



21st Century Skills, Education & Competitiveness

A RESOURCE AND POLICY GUIDE



PARTNERSHIP FOR
21ST CENTURY SKILLS

About This Guide

Americans are deeply concerned about their present and future prospects in a time of economic uncertainty. Policymakers have a make-or-break opening—and an obligation—to chart a new path for public education that will secure our economic competitiveness.

This guide summarizes the challenges and opportunities that, if left unaddressed, will curtail our competitiveness and diminish our standing in the world. The warning signals are blinking red. We can thrive in this century only with informed leadership and concerted action that prepares Americans to compete.

We urge policymakers and leaders in the business, education and workforce development communities to use this guide as a resource for shaping policies that are attuned to competitive needs. Additional resources are available on our Web site, www.21stcenturyskills.org.

ABOUT THE PARTNERSHIP FOR 21ST CENTURY SKILLS

The Partnership for 21st Century Skills has emerged as the leading advocacy organization focused on infusing 21st century skills into education. The organization brings together the business community, education leaders and policymakers to define a powerful vision for 21st century education to ensure every child's success 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.

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21st Century Skills, Education & Competitiveness

Creating an aligned, 21st century public education system that prepares students, workers and citizens to triumph in the global skills race is the central economic competitiveness issue for the next decade.

In an economy driven by innovation and knowledge ... in marketplaces engaged in intense competition and constant renewal ... in a world of tremendous opportunities and risks ... in a society facing complex business, political, scientific, technological, health and environmental challenges ... and in diverse workplaces and communities that hinge on collaborative relationships and social networking ... the ingenuity, agility and skills of the American people are crucial to U.S. competitiveness.

Our ability to compete as a nation—and for states, regions and communities to attract growth industries and create jobs—demands a fresh approach to public education. We need to recognize that a 21st century education is the bedrock of competitiveness—the engine, not simply an input, of the economy.

And we need to act accordingly: Every aspect of our education system—preK–12, postsecondary and adult education, after-school and youth development, workforce development and training, and teacher preparation programs—must be aligned to prepare citizens with the 21st century skills they need to compete.



Why We Need to Act Now

Reason 1: Fundamental Changes in the Economy, Jobs and Businesses

Over the last several decades, the industrial economy based on manufacturing has shifted to a service economy driven by information, knowledge and innovation.

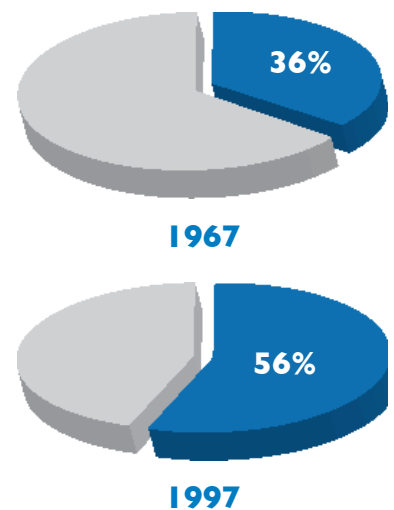
Research at the UCLA Anderson School of Management (Karmarkar & Apte, 2007; Apte, Karmarkar & Nath, 2008) documents the rise of the service economy:

- **In 1967**, the production of material goods (such as automobiles, chemicals and industrial equipment) and delivery of material services (such as transportation, construction and retailing) accounted for nearly 54 percent of the country's economic output.
- **By 1997**, the production of information products (such as computers, books, televisions and software) and the provision of information services (such as telecommunications, financial and broadcast services, and education) accounted for 63 percent of the country's output.
- **Information services** alone grew from 36 percent to 56 percent of the economy during that 30-year period.

Today, the United States is more than 15 years into the information age. It was in 1991 that U.S. spending on information technology (\$112 billion) first surpassed spending on production technology (\$107 billion) (Stewart, 1997).

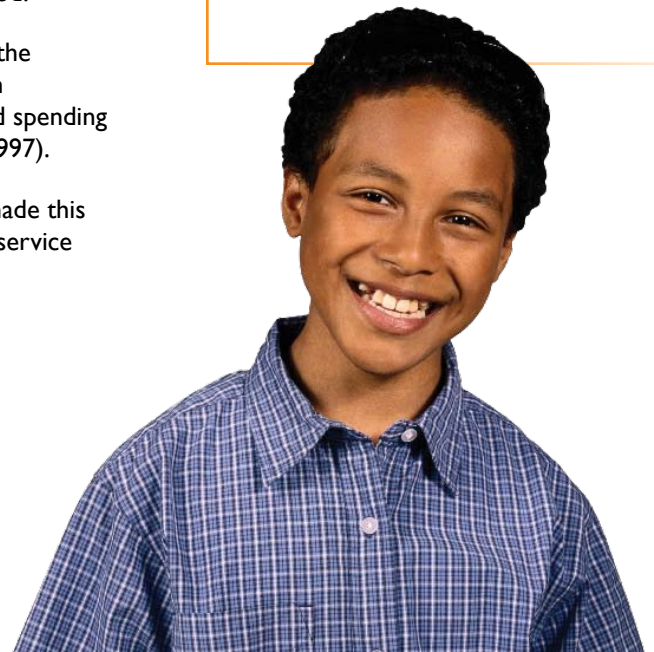
All developed countries—our competitors—have made this shift to information products and services. And the service economy continues to expand.

30-Year Growth in Information Services in the U.S. Economy

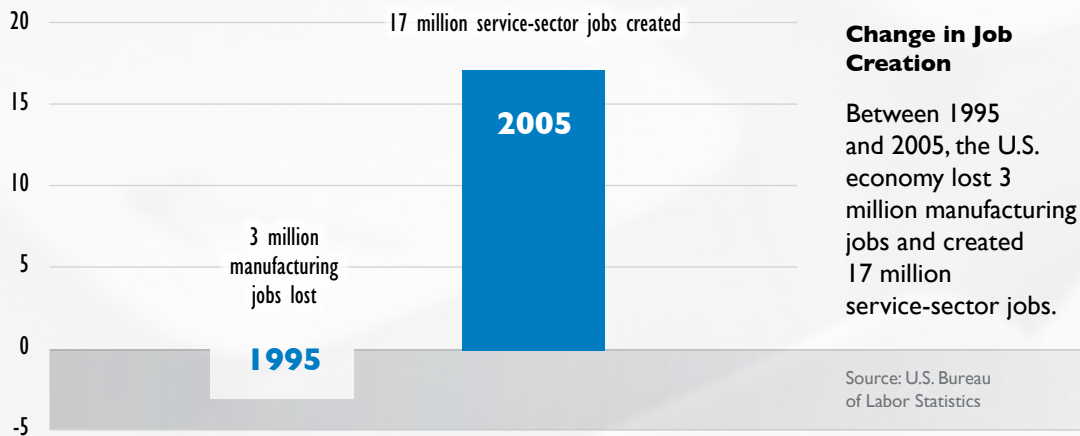


Change in Share of U.S. Gross Domestic Product from Information Services

Source: Apte, Karmarkar & Nath, 2008



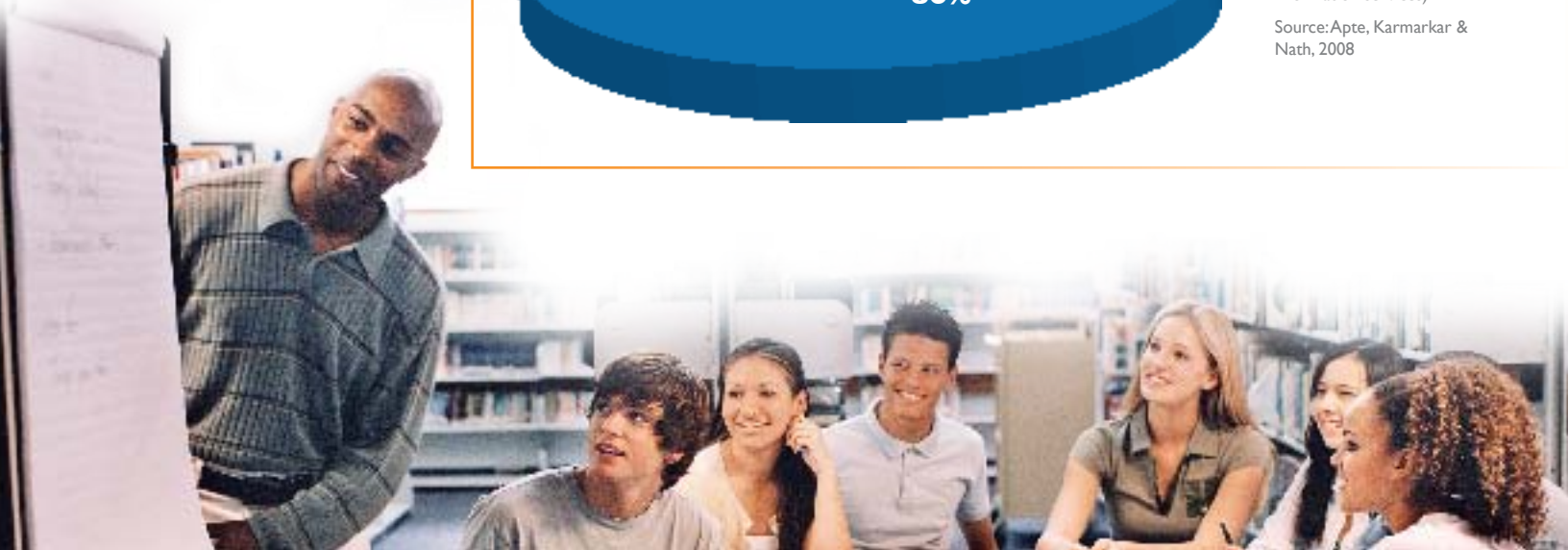
10-Year Job Trends Underscore Shift to Service Sector



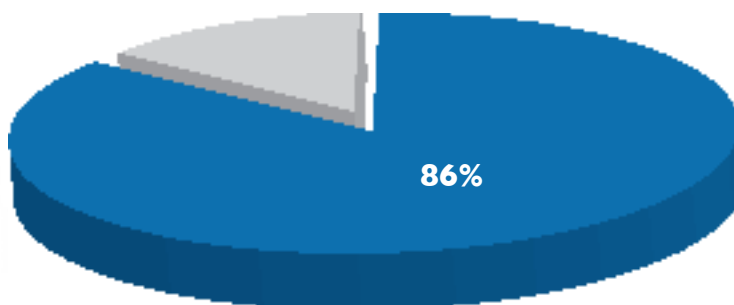
Jobs also have shifted from manufacturing to services, particularly in higher-paid information services:

- **Between 1995 and 2005**, the United States lost 3 million manufacturing jobs, according to the U.S. Bureau of Labor Statistics. In that same 10-year period, 17 million service-sector jobs were created.
- **In 1999**, the largest sector of the labor force, 45 percent, was still in material services, but the proportion of the workforce in information services was not far behind, at 41 percent—and this sector has been growing at a much faster rate (Karmarkar & Apte, 2007; Apte, Karmarkar & Nath, 2008).
- **In terms of wages**, information services accounted for the largest portion of the nation's wage bill, 48 percent, compared to 38 percent for other workers. Generally, information workers earn more than those in material products and services. There is more than a \$10,000 difference between information and material service providers, while the wage gap between workers in the information products sector and those in the material goods sector is more than \$20,000.

Many of the fastest-growing jobs in the service sector are high-end occupations, including doctors, lawyers, engineers, and sales and marketing professionals. "More than three-quarters of all jobs in the United States are in the service economy, yet many policymakers view them as low-skill, low-wage options" (Council on Competitiveness, 2008).



Service-sector Employment Dominates U.S. Economy



Percentage of U.S. Jobs in the Service Sector

(Information and non-information services)

Source: Apte, Karmarkar & Nath, 2008

ON U.S. COMPETITIVENESS

“Economic success is increasingly based on the effective utilization of intangible assets, such as knowledge, skills, and innovative potential as the key resource for competitive advantage.”

—Economic and Social Research Council, 2005

“Because other nations have, and probably will continue to have, the competitive advantage of a low wage structure, the United States must compete by optimizing its knowledge-based resources, particularly in science and technology, and by sustaining the most fertile environment for new and revitalized industries and the well-paying jobs they bring.”

—*Rising Above the Gathering Storm, Committee on Prospering in the Global Economy of the 21st Century: An Agenda for American Science and Technology*. National Academy of Sciences, National Academy of Engineering, Institute of Medicine, 2007

“America’s lead over its economic rivals has been entirely forfeited, with many nations surging ahead in school attainment. ... The skills slowdown is the biggest issue facing the country. ... [t]his slow-moving problem, more than any other, will shape the destiny of the nation.”

—David Brooks, *New York Times* columnist, 2008

Companies also have changed how they are organized and the way they do business. Workers have more responsibility and contribute more to productivity and innovation.

In response to economic changes, industries and firms have made significant organizational and behavioral shifts, such as flatter management structures, decentralized decision making, information sharing and the use of task teams, cross-organizational networking, just-in-time inventory and flexible work arrangements, according to several studies that have documented these changes. These shifts often are associated with increased productivity and innovation:

- **A U.S. Census Bureau study** (Black & Lynch, 2003) found significant firm-level productivity increases that were associated with changes in business practices, including reengineering, regular employee meetings, self-managed teams, upskilling of workers and computer use by front-line workers.
- **A U.S. Department of Labor study** (Zoghi, Mohr & Meyer, 2007) found a strong positive relationship between both information sharing and decentralized decision making and a company's innovativeness.
- **Information and communications technologies** (ICT) often have supported changes in organizational structures and practices for communication, information sharing, analysis and simulation of business processes. Early studies of ICT use showed little productivity gain from technology investments. However, later studies found significant productivity gains associated with specific ways that technology is used. For example, reviews of firm-level studies (Pilat, 2004; Gera & Gu, 2004) found that the greatest benefits are realized when ICT investments are accompanied by other organizational changes that ICT use makes possible, such as new strategies, business processes and practices, and organizational structures.

ON STATE AND REGIONAL COMPETITIVENESS

"In the New Economy, knowledge, rather than natural resources, is the raw material of business."

—Center for Regional Studies, 2002

"Clusters [geographic agglomerations of companies, suppliers, service providers and associated institutions of a particular field] are a natural manifestation of the role of specialized knowledge, skills, infrastructure, and supporting industries in enhancing productivity. Location within a cluster enables companies to become more specialized, more productive, and more innovative."

—Michael E. Porter, Christian Ketels and Mercedes Delgado, *Global Competitiveness Report 2007–2008*, The World Bank, 2007

Reason 2: New, Different Skill Demands

Advanced economies, innovative industries and firms, and high-growth jobs require more educated workers with the ability to respond flexibly to complex problems, communicate effectively, manage information, work in teams and produce new knowledge:

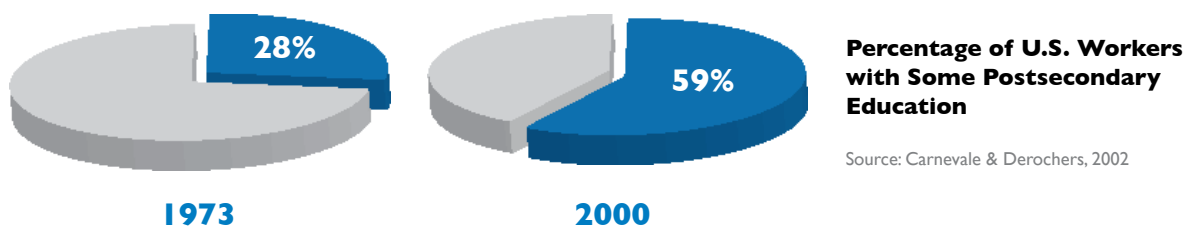
- **A study done at the Educational Testing Service** (Carnevale & Derochers, 2002) found a significant increase in the number of workers who have at least some level of higher education. Between 1973 and 2000, the percentage of U.S. workers with some postsecondary education increased from 28 percent to 59 percent. The proportion with bachelor's degrees increased from 9 percent to 20 percent during that period.
- **The U.S. Bureau of Labor Statistics** identifies 271 jobs with high-growth potential over the next 10 years; 71 are likely to increase by 20 percent or more during this period. All of these jobs require at least some college education; most require one or more college degrees.

More important than the amount of education are the kinds of skills required by the new economy.

A study from Massachusetts Institute of Technology (Autor, Levy, & Murnane, 2003) found that, beginning in the 1970s, labor input of routine cognitive and manual tasks in the U.S. economy declined and labor input of non-routine analytic and interactive tasks rose. This finding was particularly pronounced for rapidly computerizing industries. As firms take up technology, computers *substitute* for workers who perform routine tasks—but they *complement* workers who perform non-routine problem solving. Repetitive, predictable tasks are readily automated. Hence, computerization of the workplace has raised demand for problem solving and communications tasks, such as responding to discrepancies, improving production processes, and coordinating and managing the activities of others.

The net effect is that companies—particularly those with heavy ICT investments—are hiring workers with a higher skill set, particularly expert thinking and complex communications skills.

Majority of U.S. Workers Skill Up with Postsecondary Education



A different set of skills—21st century skills—increasingly powers the wealth of nations.

Advanced economies compete by producing “innovative products and services at the global technology frontier using the most advanced methods” (Porter, Ketels & Delgado, 2007). High-income countries have a high capacity for innovation—and their strategies are global in scope, which requires a workforce with the skills to “translate American business models and offerings to international marketplaces,” offer “cross-border perspectives and solutions,” and apply “tangible skills such as language proficiency” and “skills that are less tangible, including greater sensitivity to cultural differences, openness to new and different ideas, and the ability to adapt to change.”

The United States leads the world in several high-growth, ICT-intensive industries, including technology, media and telecommunications, and could dominate in emerging industries, such as advanced manufacturing, biotechnology, digital media, geospatial technology, nanotechnology, photonics and renewable energy. Fueling creativity, innovation and adaptability that are the hallmarks of competitive, high-growth and emerging industries requires a highly skilled, creative and nimble workforce (Ewing Marion Kauffman Foundation, 2007).



ON THE DEMAND FOR A 21ST CENTURY EDUCATION AND SKILLS

“The best employers the world over will be looking for the most competent, most creative, and most innovative people on the face of the earth and will be willing to pay them top dollar for their services. This will be true not just for top professionals and managers, but up and down the length and breadth of the workforce. Those countries that produce the most important new products and services can capture a premium in world markets that will enable them to pay high wages to their citizens.”

—*Tough Choices or Tough Times*, the New Commission on the Skills of the American Workforce, National Center on Education and the Economy, 2007

“I call the age we are entering the creative age because the key factor propelling us forward is the rise of creativity as the primary mover of our economy.”

—Richard Florida, *The Flight of the Creative Class*, 2006

“Your ability to act on your imagination is going to be so decisive in driving your future and the standard of living of your country. So the school, the state, the country that empowers, nurtures, enables imagination among its students and citizens, that’s who’s going to be the winner.”

—Thomas L. Friedman, *New York Times* columnist

“Creativity is as important in education as literacy and we should treat it with the same status.”

—Sir Ken Robinson, international creativity expert, 2006

Reason 3: Two Achievement Gaps

For the past decade, the United States has focused nationally on closing achievement gaps between the lowest- and highest-performing students—a legitimate and useful agenda, but one that skirts the competitive demand for advanced skills.

No Child Left Behind (NCLB) focuses on minimum competencies—basic skills—in reading, mathematics and, now, science. Yet low performance and achievement gaps persist, according to data on 8th graders from the National Assessment of Educational Progress, also called “the Nation’s Report Card.” Under NCLB, all states are required to participate in NAEP testing, which effectively serves as an independent measure and a national benchmark of states’ success in meeting NCLB goals.

- **In reading**, only 38 percent of white students were proficient on the 2007 National Assessment of Educational Progress (NAEP), compared to 12 percent of black students, 14 percent of Hispanic students and 15 percent of low-income students (Lee, Grigg & Dion, 2007b).
- **In mathematics**, only 42 percent of white students were proficient on the 2007 NAEP, compared to 14 percent of black students, 17 percent of Hispanic students and 17 percent of low-income students (Lee, Grigg & Dion, 2007a).
- **In science**, only 39 percent of white students were proficient on the 2005 NAEP, compared to 7 percent of black students, 10 percent of Hispanic students and 12 percent of low-income students. While NCLB did not include science in its accountability requirements for states until 2007, these results indicate that student achievement in science will be a challenge (Grigg, Lauko & Brockway, 2006).
- **In writing**, a skill in particular demand in business and higher education that is not a focus of NCLB, only 41 percent of white students, 16 percent of black students, 18 percent of Hispanic students and 15 percent of low-income students reached proficiency on the 2007 NAEP (Salahu-Din, Persky & Miller, 2008).

These results are troubling, especially since people with only basic competencies are the most likely to flounder in the rising high-skill, high-wage service economy. To prepare students to be competitive, the nation needs an “NCLB plus” agenda that infuses 21st century skills into core academic subjects. This is not an either–or agenda: Students can master 21st century skills while they learn reading, mathematics, science, writing and other school subjects.

Equally important is the global achievement gap between U.S. students—even our top-performing students—and their international peers in competitor nations.

As important as education is to success in the new economy, the nation is not doing well compared to other countries. While U.S. students scored above the international average in both science and mathematics at the 4th and 8th grades in the 2003 Trends in Mathematics and Science Study (TIMSS) (Martin et al., 2004; Mullis et al., 2004), 15-year-old U.S. students ranked 36th in science and 35th in mathematics among 57 countries participating in the 2006 Programme for Student Assessment (PISA) (Organization for Economic Development and Cooperation, 2007). Further, even the highest-achieving U.S. students underperform their international peers.

Particularly disappointing is the showing of U.S. 15-year-olds on a special assessment of problem solving on the 2003 PISA: U.S. students ranked 29th out of the 40 countries participating (Organization for Economic Development and Cooperation, 2004).

Beyond the obvious blow to national pride, this result is economically significant. Countries that do well on PISA have higher increases in GDP growth than countries that do not, according to studies by Stanford researchers Eric Hanushek et al. (2008):

- **The critical thinking and problem solving skills** measured on PISA, which Hanushek et al. term “cognitive skills,” differentiate the economic leaders from the laggards among 50 countries from 1960 to 2000: “A highly skilled work force can raise economic growth by about two-thirds of a percentage point every year.” Worldwide, the average annual GDP growth rate for more than half a century is 2 to 3 percent, so this is a significant boost. “Higher levels of cognitive skill appear to play a major role in explaining international differences in economic growth.”
- **Cognitive skills are significantly more important** in determining economic outcomes than a traditional measure of educational success: school attainment. “Increasing the average number of years of schooling attained by the labor force boosts the economy only when increased levels of school attainment also boost cognitive skills. In other words, it is not enough simply to spend more time in school; something has to be learned there.”
- **Cognitive skills are important for everyone.** It’s not enough to educate a few highly skilled “rocket scientists.” “In countries on the technological frontier, substantial numbers of scientists, engineers, and other innovators are obviously needed. But so is a labor force that has the technological skills to survive in a technologically driven economy.”

Sweeping demographic changes will exacerbate the two achievement gaps.

The U.S. Census Bureau (2008) projects that the U.S. population will be older and more diverse by the middle of this century. Racial and ethnic minorities will comprise the majority of the nation’s population by 2042, with children expected to be 62 percent minority by 2050, up from 44 percent today. This accelerating diversification will challenge efforts to improve student performance and close achievement gaps.

National and global demographic trends are “raising red flags” for competitiveness (Council on Competitiveness, 2008). Among the trends: slowing growth in the U.S. workforce could slow economic output if productivity does not increase. Boosting productivity and sustaining competitiveness requires many more highly skilled workers throughout the labor pool.



What We Need to Do Now

The nation needs to do a much better job teaching and measuring advanced, 21st century skills that are the indispensable currency for participation, achievement and competitiveness in the global economy.

Beyond the assessment of reading, mathematics and science, the United States does not assess other essential skills that are in demand in the 21st century. All Americans, not just an elite few, need 21st century skills that will increase their marketability, employability and readiness for citizenship, such as:

- **Thinking critically and making judgments** about the barrage of information that comes their way every day—on the Web, in the media, in homes, workplaces and everywhere else. Critical thinking empowers Americans to assess the credibility, accuracy and value of information, analyze and evaluate information, make reasoned decisions and take purposeful action.
- **Solving complex, multidisciplinary, open-ended problems** that all workers, in every kind of workplace, encounter routinely. The challenges workers face don't come in a multiple-choice format and typically don't have a single right answer. Nor can they be neatly categorized as "math problems," for example, or passed off to someone at a higher pay grade. Businesses expect employees at all levels to identify problems, think through solutions and alternatives, and explore new options if their approaches don't pan out. Often, this work involves groups of people with different knowledge and skills who, collectively, add value to their organizations.
- **Creativity and entrepreneurial thinking**—a skill set highly associated with job creation (Pink 2005, Robinson 2006, Sternberg 1996). Many of the fastest-growing jobs and emerging industries rely on workers' creative capacity—the ability to think unconventionally, question the herd, imagine new scenarios and produce astonishing work. Likewise, Americans can create jobs for themselves and others with an entrepreneurial mindset—the ability to recognize and act on opportunities and the willingness to embrace risk and responsibility, for example.
- **Communicating and collaborating** with teams of people across cultural, geographic and language boundaries—a necessity in diverse and multinational workplaces and communities. Mutually beneficial relationships are a central undercurrent to accomplishments in businesses—and it's not only top managers who represent companies anymore. All Americans must be skilled at interacting competently and respectfully with others.
- **Making innovative use of knowledge, information and opportunities** to create new services, processes and products. The global marketplace rewards organizations that rapidly and routinely find better ways of doing things. Companies want workers who can contribute in this environment.
- **Taking charge of financial, health and civic responsibilities** and making wise choices. From deciding how to invest their savings to choosing a health care plan, Americans need more specialized skills—simply because the options are increasingly complex and the consequences of poor decisions could be dire.

These skills, comprehensively articulated by the Partnership for 21st Century Skills and highlighted on page 13, will withstand the test of time, fluctuations in the economy and the marketplace, and dynamic employment demands.

ON INVESTMENTS—AND RETURNS— ON EDUCATION AND SKILLS

“As the larger return to education and skill is likely the single greatest source of the long-term increase in inequality, policies that boost our national investment in education and training can help reduce inequality while expanding economic opportunity.”

—Ben Bernanke, chairman of the Federal Reserve, 2007

“Investments in the health, knowledge, and skills of the people—human capital—are as important as investments in the more visible, physical capital of the country.”

—*The Growth Report: Strategies for Sustained Growth and Inclusive Development*, Commission of Growth and Development, 2008

“The sharp rise in inequality (of the last several years) was largely due to an educational slowdown. ... Our central conclusion is that when it comes to changes in the wage structure and returns to skill, supply changes are critical, and education changes are by far the most important on the supply side. The fact was true in the early years of our period when the high school movement made Americans educated workers and in the post-World War II decades when high school graduates became college graduates. But the same is also true today when the slowdown in education at various levels is robbing America of the ability to grow strong together.”

—Claudia Goldin and Lawrence F. Katz, *The Race Between Education and Technology*, 2008

“Teaching all students to think and to be curious is much more than a technical problem for which educators, alone, are accountable. And more professional development for teachers and better textbooks and tests, though necessary, are insufficient as solutions. The problem goes much deeper—to the very way we conceive of the purpose and experience of schooling and what we expect our high school graduates to know and be able to do.”

—Tony Wagner, *The Global Achievement Gap*, 2008

A Shared Vision of a 21st Century Education System

The Partnership for 21st Century Skills has developed a unified, collective vision for 21st century learning and education support systems that can be used to prepare young people for a global economy.

This vision is the result of a multi-year, comprehensive effort to create a shared understanding and common vision for education. This effort included extensive research on 21st century skills, a National Forum on 21st Century Skills and outreach sessions with educators, employers, parents, community members and students.

For students, proficiency in 21st century skills—the skills, knowledge and expertise students must master to succeed in college, work and life—should be the outcome of a 21st century education. To be “educated” today requires mastery of core subjects, 21st century themes and 21st century skills. To help students achieve proficiency in 21st century skills, teachers and administrators need education support systems that strengthen their instructional, leadership and management capacity. And both students and educators need learning environments that are conducive to results.

Broad Support for Education in 21st Century Skills

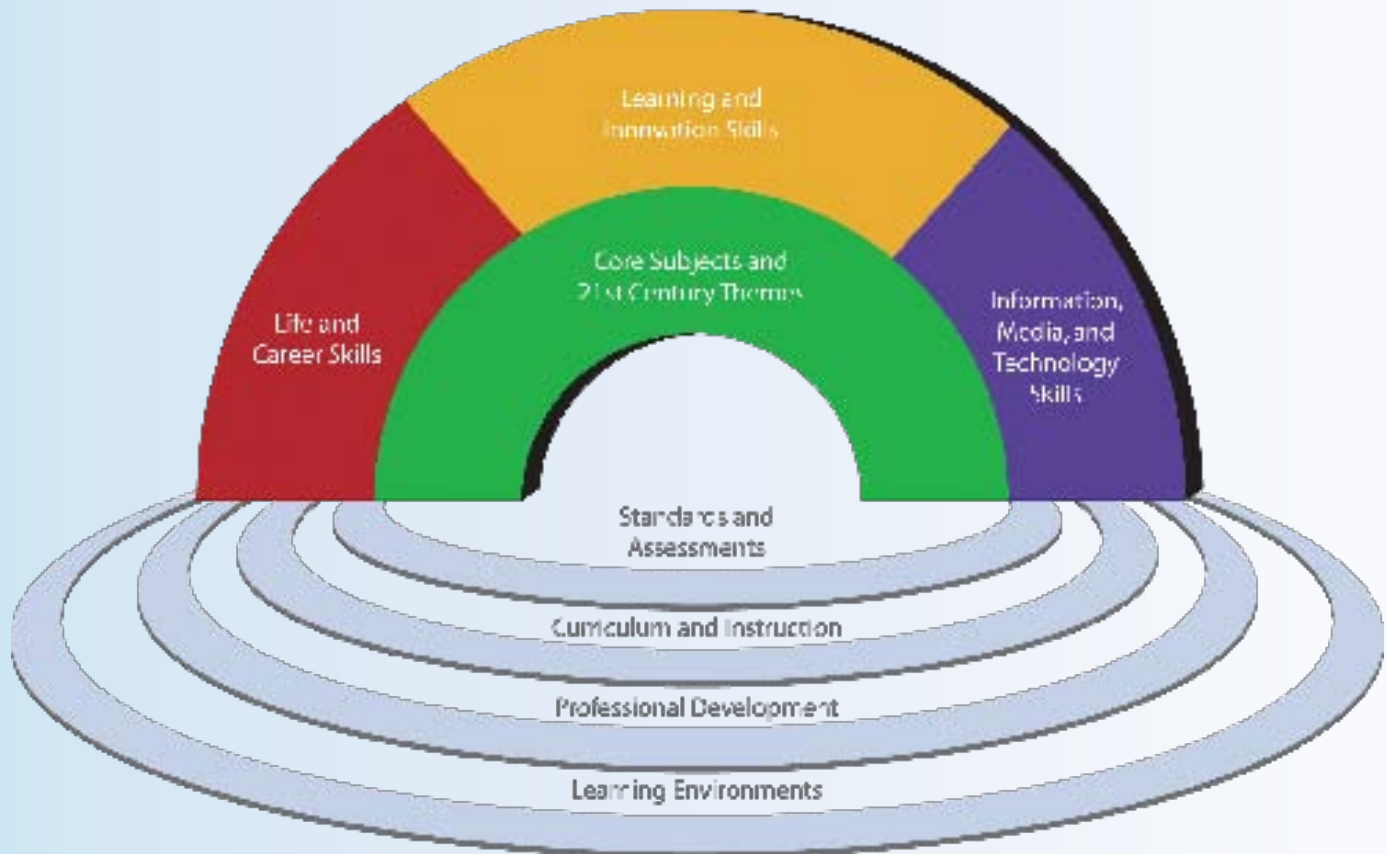
Voters. An overwhelming 80 percent of American voters say the kinds of skills students need to learn to be prepared for the jobs of the 21st century are different from what they needed 20 years ago. And 88 percent of voters believe that the nation’s schools can—and should—play a vital role in teaching 21st century skills (Partnership for 21st Century Skills, 2007).

Employers. Employers across the United States cited professionalism/ work ethic, oral and written communications, teamwork and collaboration, and critical thinking and problem solving as the most important skills that recently hired graduates from high school and two- and four-year postsecondary institutions need, according to a nationwide survey of 400 employers (the Conference Board, Partnership for 21st Century Skills, Corporate Voices for Working Families & the Society for Human Resource Professionals, 2006).

K–12 and Postsecondary Educators. The “components of college readiness” cited in a report prepared for the Bill & Melinda Gates Foundation—key cognitive strategies, key content, academic behaviors, and contextual skills and awareness—align well with the K–12 vision for a 21st century education (Conley, 2007). Likewise, “essential learning outcomes” for higher education—knowledge of human cultures and the natural world, intellectual and practical skills, personal and social responsibilities, and integrative learning—cite similar skills (Association of American Colleges and Universities, 2007).

The Partnership for 21st Century Skills includes members who represent K–12 education. Since the Partnership introduced this vision in 2002, many other advocates of young people and American workers, including youth development and after-school groups, library and media specialists, educational technology experts, and adult education and workforce development professionals, have found that it can be used as a guiding framework for their work.

FRAMEWORK FOR 21ST CENTURY LEARNING



21st Century Student Outcomes

CORE SUBJECTS AND 21ST CENTURY THEMES

Core Subjects

- English, reading or language arts
- World languages
- Arts
- Mathematics
- Economics
- Science
- Geography
- History
- Government and civics

21st Century Themes

- Global awareness
- Financial, economic, business and entrepreneurial literacy
- Civic literacy
- Health literacy

Learning and Innovation Skills

- Creativity and innovation skills
- Critical thinking and problem solving skills
- Communication and collaboration skills

Information, Media and Technology Skills

- Information literacy
- Media literacy
- ICT (information and communications technology) literacy

Life and Career Skills

- Flexibility and adaptability
- Initiative and self-direction
- Social and cross-cultural skills
- Productivity and accountability
- Leadership and responsibility

21ST CENTURY EDUCATION SUPPORT SYSTEMS

Standards and Assessments

Curriculum and Instruction

Professional Development

Learning Environments

To learn more about 21st century learning, visit www.21stcenturyskills.org.

Policy Recommendations

The United States is not alone in the quest to create, innovate and compete, to improve economic results, and to prepare citizens to prosper in a global economy. International efforts to improve 21st century skills, as evidenced by educational results and by economic growth in emerging nations, make it imperative for the United States to take concerted action now.

Federal Policy

- **Establish a senior advisor to the President** for 21st century skills and workforce development to facilitate a comprehensive, government-wide initiative on 21st century skills in education, workforce development, and research and development.
- **Create an Office of 21st Century Skills at the U.S. Department of Education** within the Office of the U.S. Secretary of Education to guide national efforts to incorporate the Framework for 21st Century Learning within preK–20 education. This includes investing in state-led partnerships aimed at incorporating 21st century skills within state standards, assessment and professional development policies.
- **Create an Office of 21st Century Skills at the U.S. Department of Labor** within the Office of the U.S. Secretary of Labor to guide efforts to align state and regional workforce investment activities with the Framework for 21st Century Learning.
- **Create a \$2 billion research and development fund for education.** Target a quarter of this fund to establish a National Institute for 21st Century Skills to research and develop curriculum, instruction and assessment strategies of 21st century skills for the entire workforce pipeline.
- **Endorse the Rockefeller-Snowe Bill (Senate Bill-1483)—the 21st Century Skills Incentive Fund Act.** This bill provides federal matching funds for states that secure state dollars, foundation grants or private donations to adopt the Partnership for 21st Century Skills framework. The bill also encourages private donations by providing tax incentives to businesses that support 21st century skills initiatives.
- **Enact a national workforce development policy** in which every aspect of the workforce pipeline is infused with the same set of 21st century skills. A systemic, preK–80 approach should integrate the Framework for 21st Century Learning into:
 - PreK programs
 - K–12 programs, including reauthorization of the Elementary and Secondary Education Act, to ensure our schools are equipped with 21st century technology infrastructures and tools and to make 21st century skills the outcome of education
 - After-school and youth development programs
 - Two-year, four-year and post-baccalaureate higher education programs, including the Higher Education Act
 - Adult education programs and worker retraining programs, including the Workforce Investment Act
 - Teacher preparation programs for preK–12, postsecondary, adult and workforce education
 - The Education Sciences Reform Act for evaluating education

State Policy

- **Partner with the business community** to set a 21st century skills agenda and plans to implement 21st century learning for the state.
- **Develop state workforce development policies** in which every aspect of the workforce pipeline is focused on the same set of 21st century skills.
- **Appoint Cabinet-level officials** for 21st century learning in education, workforce and economic development to provide dedicated leadership on 21st century skills and to coordinate state initiatives for 21st century skills.
- **Align 21st century skills measures and outcomes** with workforce and economic development initiatives.
- **Partner with businesses** to provide opportunities for educators and students to learn 21st century skills.
- **Commit to 21st century skills** by joining the Partnership's State Leadership Initiative.
- **Integrate 21st century skills** into standards, assessments and graduation requirements at all levels.
- **Establish a state center**—or realign existing state centers—for professional development, teaching and assessment of 21st century skills.

Local Policy

- **Convene business and education leaders** to agree on goals for acquiring the 21st century skills that are essential to their region or community.
- **Incorporate 21st century skills** into regional economic development strategies.
- **Align preK–12, postsecondary and adult education, after-school and youth development, workforce development and training, and teacher education programs** around the 21st century skills that matter for regional and local competitiveness.
- **Make proficiency in 21st century skills the outcome** of education, training and workforce development at all levels.
- **Develop active partnerships with businesses** to provide opportunities for educators and students to learn 21st century skills.
- **Build 21st century skills into long-term planning and budgets** for school districts.
- **Appoint assistant superintendents** for 21st century learning to oversee the development of 21st century skills strategies in school districts.
- **Develop the capacity of district administrators and school leadership teams** to implement 21st century skills strategies.
- **Embed 21st century skills** into teacher preparation and professional development.

NINE LEADERSHIP STATES

Nine states have joined the Partnership as Leadership States that are committed to promoting 21st century teaching and learning skills for all students:

- Iowa
- Kansas
- Maine
- Massachusetts
- New Jersey
- North Carolina
- South Dakota
- West Virginia
- Wisconsin



Conclusion

This is a seminal moment in history for education and competitiveness. The fundamental shifts in the economy demand bold and creative policies. Formalizing the connection between education and competitiveness with an agenda focused on 21st century skills—which are widely acknowledged and supported by voters, employers, educators, researchers and thought leaders—is the starting point.

Creating an aligned, 21st century public education system that prepares Americans to thrive is the central competitiveness challenge of the next decade. Addressing this challenge requires forceful and forward-thinking leadership from federal, state and local policymakers.

The Partnership for 21st Century Skills is prepared to work with policymakers at every level to craft and implement 21st century skills policies and strategies.



References

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Apple, Inc. (April 2008). *Apple Classrooms of Tomorrow—and Today*. Cupertino, CA: Author.

Apte, U.M., Karmarkar, U.S., & Nath, H. (Spring 2008). "Information Services in the U.S. Economy: Value, Jobs, and Management Implications." *California Management Review*.

Association of American Colleges and Universities (2007). *College Learning for the New Global Century*. Washington, DC: Author.

Autor, D., Levy, F. & Murnane, R. (2003). "The Skill Content of Recent Technological Change: An Empirical Exploration." *Quarterly Journal of Economics*, 118(4), 1279-1333.

Bernanke, Ben S. (Feb. 6, 2007). "The Level and Distribution of Economic Well-Being." Speech given to the Greater Omaha Chamber of Commerce, Omaha, NE.

Black, Sandra E., & Lynch, Lisa. "What's Driving the New Economy: The Benefits of Workplace Innovation." *The Economic Journal*, 114, 97-116.

Brooks, David. "The Biggest Issue." (July 29, 2008). *The New York Times*.

Carnevale, Anthony P., & Derochers, Donna M. (April 2002). *The Missing Middle: Aligning Education and the Knowledge Economy*. Educational Testing Service. Washington DC: ERIC document ED 465092.

Center for Regional Studies, (2002). Salveson, David, and Renski, Henry. "The Importance of Quality of Life in the Location Decisions of New Economy Firms." Chapel Hill, NC: University of North Carolina at Chapel Hill.

The Conference Board, Partnership for 21st Century Skills, Corporate Voices for Working Families and Society for Human Resource Management. (2006). *Are They Really Ready for Work? Employers' Perspectives on the Basic Knowledge and Applied Skills of New Entrants to the 21st Century U.S. Workforce*.

Conley, D.T. (March 2007). *Toward a More Comprehensive Conception of College Readiness*. Eugene, OR: Educational Policy Improvement Center.

Council on Competitiveness. (April 2008). *Thrive. The Skills Imperative*. Washington, DC: Author.

Economic and Social Research Council. (2005). *Knowledge Economy Fact Sheet*. Swindon, UK: Author.

Ewing Marion Kauffman Foundation. (July 2007). *On the Road to an Entrepreneurial Economy: A Research and Policy Guide*. Kansas City, MO: Author.

Florida, Richard. (2007). *The Flight of the Creative Class: The New Global Competition for Talent*. New York: HarperCollins.

Gera, S., & Gu, W. (2004). "The Effect of Organizational Innovation and Information Technology on Firm Performance." *International Performance Monitor*, 9, 37-51.

Goldin, Claudia, & Katz, Lawrence F. (2008). *The Race Between Education and Technology*. Boston: Harvard University Press.

Grigg, Wendy S., Lauko, Mary A., & Brockway, Debra M. (2006) *The Nation's Report Card: Science 2005*. (NCES 2006-466). Washington, DC: National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education.

The Growth Report: Strategies for Sustained Growth and Inclusive Development. (2008). Commission on Growth and Development. Washington, DC: World Bank.

Hanushek, Eric, Jamison, Dean T., Jamison, Eliot A., & Woessmann, Ludger. (Spring 2008). "Education and Economic Growth." *Education Next*.

Karmarkar, U.S., & Apte, U.M. (March 2007). "Operations Management in the Information Economy: Information Products, Processes, and Chains." *Journal of Operations Management*.

Lee, Jihyun, Grigg, Wendy S. & Dion, Gloria S. (2007a). *The Nation's Report Card: Mathematics 2007*. (NCES 2007-494). Washington, DC: National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education.

Lee, Jihyun, Grigg, Wendy S. & Dion, Gloria S. (2007b). *The Nation's Report Card: Reading 2007*. (NCES 2007-496). Washington, DC: National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education.

Martin, Michael O., Mullis, Ina V.S., Eugenio J. & Chrostowski, Steven J. (2004). *TIMSS 2003 International Science Report*. Boston: Lynch School of Education.

Mullis, Ina V.S., Martin, Michael O., Gonzales, Eugenio J. & Chrostowski, Steven J. (2004). *TIMSS 2003 International Mathematics Report*. Boston: Lynch School of Education.

Organization for Economic Cooperation and Development. (2004). *Problem Solving for Tomorrow's World: First Measures of Cross-Curricular Competencies from PISA 2003*. Paris: Author.

Organization for Economic Cooperation and Development. (2007). *PISA 2006: Science Competencies for Tomorrow's World*. Paris: Author.

National Center on Education and the Economy. (2007). *Tough Choices or Tough Times: The Report of the New Commission on the Skills of the American Workforce*. Washington, DC: Author.

Partnership for 21st Century Skills. (2007). *Beyond the Three Rs: Voter Attitudes Toward 21st Century Skills*. Tucson, AZ: Author.

Porter, Michael E., Ketels, Christian, & Delgado, Mercedes. (2007). "The Microeconomic Foundations of Prosperity: Findings from the Business Competitiveness Index." *The Global Competitiveness Report 2007-2008*. The World Economic Forum.

Pilat, D. (2004). "The economic impact of ICT: A European Perspective." Paper presented at a conference on IT Innovation, Tokyo.

Pink, Daniel H. *A Whole New Mind: Why Right-Brainers Will Rule the Future*. (2005). New York: Riverhead Hardcover.

Rising Above the Gathering Storm: Energizing and Employing America for a Brighter Economic Future (2007). Committee on Prospering in the Global Economy of the 21st Century: An Agenda for American Science and Technology, Committee on Science, Engineering, and Public Policy. National Academy of Sciences, National Academy of Engineering, and Institute of Medicine. Washington, DC: The National Academies Press.

Robinson, Sir Ken. (February 2006). "Do Schools Kill Creativity?" Presentation at TED2006 conference, Monterey, CA.

Salahu-Din, D., Persky, H., & Miller, J. (2008) *The Nation's Report Card: Writing 2007*. (NCES 2008-468). Washington, DC: National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education.

Sternberg, Robert J. (1996). *Successful Intelligence*. New York: Simon & Schuster.

Stewart, Thomas A. (1997). *Intellectual Capital: The New Wealth of Organizations*. New York: Currency Doubleday.

"Tom Friedman on Education in the 'Flat World.'" (February 2008). *The School Administrator*.

U.S. Census Bureau. (Aug. 14, 2008). "An Older and More Diverse Nation by Midcentury."

Wagner, Tony. (2008). *The Global Achievement Gap: Why Even Our Best Schools Don't Teach the New Survival Skills Our Children Need—and What We Can Do About It*. New York: Basic Books.

Zoghi, Cindy, Mohr, Robert D., & Meyer, Peter B. (May 2007). "Workplace Organization and Innovation." Bureau of Labor Statistics Working Papers, Working Paper 405. Washington, D.C.: U.S. Department of Labor, U.S. Bureau of Labor Statistics, Office of Productivity and Technology.





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