



## What's the difference? A model for measuring the value added by higher education

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## Finding out what happens is hard

- Qualifying links between post-school education and individual and social prosperity is difficult – understanding learning processes and outcomes is complex
- But measuring learning is (increasingly) vital for demonstrating the 'quality' and 'value' of university education
- Managed well, data from routine student assessment can play a formative role in stimulating and guiding learning
- **But:** Data from routine assessment is not always appropriate, and institutions need a means of assuring the quality of the data and processes

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## Four approaches; a possible model

1. How might objective measures of student learning be used by institutions to assess the quality of and 'value added' by their educational provision?
  2. How might such approaches be used to assure the quality of the routine assessments that are undertaken in regular subjects and hence manage risk associated with provision?
- Comparing expected against actual estimates of performance
  - Comparing first- and later-year assessments
  - Assessing students' engagement in effective education practices
  - Capturing feedback from graduate employers
- 'Evidence-based' and 'outcomes-focused' approaches
  - New data *from* and *about* students collected *by, for* and *with* universities – filling gaps in a possible 'academic standards' indicator framework
- A robust and potentially scalable methodology for monitoring educational quality...?

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## Evidence for managing quality and leading change: LQI

	Outcomes	Processes	Inputs
Learner	Learning outcomes	Learning processes	Student capability
Teacher	(1.II) The quality of instructional delivery	Teaching processes	(3.II) Student learning conditions and teacher working conditions
Institution	(1.III) The output of educational institutions and institutional performance	Institution supports	Reputations
Context	(1.IV) The overall performance of the education system	(2.IV) System-wide institutional settings, resource allocations, and policies	(3.IV) The national educational, social, economic, and demographic contexts

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## 'Value added' (?)

- A popular technical term (cf: 'mixed co-efficients multinomial logit model', 'polytomous', 'purposive')
- Measures of 'improvement' or 'value added' are the most powerful indicators of educational performance
- Models for calculating value added have been tested and used extensively in studies of educational effectiveness
- Analyses of 'value added' require robust baseline data to estimate the *net effects* of an educational transformation
- Can look at individuals (more reliable) and/or cohorts (more efficient)
- Combine estimates of absolute outcomes, raw gains, and 'residual change'

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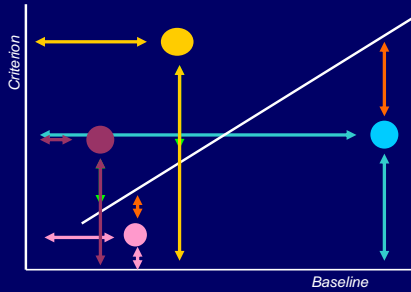
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## Outcomes, raw gains and residual gains




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## Comparing expected against actual performance

- Australian Government pilot program in 2008: Student Aptitude Test for Tertiary Admission (SATTA)
- Evaluation of the uniTEST and STAT instruments with four universities in 2008
- The extent to which uniTEST and STAT correlate both with alternative concurrent measures used for university entrance and with performance in the first year of study
- What value do uniTEST and STAT add to current approaches? Do the assessments help predict performance in the first year of study?

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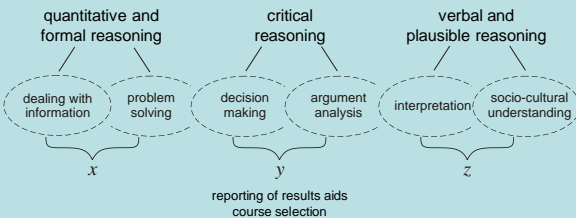
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Baseline: **uniTEST**



science and mathematics

arts, humanities and social sciences

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## Criterion measure: routine assessments?

- While there are pockets of excellence, developing robust measures of knowledge and skill remains a major challenge for higher education
- There have been enormous advances in assessment over the last hundred years, but key aspects of methodology have yet to be applied to higher education
- Universities and academics are responsible for monitoring and assuring academic standards, and it is critical that continuous efforts are made to enhance the standard of assessment itself
- Could deploy psychometrically validated exams or common items in existing exams

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## Criterion measures: follow-up objective assessment?

- Run a psychometrically linked assessment as a follow-up to the input measure and make comparisons across key domains
- Might use 'rotated instruments' to ensure coverage in core areas as well as tap reasoning in broad disciplinary areas
- A methodologically rigorous approach, but:
  - How to capture the complexity of university learning?
  - How to generate change within the 'classroom'? How to make this practical?
  - What does this mean for routine assessment practices and outcomes?

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## Comparing first- and later-year assessments

- Review the quality of university education by comparing assessments of first- and later-year students' performance and potential
- Possible to compare first- and third-year GPAs – but there are problems with routine assessment data *and* there is a circularity in assuring the quality of assessment processes using the data that they provide
  - Make comparisons between two psychometrically validated and linked assessments
  - Methodology seeded during development of the Graduate Skills Assessment (that assesses written communication, critical thinking, problem solving and interpersonal understandings)

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## Options for measurement

- Can tailor to specific disciplinary contexts or institutional missions...
- Might measure a 'common core' constructs (like the GSA), and then constructs of relevance to the sciences and/or the social science/humanities
- ACER has developed the Work Readiness Assessment Package (WRAP) to measure students' work-, career- and future-readiness
- Objective tests can be deployed online or in paper, and requires the application of complex sampling methodology

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## Assessment focus: 'core plus disciplinary modules'

- Science module
  - Scientific
  - Quantitative
  - Lower verbal
- Common core
  - General logico-deductive and interpretive reasoning skills
  - General writing skills
  - General issues and public knowledge
  - Neither high nor low verbal
- Humanities and Social Science module
  - Socio-cultural
  - Interpretive
  - Higher verbal

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## Assessment focus: 'work-, career- and future-readiness'

- Work Readiness
  - Numeracy
  - Reading
  - Writing
  - Job readiness
- Career Readiness
  - Job Searching
  - Workplace Reasoning
  - Career Management
- Future Readiness
  - Lifelong Learning
  - Adaptability
  - Resilience
  - Leadership
  - Community Engagement
  - Goals and Ambitions

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## 'Student engagement' – the idea

- Two premises:
  1. Individuals learn through behavioral, cognitive and affective involvement with key educational practices
  2. People learn when staff and institutions provide supports likely to encourage involvement
- A student-centred perspective that reflects the wide range of academic and non-academic interactions that students have with university
- Measures of engagement provide: 'an index of whether students are engaging with university study in ways likely to generate high-quality learning'
- Student engagement is not, or not just: 'student experience', 'satisfaction/happiness', 'opinion', 'retention', 'evaluation', 'outcomes'...



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## The AUSSE – overview

- 25 Australasian universities in 2007 and around 30 in 2008
- Evidence-based perspectives on university education (moving beyond 'happiness/agreement')
- Cross-institutional and cross-national comparisons: Australia, New Zealand, Canada, USA, (Japan, China, UK...?)
- Research-based process and outcome-proxy indicators that offer evidence for guiding change
- New institutional research methodologies (probabilistic sampling, post-stratification weighting, validated and rotated instruments, standard materials...)
- Conversations about 'engagement' based on independent 'living data' collected by, for and with universities

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## The AUSSE – significance

- Provides data on students'
  - involvement with key learning processes
  - perceptions of institutional supports
  - proxy learning and development outcomes
  - intrinsic involvement with study
- Provides real-time data for:
  - managing resources and educational services
  - quality assurance and enhancement
  - cross-institutional/-national benchmarking
  - understanding student markets and segments

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## Employer satisfaction

- Surprisingly little data is collected from graduate employers – stakeholders with valuable insights into 'contextualised' graduate capability
- Employer Questionnaire (EQ) developed in 2007 for sector-wide deployment to 4,500 providers in Australia's training sector
- Measures trainer quality, overall satisfaction and the effectiveness of assessment, training relevance and competency development, training resources and the effectiveness of support
- A possible deployment in higher education – registering change over time at cohort level, and triangulating data from other assessments

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## Key characteristics of a scalable model

- Work from the PISA model – rigorously developed and tested, and key aspects are transferable
- Develop an assessment/indicators framework
- Assess generic and discipline-specific information from a range of sources (students, staff, employers) using validated instruments (possibly incorporating routine assessment data)
- Deploy a robust and well-tested sampling design
- Deploy robust psychometric scaling and equation procedures
- Appropriately specified regression modelling to explain variation in the data
- Well-designed reporting for institutions, teachers, students, and external audiences

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## Possible analyses...?

- Determine and enhance the extent to which baseline measures are capable of predicting future performance
- Use baseline and follow-up data to scale the grade distributions of routine tasks
- Use data to manage grading and statistical moderation processes
- Calibrate the demand of assessment tasks
- Compare baseline against criterion to assess the 'value added' by university study – group performance that is above/below expectation
- Produce complementary estimates of student capability and potential
- Triangulate between assessment, staff, employer and engagement/process information

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## Prospects for change

- Four new evidence-based approaches to quality assurance in higher education
- Moves beyond prevailing metrics that concentrate on throughput and student satisfaction with the quality of provision
- Change forces:
  - increasing emphasis on evidence-based and outcomes-focused approaches in formal quality assurance activities (cf school education)
  - overarching need for objective evidence on the quality of institutional provision and on student outcomes
  - need for greater diversification in the data that is collected by institutions for quality assurance purposes (same data for all?)
- Universities must take the lead

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