

enGauge[®]

21st Century Skills

FOR 21ST CENTURY LEARNERS



www.ncrel.org/engage

NCREL[®]

METIRI
Group

enGauge[®] 21st Century Skills: Helping Students Thrive in the Digital Age

Technology changes the way the world works. As technology evolves, so must the skill sets of those who use it. In order to remain competitive tomorrow, today's students need to develop techniques that readily adapt to changes as they occur. enGauge leads the way in helping ensure that the next generations acquire successful skills for the 21st century.

The Urgency

Our children live in a global, digital world—a world transformed by technology and human ingenuity. Given the rapid rate of change, the vast amount of information to be managed, and the influence of technology on life in general, students need to apply current skill sets, as well as develop new skill sets to cope and to thrive in this changing society.

The federal No Child Left Behind legislation establishes technology literacy as a core foundation for learning, calling for academic excellence in the context of 21st century technologies.

The enGauge 21st Century Skills go a step further. Advances in the cognitive sciences show that learning increases significantly when students are engaged in academic study through authentic, real-world experiences. The enGauge 21st Century Skills build on extensive bodies of research—as well as calls from government, business, and industry for higher levels of workplace readiness—to define clearly what students need in order to thrive in today's Digital Age.

Along with the Six Essential Conditions for Effective Technology Use as described in the enGauge framework, the enGauge 21st Century Skills will contribute to the success of students as individuals striving to live, learn, and work in the Digital Age.

enGauge 21st Century Skills

Academic Achievement

Digital-Age Literacy

•
Basic, Scientific, Economic,
and Technological Literacies

•
Visual and Information Literacies

•
Multicultural Literacy and
Global Awareness

Inventive Thinking

•
Adaptability, Managing
Complexity, and Self-Direction

•
Curiosity, Creativity,
and Risk Taking

•
Higher-Order Thinking and
Sound Reasoning

21st Century Learning

Effective Communication

•
Teaming, Collaboration,
and Interpersonal Skills

•
Personal, Social,
and Civic Responsibility

•
Interactive Communication

High Productivity

•
Prioritizing, Planning, and
Managing for Results

•
Effective Use of Real-World Tools

•
Ability to Produce Relevant,
High-Quality Products

Academic Achievement

Academic Achievement

Academic Achievement

Digital-Age Literacy

As society changes, the skills needed to deal with the complexities of life also change. *Information and communication technologies literacy* is defined as the ability to use “digital technology, communications tools, and/or networks to access, manage, integrate, evaluate, and create information in order to function in a knowledge society” (International ICT Literacy Panel, 2002, p. 2).

- **Basic Literacy:** Can students demonstrate language proficiency (in English) and numeracy at levels necessary for success on the job and in a Digital Age society?
- **Scientific Literacy:** Do students have the knowledge and understanding of scientific concepts and processes required for personal decision making and participation in social systems?
- **Economic Literacy:** Can students identify economic issues, examine the consequences of changes in economic conditions and public policies, and weigh costs against benefits?
- **Technological Literacy:** Do students know what technology is and how it can be used efficiently and effectively to achieve specific goals?
- **Visual Literacy:** Can students interpret, use, and create visual media in ways that advance thinking, decision making, communication, and learning?
- **Information Literacy:** Are students able to evaluate, locate, synthesize, and use information effectively, and accomplish these functions using technology?
- **Multicultural Literacy:** Can students understand and appreciate similarities and differences between the customs, values, and beliefs of their own culture and the cultures of others?
- **Global Awareness:** Do students recognize and understand relationships among various entities across the globe?

Inventive Thinking

Experts agree that as technology becomes more prevalent in our everyday lives, cognitive skills become increasingly critical. “In effect, because technology makes the simple tasks easier, it places a greater burden on higher-level skills” (International ICT Literacy Panel, 2002, p. 6).

- **Adaptability/Managing Complexity:** Can students handle multiple environments, goals, tasks, and inputs while understanding and adhering to organizational or technological constraints of time, resources, and systems?
- **Self-Direction:** Are students able to set goals related to learning, plan for the achievement of those goals, independently manage time and effort, and independently assess the quality of learning and any products that result from the learning experience?
- **Curiosity:** Do students have a desire to know or a spark of interest that leads to inquiry?
- **Creativity:** Are students able to bring something into existence that is original, whether personally (original only to the individual) or culturally (where the work adds significantly to a domain of culture as recognized by experts)?
- **Risk Taking:** Are students willing to make mistakes, advocate unconventional or unpopular positions, or tackle challenging problems without obvious solutions, such that their personal growth, integrity, or accomplishments are enhanced?
- **Higher-Order Thinking and Sound Reasoning:** Are students adept at cognitive processes of analysis, comparison, inference/interpretation, evaluation, and synthesis, as applied to a range of academic domains and problem-solving contexts?

Effective Communication

According to the 21st Century Literacy Summit (2002), “Information and communications technologies are raising the bar on the competencies needed to succeed in the 21st century” (p. 4). Both researchers and the business community agree: Effective communication skills are essential for success in today’s knowledge-based society.

- **Teaming and Collaboration:** Can students cooperatively interact with one or more individuals, working with others to solve problems, create novel products, or learn and master content?
- **Interpersonal Skills:** Are students able to read and manage their own and others’ emotions, motivations, and behaviors during social interactions or in social-interactive contexts?
- **Personal Responsibility:** Do students demonstrate a depth and currency of knowledge about legal and ethical issues related to technology, combined with an ability to apply this knowledge to achieve balance, and enhance integrity and the quality of life?
- **Social and Civic Responsibility:** Can students manage technology and govern its use in ways that promote the public good and protect society, the environment, and democratic ideals?
- **Interactive Communication:** Do students generate meaning through exchanges using a range of contemporary tools, transmissions, and processes?

High Productivity

According to the U.S. Department of Labor (1999), “We are living in a new economy—powered by technology, fueled by information, and driven by knowledge” (p. 1). Though not yet a high-stakes focus of schools, these skills often determine whether a person succeeds or fails in today’s workforce.

- **Prioritizing, Planning, and Managing for Results:** Do students organize to efficiently achieve the goals of specific projects or problems?
- **Effective Use of Real-World Tools:** Can students use real-world tools (i.e., the hardware, software, networking, and peripheral devices used by information technology [IT] workers) in real-world ways?
- **Ability to Produce Relevant, High-Quality Products:** Are students adept at developing intellectual, informational, or material products that serve authentic purposes and occur as a result of their using real-world tools to solve or communicate about real-world problems?



Methodology

The *enGauge* 21st Century Skills were developed through a process that included literature reviews, research on emerging characteristics of the Net Generation, a review of current reports on workforce trends from business and industry, analysis of nationally recognized skill sets, input from educators, data from educator surveys, and reactions from constituent groups. Some of these sources are listed below. (For a complete list of sources and cross-matches to national skill sets, please see the full publication at www.ncrel.org/engauge/skills/skills.htm.)

- **National Educational Technology Standards (NETS) for students**, 2000, International Society for Technology in Education. Available at cnets.iste.org/students/s_book.html.
- **What Work Requires of Schools**, 1991, Secretary's Commission on Achieving Necessary Skills, U.S. Department of Labor. Available at wdr.doleta.gov/SCANS/whatwork/whatwork.html.
- **Standards for Technological Literacy: Content for the Study of Technology**, 2000, International Technology Education Association. Available at www.iteawww.org/TAA/PDFs/xstnd.pdf.
- **21st Century Literacy in a Convergent Media World**, 2002, 21st Century Literacy Summit. Available at www.21stcenturyliteracy.org/white/WhitePaperEnglish.pdf.
- **Being Fluent With Information Technology**, 1999, Committee on Information Technology Literacy, National Research Council. Available at www.nap.edu/html/beingfluent/.
- **Information Literacy Standards for Student Learning**, 1998, American Association of School Librarians (AASL), Association of Educational Communications Technology (AECT), and American Library Association (ALA). Available at www.ala.org/aasl/ip_nine.html.
- **Technically Speaking: Why All Americans Need to Know More About Technology**, 2002. National Academy of Engineering and National Research Council. Available at www.nap.edu/books/0309082625/html/.
- **Preparing Students for the 21st Century**, 1996, American Association of School Administrators.
- **Digital Transformation: A Framework for ICT Literacy**, 2002. Report by the International Information and Communication Technologies (ICT) Literacy Panel for the Educational Testing Service (ETS). Available at www.ets.org/research/ictliteracy/ictreport.pdf.
- **How People Learn: Brain, Mind, Experience, and School**, 1999. Bransford, J., Brown, A., & Cocking, R., Eds. Available at www.nap.edu/html/howpeople1/.

References

- International Information and Communication Technologies (ITC) Literacy Panel. (2002). *Digital transformation: A framework for ICT literacy*. Princeton, NJ: Educational Testing Service. Retrieved February 19, 2003, from <http://www.ets.org/research/ictliteracy/ictreport.pdf>
- 21st Century Literacy Summit. (2002, March). *21st century literacy in a convergent media world* [White paper]. Retrieved February 19, 2003, from <http://www.21stcenturyliteracy.org/white/WhitePaperEnglish.pdf>
- U.S. Department of Labor. (1999). *Futurework: Trends and challenges for work in the 21st century*. Washington, DC: Author. Retrieved February 19, 2003, from <http://www.dol.gov/asp/programs/history/herman/reports/futurework/report.htm>

To Access the Full Publication and Web Resources

NCREL and the Metiri Group produced a major publication titled *enGauge 21st Century Skills: Literacy in the Digital Age*. This publication provides education, communities, business, and industry with sound information on the 22 skills:

- A definition of each skill.
- A bulleted list of student competencies and characteristics related to each skill.
- Background information, resources, examples, and research related to each skill.
- An addendum containing a continuum of progress for each student competency.

View the publication online at www.ncrel.org/engauge/skills/skills.htm or order a print copy through the NCREL Product Order Line at (800) 252-0283 or the NCREL Product Catalog at www.ncrel.org/catalog/.



About NCREL www.ncrel.org

The North Central Regional Educational Laboratory (NCREL) is a nonprofit organization dedicated to helping schools and the students they serve reach their full potential. NCREL's service region includes Illinois, Indiana, Iowa, Michigan, Minnesota, Ohio, and Wisconsin.

About the Metiri Group www.metiri.com

The Metiri Group is a national consulting firm based in Los Angeles, California. Specializing in K-20 learning technology, the Metiri Group works in the public and private sectors focusing on policy, strategic planning, professional development, research, assessment, audits, and impact studies. The firm specializes in gauging the impact of technology in schools.

About NCRTEC

North Central Regional Technology in Education Consortium (NCRTEC) helps states, districts, and schools effectively integrate technology into education by providing high-quality professional development, building the capacity of leaders, and disseminating information on critical technology issues. NCRTEC provides professional development and an evaluation program based on the *enGauge* Six Essential Conditions and 21st Century Skills.

NCREL/Metiri Partnership

Since identifying the *enGauge* 21st Century Skills in December 2000, NCREL and the Metiri Group have continued to collect and synthesize the research underlying this skill set. From that extensive review, two things became clear. First, the urgency for schools to address 21st century skills has increased dramatically because of the tremendous influence of technology on the economy and society. Second, most of the skills have been significantly redefined to reflect the tools, conventions, and norms of the Digital Age.

The *enGauge* 21st Century Skills publication and related tools will be most effective when used in the context of learning standards and state and local initiatives. The authors welcome opportunities to localize the rollout and use of these resources in your community. Please send an e-mail message describing your interest to info@ncrel.org or info@metiri.com.

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