

Educational Assessment: Challenges and Opportunities

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Curriculum Vitae

S1, Mathematics, ITB, Indonesia

S2 and S3, Educational Measurement and
Statistics, University of Iowa, USA

± 5 years at Puspendik, Balitbang,
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± 16 years at ACT, Inc., USA

Indonesian Education Quality



“...Indonesian students are performing some **three years behind** the OECD average. Over 50% of Indonesian **fifteen years** old do not master **basic** skills in **reading or mathematics.**” (OECD/Asian Development Bank (2015), *Education in Indonesia: Rising to the Challenge*, page 19) <http://factsmaps.com/pisa->

CWUR World University Rankings 2018-2019

<https://cwur.org/2018-19.php>

World Rank	Institution	Location	National Rank	Quality of Education	Alumni Employment	Quality of Faculty	Research Output	Quality Publications	Influence	Citations	Score
1	Harvard University	USA	1	2	1	1	1	1	1	1	100
2	Stanford University	USA	2	10	3	2	10	4	3	2	96.7
3	Massachusetts Institute of Technology	USA	3	3	11	3	30	15	2	6	95.1
4	University of Cambridge	United Kingdom	1	5	19	6	12	8	6	19	94.0
5	University of Oxford	United Kingdom	2	9	25	10	9	5	7	4	93.2
6	University of California, Berkeley	USA	4	7	52	5	18	12	4	8	92.5
7	Princeton University	USA	5	4	15	4	146	99	28	27	91.9
8	Columbia University	USA	6	16	13	8	20	14	10	10	91.4
9	California Institute of Technology	USA	7	1	200	7	127	81	13	31	91.0
10	University of Chicago	USA	8	13	22	9	39	22	18	10	90.6

What is Assessment ?

Educational **assessment** is the systematic process of documenting and using **empirical data** on the **cognitive abilities**, attitudes, and beliefs to refine **programs** and **improve student learning**

Three interrelated general cognitive abilities:
verbal, **quantitative**, and **analytical** (Gardner,
1986; Guilford, 1967).

The diagram consists of three colored arrows: a red arrow pointing from 'verbal' to 'reading, writing', a blue arrow pointing from 'quantitative' to 'mathematics', and a purple arrow pointing from 'analytical' to 'science'.

“....these three abilities have been found to be
useful in a variety of settings and professions.”
(Haladyna, 2004; p. 7)

Measured through: **reading, writing,**

mathematics, science

EDUCATIONAL MEASUREMENT IN THE 21ST CENTURY

*“..in the 21st century using an analogy from engineering, we envision a modern testing program as **an integrated system of systems**. Thus, there is **an item generation system, an item pretesting system, and examinee registration system, and so forth...**” (Drasgow, Luecht, and Bennett (2006), “Technology and Testing” in the 4th Edition, p. 471).*

EDUCATIONAL MEASUREMENT IN THE 21ST CENTURY

Some problems associated with traditional testing:

- Time-consuming
- Labor-intensive
- Expensive

Two examples of innovations in testing

1. Automatic Item Generation

Cognitive and psychometric theories are used to produce items generated using computer technology₈

EDUCATIONAL MEASUREMENT IN THE 21ST CENTURY

First: test development specialists create item models

Second: these item model elements are manipulated to generate new items with the aid of computer-based algorithms.

ACT, Inc. has been developing a software is called **IGOR** (Item **G**enerat**OR**) [80234-136975-2-PB.pdf](#)

A simple example for *Grade 6 mathematics with two integer elements*

Ann has paid \$1525 for planting her lawn. The cost of lawn is \$45/m². Given the shape of her lawn is square, what is the side length of Ann's lawn?

- A. 5.8
- B. 6.8
- C. 4.8
- D. 7.3

2. Automated essay scoring (AES)

It is an application of **natural language processing**

ACT, Inc. has been developing a constructed response automated scoring engine, called CRASE[®] [Automated Essay Evaluation.pdf](#)

Has been used in large-scale formative and summative assessment programs since 2007 by several state departments of education, a U.S. Department of Education, and private-funded assessment grants.

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