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# **ICT Literacy: Equipping Students to Succeed in an Information-Rich, Technology-Based Society**

An Issue Paper from ETS

The *ICT Literacy Assessment* is now called the *iSkills™* assessment. All references to the *ICT Literacy Assessment* in the following document apply to the *iSkills* assessment.



# **ICT Literacy Assessment**

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## Introduction

When personal computers first appeared just 30 years ago, few imagined the extent to which they would become part of our daily lives. Those who learned to operate the machines' basic functions earned hurrahs, and mastering a word processing program was the greatest success.

At the time, it was not known that these tools and the tools that would succeed them — such as the Internet and e-mail — would change the way we find, learn and communicate information. We have become increasingly reliant upon technology, and many of us now use instant messaging or e-mail to communicate with friends or colleagues down the hall or around the world. We use the Internet to conduct job searches, watch the news, learn about political candidates, plan vacations and purchase products. Some of us even engage in conversation and debate through chat rooms or blogs.

## Technology is an ever-growing part of students' lives.

To most young adults, the future will likely bring an even greater breadth of complex information and communication technologies, including those that are not yet imagined. “Students will spend their adult lives in a multi-tasking, multifaceted, technology-driven, diverse, vibrant world — and they must arrive equipped to do so.”<sup>1</sup>

In the world of higher education, virtually every aspect of scholarship has been influenced by technology. Students conduct research through the Web, drawing from academic journals, newspaper articles and speech transcripts. Some receive assignments online and e-mail completed projects to their professors. Many use spreadsheets, graph plotters, presentation programs and multimedia tools on a regular basis. The proliferation of distance education and e-learning has altered the traditional definition of “classroom.”<sup>2</sup>

Technology has brought a vast new world of information resources into our homes, classrooms and offices, and there is considerable pressure upon us to use it. We are accessing, analyzing and communicating information faster than ever before and feel compelled to keep up with the mass of ever-changing news and information perpetually collecting at our fingertips. It is clear that in today's world, having a computer is not enough — increased exposure to technology does not automatically lead to increased ability to use it. A measure of success today is how well one can evaluate, manage and communicate all forms of information within a technological environment. These are Information and Communication Technology (ICT) skills.

In its 2005 report, *Assessment of 21st Century Skills: The Current Landscape (pre-publication draft)*, the Partnership for 21st Century Skills describes the need for mastering ICT skills:

In order to provide both flexibility and security in an era characterized by constant change, 21st century students need ‘knowing how to learn’ skills that enable them to acquire new knowledge and skills, connect new information to existing knowledge, analyze, develop habits of learning, and work with others to use information. ... And as technology increasingly becomes the medium for communication and information sharing, students need to be capable of harnessing technology to perform learning skills, such as communicating effectively with presentation software or juggling personal responsibilities with a personal digital assistant ...<sup>3</sup>

## ICT literacy is crucial for economic leadership.

An individual who lacks ICT skills has fewer opportunities for personal advancement, and a society that lacks an ICT literate workforce will not compete in the global economy. Students who lack ICT skills cannot fully benefit from learning opportunities in the classroom or beyond it.<sup>4</sup> Students who are less proficient in ICT may be unable to evaluate the validity of information they find through modern search engines or draw meaning from it. They may not be able to compare information from numerous sources or communicate their findings effectively, ethically and legally. The lost opportunity to acquire these skills in college may follow them throughout their careers. Whereas it used to be the case that only certain occupations required skills in technology, the U.S. Department of Labor projects that eight of the ten fastest growing occupations in this country require “technological fluency.”<sup>5</sup>

The education ministries of several other nations — including Ireland, New Zealand, Namibia, South Africa, Uganda and Vietnam — have already recognized that ICT must be a core competency for success in a global economy. Should our schools and institutions of higher learning not address this issue, our society will weaken over time, with fewer informed voters and citizens, less productive workers and fewer lifelong learners.<sup>6</sup> “As more of our economic competitors move to foster 21st century skills development and assessment within their educational systems, the United States faces a critical challenge to keep pace in preparing our students to meet the demands of global community and tomorrow’s workforce.”<sup>7</sup> The United States could fall behind its international competitors, with consequences for all.

As Thomas Friedman writes in his book *The World is Flat*:

It is hard to have an American national strategy for dealing with flatism (a leveling of the playing field due to advances in technology and other areas, resulting in increased international competition) if people won’t even acknowledge that there is an education gap emerging and that there is an ambition gap emerging and that we are in a quiet crisis. The assumption that because America’s economy has dominated the world for more than a century, it will and must always be that way is as dangerous an illusion today as the illusion that America would always dominate in science and technology was back in 1950.<sup>8</sup>

Table 1

Components of ICT Literacy\*

| Proficiency | Definition   |
|-------------|--|
| Define      | Using ICT tools to identify and appropriately represent an information need  |
| Access      | Collecting and/or retrieving information in digital environments   |
| Manage      | Using ICT tools to apply an existing organizational or classification scheme for information   |
| Integrate   | Interpreting and representing information, such as by using ICT tools to synthesize, summarize, compare and contrast information from multiple sources         |
| Evaluate    | Judging the degree to which information satisfies the needs of the task in ICT environments, including determining authority, bias and timeliness of materials |
| Create      | Adapting, applying, designing or inventing information in ICT environments   |
| Communicate | Communicating information properly in its context (audience, media) in ICT environments  |

\*As defined on page 18 of the Educational Testing Service’s 2003 report, *Succeeding in the 21st Century: What Higher Education Must Do to Address the Gap in Information and Communication Technology Proficiencies*. It is available at [www.ets.org/ictliteracy/succeeding1.html](http://www.ets.org/ictliteracy/succeeding1.html).

## Educators helped define and create a cognitive assessment of ICT literacy skills.

Despite widespread consensus about the need for ICT literacy among college students, there is little information available to tell us the dimensions of the need or what might be done to address it. Higher education institutions are just starting to identify ICT as a core competency (as opposed to “information literacy” or “technology literacy”). A few institutions, such as California State University and Purdue University, are taking that a step further — classroom faculty and library professionals are working together to integrate technology into the curriculum and create discipline-specific assignments that require critical use of information resources.<sup>9</sup> Yet there is still a need to measure the effectiveness of these efforts and to evaluate whether students have obtained the ICT skills they need to be successful in an information-rich, technology-based society.

To address this critical need, the Educational Testing Service (ETS) in 2001 convened a multinational group of experts from education, government, nongovernmental organizations, labor and the private sector. The panel defined what it means to be ICT literate and determined that there is a dire need for an assessment of a person’s ability to think critically and communicate effectively in a technological environment. The group released *Digital Transformation: A Framework for ICT Literacy*, an analysis of what was known and not known about ICT literacy, including recommendations for research and policy.<sup>10</sup>

Building upon that work, ETS joined forces with seven leading college and university systems — which together enroll about 25 percent of the nation’s college students — to create the National Higher Education Information and Communication Technology (ICT) Initiative. Together, they identified seven areas that needed to be measured in a higher education environment (see Table 1), and what information would help faculty and administrators gauge the effectiveness of current teaching strategies and curricula, identify best practices and initiate better approaches. The seven areas are define, access, manage, integrate, evaluate, create and communicate. The charter colleges worked with ETS to conceive, design and build the first test of a person’s ability to use ICT to think critically and solve problems.

Earlier this year, ETS launched the ICT Literacy Assessment.<sup>11</sup> It is an interactive assessment that uses simulated software applications and simulations of authentic technology environments, such as an Internet-like database.<sup>12</sup> Students are asked to complete several multi-step tasks that integrate the seven proficiencies and reflect real-life situations that are likely to occur in college, at work and in their personal use of technology. One task might ask students to read three e-mails (each with an embedded link), analyze the authoritativeness of each source and compose an e-mail message summarizing their research findings. Other tasks might ask students to enter terms into a search engine to find information on the Internet, cite sources properly or answer questions about a graph they created. The scenarios effectively model how technology can be integrated across a variety of disciplines. Students are evaluated based upon their ability to effectively and efficiently perform cognitive and information management tasks in an ethical and legal way using digital technologies, communication tools and networks.<sup>13</sup>

The first test administration, which ended in April 2005, yielded aggregate scores for participating institutions. The test body varied from campus to campus — for example, some institutions tested a random sample of rising juniors while others tested students enrolled in a particular course — and institutions will use results for a number of different purposes.

Portland State University intends to use results to determine whether students who have been at PSU since their freshman year will perform better than students who transferred in. In the future, PSU may also use test results as a pre- and post-program assessment for selected university programs.<sup>14</sup>

Institutions can use the aggregated data in a variety of ways:

- Design courses to close the gap between the current state and basic proficiency
- Benchmark ICT proficiency and gauge students' need for training
- Help guide curricula innovations and evaluate curricula changes
- Provide accreditation evidence
- Provide support for institutional ICT literacy initiatives

Based upon the first administration, ETS is making several adjustments to the assessment, including reducing the test time from two hours to 75 minutes. Two levels of the revised assessment will be released in January 2006, and they will produce detailed score results for each test taker and give institutions the ability to analyze the data at an aggregate level. A Core Level test will be appropriate for students transitioning to college, and an Advanced Level test will be appropriate for rising juniors transitioning to upper-level coursework.

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The individual student results can be used in a number of ways:

- Satisfaction of an information or technology literacy requirement
- End-of-course assessment for an ICT-related course
- Placement of students into or out of course(s)
- Prerequisite for certain courses
- Identification of students at risk
- Placement of students into a distance learning program
- Determination of a student's workforce readiness

ETS's ICT Literacy Assessment is built upon the belief that people's cognitive skills — how they think, solve problems and learn — have a bigger impact on their ability to function in our technology-rich society than knowledge of any specific software package or hardware platform. Society needs citizens who not only know how to obtain information, but who can also analyze and evaluate what they learn in order to develop an informed opinion.<sup>15</sup>

Friedman writes, "One cannot stress enough the fact that in the flat world the frontiers of knowledge get pushed out farther and farther, faster and faster. Therefore, companies need the brainpower that can not only reach the new frontiers but push them still farther ... And America either needs to be training that brainpower itself or importing it from somewhere else — or ideally both — if it wants to dominate the twenty-first century the way it dominated the twentieth — and that simply is not happening."<sup>16</sup>

*This issue paper was written by **Linda Tyler**, Group Executive Director for New Product Development in the Higher Education Division at ETS. Dr. Tyler worked on many programs for the testing organization, from admissions tests to teacher licensure exams and learning products. She has a B.A. and M.A. from the University of California, Riverside, and an M.F.A. and Ph.D. in Musicology from Princeton University.*

## End Notes:

<sup>1</sup>Partnership for 21st Century Skills (2003). *Learning for the 21st Century: A Report and Mile Guide for 21st Century Skills*. Washington, DC: Partnership for 21st Century Skills, p. 4. Available at [www.21stcenturyskills.org](http://www.21stcenturyskills.org).

<sup>2</sup>Educational Testing Service (2003). *Succeeding in the 21st Century: What Higher Education Must Do to Address the Gap in Information and Communication Technology Proficiencies*, p. 5. Available at [www.ets.org/ictliteracy/succeeding1.html](http://www.ets.org/ictliteracy/succeeding1.html).

<sup>3</sup>Partnership for 21st Century Skills (2005). *The Assessment of 21st Century Skills: The Current Landscape (pre-publication draft)*. Washington, DC: Partnership for 21<sup>st</sup> Century Skills, p. 18. Available at [www.21stcenturyskills.org](http://www.21stcenturyskills.org).

<sup>4</sup>Educational Testing Service (2003). *Succeeding in the 21st Century*, p. 6.

<sup>5</sup>Ellis, C. (2001, April 3). *Innovation in education: The increasing digital world—issues of today and tomorrow*. Presentation at the National IT Workforce Convocation of the Information Technology Association of America, San Diego, California.

<sup>6</sup>Educational Testing Service (2003). *Succeeding in the 21st Century*, p. 7.

<sup>7</sup>Partnership for 21st Century Skills (2005). *The Assessment of 21st Century Skills: The Current Landscape (pre-publication draft)*, p. 37.

<sup>8</sup>Friedman, T. (2005). *The World is Flat: A Brief History of the Twenty-First Century*. New York, NY: Farrar, Straus and Giroux, p. 278 and 281.

<sup>9</sup>Educational Testing Service (2005, March 16). *Purdue University Students Take New ETS ICT Literacy Assessment* (press release). Princeton, NJ: ETS. Available at [www.ets.org/ictliteracy/news2.html](http://www.ets.org/ictliteracy/news2.html).

<sup>10</sup>International ICT Literacy Panel (2002). *Digital Transformation: A Framework for ICT Literacy*, p. 11. Available at [www.ets.org/ictliteracy/digital1.html](http://www.ets.org/ictliteracy/digital1.html).

<sup>11</sup>Additional information on the ICT Literacy Assessment from ETS is available at [www.ets.org/ictliteracy](http://www.ets.org/ictliteracy).

<sup>12</sup>Educational Testing Service (2004). *ICT Literacy Assessment: An Issue Paper from ETS*. Princeton, NJ: ETS, p. 4-5. Available at [www.ets.org/ictliteracy/whitepaper1.html](http://www.ets.org/ictliteracy/whitepaper1.html).

<sup>13</sup>Katz, I., Smith, G., Rockman, I. (2005). An Overview of the Design and Architecture for the ICT Literacy Assessment, p. 3. Presentation given at the American Library Association Annual Conference, Chicago, IL, June 26, 2005. Available at [www.ets.org/Media/Tests/ICT\\_Literacy/pdf/ALA-062605.ppt](http://www.ets.org/Media/Tests/ICT_Literacy/pdf/ALA-062605.ppt).

<sup>14</sup>Educational Testing Service (2005, March 3). *ETS ICT Literacy Assessment Premieres at Portland State University* (press release). Princeton, NJ: ETS. Available at [www.ets.org/ictliteracy/news1.html](http://www.ets.org/ictliteracy/news1.html).

<sup>15</sup>Educational Testing Service (2003). *Succeeding in the 21st Century*, p. 12.

<sup>16</sup>Friedman, T., p. 274.

For more information call **1-800-745-0269** or visit [www.ets.org/ictliteracy](http://www.ets.org/ictliteracy).

