21st Century Workplace: Skills for Success

Most Americans agree that the workplace is changing and that the skills necessary for success in the 21st century workplace are different from those needed in the 20th century. In his book *A Whole New Mind*, author Daniel H. Pink writes that we are "moving from the Information Age to the Conceptual Age" [Pink, 2005, p. 33]. He argues that the workplace is changing as a result of three factors--Asia, abundance, automation-and that to remain competitive workers will need new skills [Pink, 2005, p. 46]. According to Pink "in the Conceptual Age, what we need . . . is a *whole* new mind"--one that incorporates both right brain and left brain directed aptitudes (Pink, 2005, p. 51). Where the left brain is "sequential, logical, and analytical," the right brain is "nonlinear, intuitive, and holistic." He notes that while the "defining skills of the previous era are necessary," they are "no longer sufficient." Instead he argues, the "right brain qualities of inventiveness, empathy, joyfulness, and meaning increasingly will determine who flourishes and who flounders" (Pink, 2005, p. 3).

The Changing Workplace

Pink's findings concur with those of other experts and researchers who have studied the changing workplace and the skills that will be needed for continued work success. The enGauge 21st Century Skills notes in its report on *Literacy in the Digital Age* that "experts at the U.S. Department of Labor... assert, ‘The influence of technology will go beyond new equipment and faster communication, as work and skills will be redefined and reorganized' " (enGauge, 2003, p. 8). The enGauge report asserts that "rapid change and increased competition require that workers use their ‘soft skills' to adapt quickly to changing technologies and organizational structures" (enGauge, 2003, p. 8).

According to this study "As society changes, the skills needed to negotiate the complexities of life also change. In the early 1900s, a person who had acquired simple reading, writing, and calculating skills was considered literate. Only in recent years has the public education system expected all students to build on those basics, developing a broad range of literacies. To achieve success in the 21st century, students also need to attain proficiency in science, technology, and culture, as well as gain a thorough understanding of information in all its forms" (enGauge, 2003, p.15).

The workplace and employer expectations have changed over time. "For businesses, it's no longer enough to create a product that's reasonably priced and adequately functional. It must also be beautiful, unique, and meaningful...," writes Pink [Pink, p. 35]. In addition many jobs are being outsourced. "White collar work of all sorts is migrating to other parts of the world," Pink notes [p. 38]. "The main reason is money." Workers in other parts of the world can do what American workers can do--only for less money. Automation is also changing the workplace as we know it: Computers are now doing tasks better, faster, and cheaper [Pink, 2005].

"The future belongs to a very different kind of person with a very different type of mind," warns Pink [p.1]. Workers will need to build on the skills of the 20th Century by mastering a new and different set of skills in the 21st Century. "We must perform work that overseas knowledge-workers can't do cheaper, that computers can't do faster, and that satisfies the aesthetic, emotional, and spiritual demands of a prosperous time," writes Pink [p. 61]. For example, "engineers and

programmers will have to master different aptitudes, relying more on creativity than competence, more on tacit knowledge than technical manuals, and more on fashioning the big picture than sweating out the details," Pink writes. [p. 44-45].

In their book *The new division of labor: How computers are creating the next job market*, Frank Levy and Richard Murnane argue that two categories of skills will be more valued: "expert thinking--solving new problems for which there are no routine answers" and "complex communication--persuading, explaining, and in other ways conveying a particular interpretation of information" [Pink, 333].

Schools must prepare students for a different workplace--one that values innovation, imagination, creativity, communication, and emotional intelligence [Pink, 233].

The 21st Century Workplace Skills

The enGauge report identified four skill clusters as essential to success in the 21st Century workplace. These 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. In addition, data was gathered from educators at state-level conference sessions in 10 states, surveys, and focus groups Chicago and Washington, D.C." (enGauge, 2003, p. 13).

The four skill clusters are:

- **Digital-age literacy**, which includes the various competencies expected in a 21st century workplace.
- **Inventive thinking**, which includes the ability to think outside the box.
- **Effective communication**, which is the ability to clearly communicate with a wide range of audiences.
- **High productivity**, which will be a requirement of success in the 21st Century workplace.

Mastering the Skills

Within these skill clusters are a subset of skills and competencies that workers will be expected to have mastered. EnGauge further defines the subset of skills for each skill as follows:

Digital-age literacy encompasses:

- **Basic literacy:** This is defined as the ability to read, write, listen and speak as well as to compute numbers and solve problems.
- **Scientific literacy:** This is defined as a general knowledge and understanding of scientific concepts and processes.

- **Economic literacy:** This includes an understanding of basic economic concepts, personal finance, the roles of small and large businesses, and how economic issues affect them as consumers and citizens.

- **Technological literacy:** This includes an understanding about technology and how it can be used to achieve a specific purpose or goal.

- **Visual literacy:** This includes good visualization skills and the ability to understand, use, and create images and video using both conventional and new media.

- **Information literacy:** This includes the ability to find, access, and use information as well as the ability to evaluate the credibility of the information.

- **Cultural literacy:** This includes the ability to value diversity, to exhibit sensitivity to cultural issues, and to interact and communicate with diverse cultural groups.

- **Global awareness:** This is an understanding of how nations, individuals, groups, and economies are interconnected and how they relate to each other.

Inventive thinking will be prized in the 21st Century and a successful individual needs to develop and cultivate these essential life skills: (enGauge, 2003, p. 35)

- **Adaptability and managing complexity:** This is the ability to recognize and understand that change is a constant, and to deal with change positively by "modifying one's thinking, attitude or behavior" to accommodate and handle this new environment.

- **Self-direction:** This is the ability to work independently, whether developing goals or plans, managing one's time and work, or evaluating one's knowledge or learning process.

- **Curiosity:** This is the desire to learn more about something and is an essential component of lifelong learning.

- **Creativity:** This is the means of producing something new or original that is either personally or culturally significant

- **Risk taking:** This is a willingness to think about a problem or challenge, to share that thinking with others, and to listen to feedback. It is a willingness to go beyond a safety zone, to make mistakes, to creatively tackle challenges or problems with the ultimate goal of enhancing personal accomplishment and growth.

- **Higher-order thinking and sound reasoning:** The higher-level thinking processes include the ability to analyze, compare, infer, interpret, evaluate, and synthesize. Sound reasoning applies common sense and acquired knowledge and skills to ensure good problem solving and decision making.

Effective communication is the ability to communicate with both individuals and groups in a positive manner. Effective communication involves: (enGauge, 2003, p. 47)

- **Teaming and collaboration:** Teaming is a situation in which individuals share a common

goal, bring unique capabilities to the job of achieving, work in a structured environment, and exhibit trust and respect towards one another. Collaboration is the cooperative interaction between the members of the team as they work together to achieve their goal.

- **Interpersonal skills:** This is the ability to manage one's behavior, emotions, and motivations to foster positive interactions with other individuals and groups. The ability to effectively manage conflict is also an important interpersonal skill necessary for success in the 21st Century workplace. These skills are exhibited both in one-on-one situations and in emails, conference calls, and videoconferences.

- **Personal responsibility:** Personal responsibility in the 21st Century workplace requires one to understand the legal and ethical issues related to technology and to mange and use technology in a responsible manner.

- **Social and civic responsibility:** This requires that individuals use and manage technology to promote the public good and to protect society and the environment.

- **Interactive communication:** This requires that individuals learn to communicate using a wide range of media and technology. They must select the most effective method of communication for the intended audience and use it responsibly and effectively to enhance the dissemination of information.

High productivity is expected of workers in the 21st Century workforce. Individuals need to master these skills if they are to be productive. (enGauge, 2003, p.59)

- **Prioritizing, planning, and managing for results:** These organizational skills help an individual achieve the goals that have been set through efficient management of time and resources, effective problem solving, and strong leadership skills.

- **Effective use of real-world tools:** This requires that individuals master current and new technology to communicate and collaborate with others, to effectively problem solve, and to accomplish tasks. They must learn how to select the appropriate tools for the task at hand and to apply these tools efficiently and effectively to achieve results.

- **Ability to produce relevant, high-quality products:** This is the "ability to produce intellectual, informational, or material products that serve authentic purposes and occur as a result of students using real-world tools to solve or communicate about real-world problems" (enGauge, 2003, p. 59).

Conclusion

Our changing workplace requires that all 21st Century workers master the skills required in a knowledge-society as well as the new skills necessary to move beyond the Information Age into the Conceptual Age. The enGauge report identifies "three significant things that need to occur if students are to thrive in today's knowledge-based, global society. These are: (enGauge, 2003, p. 2)

- The public must acknowledge 21st century skills as essential to the education of today's learner.

- Schools must embrace new designs for learning based on emerging research about how people learn, effective uses of technology, and 21st century skills in the context of rigorous academic content.

- Policymakers must base school accountability on assessments that measure both academic achievement and 21st century skills.

As the workplace changes and evolves, so must its workers if they are to be successful.

References

NCREL and Metiri Group. (2003). "*enGauge 21st century skills: Literacy in the digital age*." Napierville, IL and Los Angeles, CA: NCREL and Metiri.

Pink, Daniel H. (2005). *A whole new mind: Moving from the Information Age to the Conceptual Age*. New York: Penguin Group.

21st Century Skills
Classroom Application

21st Century Workplace Skill	Examples of Application in Social Studies
Digital-age Literacy	
Basic, scientific, economic, and technological literacies	Use understanding of statistical techniques, sampling bias, and population parameters in simulated settings to study the effects on outcomes. Analyze these factors in published scientific or economic reports, and use knowledge of statistical techniques to evaluate the validity of the reports' findings.
Visual and informational literacy	Create an age-appropriate electronic portfolio of maps and other geographic projects, and write a reflective essay explaining how selected portfolio pieces reflect what they have learned about specific topics
Cultural literacy and global awareness	Conduct analysis using demographic data in a geographic information system to analyze voting patterns and determine redistricting guidelines
Inventive Thinking	
Adaptability/ability to manage complexity	Create a high-quality digital map product, including data that has been gathered in the local area, to submit to an agency outside the classroom (e.g., national contest, local newspaper, community member)
Self-direction	Create a culminating project that demonstrates content knowledge and conceptual understanding in at least three distinct content areas; project should demonstrate problem-solving ability and ability to draw connections between social studies content and real world settings.
Curiosity, creativity, and risk taking	Use a geographic information system to analyze information on soil, hydrology, and other factors in order to choose the best site for a sanitary landfill in an urban region, and prepare an informational video to present findings
Higher-order thinking and sound reasoning	Using the Internet and digital l braries, identify and compare alternative, sustainable economic activities in regions of significant resource depletion
Effective Communication	
Teaming, collaboration, and interpersonal skills	Create a public awareness campaign to encourage product recycling in order to reduce the amount of refuge that is deposited in the local landfill each week.
Personal, social and civic responsibility	Collect, analyze, and comply data that reflects current political candidates position on pending legislation and future agenda as a public service tool.
Interactive communication	Prepare an informative oral presentation that evaluates alternative land use proposals using various presentation tools (e.g., multimedia slide show) and incorporating spatial data and maps.
High Productivity	
Ability to prioritize, plan and manage for results	Employ more complex problem-solving methods to develop a deeper understanding of the planning and management of a construction project (within certain material & budget constraints).
Effective use of real-world tools	Formulate, approach, and solve problems beyond those studied using a variety of problem-solving tools such as graphing calculators, probes, GPS, and geometry tool software.
Ability to produce relevant, high quality products	Use data and maps prepared in a geographic information system to compare and analyze alternative land use proposals and communicate conclusions using such tools as html, advanced multimedia applications, and video technologies

21st Century Workplace Skill	Examples of Application in Language Arts
Digital-age Literacy	
Basic, scientific, economic, and technological literacies	Choose a social issue or controversy that has been a subject of protest songs. Primary sources (print, digital, or community resources), research an aspect of the issue to use as background in writing an original protest song or lyrics.
Visual and informational literacy	Create a visual representation (any media) of life combining family interviews and historical significant events.
Cultural literacy and global awareness	Analyze the portrayal of bosses in popular media (comic strips, TV comedies, dramas, movies), identifying stereotypes found and identifying the kinds of "real life" bosses that are not included.
Inventive Thinking	
Adaptability/ability to manage complexity	Create digital videos that present a persuasive argument that calls for social action or community change.
Self-direction	Create and produce a DVD or website promoting personal responsibility.
Curiosity, creativity, and risk taking	Develop a "Frequently Asked Questions" type research paper (that explains a topic thoroughly, based on l kely questions about the subject) as a webpage.
Higher-order thinking and sound reasoning	Evaluate information found on the internet to distinguish between information and propaganda, satire, or commercialism on the Internet.
Effective Communication	
Teaming, collaboration, and interpersonal skills	As a team use video cameras and editing software to create a DVD of a collaboratively written play.
Personal, social and civic responsibility	Maintain a generative self-reflective journal (either print or online) that is utilized and referenced throughout the development of a project or unit that has social and or civil implications. For example researching the legal, moral, health, and social consequences of lowering the legal drinking age to 18.
Interactive communication	Select and organize abundant materials (digital and print) according to the basic principles of information management. Read and understand the organizational efforts of others. Students can demonstrate this by creating a substantial web site of personal portfolio materials that is not only easy to navigate and read at the interface level, but also organized and understandable at the file-management level.
High Productivity	
Ability to prioritize, plan and manage for results	Participate in an online interactive debate with student panels and evaluator-experts.
Effective use of real-world tools	For a selected topic, evaluate the accuracy, relevance, appropriateness, comprehensiveness, and bias of electronic information sources.
Ability to produce relevant, high quality products	Create digital videos that present a persuasive argument that calls for social action or community change.

21st Century Workplace Skill	Examples of Application in Science
Digital-age Literacy	
Basic, scientific, economic, and technological literacies	Read and evaluate technical information about measuring instruments for the purpose of deciding which instrument is the most economic for the job.
Visual and informational literacy	Develop a graph to illustrate the optimal amount of fertilizer and pesticides for maximum crop yield from tables of experimental data.
Cultural literacy and global awareness	Investigate the impact of genetic engineering of crops on global and local food production, and populations.
Inventive Thinking	
Adaptability/ability to manage complexity	Devise a strategic plan to network all the company computers. At the last minute a division is added. You changed design to a wireless network to accommodate the additional computers.
Self-direction	Research a scientific problem by writing grants and supporting the research.
Curiosity, creativity, and risk taking	Conventional belief is that stomach ulcers are created by excess stomach acid. You observe a certain type of bacteria in all stomach ulcers and suggest that the bacterium is the cause of the stomach ulcer. Colleagues laugh at you and you lose grant support. Years later, ant biotics are standard treatment for stomach ulcers.
Higher-order thinking and sound reasoning	Cancer drugs work by killing cancer cells. You have an idea that by cutting off blood supply to the tumor, you kill the tumor. You find the chemical signal to make blood vessels grow and devise a drug to block the chemical signal.
Effective Communication	
Teaming, collaboration, and interpersonal skills	A team designs a new candy. The candy is tested by the sensory and marketing departments. The design, sensory, and marketing teams meet and recommend changes in the candy formulation.
Personal, social and civic responsibility	Test and analyze results of local water systems. Share the results of an investigation of water quality with neighboring communities in order to increase public awareness.
Interactive communication	Design an educational software site to aid in teaching specific content material. Run a beta test program with teachers. Analyze and incorporate the suggestions from the teachers into the program. Run a beta test again and make the necessary changes. Continue with the design cycle until desired results are accomplished.
High Productivity	
Ability to prioritize, plan and manage for results	Create a report for local authorities highlighting the pros and cons (E.G. economic, personal, and scientific factors) of long term storage of radioactive waste materials.
Effective use of real-world tools	Run a computer simulation and design an aircraft wing. Build a scale model and test the wing in a wind tunnel. Repeat cycle several times until the wing design uses 5% less fuel.
Ability to produce relevant, high quality products	Design a new computer operating system that runs on a wide variety of computers, adapts to new hardware easily, and boots up very quickly.

21st Century Workplace Skill	Examples of Application in Mathematics
Digital-age Literacy	
Basic, scientific, economic, and technological literacies	Research, graph and analyze school attendance and the effect it has on the school and the community.
Visual and informational literacy	Use physical and digital models to demonstrate mathematical concepts. Research, design, and create model of a safe playground for a day-care center.
Cultural literacy and global awareness	Use online bulletin boards to engage in discussions of math concepts with people (students and/or experts) from around the world; demonstrate tolerance and respect for the points of view of others.
Inventive Thinking	
Adaptability/ability to manage complexity	Provided with a salary, setup a workable budget for living independently as an adult.
Self-direction	Create a culminating project that demonstrates content knowledge and conceptual understanding in at least three distinct content areas; project should demonstrate problem-solving ability and ability to draw connections between mathematics content and real world settings.
Curiosity, creativity, and risk taking	Use graphing calculators and probes to collect and analyze environmental data (e.g., pH of streams) or contextual data (e.g., speed of cars in school zones).
Higher-order thinking and sound reasoning	Develop an audience-appropriate presentation that uses analysis, interpretation and display of data and related inferences to descr be the situation and possible solutions for the speeding cars in a school zone.
Effective Communication	
Teaming, collaboration, and interpersonal skills	After researching community needs/restrictions, design and layout the dimensions for a community multi-purpose entertainment center.
Personal, social and civic responsibility	Use estimation to determine the reasonableness of an answer and use word-processing software to explain the process. How soon will the local landfill be full based upon the property availability dimensions and the rate of refuge deposited weekly?
Interactive communication	Design a presentation to sell the multi-purpose entertainment center concept to an entrepreneur for financial packing. Include startup, construction cost compared to potential revenue generated.
High Productivity	
Ability to prioritize, plan and manage for results	Employ more complex problem-solving methods to develop a deeper understanding of mathematics, such as simulating a construction project (within certain material & budget constraints).
Effective use of real-world tools	Select and research a stock listed on the New Stock Exchange. Estimate the projected outlook and profit margin, track, document, and offer rationale for its gain or loss over a period of time.
Ability to produce relevant, high quality products	Design a cost effective efficient container to mass produce for industry according to specific requirements.