



 News on Research, Products and Solutions for Learning and Education

innovations



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A Letter From Kurt Landgraf

Dear Colleague:

Since its founding as a nonprofit educational research and testing company in 1947, ETS has pursued one overriding mission: to advance quality and equity in education for all learners.

As we have discovered over the past 64 years, there are many ways to support teaching and learning. In this issue of *ETS Innovations*, we highlight a few of the approaches by which research and assessment are helping educators, academic institutions and policy-makers around the world expand and improve education.

Our lead story examines the intensifying interest in assessing student-learning outcomes in higher education. The goal is to ensure that students graduate not only with a degree, but with the skills and knowledge they need for the global workplace.

In a sidebar, we look at some of the new technologies being used in colleges and universities for both education and assessment, from distance learning and course-management tools to open-source curricula and research collaborations.

Technology is also improving education at the primary and secondary levels, thanks in part to computer-based testing. CBT, as it is known, is especially useful in creating opportunities for teachers to integrate formative assessment with instruction.

As Patricia Levesque, Executive Director of Florida's [Foundation for Excellence in Education](#), notes in an essay, "Assessments tell you what is working and what is not, so you can decide what to do next." Levesque shows how test results can contribute to gains in academic performance, particularly among traditionally underserved students.

She makes a great point. Students come to school with all sorts of backgrounds and experiences, but we are all headed in the same direction: toward quality and equity in education for all learners.

Regards,

Kurt M. Landgraf
President and CEO

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innovationsmailbox@ets.org



From Capacity to Quality

In Global Higher Education, the Focus Turns to Student-Learning Outcomes

After decades of working to increase the capacity of their colleges and universities, many nations are now turning their attention to quality.

Around the world, efforts are under way to strengthen, modernize and in some instances overhaul national higher education systems.

China, France, Germany, India, Korea, Saudi Arabia, Singapore and the United States are among the dozens of countries working to upgrade their postsecondary systems to meet the needs of employers, expand the economic opportunities available to their citizens, accommodate growing numbers of adult learners, and strengthen their national economies.

Underlying these initiatives is a simple goal: to make sure that students graduate not just with a degree, but with the skills and knowledge the degree is meant to represent — and that employers increasingly demand.

“This is a historic moment in higher education,” says David Payne, Vice President and Chief Operating Officer for Higher Education at Educational Testing Service.

“We have an unprecedented expansion of learner populations throughout the world; an almost universal interest among employers in educational quality; and technology infrastructures that are reshaping the delivery of higher education.”

“The end result,” Payne says, “will be vast, new opportunities for students to learn where they want, when they want and how they want.”

Mind the gap

It is no accident that quality is now at the top of the global reform agenda. Education and workforce analysts have been warning of a growing gap between what students are learning in the world’s colleges and universities, and what knowledge, skills and capabilities they need to succeed in the workplace.

A recent report by the Organisation for Economic Co-operation and Development (OECD), for example, examined vocational

education and training in Korea. It lauded the “Korean economic miracle” that in recent decades transformed an agricultural economy to a global powerhouse based on manufacturing, services and high-tech.

But it also warned of a “mismatch” between what Korea’s college graduates know upon entering the labor market, and what the labor market increasingly wants them to know.

Muted payoff

“Though a comparatively high proportion of young Koreans pursue tertiary education, the payoff in terms of higher earnings and greater employability is more muted than in other countries,” the report, *Learning for Jobs: OECD Reviews of Vocational Education and Training/Korea*, argues.

Yi Cao, of the [College of Education and Human Development](#) at the University of Minnesota, sees a similar issue in India.

“In India, more than half... of the disciplines offered in higher education institutions are nontechnical disciplines, such as arts, science and commerce,” Cao says in an analysis titled “[Skill Development and Policy Implications in East Asia and Australia](#),” published for the [Comparative & International Education Society’s Higher Education Special Interest Group](#).

“Students obtaining degrees in these fields of study often have difficulty finding appropriate employment opportunities partly due to the fact that the institutions seldom develop skills that are essential in the workforce,” she writes.

This “skills misalignment” is affecting capital as well as labor. Throughout Asia-Pacific, the shortage of skilled workers is a “major bottleneck in economic and social development,” according to the [Asian Development Bank](#). Already, some businesses have been forced to scale back expansion plans because of a lack of skilled workers.

The United States is in the same bind. It will produce 300,000 too few college graduates every year through 2018, according to projections by the [Georgetown University Center on Education and the Workforce](#).

That will put the country at a competitive disadvantage, the Center says.

Capacity with a cost

By no means is higher education now universally available. But there has been tremendous growth in access and capacity over the past half-century.

Still, capacity has come with a cost. “Broadly speaking, higher education has evolved a ‘production model’ of operation, much like a factory,” says ETS’s Payne. “An institution’s success often is measured not by whether students graduate with a mastery of the curriculum and the intellectual tools for the workforce, but by whether the school’s seats are filled at the beginning of the semester, and whether sufficient numbers of degrees are distributed at the end of the semester.”

“It is increasingly clear,” he says, “that in addition to providing access to higher education, we need to be concerned with the levels of teaching and learning that occur — or do not occur — in institutions of higher education throughout the world.”

New students, new technologies

Among the most transformative developments in higher education in recent years is the expanding demographic of the student population. Not only are there more students, but there are more adult students. Many of these older students already have careers and families, and many are interested in developing their skills and obtaining certifications rather than undergraduate degrees.

“You see this everywhere now, especially in urban environments where there are many postsecondary options,” says Gary L. Miller, Provost at [Wichita State University](#). “Students are stepping out at various points in their careers.”

“There is also a good deal of blending, where students engage in a kind of economic optimization by piecing together parts of their curriculum with courses from the university, community colleges, for-profit institutions and, in some cases, technical

colleges. As an enterprise, American higher education has not yet begun to organize the kind of interinstitutional collaborations required to leverage this behavior.”

Reshaping education

As for adult learners, Miller estimates that in Wichita, there are more than 19,000 working adults without college degrees who successfully completed a substantial portion of their college degree before they stepped out to start families and get jobs.

“This is an enormous pool of potential college graduates,” he says.

New technologies, too, are reshaping the manner in which higher education is being delivered. They include everything from distance learning and intelligent tutoring systems, to open-source collaborations and content, online video learning libraries, and video-seminars and real-time video- and web-conferencing.

But are all these students learning the things they need in order to be economically



This is an enormous pool of potential college graduates.

— Gary L. Miller
Provost, Wichita State University

viable? Employers frequently tell educators that the education community's traditional measures of learning no longer reflect a prospective employee's abilities.

Student-learning outcomes

"Undergraduate degrees have less and less bearing on whether one can do a job," says Walter MacDonald, ETS's Executive Vice President & Chief Operating Officer. "Hiring managers need confidence that applicants' skills and attributes, especially among new graduates and career changers, are a good match to their needs."

Two recent developments illustrate the trend toward determining whether students are learning and are equipped for the workplace: the [Tuning Project](#) in Europe and the [Degree Qualifications Profile](#), an initiative of the Lumina Foundation of Indianapolis, Indiana.

'The Tuning Project'

The Tuning Project aims to identify common required student-learning outcomes and competencies in various subject areas, from the primary through undergraduate levels, among countries participating in the [Bologna Process](#). A similar, more limited project — Tuning USA — is under way in the United States through the [Lumina Foundation](#).

The Lumina Foundation's Degree Qualifications Profile is designed to illustrate what students should know and be able to do after earning their degrees. It proposes specific learning outcomes that benchmark the associate, bachelor's and master's degrees regardless of a student's field of specialization.

Other efforts aim to measure outcomes and highly valued noncognitive traits.

"While employers around the world are looking for individuals with solid abilities in reading, writing and mathematics, they also feel skills such as ethics, teamwork, communication, critical thinking and problem solving are very important to success at work," says MacDonald.

ETS has developed a tool to measure six traits that are viewed as critical for graduate school and the knowledge workplace but that don't get measured by grades and test scores. The traits are knowledge and creativity; resilience; communication skills; planning and organization; teamwork; and ethics and integrity.

The tool, the [ETS® Personal Potential Index](#) (ETS® PPI), is based on extensive psychometric research. It is already being used by numerous graduate schools throughout the United States.

Taking the measure of nations

Group-score human capital assessments are also helping nations measure their populations' knowledge and compare the results against other nations'. Among the most well-known are the Trends in International Mathematics and Science Study ([TIMSS](#)), Progress in International Reading Literacy Study ([PIRLS](#)), the Programme for International Student Assessment ([PISA](#)), and the Programme for the International Assessment of Adult Competencies ([PIAAC](#)). (See [ETS Innovations Vol. 10](#), page 3.)

Nor are students the only group on whom the explosion of information imposes intellectual burdens. In the digital age, the utility and lifecycle of knowledge are becoming increasingly short.

Learning for teaching

Paek Cho, President of [Seoul Digital University](#), notes that instructors must continuously augment their own knowledge, in part to keep up with their students.

"An instructor who considers himself more knowledgeable and better informed than his students could be mistaken if he does not continuously augment his own knowledge base," he writes. "The necessity of self-improvement through constant learning gives rise to the need for lifelong education."

There are other reasons for colleges and universities to focus more energetically on student-learning outcomes: marketability



... the institution that shows it cares enough about teaching and learning to set learning goals and monitor results will have an advantage.

— Paul E. Lingenfelter, President,
State Higher Education Executive Officers

and credibility. "When students and parents are deciding whether to attend a particular college or university, often at great expense, the institution that shows it cares enough about teaching and learning to set learning goals and monitor results will have an advantage," says Paul E. Lingenfelter, President of the organization State Higher Education Executive Officers ([SHEEO](#)). SHEEO, based in Boulder, Colorado, is a national nonprofit association of the chief executive officers serving statewide coordinating boards and governing boards of postsecondary education.

"When policymakers are making decisions about public investments in higher education, a disciplined approach for assessing, learning and improving teaching will build the confidence needed to justify public investments." 🌟



For Computer-Based Testing, the Future Is Here

Once viewed as part of the far-off future, computer-based testing, or CBT, is not only attracting the interest of large school systems throughout the United States. It is already widely used — and highly regarded — for its ability to support teaching, learning, innovative assessment and administrative efficiency.

When it comes to CBT, the future is here.

“CBT creates so many wonderful opportunities for classroom teachers, who are using it for formative as well as summative assessment,” says Linette McJunkin, Assessments Services Specialist at Computerized Assessments & Learning (CAL).

“The capability of real-time, classroom-based testing with immediate results and feedback with CBT creates teaching opportunities during critical moments of student learning, such as during a lesson,” she says. “Teachers get information about students through immediate score reporting, which they can use to identify student misunderstandings and clarify on the spot.”

Crucial in K–12

Student assessment is a crucial element in K–12 education. In the United States, the requirement for periodic testing is driven by annual reporting requirements. Consequently, states are continually evaluating their testing procedures and systems, and in doing so discovering the possibilities of CBT.

CBT has numerous advantages over traditional paper-and-pencil testing. For one thing, computer-based testing is more efficient than paper-based testing given that it eliminates the need to print, handle and mail test booklets and to scan and mail answer sheets.

CBT systems, moreover, provide increased security by eliminating printed keys and booklets and by offering the capability of requiring multilevel password protection.

Pedagogically, the ease and efficiency with which teachers can include test questions and get immediate score reports and feedback make CBT especially useful for integrating formative assessment with instruction.

Meeting special needs

Computer-based testing also creates opportunities to support accommodations for students with special needs. Special accommodations can be designed to support access to test content and the ability to respond to questions. Accommodations

include text-to-speech audio support, and attention-focus and visual-accommodation tools, such as those for magnification, zoom and color contrast.

CBT permits these accommodations to be integrated into the testing system, where they are accessible to any student who needs them. It also reduces the burden on schools to provide additional staff to assist students who need accommodations during testing.

And unlike paper-based testing, CBT opens up opportunities for adaptive testing — that is, tests in which the difficulty of each question is based on the test taker's correct or incorrect response to the previous question. Adaptive testing allows for highly individualized assessment, and thus individualized teaching and learning.

New dimensions of data

“One of the other really exceptional features of computer-based testing is that it lends itself to entirely new types of items, or test questions,” says Abel León, Director of Technology at CAL. “Drag-and-drop, graphing, multiple selections, sound and video, animation — all these interactive features are now available with CBT.”

“They allow different skills and knowledge to be measured and all new dimensions of data to be gathered on student performance,” León says.

Not surprisingly given its manifold benefits for teaching, learning and assessment, CBT is attracting the attention of state-level test officials around the country. Several states have converted at least some aspects of their yearly testing measures to CBT.

Many of these states started CBT implementation by inviting schools to participate in pilot testing. Pilots usually begin by testing a limited number of subjects at selected grade levels. As their comfort grows and local capacity allows, online testing is expanded to all subjects and grades.

In Kansas in 2003, for example, 3,000 students participated in online testing. By

2006, 80 percent to 90 percent of Kansas schools were voluntarily participating in CBT. In Idaho, nearly 100 percent of the state's students take the [Idaho Standards Achievement Tests](#) online.

The [Washington Office of the Superintendent of Public Instruction](#) last year began transitioning the state's Measurements of Student Progress (MSP) testing program to CBT. About 25 percent of students in grades six through eight took the MSP on a computer in reading and math.

Superintendent of Public Instruction Randy Dorn described the system as “a quick adjustment for schools and students.” In a review of the performance of the new test-delivery system, his office called the feedback from schools and students “overwhelmingly positive.” In a survey of 89,433 students, nearly 73,000, or 82 percent, said they would choose online testing over traditional paper and pencil, Dorn's office said.

CAL, which provides Washington's computer-based testing, is at the forefront of providing advanced computerized testing capabilities in the United States. The company, which was recently acquired by ETS and operates as a wholly owned subsidiary, has also seen international interest in recent months — from Mexico, Malaysia, Canada and other countries interested in using CBT to improve their education systems.

‘Race to the Top’

In the United States, computerized testing capabilities are playing a role in the federal government's [Race to the Top](#) education-reform initiative, in which groups of states are forming consortia to measure student performance according to recently adopted common core standards.

Two recently organized consortia, the SMARTER Balanced Assessment Consortium (SBAC) and the Partnership for Assessment of Readiness for College and Careers (PARCC), are developing computerized assessment measures aligned with common core standards.

Despite growing interest in the capabilities of computerized testing systems, barriers remain. One obstacle is the limited computer infrastructure available in some schools. Schools' network and bandwidth limitations can also impede implementation of CBT, although some companies, including CAL, have developed ways to deliver uninterrupted testing regardless of school network capacity.

Standardized, speedy testing

CAL's Local Caching Software (LCS) technology supports the pre-loading of test data to a local server or workstation and eliminates the need for multiple downloads of the same data. Students' responses are also securely stored in the local workstation. This allows a standardized and speedy testing experience regardless of the local network infrastructure, even in cases in which Internet connectivity is interrupted.

“It's true that the idea of technology can sometimes outpace its development and real-world utility,” says León. “But computer-based testing has demonstrated its value — administrative, financial and, most important, pedagogical — so often, so dramatically and in so many places.”

“This is one of those rare instances in which the technology and the concept are running neck and neck.”

For more information about computer-based testing, contact CAL at info@caltesting.org, or visit www.caltesting.org. 🌟

This is one of those rare instances in which the technology and the concept are running neck and neck.

— Abel León, Director of Technology, Computerized Assessments & Learning (CAL)



By Patricia Levesque



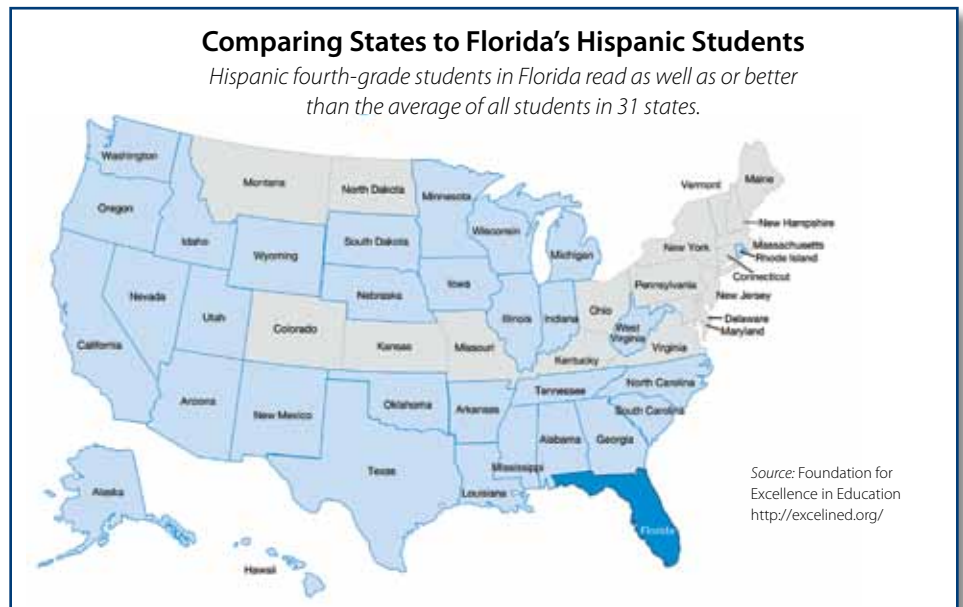
In Florida, Achievement Measurement and Academic Success

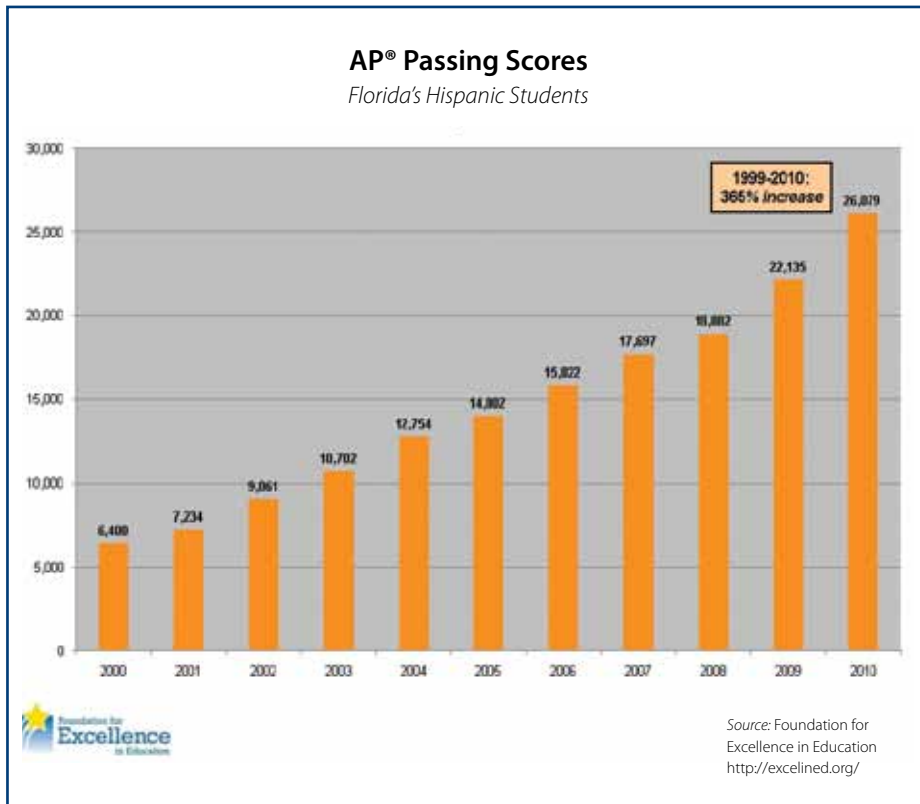
Measuring student achievement and growth is the foundation of a quality education. The fact is, you can't fix what you don't know is broken.

Assessments tell you what is working and what is not, so you can decide what to do next. In Florida, the results of our assessments also tell the story of how hope, hard

work and hard-edge reform can transform education for millions of students across our nation.

Our combination of high expectations





for students, accountability for schools and unprecedented choices create the opportunity for all students to achieve their potential for learning.

Preparing kids for college and careers starts on the first day of kindergarten, and perhaps the first good indicator of their chances for success comes in fourth grade. Reading is the foundation of lifelong learning. In the fourth grade, students transition from “learning to read” to “reading to learn.” Students who can’t read in this critical gateway year are more likely to fall further and further behind.

In 1998, nearly half of Florida’s fourth-grade students scored below the Basic level for reading, according to results from the National Assessment of Educational Progress (NAEP). These dismal statistics were not just a snapshot of the present, but also a bleak outlook for the future.

Low expectations and a lack of accountability in schools were dooming millions of children to a life of constricted opportunities. Students were not learning the basic skills for success in school and in life beyond the classroom.

That changed in 1999 when then-Gov. Jeb Bush and the Florida Legislature implemented bold reforms that included higher expectations and rigorous academic standards for students; an A-through-F grading scale for schools; incentives for teachers whose students pass Advanced Placement® courses; and more educational choices for families, including [Tax Credit Scholarships](#), [McKay Scholarships for Students with Disabilities](#) and charter schools.

These reforms have reversed a generation of decline in public education and launched a renaissance of learning in Sunshine State schools. Today’s test results provide evidence of the remarkable turnaround in education.

Minority gains

According to the same assessment tool used more than a decade ago, nearly three-quarters of fourth graders are reading above the national average. Minority students are making the greatest gains. In fact, Florida’s fourth-grade Hispanic students read as well as or better than the average of all students in 31 states and the District of Columbia.

Graduation rates are another sign of rising student achievement in the state. Since 1999, the graduation rate in Florida has increased by 21 percent, from 60 percent to 81 percent. Hispanic students have made the greatest improvement, jumping 23 percent.

Unlike most states in the nation, Florida requires students to pass an exit exam to earn a high school diploma. During the last decade, the test has become tougher, and yet according to the Florida Department of Education, more students are reaching the higher bar.

Students are also better prepared to enter college or careers after graduation. Since 2000, the number of students taking rigorous AP courses increased by 366 percent, with participation by Hispanic students growing an astounding 505 percent. The number of Hispanic students passing the end-of-course exams increased by 365 percent, which is more than 100 percent higher than the overall increase in passing rates.

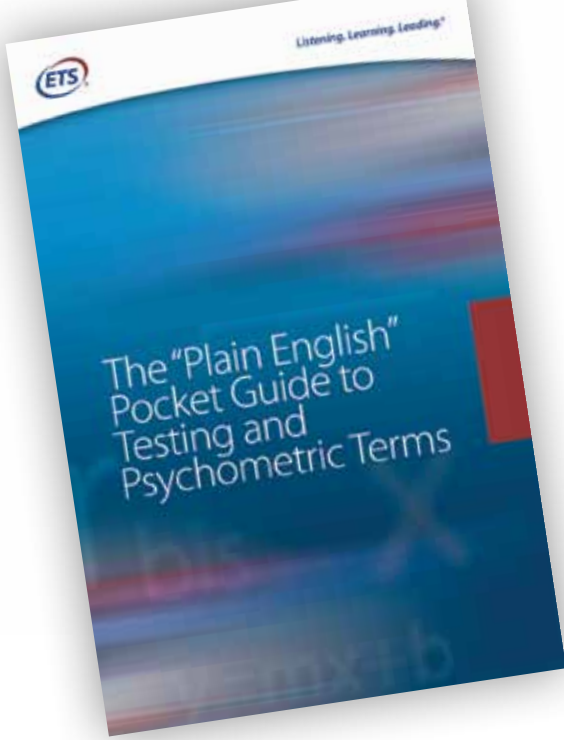
The success of Florida’s students, perhaps especially Hispanic students, also debunks all-too-common myths that plague education policy in America. The results of our assessments, we believe, are an indication that poverty, language barriers and broken homes are not excuses for failure in school. All students can learn.

A model for all states

With 2.7 million public school students, Florida has the fourth-largest student population in the country. Our public schools are “majority minority,” and about half of our students are considered low income.

If Florida can do it, every state can do it.

Patricia Levesque is the Executive Director of the [Foundation for Excellence in Education](#) of Tallahassee, Florida. The mission of the Foundation is to ignite a movement of reform, state by state, to transform education for the 21st century. ✨



takers of the same overall ability (as indicated by their performance on the full test), are any test questions significantly harder for one group than for the other?

Discrimination: Outside the testing context, this term usually means treating people differently because they are members of particular groups, e.g., male and female. In the testing context, discrimination means something quite different. It refers to the power of a test or (more often) a test question to separate high-ability test takers from low-ability test takers.

ETS Glossary Clarifies Complex Testing Concepts

“Discrimination” always refers to the practice of denying people opportunities based on their race, gender, religion or other personal characteristics — doesn’t it?

And a “standard error of measurement” must result from negligence — right? After all, “error” is synonymous with “mistake,” isn’t it? Not exactly. It turns out that, when used in the context of analyzing test results, neither “discrimination” nor “error” necessarily has the same negative meaning commonly associated with these words.

When measurement professionals use words such as these, they may be using them in ways that have dramatically different meanings.

Other terminology in the assessment lexicon, such as *criterion referencing* or *confidence interval*, may prove vexing not because their measurement use differs from their common use, but rather because they simply aren’t common. Important as they may be for understanding tests, such words may be technical and specialized, and therefore rarely encountered outside of testing contexts.

A rose is not always a rose

For these reasons, ETS recently released a glossary of testing terminology, known in its printed form as *The “Plain English” Pocket Guide to Testing and Psychometric Terms*. The online version includes hyperlinks that cross-reference related terminology where appropriate.

“As part of its nonprofit mission, ETS communicates with diverse audiences on subjects related to educational and psychological measurement,” says Ida Lawrence, Senior Vice President of ETS’s Research & Development Division.

Plain language

“We created this glossary as a way of helping the public to understand some of the often-complex terminology used in testing,” Lawrence says.

The glossary was originally developed at the request of Gerben van Lent, Executive Director for Business Development in the wholly owned ETS Global BV subsidiary. In an effort to create brief, clear definitions that would help van Lent and other ETS business representatives in their communications with clients and test takers, Samuel A. Livingston,


an ETS Principal Psychometrician, drafted the definitions for the first edition of the glossary.

In 2010, the glossary evolved from a useful, internal document printed on white paper to its current form as a user-friendly web resource and convenient pocket guide.

Incidentally, an assessment “psychometrician” is a scientist who specializes in measuring an individual’s psychological attributes, including knowledge, skills and abilities.

In addition to *discrimination*, *standard error of measurement*, *criterion referencing* and *confidence interval*, other terms among the 59 defined in the glossary cover topics related to areas such as:

- psychometric theories and phenomena, such as *true score*, *item response theory* and *differential item functioning*
- score reporting terminology, such as *grade-equivalent score*, *percentile score*, and *scaling score*
- test concepts, such as *validity* and *reliability*

Find the definitions for these and other testing and psychometric terms online at http://www.ets.org/understanding_testing/glossary/. 



In Higher Education, Technology Recreates the Logistics of Learning

If the word “college” conjures images of cavernous lecture halls, overstuffed notebooks, and the endless struggle to get to early class on time, then you may need to refresh your mental images of college.

Higher education is changing. In fact, though students’ lives may be getting more complicated, the logistics of learning are getting simpler.

“Higher education is becoming as much about the modes of delivery as about course content,” says David Payne, Vice President and Chief Operating Officer of the Higher Education Division at Educational Testing Service. “Students no longer need to be in the lecture hall or even on a physical campus to participate in higher education. In many cases, they just need a good Internet connection.”

That’s a good thing, Payne says, because tech-savvy students have less patience for traditional classroom learning. And the growing number of adult learners, many of whom already have careers and families, don’t have the time for commuting to and from classes and long hours in the university library.

New pathways

Distance learning is already ubiquitous. And newer technologies offer the promise of

greater convenience and broader access to higher education.

Learners around the world, for example, have access to expanding amounts of course material, including curricula and lectures, through open-source collaborations, such as MIT’s [OpenCourseWare](#) project, [Carnegie Mellon’s Open Learning Initiative](#) and [India’s National Programme on Technology Enhanced Learning](#).

Intelligent tutoring systems, too, enable students to learn at times, places and paces of their choosing. Among the most well-known is [Carnegie Learning on the Web](#), which publishes research-based math curricula and provides differentiated instruction for middle school, high school and postsecondary students.

Online video-learning libraries, too, are expanding. The [Khan Academy](#) is a free online library of some 2,000 video lessons posted on YouTube® covering subjects in math, science and the humanities, along with exercises that allow students to practice and assess their knowledge at their own pace.

Online collaborations

Educators and researchers are also collaborating online to improve education.

The [Sakai Collaboration](#), a four-million-member online community, develops software to support teaching, learning and research. Members create software tools, share best practices and pool knowledge and resources. Course-management tools, meanwhile, can relieve instructors of some of the administrative toil of academia, freeing them up for academic work.

“With English as the common language of education, content can be shared around the globe more easily via the new technologies and platforms,” says Payne. “There is even work being done to develop automated real-time translators to further minimize language as a barrier.”

Just as new and emerging platforms expand students’ learning opportunities, they’re creating possibilities for institutions of higher education.

“Traditional and nontraditional institutions of higher education that move rapidly and creatively will find opportunities to provide the access that meets the needs of this new generation of e-learners and equip them for the knowledge economy,” says Luis Tavel, National Director of Latino Affairs and Workforce Solutions for the [University of Phoenix](#). 🌟



Traditional and nontraditional institutions ... that move rapidly and creatively will find opportunities to ... meet the needs of this new generation of e-learners ...

— Luis Tavel, National Director for the University of Phoenix



ETS Innovations brings you news, insight and information on educational assessment in the United States and around the world, from research and test design, administration, scoring and reporting, to test use in and out of the classroom.



ETS Reports and Publications



ETS Policy Notes: The Family: America's Smallest School – The challenge of helping families prepare their children for school success was the subject of "The Family: America's Smallest School," the 14th in ETS's series of "Addressing Achievement Gaps" symposia.



Access/Acceso: Rising to the Challenge of Improving Higher Education Opportunities for Latinos – In the 2010 Tomás Rivera lecture, California chancellors Charles B. Reed and Jack Scott address higher education issues ranging from access and recruitment to retention and graduation of underrepresented students.



ETS Policy Notes: The Fourth-Grade Reading Classroom – This issue of ETS Policy Notes provides a view of the nation's fourth-grade reading classroom and its teachers.

These and other ETS publications are available online at <http://www.ets.org/research>.