

The Principles and Logic of Competency Tests: Lessons From One Approach

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Themes

- The New Limits of Education Policy: Implications for Assessment
- Postsecondary education as a common pool problem (CPP) equals a greater need for evidence-based decision making
- Lessons Learned From Application of the Collegiate Learning Assessment

The Thesis: The New Place of Education Policy and Research

- If human capital, the stock of knowledge, skills, and experience is the principal national resource and education the formal venue to preserve and develop it, education policy should be recognized as critical to the success of all other policy areas of concern to the State such as health, the economy, energy, and national security.

However, There Is A Disconnect

- Existing priorities of the State have not caught up with this new reality. In the U.S. and many other countries,
 - Education not a high priority at national level
 - Education research budget low compared to other key policy areas
 - Education policy and research is an academic field of marginal status in colleges and universities

The Concept of the Common Pool Problem (CPP)

- CPP's arise whenever a group of people depend on a public good that everyone uses but no one owns and where one person's use affects another person's ability to use the good, and either the citizens fail to provide the resources, over consume, and/or fail to replenish it.
- If the CPP becomes a permanent crisis, it can become a tragedy of the commons.

Nature of the U. S. Undergraduate Education CPP

- Massive access deficits, low graduation rates and quality issues combine with rising costs and declining revenues
 - 47 million high school dropouts
 - 57 percent graduation rates within 6 years
 - 40 percent of entering college students require remediation
 - Surveys and recent studies identify lower than acceptable quality of student learning

The Coming Test for Institutional Redesign

- The CPP in postsecondary education exists when human capital is viewed as the key national resource.
- Institutional redesign with a commitment to improve access and quality while lowering costs will be the focus.
- National debate on CPP in U.S. is likely in the next few years. More evidence-based decision-making will be needed.

Assessment Needed To Anchor Evidence-Based Decisions

- For the improvement of teaching and learning
- To provide a metric against which to evaluate ideas for improvement in productivity
- To evaluate accountability systems
- To provide students information about their level of performance they can use for employers and other purposes

The Faculty Are the Key to the Success of Assessments

- Assessments must be reliable and valid to make informed decisions but the critical question should be do the faculty find the assessment of direct utility to their teaching and learning goals?
- The focus, then. should be on assessments that tell faculty whether and how much their students are improving.

One Competency Test: The Collegiate Learning Assessment (CLA)

- Measures critical thinking, analytic reasoning, problem solving, and writing mechanics and writing persuasiveness skills
- Focuses on the institution not the student asking two questions,
 - How much value added growth in these skills occurs from the point students enter the institution to when they graduate, controlling for students' competencies when they enroll in college?
 - How much difference in value added growth or absolute proficiency levels achieved are there in similarly situated colleges?

CLA Tasks

Performance tasks (90 minutes)

- Present realistic problems drawn from the arts and sciences and engineering, complete with document library
- Requires students to apply what they have learned to new situations and make recommendations
- Relevant scholars agree that graduating college students should be able to perform these tasks.
- No “right” or “wrong” answer, it’s the quality of the response that matters
- Students find the tasks engaging---they exercise critical thinking skills while performing the tasks

CLA Tasks

Analytic writing tasks (45 and 30 minutes)

- Measure ability to articulate complex ideas, examine claims and evidence, support ideas with relevant reasons and examples, sustain a coherent discussion, and use standard written English.
 - Make-an-Argument (45 minutes): support or reject a position on some issue
 - Critique-an-Argument (30 minutes): evaluate the validity of an argument made by someone else.

Swiftaire 235

- You advise the president of DynaTech
- DynaTech makes airplane navigation and communication equipment
- DynaTech's sales manager suggests buying a Swiftaire 235 to visit customers and demo its products
- Recent accident – wing came off in flight
- Student's tasks
 - Review document library
 - Write memo discussing pros and cons of DynaTech getting a Swiftaire 235
 - Justify your recommendations

Document Library

- Newspaper article about recent accident
- Transcript of interview about accidents
- DynaTech email exchanges regarding reasons to buy a Swiftaire 235
- Trade magazine article that compares Swiftaire 235's performance and safety characteristics to similar planes
- Manufacturer specifications and required pilot training for Swiftaire 180 and 235
- Charts about airplane accidents/sales

The Benefits of Performance Assessment (PA)

- Multiple choice tests require recognition of proper response
- Performance tests requires active formulation of a cogent response
- Multiple choice tests require recognition of a painting while performance tests requires the student to paint.

PA as Part of Education Reform

- A shift from the lecture format to a student-centered approach to learning
- A change in emphasis from a focus on content in curriculum and textbooks to problem based materials that ask students to apply what they know to new situations
- A change from multiple choice to open-ended essay assessment
- PA employs open-ended essays

Large Scale PA Program Enabled by New Technology

- Administration, scoring, analysis, and reporting of results now accomplished on Internet-based platform
- Even complex 90 performance tasks now machine scored.
- The Internet and Machine Scoring Permit Significant Advances in assessment

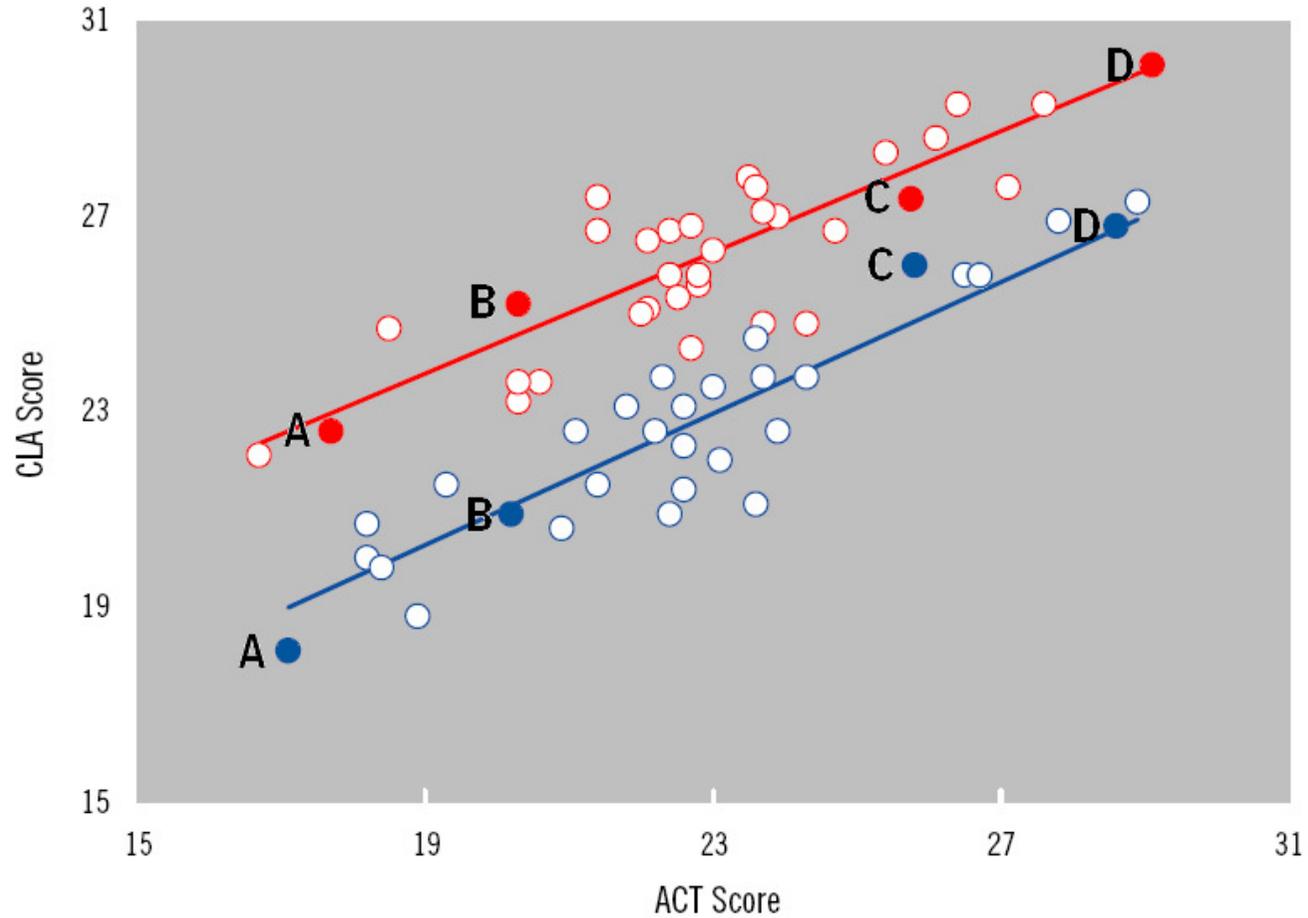
Standardized Tests Needed

- They are essential to the interpretation of formative assessments within individual colleges.
- If 35% of the students in a college report reading a book during the past two weeks not assigned by their professors, is this percentage good, bad, or indifferent?

The Case for International Comparisons

- Leaders everywhere increasingly recognize that human capital is their country's principal resource and that education is the way to preserve and enhance it.
- Assessments that permit international comparisons of student learning outcomes can provide information essential to the improvement of postsecondary education.

Freshman To Senior Value Added Comparisons



PA Needs to be Aligned With Teaching and Learning

- CLA Education Program: teach, learn, assess
 - Offers performance task academies to help faculty learn 1) how to develop their own tasks and 2) how to teach the types of complex problem solving skills employed in the CLA performance tasks
 - 50 academies held so far with over 2,000 faculty/ many more planned
 - Open Education Resource (OER) being explored to place performance tasks/model courses on Internet platforms for faculty to access. Goal is to create virtual community for improvement of teaching and learning.

Sample Courses Developed At Colleges

- Performance is Reality---Developing a Performance Task (PT) in Legal Studies
- Using CLA in the Classroom: Performance Tasks for Assessment in a Quantitative Reasoning Course
- A Cognitive Psychology PT: A Referendum on Cell Phone Use While Driving
- A CLA-based biology course: development of a protocol for breast cancer treatment

New Protocol: An Individual, Student-Based CLA Test

- A reliable and valid individual-based protocol would provide students, faculty, and administrators with information about individual students' strengths and weaknesses when they enter college.
- Graduating students to receive a certified report of results which they could choose to use for job applications and other purposes.

Benefits

- For colleges the costs of testing shift to the student. This means the college would have greater incentive to recommend larger numbers of students to test with the new protocol which would give the school more information about its teaching and learning. The institution could still compute its value added scores.

Principles

- Since it is impossible to measure all of what is important in education, it is impossible to measure anything that is important.
- Comment: this logical fallacy has provided a convenient excuse to not measure any student learning outcomes systematically.

Content Not Only Focus In Education

Theories of learning have shifted from simply being able to recall information to being able to find and use information (Herbert Simon 1996)

The size of knowledge means the goal is conceived as helping students develop the intellectual tools and learning strategies needed to acquire the knowledge to think productively (Bransford et al. 2000)

One Size Fits All Tests Are Inappropriate

- Yes, postsecondary institutions are far too complex to be reduced to single standardized tests. Institution-based tests should be set in the context of multiple indicators developed within the institution itself.

Do Not Rank Countries or Colleges

- Peer review principles used successfully in research appropriate for use of assessment of student learning outcomes.
- Accountability systems should be based on these same principles.

Performance Assessment Issues to Consider

- Reliability and validity of measures of new individual protocol
- Motivation
- Interaction with academic majors
- What best practices/resources/ curriculum and pedagogy are associated with colleges of above expected value added?

Performance Assessment Issues (Continued)

- Extension of the performance assessment paradigm to academic majors
- Extension of performance assessment to high school, middle school and the private sector
- Methodological challenges in international comparisons
- Test security issues

Education Policy Is Central

- It's the quality of human capital, that determines the success of the economy, health care, and, yes, even national security.
- Evidence-based reasoning---assessment, cognitive science and the new opportunities offered by education technology are needed to improve it.
- Carnegie-Mellon's OEI is a good model.

Proposal

- Major research programs needed for collaboration between experts in pedagogy, cognitive science, measurement specialists, and education technology who now have much to contribute to our understanding about how people learn. Faculty from disciplines must be key players in this program as well.

Statistical Matters

- Matrix sampling yields correlations of .80 and above between performance tasks
- Recent test validity study shows CLA, Academic Profile, and College Assessment of Academic Progress tests correlated at .80 plus at institution level
- SAT and CLA, together, predict freshmen GPA better than either does alone