

## 21<sup>st</sup> Century Skills: Definitions, Practices & Research

### Definitions & Elements

The Asia Society and Council of Chief State School Officers specify global competence as the core capacity students need for the 21<sup>st</sup> century and define it as the capacity and disposition to understand and act on issues of global significance. Thus globally competent students:

1. Investigate the world beyond their immediate environment.
2. Recognize perspectives, others' and their own.
3. Communicate ideas effectively with diverse audiences.
4. Take action to improve conditions (page 11.)

From Boix-Mansilla, V. & Jackson, A. (2011). *Educating for global competence: Preparing our youth to engage in the world*. New York, NY: Asia Society.

The authors of *Education for Life and Work: Developing Transferable Knowledge and Skills in the 21<sup>st</sup> Century* (2012) describe key skills that increase deeper learning, college and career readiness, student-centered learning, and higher order thinking. These labels include both cognitive and non-cognitive skills such as critical thinking, problem solving, collaboration, effective communication, motivation, persistence, and learning to learn. 21<sup>st</sup> century skills also include creativity, innovation, and ethics that are important to later success and may be developed in formal or informal learning environments.

The North Central Regional Educational Laboratory (2003) identifies broader 21<sup>st</sup> century skills as achieving 21<sup>st</sup> century learning through digital age literacy, inventive thinking, effective communication, and high productivity.

The Partnership for 21<sup>st</sup> century skills identifies six key elements for fostering 21<sup>st</sup> century learning: (1) emphasize core subjects, (2) emphasize learning skills, (3) use 21<sup>st</sup> century tools to develop learning skills, (4) teach and learn in a 21<sup>st</sup> century context, (5) teach and learn 21<sup>st</sup> century content, and (6) use 21<sup>st</sup> century assessments that measure 21<sup>st</sup> century skills.

The University of Melbourne–based and Cisco-, Intel-, and Microsoft-funded Assessment and Teaching of 21<sup>st</sup> Century Skills (AT21CS) consortium — which includes Australia, Finland, Portugal, Singapore, the United Kingdom, and the United States — organizes 21<sup>st</sup> century skills, knowledge, and attitudes, values, and ethics into the following four categories:

- Ways of Thinking: creativity and innovation, critical thinking, problem solving, decisionmaking, and learning to learn (or metacognition)
- Ways of Working: communication and teamwork
- Tools for Working: general knowledge and information communication technology (ICT) literacy
- Living in the World: citizenship, life and career, and personal and social responsibility, including cultural awareness and competence.

## Research & Reports

Blackboard. (2008). Teaching in the 21<sup>st</sup> century: A review of the issues and changing models in the teaching profession. *Eduviews*.

[http://www.blackboard.com/resources/k12/K12\\_Teaching21st\\_Final.pdf](http://www.blackboard.com/resources/k12/K12_Teaching21st_Final.pdf)

Executive Summary: As educational leaders, classroom teachers, students and parents will agree, 21<sup>st</sup> century teaching carries with it a complicated mix of challenges and opportunities. Challenges include the issues of teacher turnover, accountability, changing student populations and student expectations, mounting budget pressures, and intense demand to build students' 21<sup>st</sup> century skills. On the opportunity side of the equation, the growing capacity, capability, and power of technology-based tools and resources give the education community the ability to address these challenges successfully. With strategic use of 21<sup>st</sup> century learning tools, educational institutions can provide the supportive productive environment educators need to reach, teach, and support each student's learning needs and potential.

Topics and recommendations include:

- Professional Development — continuous, on-going professional development. Provide educators with more convenient “anywhere, anytime” access to learning materials and online courses, offering more personalized professional learning opportunities, and creating online communities that would support individual needs and the sharing of best practices.
- Technology — Use a platform that integrates online course and content delivery and community to support multiple professional learning communities with a growing collection of custom resources and tools.
- Shifting from teaching to learning — Cohesive, comprehensive and integrated human resource, instructional, and professional development strategies are the driving force and technology tools and infrastructure are a core part of the foundation.

Jerald, C.D. (2009). *Defining a 21st century education*. Alexandria, VA: The Center for Public Education. <http://www.centerforpubliceducation.org/Main-Menu/Policies/21st-Century/Defining-a-21st-Century-Education-Full-report-PDF.pdf>

This paper from the Center for Public Education is aimed at **defining the educational skills needed** in the 21<sup>st</sup> century. The author first outlines how the world is changing and the impacts on work and life. This includes automation of formerly human-performed tasks, globalization of the economy, and restructuring of traditional organizational hierarchies, along with a rapidly changing and more diverse demographic population who have more individual responsibility over their lives. He then discusses specific knowledge and skills that will be most important in addressing these new work-life demands. The author concludes by identifying the implications of this knowledge shift for schools and **providing suggestions for how school districts can adapt** to this new way of learning and allow students to thrive in postsecondary life.

Mathis, W. (2013). *Research-based options for education policymaking: Twenty-first century skills and implications for education*. Boulder, CO: National Education Policy Center. <http://nepc.colorado.edu/files/pb-options-8-21stcent.pdf>

This brief describes the different interpretations of what “21<sup>st</sup> century skills” are as well

as the different perspectives of how these skills should be implemented and assessed. The brief also includes **recommendations for policymaking around implementation and assessment of 21<sup>st</sup> century skills**. These recommendations include refocusing accountability systems, defining proficiencies and competencies around work-based learning opportunities, expanding secondary and higher education cooperation, and implementing Linked Learning.

Nagel, David. (10/30/2009). *State Implementation Guides Focus on Best Practices for 21st Century Learning*. Partnership for 21<sup>st</sup> Century Skills, [www.P21.org](http://www.P21.org)

The Partnership for 21<sup>st</sup> Century Skills is a coalition of business and education groups focused on technology education and the integration of technology into education. The group provides the [Framework for 21st Century Learning 2-page PDF](#), which is a roadmap for education centered on technology and skills-focused learning. It also provides resources focused on providing information and tools for educators for boosting 21<sup>st</sup> century learning in K–12.

### **21st Century Student Outcomes**

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

1. [Core Subjects \(the 3 Rs\) and 21st Century Themes](#)
2. [Learning and Innovation Skills](#)
  - [Creativity and Innovation](#)
  - [Critical Thinking and Problem Solving](#)
  - [Communication and Collaboration](#)
3. [Information, Media and Technology Skills](#)
  - [Information Literacy](#)
  - [Media Literacy](#)
  - [ICT Literacy](#)
4. [Life and Career Skills](#)

### **21st Century Support Systems**

The elements described below are the critical systems necessary to ensure student mastery of 21<sup>st</sup> century skills. 21<sup>st</sup> century standards, assessments, curriculum, instruction, professional development and learning environments must be aligned to produce a support system that produces 21<sup>st</sup> century outcomes for today’s students.

1. [21st Century Standards](#)
2. [Assessment of 21st Century Skills](#)
3. [21st Century Curriculum and Instruction](#)
4. [21st Century Professional Development](#)
5. [21st Century Learning Environments](#)

Pacific Policy Research Center. (August 2010). *21<sup>st</sup> Century Skills for Students and Teachers*. Honolulu: Kamehameha Schools, Research & Evaluation Division.  
<http://www.ksbe.edu/spi/PDFS/21%20century%20skills%20full.pdf>

This **literature review** synthesizes published works on 21<sup>st</sup> century learning skills. There

has been a significant shift over the last century from manufacturing to emphasizing information and knowledge services. New standards for what students should be able to do are replacing the basic skill competencies and knowledge expectations of the past. To meet this challenge schools must be transformed in ways that will enable students to acquire the creative thinking, flexible problem solving, collaboration and innovative skills they will need to be successful in work and life. Some authors and organizations argue that 21<sup>st</sup> Century Learning Skills, the subject of this literature review, are critical for accomplishing the necessary transformation. The Partnership for 21<sup>st</sup> Century Skills has developed a framework for 21<sup>st</sup> century learning, which describes the skills that students need to thrive in today's global economy. The North Central Regional Education Laboratory (NCREL) and the Metiri Group have also identified a framework for 21<sup>st</sup> century skills, which is organized into four categories: digital age literacies, inventive thinking, effective communication, and high productivity. This literature review is organized in line with the framework developed by the Partnership for 21<sup>st</sup> Century Learning Skills.

The literature review begins by defining 21<sup>st</sup> century learning skills, and then addresses the following areas:

- 21<sup>st</sup> Century Critical Learning and Innovation Skills
- 21<sup>st</sup> Century Life and Career Skills
- 21<sup>st</sup> Century Information, Media, and Technology Skills
- Best Practices for Implementing 21<sup>st</sup> Century Skills
- 21<sup>st</sup> Century Assessment
- 21<sup>st</sup> Century Professional Development

The review concludes with discussions of 21<sup>st</sup> century support systems.

Partnership for 21<sup>st</sup> Century Skills. (2012). *21<sup>st</sup> Century Skills Assessment*.

[http://www.p21.org/storage/documents/21st\\_Century\\_Skills\\_Assessment\\_e-paper.pdf](http://www.p21.org/storage/documents/21st_Century_Skills_Assessment_e-paper.pdf)

Meeting the demands of today's world requires a shift in **assessment strategies** to measure the skills now prized in a complex global environment. The Partnership for 21<sup>st</sup> Century Skills believes that such a shift is vital to the widespread adoption of 21<sup>st</sup> century skills in our schools. We must move from primarily measuring discrete knowledge to measuring students' ability to think critically, examine problems, gather information, and make informed, reasoned decisions while using technology. In addition to posing real world challenges, such assessments should accept a range of solutions to a task. For example, one possible assessment of 21<sup>st</sup> century skills would focus more on a student's operational skills, such as her expertise in using multiple sources appropriately and efficiently, rather than on whether or not a correct response was submitted.

James W. Pellegrino, James W. and Margaret L. Hilton, Margaret L. (Eds). (2012). *Education for life and work: Developing transferable knowledge and skills in the 21<sup>st</sup> century*. Committee on Defining Deeper Learning and 21<sup>st</sup> Century Skills; Center for Education; Board on Testing and Assessment; Division of Behavioral and Social Sciences and Education; National Research Council.

[http://www.nap.edu/catalog.php?record\\_id=13398](http://www.nap.edu/catalog.php?record_id=13398)

Americans have long recognized that investments in public education contribute to the

common good, enhancing national prosperity and supporting stable families, neighborhoods, and communities. Education is even more critical today, in the face of economic, environmental, and social challenges. Today's children can meet future challenges if their schooling and informal learning activities prepare them for adult roles as citizens, employees, managers, parents, volunteers, and entrepreneurs. To achieve their full potential as adults, young people need to develop a range of skills and knowledge that facilitate mastery and application of English, mathematics, and other school subjects. At the same time, business and political leaders are increasingly asking schools to develop skills such as problem solving, critical thinking, communication, collaboration, and self-management — often referred to as “21<sup>st</sup> century skills.”

This report describes how these skills relate to each other and to more traditional academic skills and content in the key disciplines of reading, mathematics, and science. *Education for Life and Work: Developing Transferable Knowledge and Skills in the 21<sup>st</sup> Century* summarizes the findings of the research that investigates the importance of such skills to success in education, work, and other areas of adult responsibility and that demonstrates the importance of developing these skills in K–16 education. In this report, features related to learning these skills are identified, which include teacher professional development, curriculum, assessment, after-school and out-of-school programs, and informal learning centers such as exhibits and museums.

Rice, Erik. (June 2011). *Reframing student outcomes to develop 21<sup>st</sup> century skills*. Stanford Center for Opportunity Policy in Education. <https://edpolicy.stanford.edu/sites/default/files/publications/reframing-student-outcomes-develop-21st-century-skills.pdf>

In this brief, Erik Rice identifies three strategic practices schools, districts, and communities can use to help prepare students for college and career success:

- Collectively articulate and align a set of student outcomes that prioritize 21<sup>st</sup> century skills,
- Transform defined outcomes into functioning frameworks for curriculum and instruction and student support, and
- Measure student mastery of outcomes through the implementation of authentic, performance- based assessment.

Rosefsky Saavedra, Anna & Opfer, V. Darleen. (April 2012). *Teaching and Learning 21<sup>st</sup> Century Skills: Lessons from the Learning Sciences*. Asia Society and RAND Corporation. <http://asiasociety.org/files/rand-1012report.pdf>

This report, prepared for the first Asia Society Global Cities Education Network Symposium, held in Hong Kong in May 2012, examines the current definitions of 21<sup>st</sup> century skills and looks at why and how they should be taught. Contents include: Defining 21<sup>st</sup> century skills, Why students need 21<sup>st</sup> century skills, Why are many students not learning 21<sup>st</sup> century skills? How to teach 21<sup>st</sup> century skills: Nine lessons from the science of learning, Assessing 21<sup>st</sup> century skills, Building the capabilities to teach 21<sup>st</sup> century skills, and Moving school systems toward 21<sup>st</sup> century education.

Rotherham, Andrew J. & Willingham, Daniel. (September 2009). 21st century skills: The

challenges ahead. *Educational Leadership, Teaching for the 21st Century*, Volume 67, Number 1, 16–21. <http://www.ascd.org/publications/educational-leadership/sept09/vol67/num01/21st-Century-Skills@-The-Challenges-Ahead.aspx>

Abstract: The skills that students need for the 21<sup>st</sup> century are not really new, assert Rotherham and Willingham. Critical thinking, problem solving, information literacy, and global awareness have been important to human progress throughout history, at least among the elites in different societies. What is new is the extent to which individual and collective success now depends on all students having such skills. Twenty-first century skills advocates, say the authors, often underestimate the magnitude of the challenge of teaching these skills in the context of meaningful content. **For the 21<sup>st</sup> century skills movement to improve schools, major changes will be necessary in curriculum, teacher training, and assessment.** First, educators and policymakers must ensure that the instructional program is complete and that content is not shortchanged for an ephemeral pursuit of skills. Second, states, school districts, and schools need to revamp how they think about human capital in education—in particular how teachers are trained. Finally, we need new assessments that can accurately measure richer learning and more complex tasks. Curriculum, teacher expertise, and assessment have all been weak links in past education reform efforts. For the 21<sup>st</sup> century skills effort to be effective, these three elements must be implemented in concert.

Highlights and recommendations:

**Curriculum** — To think critically, students need the knowledge that is central to the domain. We must plan to teach skills in the context of particular content knowledge and to treat both as equally important. Practice matters more than experiences. Practice means that you try to improve by noticing what you are doing wrong and formulating strategies to do better. Practice also requires feedback, usually from someone more skilled.

**Human Capital** — Advocates of 21<sup>st</sup> century skills favor student-centered methods — for example, problem- and project-based learning — that allow students to collaborate, work on authentic problems, and engage with the community. Teachers need more robust training and support than they receive today, including specific lesson plans that deal with the high cognitive demands and potential classroom management problems of using student-centered methods.

**Assessment** — Elena Silva (2008) noted in a recent report for Education Sector, the potential exists today to produce assessments that measure thinking skills and are also reliable and comparable between students and schools — elements integral to efforts to ensure accountability and equity. But efforts to assess these skills are still in their infancy; education faces enormous challenges in developing the ability to deliver these assessments at scale. The first challenge is the cost. Although higher-level skills like critical thinking and analysis can be assessed with well-designed multiple-choice tests, a truly rich assessment system would go beyond multiple-choice testing and include measures that encourage greater creativity, show how students arrived at answers, and even allow for collaboration. Such measures, however, cost more money than policymakers have traditionally been willing to commit to assessment. Substantial delivery challenges also exist. Delivering these assessments in a few settings, as is the case today, is hardly the same as delivering them at scale across a state — especially the larger states. Because most of these assessments will be technology-based, most schools'

information technology systems will require a substantial upgrade.

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*. NY: Basic Books.

Wagner proposes that students need seven survival skills to be prepared for 21<sup>st</sup> century life, work, and citizenship:

1. critical thinking and problem solving
2. collaboration and leadership
3. agility and adaptability
4. initiative and entrepreneurialism
5. effective oral and written communication
6. accessing and analyzing information
7. curiosity and imagination.