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About the Fundamentals of K-12 Technology Programs

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Six Key Elements of 21st Century Learning

- Core subjects: NCLB-identified core subjects.
- 21st century content: emerging content areas such as global awareness; financial, economic, business, and entrepreneurial literacy; civic literacy; health and wellness awareness.
- Learning and thinking skills: critical thinking and problem-solving skills, communication, creativity and innovation, collaboration, contextual learning, information and media literacy.
- ICT literacy: using technology in the context of learning so students know how to learn.
- Life skills: leadership, ethics, accountability, personal responsibility, self-direction, and so on.
- 21st century assessments: Authentic assessments that measure all five areas of learning.

21st Century Learning Environments

- Personalized learning strategies and customizable content.
- New tools, including individual notebook or Tablet PCs, wireless connectivity,¹ a projection device, printing needs, wireless access points, accessories like notebook PC bags, mobile carts, USB key drives, etc.
- Learning spaces that encourage collaboration and communication.
- Project-based learning that addresses state learning standards.
- Performance-based assessments.
- Formative assessment using notebooks to get immediate feedback.
- Differentiated instruction—adjust learning activities to address varied learning styles and to maximize each student's learning experience.

21ST CENTURY LEARNING AND ASSESSMENT

What Students Need to Know and How To Measure It

Because living and working are so different now from even a decade or two ago and will continue to change, today's students need new thinking, technical, and communication skills to survive and thrive in the future. Fortunately, the pursuit of knowledge has never been as exciting as it is today. The ability to learn in a mobile, connected environment affords students and educators the ability to participate in a new paradigm of technology-enabled education.

New technologies enhance our ability to create ideas, make discoveries, test our theories, build knowledge, and collaborate and communicate like never before, and education can combine practical, intellectual, and social skills. What does this mean for day-to-day teaching and learning? While students have to demonstrate proficiency in standards-based skills, they also need to show higher order thinking and interpersonal skills.

Assessment of these new skills is essential. Schools need to know what students know and how prepared they are for the future. Similarly, the public needs a record of school progress and activity. Schools are creating new learning environments and new assessments capable of mining different kinds of information.

The six key elements of 21st century learning, according to the Partnership for 21st Century Skills, start with the NCLB-identified core subjects. Instead of stopping there, they include 21st century content, learning and thinking skills, Information and Communication Technology (ICT), and life skills. In addition, a key component is assessment that can measure all areas of learning.

21st Century Tools

Today's students are clearly citizens of the 21st century and rely on personal technologies for information and connections to others, at least outside of school. Schools can either capitalize on young people's affinity for technology or fail to engage them in learning and be perceived as more and more irrelevant.

The International Society for Technology in Education (ISTE) believes that "To live, learn, and work successfully in an increasingly complex and information-rich society, students must be able to use technology effectively." They developed standards to guide educational leaders in recognizing and addressing the conditions for effective use of technology to support Pre K-12 education. They state: "Within an effective educational setting, technology can enable students to become:

- Capable information technology users
- Information seekers, analyzers, and evaluators
- Problem solvers and decision makers
- Creative and effective users of productivity tools
- Communicators, collaborators, publishers, and producers
- Informed, responsible, and contributing citizens."

Logically, without technology, schools will not be able to prepare students for an increasingly technology-driven world of the future. Thus technology-empowered learning is a requirement for any educational institution to be effective and more and more schools are providing individual access. Research shows that 1:1 computing produces impressive results. In several of these studies, researchers' findings indicate that 1:1 computing provides greater access to resources, information, and up-to-date instructional content for more students and families as well as increases student motivation, engagement, interest, organization, and self-directed learning. Educator benefits were found to increase professional productivity, encourage greater collaboration, and improve home-school communication.

21st Century Strategies

DIFFERENTIATED INSTRUCTION

Differentiated instruction is a way to enhance learning for all students by engaging them in instructional strategies and learning activities that address diverse learning needs, strengths, and preferences. Students are at the center of instruction in a classroom where differentiated methods are implemented. Teachers tailor their instruction and adjust the curriculum to students' needs rather than assuming that all students can learn in the same way. Students can learn using the method that works best for them or what challenges them the most. For example, some students learn by reading about a topic; others may listen, and others may need to manipulate objects in order to understand.

"We have seniors working at internships before they ever enter college. Some of my students graduate high school with a level of proficiency comparable to recent college graduates."

— Dan Cornell, Digital Media Arts Instructor, Smoky Hill High School

PROJECT-BASED LEARNING

Schools need strategies to help students acquire new skills. One of the best ways to help students learn is to engage them in project-based learning. In project-based learning, students work in groups to solve challenging problems that are authentic, curriculum-based, and often interdisciplinary. Learners decide how to approach a problem and what activities to pursue. They gather information from a variety of sources and synthesize, analyze, and derive knowledge from it. Their learning is inherently valuable because it's connected to something real and involves adult skills such as collaboration and reflection. At the end, students demonstrate their newly acquired knowledge and are judged by how much they've learned and how well they communicate it. Throughout this process, the teacher's role is to guide and advise, rather than to direct and manage, student work.

For educators and communities that focus on basic skills, the transition to more forward-looking strategies is fairly easy. Students will always need basic skills and they can be embedded into preparation materials for projects. Assessments measure both basic and 21st century skills.

21st Century Assessments

According to the U.S. Department of Education, assessments can provide impetus for improving instruction, and increase students' understanding of what they need to know and be able to do. Formative assessments provide ongoing information about student success on a continuum of basic skills so that no one falls behind. Performance assessments present ways for students to demonstrate curriculum-related knowledge as well as 21st century skills. The best performance tasks are inherently instructional, actively engaging students in worthwhile learning activities.

FORMATIVE ASSESSMENT

While standardized tests determine student, school, and district success, recent efforts to help students do well include using formative assessments, which assess how students are learning during the course of the year, week or day. Armed with information from the formative assessment, teachers can adjust instruction and materials and make changes.

Teachers use several tools for formative assessment. These include observation, classroom discussion, and analysis of student work, including homework and regular tests. In a formative assessed environment, student can take tests and get immediate feedback on how they performed.

Adjusting lessons and using this information to fill in the gaps between the students learning style and performance involves differentiating instruction, which is based on the beliefs that students differ in how they learn, classrooms that are not “one size fits all” are more effective, and students must be able to make meaning from subject matter. A differentiated classroom offers students different ways to learn subject content, make sense of ideas, and demonstrate learning.

PERFORMANCE ASSESSMENT

Performance assessment is a measurement strategy based on authentic tasks such as activities, exercises, or problems that require students to show what they can do. Some performance tasks are designed to have students demonstrate their understanding by applying their knowledge to a particular situation.

In preparing their students to work on a performance task, teachers describe what the task entails and the standards that will be used to evaluate performance. This requires a careful description of the elements of good performance, most often in the form of a rubric, and allows students to judge their own work as they proceed. Students develop their approaches to the task knowing that their work will be evaluated against agreed-upon standards.

According to the U.S. Department of Education, these two methods have been used successfully to assess performance:

Open-ended or extended response exercises are questions or other prompts that require students to explore a topic orally or in writing. Students might be asked to describe their observations from a science experiment, or present arguments that an historic character would make concerning a particular proposition. For example, what would Abraham Lincoln argue about the causes of the Civil War?

Extended tasks are assignments that require sustained attention in a single work area and are carried out over several hours or longer. Such tasks could include drafting, reviewing, and revising a poem; conducting and explaining the results of a science experiment on photosynthesis; or even painting a car in auto shop.

“After experiencing the learning environment we created using HP notebook PCs, students who leave Kershaw County School District are going to be able to compete with anyone worldwide.”

— Dr. Agnes Slayman, Kershaw County School District’s Assistant Superintendent for Curriculum and Instruction.

21st Century Skills

A nationwide poll of registered voters by the Partnership for 21st Century Skills reveals that Americans are deeply concerned that the United States is not preparing young people with the skills they need to compete in the global economy.

- 80 percent of voters say the things students need to learn today are different than 20 years ago.
- Six in 10 voters say our schools are not keeping pace with changing educational needs.
- Almost nine in 10 voters (88 percent) believe 21st century skills can and should be part of the curriculum.

— From The Partnership for 21st Century Skills

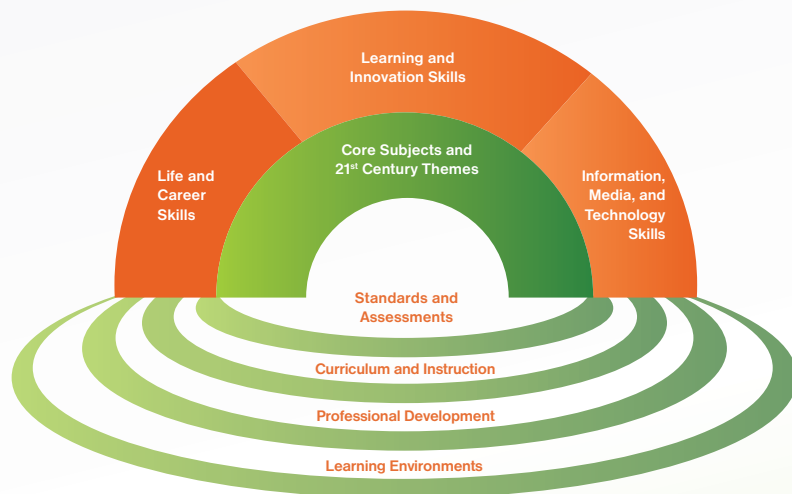
EPORTFOLIOS

Student work can be saved in portfolios, collections of student work performed over time to show progress. A portfolio might include a student’s “best pieces” and the student’s evaluation of the strengths and weaknesses of several pieces. It can contain some “works in progress” that illustrate the improvements the student has made over time. ePortfolios, because of the nature of digital media, can be saved throughout a student’s school career and be a clear indicator of effort and achievement.

Measuring Up

A TechLearning QuickPoll noted that some critics say that schools are failing to prepare students for the demands of the 21st century in which students will need not just a high level of academic skills, but also new literacies and new abilities. It asked how schools measure up on teaching 21st Century skills.

- Almost half of the responses indicated that schools are trying to address these skills, but there really is no time to do much in an already crowded curriculum.
- Almost a third said that their schools are doing an effective job of integrating these more analytic skills into the daily curriculum or that they have restructured the curriculum to focus on higher-order thinking skills, creativity and collaboration.
- One fifth said that they choose to focus on solid reading, writing and math skills so that students will be prepared with those necessary and basic skills.



Framework for 21st Century Learning

The Partnership for 21st Century Skills has developed a unified, collective vision for 21st century learning. Among the elements are the standards, curriculum, environment, and assessments that districts must implement.

21st CENTURY STANDARDS

- Focuses on 21st century skills, content knowledge and expertise.
- Builds understanding across and among core subjects as well as 21st century interdisciplinary themes.
- Emphasizes deep understanding rather than shallow knowledge.
- Engages students with the real world data, tools, and experts they will encounter in college, on the job, and in life—students learn best when actively engaged in solving meaningful problems.
- Allows for multiple measures of mastery.

21st CENTURY CURRICULUM & INSTRUCTION

- Teaches 21st century skills discretely in the context of core subjects and 21st century interdisciplinary themes.
- Focuses on providing opportunities for applying 21st century skills across content areas and for a competency-based approach to learning.
- Enables innovative learning methods that integrate the use of supportive technologies, inquiry- and problem-based approaches and higher order thinking skills.
- Encourages the integration of community resources beyond school walls.

21st CENTURY ASSESSMENT

- Supports a balance of assessments, including high-quality standardized testing along with effective classroom formative and summative assessments.

- Emphasizes useful feedback on student performance that is embedded into everyday learning.
- Requires a balance of technology-enhanced, formative and summative assessments that measure student mastery of 21st century skills.
- Enables development of portfolios of student work that demonstrate mastery of 21st century skills to educators and prospective employers.
- Enables a balanced portfolio of measures to assess the educational system's effectiveness at reaching high levels of student competency in 21st century skills.

21st CENTURY LEARNING ENVIRONMENTS

- Creates learning practices, human support and physical environments that will support the teaching and learning of 21st century skill outcomes.
- Supports professional learning communities that enable educators to collaborate, share best practices and integrate 21st century skills into classroom practice.
- Enables students to learn in relevant, real world 21st century contexts (e.g., through project-based or other applied work).
- Allows equitable access to quality learning tools, technologies and resources.
- Provides 21st century architectural and interior designs for group, team and individual learning.
- Supports expanded community and international involvement in learning, both face-to-face and online.

—From *Partnership for 21st Century Skills*, www.21stcenturyskills.org

¹Wireless access point and Internet service required and sold separately. Availability of public wireless access points limited.

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