for the students we are educating in today's schools. Their lives in the future, even their future jobs and their lifespan, are difficult to imagine. We don't know what inventions or disasters will shape the lives of today's students, or how advances in health care or preserving our environment will progress, and we don't even know what kinds of jobs might disappear or become prominent as the 21st century advances. Therefore, we take risks with nearly every decision we make in education today because we don't know if we are providing the right kind of education our students will need to "survive and thrive" in the 21st century (Fullan, 2008). Politicians, policymakers, and prognosticators may have different ideas than you have about how to educate our youth and perhaps different ideas about the purpose of education, but they do drive many of the decisions that directly affect our schools today. We presume that external forces will continue to drive many educational policies, but we hope this book will provide you with the knowledge you need to take advantage of some of the change that is already here and will continue to come.

WHAT IS YOUR VISION OF 21ST-CENTURY SCHOOLS?

Most school leaders have a vision for what they want their students to be like when they leave their schools and move on to further their education or enter the work world. One of the concerns addressed in this book is whether that vision includes an understanding of the role of technology in educating 21st-century students. Given the ubiquitous nature of the Internet, the explosion of freely available Web 2.0 tools, and an understanding of who our students and young teachers are and the roles they will play in education in the 21st century, we hope this book will help prepare you to take advantage of Web 2.0 to educate students in ways that will help them live successfully and thrive in the 21st century.

Unfortunately, many people today have very negative views about the future of public schools in particular and education in general (e.g., Kozol, 1991, 1995, 2000; Whittle, 2005), including the preparation of new teachers (e.g., Levine, 2006). Our belief is that we need to pay attention to these

voices (Berliner & Biddle, 1995) but not let them drive the changes we want to see in education. Although we may not always like what we hear when we are criticized, we believe that we do need to listen to what our many constituents have to say about education. After all, we are supported by taxpayers—and therefore by parents and families—and we are accountable. Fullan (2001) wisely tells us that understanding one's critics, appreciating resistance, and seeing dissent as a source of possible new ideas is essential to a learning culture, to building relationships, and to managing change. Sometimes this requires taking risks.

Of course, we want our students to be prepared for whatever their future will bring. We know life will be very different for our students in the next 10, 20, and 30 years, given the pace of change in a technologically driven world, but our current educational system is not adequately preparing our students for the kinds of jobs and lives they are likely to encounter in their lifetime (Cuban, 2003; Friedman, 2005; Pink, 2006). Our argument in this book is that we haven't yet embraced some of the tools that we can use to prepare our students to learn and thrive in the 21st century—or at least for the foreseeable future. And, we contend that information offered in this book can help school leaders take risks, embrace change, and be leaders in 21st-century schools. As Don Knezek (North Central Regional Technology in Education Consortium, 2001), ISTE CEO, commented,

> Integrating technology throughout a school system is, in itself, significant systemic reform. We have a wealth of evidence attesting to the importance of leadership in implementing and sustaining systemic reform in schools. It is critical, therefore, that we attend seriously to leadership for technology in schools. (n.p.)

WHAT HAS CHANGED?

Globalization and Economic Change

During the first half of the 20th century, the job market was dominated mainly by agriculture, mining, and manufacturing. After World War II, the job market was driven by manufacturing that became increasingly high-tech as well as by a growing service industry. In recent decades, jobs once available in agriculture and manufacturing have given way to a wide variety of professional, technical, and service occupations. Jobs available today have changed radically due to the rise of globalization, the recent surge of outsourcing by many industries and businesses, increasing immigration, and a flattened world (Friedman, 2005). Furthermore, the kinds of work opportunities our students will have in the 21st century will continue to evolve. Some jobs available today will disappear altogether, and other as yet to be imagined jobs will emerge. We know there will continue to be jobs

in the service sector because many of these types of jobs cannot be out-sourced, but nearly all service-producing jobs already require at least some computer skills. Of course, we want our students to be prepared to work in emerging fields of biotechnology, e-commerce, telecommunications, and the environment, and in fields predicted to continue to grow for at least the next few decades, such as in health care, social assistance, public and private sector education, entertainment and leisure, information technology, retail, transportation, and in professional, scientific, and technical settings. According to the Bureau of Labor Statistics (2007):

> Professional and related occupations will be one of the two fastest growing major occupational groups, and will add the most new jobs. Over the 2006–2016 period, a 16.7 percent increase in the number of professional and related jobs is projected, which translates into nearly 5 million new jobs. Professional and related workers perform a wide variety of duties and are employed throughout private industry and government. Almost three-quarters of the job growth will come from three groups of professional occupations—computer and mathematical occupations, healthcare practitioners and technical occupations, and education, training, and library occupations—which together will add 3.5 million jobs. (p. 5)

The Needs of Our 21st-Century Students

But are today's schools preparing students effectively to work in just these areas, or to live well in a future that will continue to become more and more high tech and technology dependent? Will the current emphasis on learning a body of knowledge long enough to regurgitate it on a test be enough for our students to be successful in the future? Will our students have mastered the 21st-century skills, that include critical thinking and problem solving, creativity and innovation, and communication and collaboration, before they leave our schools? Will they be information literate, media literate, and technology literate, to name just a few kinds of new literacies required for success in the 21st century?

We fear that if students are taught that communication only requires facility with the standard five-paragraph essay, that problem solving is the same as finding the correct answer, that critical thinking means giving your opinion, and that collaboration means dividing up the task so that everyone does a small part of it, then we are *not* preparing our students effectively for the 21st century. In order for our 21st-century students to "survive and thrive," they will need to be creative and innovative in order to get and keep a job, much less to make meaningful contributions at work and in their communities as well as in their personal lives. They will have to become problem solvers and critical thinkers if we are going to resolve many of the problems we have created in our world today. To do this, they will have to truly collaborate because no one person can do the work that is needed to survive and

thrive alone in the 21st century. We owe it to ourselves, and certainly to our students, to prepare them for the future, even if we don't quite understand it.

One School Leader's Story . . .

Leading the Way Through Modeling: Principal Dave Meister's Story

Today's students come to us wired differently than those who graced our hallways as few as five years ago. They have just watched how the 2008 presidential election was heavily influenced by Web 2.0. These young adults have seen the many different Web-based tools used on television news programs as well as other entertainment venues. For a majority of students, their world revolves around the social connections they make using these tools. Schools, in my experience, have been very slow to adopt these engaging classroom tools despite the fact that students are using them daily outside of school.

They are programmed to multitask in technology-rich, engaging environments and are used to multifunction, interactive formats. In the typical classroom, the pedagogies of years gone by are still the status quo. In this typical classroom, the average student is unengaged and bored. In my opinion, schools had better catch up or become irrelevant.

As a school administrator, I feel it is very important to model the use of Web 2.0 tools for both students and staff. I started the PHSprincipalBlog for this very reason. I wanted staff to see a practical use of this tool so they could begin to use the tool themselves. It has allowed me to demonstrate its use as well as to provoke thoughts and conversations about the many uses of the Web in the classroom. Some of my leading teachers have taken my example and have run with it. Still others are reluctant to try. I am lucky to have a media specialist that is a big advocate of using Web 2.0 in school, and she has been able to help by demonstrating her expertise as well as by scheduling teacher inservices for staff development. I have presented technology workshops for my staff demonstrating the uses of technology in their classrooms and encourage them to share their experiences with each other in teacher meetings as well as our own school staff-development blog.

Dave Meister, Principal
Paris High School, Illinois

This story exemplifies NETS·A Standard 1. Inspire Excellence Through Transformational Leadership.

NEW LITERACIES

Being literate in the 21st century requires more than knowing how to read, write, and compute. The Partnership for 21st Century Skills initiative (http://www.21stcenturyskills.org; 2004a) helps us see the necessity of infusing information literacy, critical media literacy, and information, communication, and technology (ICT) literacy into every subject taught in our schools. Without these skills, and others—including visual literacy,

multimedia literacy, and cultural literacy—our students will not be able to adapt to changes coming their way. They will be left behind unless they gain these skills, which Leu, Kinzer, Coiro, & Cammack (2004) suggest in talking about 21st-century learners:

> Consider, for example, the changes experienced by students who graduate from secondary school this year. Their story teaches us an important lesson about our literacy future. Many graduates started their school career with the literacies of paper, pencil, and book technologies but will finish having encountered the literacies demanded by a wide variety of information and communication technologies (ICTs): Web logs (blogs), word processors, video editors, World Wide Web browsers, Web editors, e-mail, spreadsheets, presentation software, instant messaging, plug-ins for Web resources, listservs, bulletin boards, avatars, virtual worlds, and many others. These students experienced new literacies at the end of their schooling unimagined at the beginning. Given the increasingly rapid pace of change in the technologies of literacy, it is likely that students who begin school this year will experience even more profound changes during their own literacy journeys. Moreover, this story will be repeated again and again as new generations of students encounter yet unimagined ICTs as they move through school and develop currently unenvisioned new literacies. (n.p.)

The authors of this statement argue that how we define, use, and teach literacy is influenced by ever-changing forces in our world, including the ubiquitous presence of technology today. If we think historically, we know that the nature and uses of reading and writing have changed over time. If we think about the future, we also know that the nature and uses of reading and writing will continue to change. Certainly the ability to access, evaluate, synthesize, and communicate large amounts of rapidly changing information is required to solve problems and create new knowledge in a global world. Unfortunately, not all students possess the skills to do such things because our current assessment system doesn't demand them. Leu and colleagues (2004) further argue that three forces are currently shaping how we define and teach literacy skills:

- Global economic competition that requires the sharing of information and constant communication with others around the world
- The emergence of the Internet as a powerful tool for information sharing and rapid communication
- Public policy that focuses on the need for higher-level literacy skills including the use of the Internet and other information communication technology skills

But Leu and colleagues (2004) also caution us that:

It is important, however, to recognize that new literacies do not simply create more productive workers and workplaces. Just as important, the new literacies of the Internet and other ICTs provide individuals with opportunities to make their personal lives more productive and fulfilling. This might happen while refinancing a home, selecting a university, advocating for social justice, purchasing books, or any one of hundreds of other tasks important to daily life. In addition, we are beginning to see that the new literacies of the Internet and other ICTs permit greater civic engagement in democratic institutions. Increasingly, national and local politics are changing as more citizens discover important information about candidates, participate online in campaign efforts, organize online communities to support various political agendas, and communicate more frequently with their representatives via e-mail. Expertise in the new literacies of the Internet and other ICTs helps individuals have more satisfying personal lives, more engaged civic lives, as well as more productive professional lives. (n p.)

Defining Knowledge in the 21st Century

Briefly, the theoretical framework that undergirds the ideas presented in this book about what counts as knowledge and how teaching and learning should occur in the 21st century is a postmodern one that includes a sociocultural orientation to how people learn. These ideas may or may not be a fit to your own definition of what knowledge is, what teaching should be like, and of how people learn. However, if what follows makes sense to you and fits with your beliefs, the rest of this book will make even more sense to you. If not, you may need a bit more time to be prepared to face the myriad of changes coming at education in the 21st century, and perhaps it is even more important to read this book.

It is our belief that knowledge does not and cannot reside in any one individual, text, object, or tool. Rather, we believe that knowledge is distributed across members of a group (including both novices and experts) and across the many objects, tools, and processes the group may use (Hutchins, 2000). For example, we believe that no principal has all the knowledge it takes to run a school successfully. It takes the community of teachers, bus drivers, cafeteria workers, office staff, special educators, coaches,

> It is our belief that knowledge does not and cannot reside in any one individual, text, object, or tool.

librarians, custodians and maintenance workers, other school leaders, plus the students and their families for the school to operate and flourish. No one teacher knows everything, even about her specialty, and she depends on tools such as textbooks, other resource books and teaching materials, videos,

Internet resources, other teachers, and even her students to teach and to help them learn. And, because we believe that teaching is not just telling, and learning is not just getting a passing grade on a test, we believe that knowledge has to be gleaned from many sources, from many people, and from many experiences and situations that are usually social.

As it turns out, this view of knowledge is highly compatible with Web 2.0, which involves an interactive Web where many people have come together to create new tools for learning and teaching that are not static but are highly interactive and that do not operate in isolation but require collaboration and communication. The uses of Web 2.0 described throughout this book are predicated on this postmodern view of learning and teaching, so they are quite different from traditional ways of thinking about teaching and learning seen in many classrooms and schools today. However, all the ideas we present throughout this book are compatible with and promote the 21st-century skills of critical thinking and problem solving, creativity and innovation, and communication and collaboration, which is why we offer them as exemplars.

WHAT DRIVES THESE CHANGES?

While a changing world, globalization, a changing economy, and an uncertain future are some of the drivers of changes school leaders see in education today, they will continue to affect schools in the years to come. And, as we continue to adjust to the needs of our 21st-century students (see Chapter 2), to the importance of embracing new literacies and a shared understanding of how people learn, we know that the legacy of No Child Left Behind will continue to drive accountability and the need for standards in the foreseeable future. Without these pressures we may have ignored groups of students who were not succeeding in our schools and perhaps tolerated other inequities in our educational system. Therefore, we also assert that making use of Web 2.0 tools may motivate some of your students and teachers to continue to strive for high academic performance. We now turn to a discussion of current and new standards that will continue to drive change in 21st-century education.

Administrator Standards

As you may know, in 1996 the Interstate School Leaders Licensure Consortium (ISLLC) developed a set of common standards and indicators for the knowledge, skills, and dispositions that school leaders should possess. These standards for administrators were updated in 2008 and adopted by over 30 states and a dozen affiliated professional organizations that participated in the development of these standards. At heart, these standards are about learning and teaching and the learning environment.

They require that school leaders have a shared vision of learning, provide a school culture that promotes student learning and professional growth for all staff, possess strong management and organizational skills that protect the learning environment while collaborating with parents and the community, and do all of this in a fair and ethical manner. The final ISLLC standard asks that each administrator "promotes the success of every student by understanding, responding to, and influencing the larger political, social, economic, legal, and cultural context" (Council of Chief State School Officers, 2008, p. 15). So, while 35 states have now adopted standards for the professional practice of administrators originally developed by ISLLC, new leadership standards for administrators are always evolving, and administrator standards convey the importance of understanding and responding to changes driven by the political, social, economic, and cultural drivers discussed in this book.

In California, as part of Assembly Bill 430 and California's most recent school reform efforts, for example, school leaders are required to attend professional development about instructional leadership and management strategies regarding the use of instructional technology to improve pupil performance. In North Carolina, the first of seven new leadership standards for principals and assistant principals adopted by the State Board of Education in December 2007 states that

> School executives will create conditions that result in strategically re-imaging the school's vision, mission, and goals in the 21st century. Understanding that schools ideally prepare students for an unseen but not altogether unpredictable future, the leader creates a climate of inquiry that challenges the school community to continually re-purpose itself by building on its core values and beliefs about its preferred future and then developing a pathway to reach it. (North Carolina Department of Public Instruction, 2006, p. 3)

Other states are also changing their standards for current school leaders and their preparation for future school leaders. Changing standards are a way of life for educators.

Changing Standards

Every state has its own set of student-learning outcomes and its own accountability system. All professional organizations have their content-specific standards. Schools and districts are appropriately focused on meeting current standards, but you know from experience that standards continue to evolve and change. Recently, many organizations have joined together to help align and implement this plethora of standards, including the above-mentioned set of 21st-century skills, which we will discuss in more detail below. Because one focus of this book is on how Web 2.0 tools can support

school leaders as they change to meet the needs of both their 21st-century students and teachers as well as these new standards, we begin our discussion of standards with the newest technology standards for students, followed by a discussion of content-area standards, 21st-century skills, technology standards for teachers, and finally our new technology standards for school leaders.

Technology Standards for Students

In 1998, International Society for Technology in Education (ISTE) developed its National Educational Technology Standards for Students (NETS·S) in collaboration with representatives from the major content organizations (English, Mathematics, Social Studies, Science, Foreign Language, and Special Education). The original technology standards for students were focused on tools, technology tasks, and ethical behavior. In 2006, those standards underwent a significant revision process, and in June, 2007, new technology standards for students were released ((NETS·S Refreshed). The newest student technology standards are focused on 21st-century skills, Web 2.0 characteristics (see more in Chapter 3), and collaboration. Table 1.1 shows a comparison of the old and refreshed standards.

Table 1.1   Original and Refreshed National Technology Standards for Students

ISTE NETS·S 1998 Standards	*ISTE NETS·S 2007 Standards*
1. Basic Operations/Concepts 2. Social, Ethical, Human Issues 3. Technology Productivity Tools 4. Technology Communication Tools 5. Technology Research Tools 6. Problem Solving/Decision Making	1. Creativity & Innovation 2. Communication & Collaboration 3. Research & Information Literacy 4. Critical Thinking, Problem Solving, & Decision Making 5. Digital Citizenship 6. Tech Operations/Concepts

Content-Area Standards

The challenge in implementing the newest technology standards for students has been to find ways to promote and integrate them within the context of all the other requirements for student learning. All school leaders are familiar with the content standards for students and probably routinely provide professional development activities for their teachers and themselves. It may be unknown, however, that all the content-specific standards now include technology in very clear and compelling ways. For example, the National Council of Teachers of Mathematics (2000)

(http://www.nctm.org) has chosen to weave technology through all its standards; the executive summary of the 2000 standards states, "Technology is essential in teaching and learning mathematics; it influences the mathematics that is taught and enhances students' learning" (National Council for Teachers of Mathematics, 2000, p. 3). The National Council of Teachers of English (http://www.ncte.org) released a new definition of 21st-century literacies in February, 2008, and that includes the following proficiency standards:

> Because technology has increased the intensity and complexity of literate environments, the twenty-first century demands that a literate person possess a wide range of abilities and competencies, and many literacies. These literacies—from reading online newspapers to participating in virtual classrooms—are multiple, dynamic, and malleable. As in the past, they are inextricably linked with particular histories, life possibilities, and social trajectories of individuals and groups. Twenty-first century readers and writers need to:
>
> - Develop proficiency with the tools of technology
> - Build relationships with others to pose and solve problems collaboratively and cross-culturally
> - Design and share information for global communities to meet a variety of purposes
> - Manage, analyze, and synthesize multiple streams of simultaneous information
> - Create, critique, analyze, and evaluate multi-media texts
> - Attend to the ethical responsibilities required by these complex environments (National Council of Teachers of English Executive Committee, 2008, n.p.)

The National Council for the Social Studies (2008) (http://www.social studies.org) has recently added an addendum to its standards. One focus is "Social studies teaching and learning are powerful when they are integrative," which means that:

> Integrated social studies teaching and learning include effective use of technology that can add important dimensions to students' learning. Teachers can provide students with information through films, videotapes, videodiscs, and other electronic media, and they can teach students to use computers to compose, edit, and illustrate social studies research reports. Computer-based learning, especially games and simulations, can allow students to apply important ideas in authentic problem-tackling or decision-making contexts. If students have access to computerized databases, they can search these resources for relevant research information. If they can communicate with peers in other states or nations, they can

engage in personalized cultural exchanges or compare parallel data collected in geographically or culturally diverse locations. (National Council for the Social Studies, 2008, n.p.)

Finally, the National Science Teachers Association (National Committee on Science Education Standards and Assessment, 1996) (http://www.nsta.org) has stated that "Effective science teaching depends on the availability and organization of materials, equipment, media, and technology. An effective science learning environment requires a broad range of basic scientific materials, as well as specific tools for particular topics and learning experiences" (p. 44). Thus it is clear that the major subject matter organizations agree that technology is an important aspect to teaching and learning for pedagogical and preparation reasons.
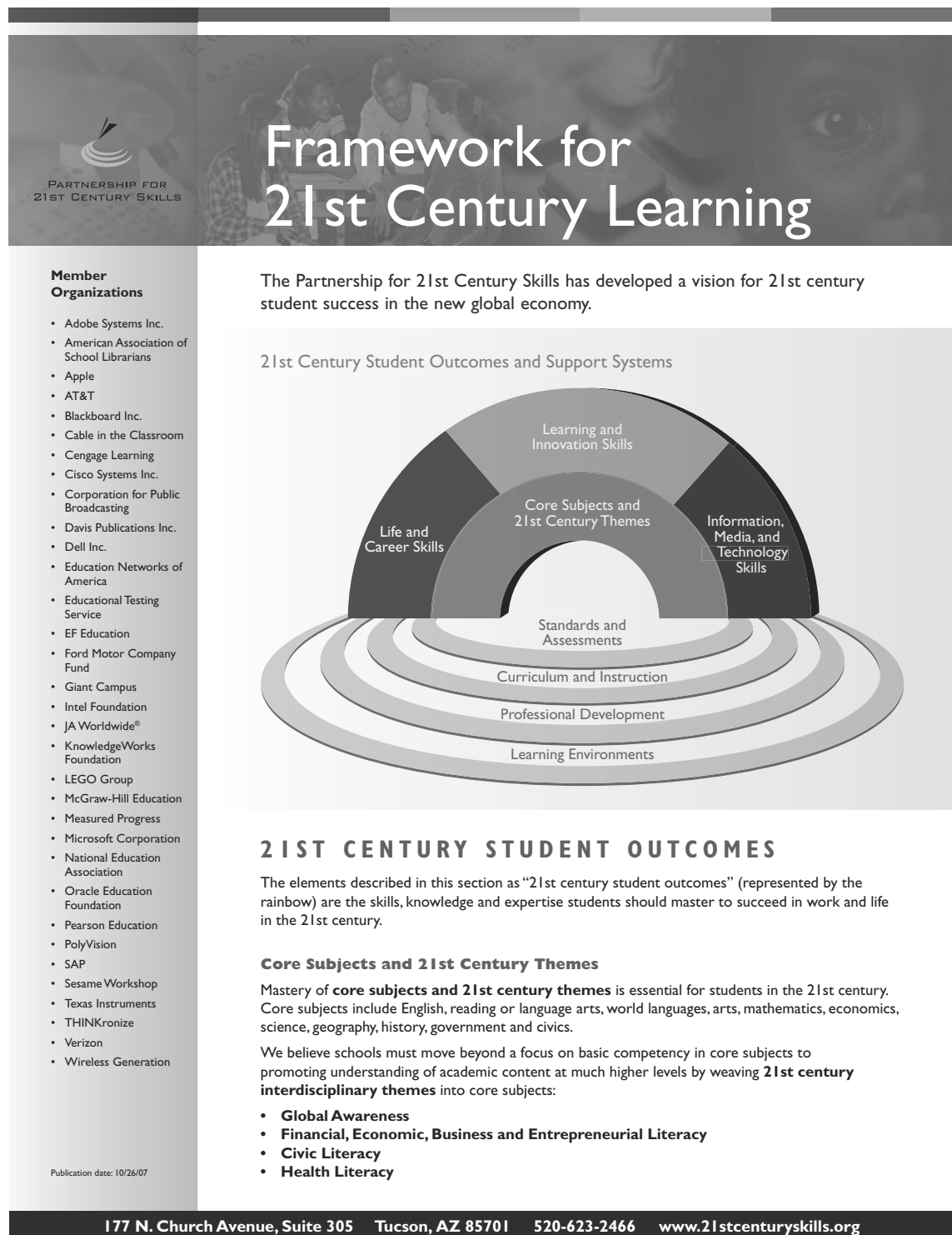
21st-Century Standards

The Partnership for 21st Century Skills initiative (http://www.21stcenturyskills.org/) has examined all these standards together and also tried to weave in other perspectives. This organization brings together the business community, education leaders, and policymakers to define a powerful vision for 21st-century education to ensure success of all children as citizens and workers in the 21st century. "The Partnership encourages schools, districts and states to advocate for the infusion of 21st century skills into education and provides tools and resources to help facilitate and drive change" (Partnership for 21st Century Skills, 2004a, n.p.). The Partnership for 21st Century Skills has emerged as the leading advocacy organization focused on infusing 21st-century skills into education. This collaborative group has designed a framework that describes an iterative and interactive relationship between content, support, skills, and more. Figure 1.1 shows that framework.

In this figure the rainbow represents student outcomes that include the following skills, knowledge, and expertise students should master to succeed in work and life in the 21st century:

1. *Core Subjects and 21st-Century Themes* (including English, reading, or language arts; world languages; arts; mathematics; economics; science; geography; history; government and civics). It also includes integrative themes (global awareness; financial, economic, business and entrepreneurial literacy; civic literacy; health literacy).

2. *Learning and Innovation Skills* (including creativity and innovation skills; critical thinking and problem-solving skills; and communication and collaboration skills).

3. *Information, Media, and Technology Skills*

4. *Life and Career Skills* (including flexibility and adaptability; initiative and self-direction; social and crosscultural skills; productivity and accountability; leadership and responsibility).

Figure 1.1 The Partnership for 21st Century Skills

Framework for 21st Century Learning

The Partnership for 21st Century Skills has developed a vision for 21st century student success in the new global economy.

21st Century Student Outcomes and Support Systems

21ST CENTURY STUDENT OUTCOMES

The elements described in this section as "21st century student outcomes" (represented by the rainbow) are the skills, knowledge and expertise students should master to succeed in work and life in the 21st century.

Core Subjects and 21st Century Themes

Mastery of **core subjects and 21st century themes** is essential for students in the 21st century. Core subjects include English, reading or language arts, world languages, arts, mathematics, economics, science, geography, history, government and civics.

We believe schools must move beyond a focus on basic competency in core subjects to promoting understanding of academic content at much higher levels by weaving **21st century interdisciplinary themes** into core subjects:

- **Global Awareness**
- **Financial, Economic, Business and Entrepreneurial Literacy**
- **Civic Literacy**
- **Health Literacy**

(Continued)

Figure 1.1 (Continued)

Learning and Innovation Skills

Learning and innovation skills are what separate students who are prepared for increasingly complex life and work environments in the 21st century and those who are not. They include:

• **Creativity and Innovation**
• **Critical Thinking and Problem Solving**
• **Communication and Collaboration**

Information, Media and Technology Skills

People in the 21st century live in a technology and media-driven environment, marked by access to an abundance of information, rapid changes in technology tools and the ability to collaborate and make individual contributions on an unprecedented scale. To be effective in the 21st century, citizens and workers must be able to exhibit a range of functional and critical thinking skills, such as:

• **Information Literacy**
• **Media Literacy**
• **ICT (Information, Communications and Technology) Literacy**

Life and Career Skills

Today's life and work environments require far more than thinking skills and content knowledge. The ability to navigate the complex life and work environments in the globally competitive information age requires students to pay rigorous attention to developing adequate life and career skills, such as:

• **Flexibility and Adaptability**
• **Initiative and Self-Direction**
• **Social and Cross-Cultural Skills**
• **Productivity and Accountability**
• **Leadership and Responsibility**

21ST CENTURY SUPPORT SYSTEMS

Developing a comprehensive framework for 21st century learning requires more than identifying specific skills, content knowledge, expertise and literacies. An innovative support system must be created to help students master the multi-dimensional abilities required of them in the 21st century. The Partnership has identified five critical support systems that ensure student mastery of 21st century skills:

• **21st Century Standards**
• **Assessments of 21st Century Skills**
• **21st Century Curriculum and Instruction**
• **21st Century Professional Development**
• **21st Century Learning Environments**

For more information, visit the Partnership's website at www.21stcenturyskills.org.

PARTNERSHIP FOR
21ST CENTURY SKILLS

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In addition, underlying and essential to the success of these elements are the 21st-century support systems. These include 21st-century standards and assessment; 21st-century curriculum and instruction; 21st-century professional development; and 21st-century learning environments. Chapters 3 through 5 in this book provide examples of teaching and learning using Web 2.0 tools that address core subjects, learning and innovation skills, information and media skills, as well as life and career skills; hence, 21st-century skills. Chapters 6 through 8 address the other support systems needed to achieve these skills, including issues of assessment and accountability, Internet safety, and professional development for teachers. Chapter 7 also addresses administrative uses of Web 2.0 tools to complement the instructional uses of these tools that are the focus of Chapter 3 through 5.

TECHNOLOGY STANDARDS FOR TEACHERS

A year after the first NETS for students were released, NETS for teachers (NETS·T) were created and presented. These were quite analogous to the student standards of their day. However, during the 2007–2008 school year, these teacher standards went through a rigorous refresh process and in June, 2008, the new NETS·T were released. Table 1.2 shows the original and refreshed technology standards for teachers.

Table 1.2   Original and Refreshed Technology Standards for Teachers

ISTE NETS·T 1999 Standards	ISTE NETS·T 2008 Standards
1. Technology Operations and Concepts 2. Planning and Designing Learning Environments and Experiences 3. Teaching, Learning, and Curriculum 4. Assessment and Evaluation 5. Productivity and Professional Practice 6. Social, Ethical, Legal, and Human Issues	1. Facilitate and Inspire Student Learning and Creativity 2. Design Digital-Age Learning Experiences and Assessments 3. Model Digital-Age Work & Learning 4. Promote Digital Citizenship & Responsibility 5. Engage in Professional Growth and Leadership

Again, one can see that the new standards reflect the same changes seen in the NETS·S; that is, the goal is that teachers are aware of, model, and design instruction to move students into the 21st-century digital-age experiences. In Chapter 6, we discuss strategies for promoting the professional development of educators in learning about and using technology standards—NETS·S and NETS·T.

TECHNOLOGY STANDARDS
FOR ADMINISTRATORS

In 2001, the North Central Regional Technology in Education Consortium, a collaborative of many organizations, created the original National Educational Technology Standards for Administrators (NETS·A) to promote the idea that specific skills, knowledge, and practice were required for administrators to be ready to support the appropriate use of technology in a school. This collaborative included the National Association of Secondary School Principals (NASSP), National Association of Elementary School Principals (NAESP), American Association of School Administrators (AASA), National School Board Association (NSBA), North Central Regional Educational Laboratory (NCREL), the International Society for Technology in Education (ISTE), two state departments of education, two universities, and other interested parties. These standards were introduced in 2002, but almost immediately after that introduction, No Child Left Behind was passed and the educational community turned its attention to its implementation. Thus, the standards did not gain the traction that perhaps they would have at another time. In June 2008 ISTE announced that it would refresh these administrator standards and by June 2009 the new standards were ready for dissemination. Table 1.3 shows the newly refreshed standards for administrators, NETS·A released in June 2009.

WHAT REMAINS THE SAME?

Importance of Achievement for All Students

Of course, the goal of student achievement remains at the top of any administrator's priority list. This is a crucial goal for everyone involved in education—teachers, students, parents and families, support staff, and administrators. This is our job and our business. What this book hopes to do is educate you about some important tools for teaching and learning that 21st-century students and teachers are already familiar with but that are not being very used often in schools today. As an administrator, we are sure that you want to be knowledgeable not only about standards but also about teaching and learning tools that will engage your students, help them acquire and practice all the 21st-century skills and content standards they need, and engage them at the same time. Furthermore, the Web 2.0 tools we focus on in this book are almost all free and are readily accessible from any computer with Internet access. We will introduce these tools to you in Chapter 3 and provide many examples of how they can be used for instruction in Chapters 4 and 5, along with stories from your fellow administrators about how they have successfully integrated Web 2.0 in their schools and districts.

Table 1.3   National Educational Technology Standards for Administrators—
NETS·A

I. Inspire Excellence Through Transformational Leadership: Inspire and lead development and implementation of a shared vision for comprehensive integration of technology to transform the educational enterprise and promote excellence throughout the organization. Educational Administrators:

A. Inspire, articulate, and facilitate among all stakeholders a contemporary, shared vision of purposeful change that maximizes use of digital-age resources to meet and exceed learning goals, support effective instructional practice, and maximize performance of district and school leaders.
B. Convene stakeholders to contribute to the development of technology-infused strategic plans aligned to a shared vision.
C. Lead purposeful change in the learning environment that maximizes use of digital age tools to achieve learning goals.
D. Advocate on local, state, and national levels for policies, programs, and funding opportunities that support implementation of technology-infused strategic goals.

II. Establish a Robust Digital Age Learning Culture: Create, advocate for, and sustain an educational culture that values and rewards a rigorous, relevant digital-age education for all students. Educational Administrators:

A. Ensure instructional innovation focused on continuous improvement of digital-age learning.
B. Model and reward the frequent, purposeful, and effective use of technology for learning.
C. Provide for learner-centered environments that use technology to meet the individual and diverse needs of learners.
D. Ensure effective practice in the infusion of technology.
E. Promote and participate in local, national, and global learning communities that stimulate innovation, creativity, and digital-age collaboration.

III. Advance Excellence in Digital Age Professional Practice: Advance and sustain a professional environment that promotes, supports, and rewards robust, continuous professional growth and fluency in the infusion of current and emerging technologies. Educational Administrators:

A. Ensure ongoing professional growth by allocating time, resources, and access to learning opportunities related to the effective use of technology for improved learning and teaching.
B. Facilitate and participate in learning communities that stimulate, nurture, and support administrators, faculty, and staff in the use of technology for lifelong learning, leadership, and productivity.

(Continued)

Table 1.3 (Continued)

> C. Promote and model effective communication and collaboration among colleagues, staff, parents, students, and the larger community using digital-age tools.
> D. Increase awareness of educational trends and emerging technologies and their potential uses in education.
>
> **IV. Ensure Systemic Transformation of the Educational Enterprise.**
> Provide leadership to manage and implement strategic plans, monitor progress, and evaluate results to ensure ongoing improvement of the educational enterprise. Educational Administrators:
>
> A. Establish metrics, collect and analyze data, interpret results, and communicate findings to improve staff, teacher, and student performance.
> B. Recruit highly competent personnel who demonstrate proficiency at implementing technology to advance academic and operational goals.
> C. Leverage strategic partnerships to support the educational enterprise.
> D. Establish and maintain a robust infrastructure for technology.
> E. Implement and use integrated technology-based systems to support management and operations.
>
> **V. Model and Advance Digital Citizenship.** Model and advance digital citizenship by developing and implementing policies, acting with integrity, and facilitating understanding of social, ethical, and legal responsibilities by all stakeholders. Educational Administrators:
>
> A. Provide equitable digital-age learning and working environments for all students, teachers, and staff.
> B. Ensure access to appropriate digital tools and resources to meet the needs of all learners.
> C. Advocate for, promote, and model safe, legal, and ethical use of digital information and technology, including respect for copyright and intellectual property.
> D. Promote and model responsible social interactions related to the use of technology and information.
> E. Model and facilitate the development of a shared cultural understanding and global awareness among all stakeholders using digital-age communication and collaboration tools.

Challenges of Teaching With Technology

Yes, Web 2.0 tools are nearly all free and they are readily accessible on the Internet. However, that means your students have to have access to the Internet and your teachers have to know how to make use of these

tools. Many of your teachers and just about all of your students already know about these tools and use them daily outside of school. But not all your veteran teachers know about or use Web 2.0, and not all your students have access to the Internet in their homes. We will discuss how to address these issues in Chapters 6, 7, and 8, where we cover the roles of other staff members in the strategic efforts to integrate technology throughout all aspects of the school (Chapter 6); ways to engage all stakeholders and to lead a communitywide effort so that the other significant groups will understand, participate, support, and promote these goals (Chapter 7); and valuable information about safety, legal, ethical, and behavioral aspects of leading a technology-rich school, including strategies and ideas to assist you and others on your staff in implementing technological and instructional safeguards needed when the Internet is involved (Chapter 8).

A WORD ABOUT LEADERS AND SYSTEMIC CHANGE

Throughout this book, we take a perspective that leadership, by the administrator and other individuals or teams, must be systemic; that is, it is an approach that involves individuals from throughout a system and considers how change in one area impacts other areas. Further, it is based on an understanding that planned change is designed to move toward shared goals and vision. It is very similar to a concept of continuous improvement, so that steps are evaluated, reflected upon, and revisions move the entire organization closer to that shared vision.

This type of leadership toward systemic change requires a conversation about the roles of various staff members in a school who may assist in implementing these new models of communicating, identifying common goals, and ultimately to support efforts to integrate technology throughout all aspects of the school. It is also important to wonder, How do school leaders encourage, support, and assess those things that are important to the successful school? Or perhaps it is worth asking, What happens to innovations when the school leader does not commit effort and energy to support them? With the current focus on test scores and student outcomes, it is essential to pay attention to these data. But it is also worth looking at a larger picture. Reeves (2006) reminds us, "not everything that counts can be counted, not everything that can be observed can be expressed in quantitative terms" (p. 14). And as much as data are aggregated at the district, state, and national levels, it is also worth remembering that change is still at the local level. After a decade of research in one school district, Carrigg, Honey, and Thorpe (2005) found that "Ultimate success is anchored in the opportunity schools and districts have to localize practices while maintaining high levels of coherence and consistency concerning the goals and principles of a given policy" (p. 2).

In other words, it is essential that an entire school or district work together to make an intended outcome actually take hold. "The first obligations of leadership are articulating a compelling vision and linking clear standards of action that will accomplish the vision" (Reeves, 2006, p. 34). Gerard, Bowyer, and Linn (2008) found that the principal "guides the school community to build a vision" (p. 2). After their year-long study, these researchers concluded that "active and early involvement" is essential for implementation of technology and curriculum (p. 14).

> It is essential that an entire school or district work together to make an intended outcome actually take hold.

It is equally important to recognize that change will be slow and not move only in a straight line, but it will appear more like a spiral with "fits and starts" that may seem slow. Anderson (1993) suggests that there are several stages of systemic change. First, participants focus on maintaining the old system, and then they become aware of challenges and begin to explore new approaches. Next, they begin to transition to a new system, which leads to the emergence of the new ways, and finally that new system predominates. However, it is necessary that the stakeholders are involved in every stage of the process for this to really work and take hold. Preparing everyone for potential nonlinear progress may be helpful as well.

CONCLUSION

At the beginning of this chapter, we talked about the importance of school leaders becoming knowledgeable about and having the skills and vision to be leaders of 21st-century schools. Providing the knowledge and a vision to lead by taking advantage of Web 2.0 is what this book is all about. Most of your young teachers and all of your students are already skilled with using Web 2.0, but they need *you* to have the knowledge and the vision to use these tools for educational purposes. By the time you finish reading this book, we guarantee you will have acquired the knowledge you need to lead in the 21st century and some skills to make this happen. But, you do not have to do this all on your own. After all, we must remember that Fullan's (2008) six secrets are important for leaders and their employees (teachers), customers (students), partners (parents and families), and investors (taxpayers) to understand.

> The first task of the Secret Six is to enact the first five secrets. By doing so, organizational members will feel valued and be valued (Secret One), be engaged in purposeful peer interaction that generates knowledge and commitment (Secret Two), build their individual and collective capacity (Secret Three), learn every day on the job (Secret Four), and experience the value of transparency in practice

linked to making progress (Secret Five). The net effect is a critical mass of organizational colleagues who are indeed learners . . . [who] have a broader system perspective and are more likely to act with the larger context in mind. (Fullan, 2008, pp. 110–111)

ACTIVITIES TO CONSIDER . . .

- Make a list of possible future uses of technology that have been discussed in your school. Be sure to consider new administrative uses, but also consider the instructional uses of technology that encourage teachers and students to engage in critical thinking, problem solving, collaboration, communication, creativity, innovation, or other 21st-century skills.
- Look up your state's standards for technology for school leaders and see if (or how) they include 21st-century skills.
- Read a blog for administrators such as the one called LeaderTalk, started by Scott McLeod, at http://www.leadertalk.org/. Read some of these postings and consider asking questions or adding your own comments.
- Do a telephone survey of fellow administrators to learn about what they are currently doing or planning to do with regard to Web 2.0 and other new technology in their schools and districts.
- Write your own definition of a 21st-century learner and what it means to be literate in the 21st century.
- View this six-minute video online: *Learning to Change-Changing to Learn: Advancing K–12 Technology Leadership,* produced by the Consortium for School Networking (CoSN) Video at http://www.youtube.com/watch?v=tahTKdEUAPk.
- Also, view this short video about education and the future of technology, called *Did You Know?,* at http://www.flixxy.com/technology-and-education-2008.htm.
- And for more, view this nine-and-a-half minute video, *21st Century Learning Matters,* from Colorado, that reviews many of the points made in this chapter at http://www.youtube.com/watch?v=2L2XwWq4_BY&feature=related.
- We also recommend reading
  - Friedman, T. (2007). *The World is Flat 3.0: A Brief History of the 21st Century.* New York: Picador.
  - Fullan, M. (2008). *The Six Secrets of Change: What the Best Leaders Do to Help Their Organizations Survive and Thrive.* San Francisco: Jossey-Bass.
  - Gladwell, M. (2002). *Tipping Point: How Little Things Can Make a Big Difference.* Boston: Back Bay Books.