


HSRC RESEARCH OUTPUTS

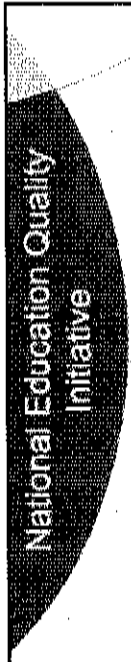

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Large scale assessment of Mathematics achievement: Challenges for improving learning in South African schools

Paper presented at the Large Scale Assessment panel
Association for Mathematics Education in South Africa
13th Annual National Congress, 2-6 July 2007, Mpumalanga

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National Education Quality Initiative



**Some information about the
National Education Quality
Improvement Initiative**

National Education Quality Improvement Initiative (NEQI)

What is NEQI?

National initiative established by the HSRC to support key role-players improve education system in South Africa

Primary purpose:

To support government and other key role-players (teachers, parents, learners, NGOs, donors) enhance decision making processes for implementing relevant and effective strategies to improve education quality at all levels of the system in South Africa

Current Project (5 years)

Develop and pilot – an integrated & effective national assessment system to enhance learning in schools

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Large scale assessment of Mathematics achievement: Challenges for improving learning in South African classrooms

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The image shows the cover of a report. On the left, there is a dark, curved banner with the text 'National Education Quality Initiative' written vertically. The main title of the report is 'Large scale assessment of Mathematics achievement: Challenges for improving learning in South African classrooms'. At the bottom right, there is the HSRC logo, which consists of a stylized 'H' and 'S' inside a circle, followed by the text 'HSRC Human Sciences Research Council'. The background of the cover is white with some faint, abstract lines.

Take-away point

- **For LSAS to impact on improving learning, its potential to address the formative function of assessment must be fully realised**
- **In South Africa – expertise and experience exists to do this**

Caution

- **Assessment only a means to an end – not an end itself**
- **In practice – range of different types of evidence to determine learner performance**
- **Current model limited to paper and pencil type assessments**
- **Focus – to support teachers with ONE aspect of assessment**

Review LSAS in SA:

- **To determine:**
 - **Purpose**
 - **Target audience**
 - **Focus**
- **Identify impact on improving learning**
- **Extract ideas for ensuring LSAS address formative assessment function**

Definition - LSAS

- **Any assessment study planned and conducted by relevant authorities from outside the classroom**

3 core functions of assessment

- **Formative:**

assessment that provide feedback to learners about how to go about improving, i.e. evidence for learning based on the on the here and now.

- **Summative:**

summative assessments are used to certify achievement or potential, i.e. evidence pertaining to what learners have been or will be able to do used for certification & selection

- **Evaluative:**

assessment are used to evaluate institutions and curricular and serve the purpose of accountability -

Assessment in South Africa

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- Assessment integral part of apartheid system
- Neglected in initial policy formulation and implementation
- Limited information on the impact of assessment policies and practices - in particular LSAS

LSAS conducted in SA to date

Name of study	Date
Grade 9 Longitudinal Study	1996
Monitoring Learning Achievement project	1999
District Wide Reading Improvement Program	1999
Evaluation of the Quality Learning Programme	2000, 2002, 2004
Grade 3 Systemic Evaluation	2001
Assessment Modelling Initiative	2001 to 2003
Monitoring Trends in Education Quality	2002
Grade 6 Systemic Evaluation	2004
Grade 6 Systemic Evaluation Teacher Guides	2005
Integrated Education Programme Evaluation	2004, 2005, 2006
Primary Mathematics Research Project	2004
WCED Assessment of Language and Mathematics Skills	2006
ECED Baseline assessment in Grade 3, 6 & 9	2002 - 2005
SACMEQ	2001
TIMSS	1995, 1999, 2003

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Trends in LSAS

- Only 1 study (AMI) focussed on formative function
- Rest aimed to:
 - Provide information to policy makers
 - Evaluate interventions
 - Obtain baseline information
- Many reported information that could be used to support formative assessment function
 - Reported by achievement levels
 - Examples and interpretation of 'actual' learner responses
 - Matrix sampling to ensure full coverage of curriculum
 - IRT to equate and report scores
 - Assessment of teacher knowledge and competency

Reporting by Mastery Level & Sub-domain

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School	Sections 2, 3 & 4		Section 5		Sections 7 & 9		Section 8		Section 10	
	MML	DML	MML	DML	MML	DML	MML	DML	MML	DML
DET Schools										
School 1	7.7	0	12.8	0	64.1	46.2	66.7	33.3	12.8	7.7
School 2	0	0	8.3	4.2	29.2	8.3	16.7	4.2	4.2	0
....	4.2	2.1	2.1	2.1	50.0	22.9	50.0	14.6	4.2	2.1
HOA Schools										
School 1	57.1	21.4	35.7	17.9	96.4	82.1	92.9	78.6	46.4	28.6
School 2	40.6	9.4	43.8	9.4	81.3	56.3	65.6	18.8	31.3	15.6
....	27.3	6.1	36.4	12.1	66.7	51.5	63.6	30.3	9.1	9.1
HOD Schools										
School 1	57.1	21.4	35.7	17.9	96.4	82.1	92.9	78.6	46.4	28.6
School 2	40.6	9.4	43.8	9.4	81.3	56.3	65.6	18.8	31.3	15.6
....	27.3	6.1	36.4	12.1	66.7	51.5	63.6	30.3	9.1	9.1
HOR School										
School 1	57.1	21.4	35.7	17.9	96.4	82.1	92.9	78.6	46.4	28.6
School 2	40.6	9.4	43.8	9.4	81.3	56.3	65.6	18.8	31.3	15.6
....	27.3	6.1	36.4	12.1	66.7	51.5	63.6	30.3	9.1	9.1

Example 1

Letter-sound and letter-name matching (Section 4):

This section determines the learners' ability to match written symbols (both upper and lower case) to spoken sounds and to the spoken name of the letter. To become successful at spelling it is important that the child learns to use the names of the letters where the same sound may be represented by different symbols, for example, "sea" and "see".

Example:

The test administrator call out a relevant sound p (puh) and learners are required to cross out the corresponding alphabet.

P	R	C	I
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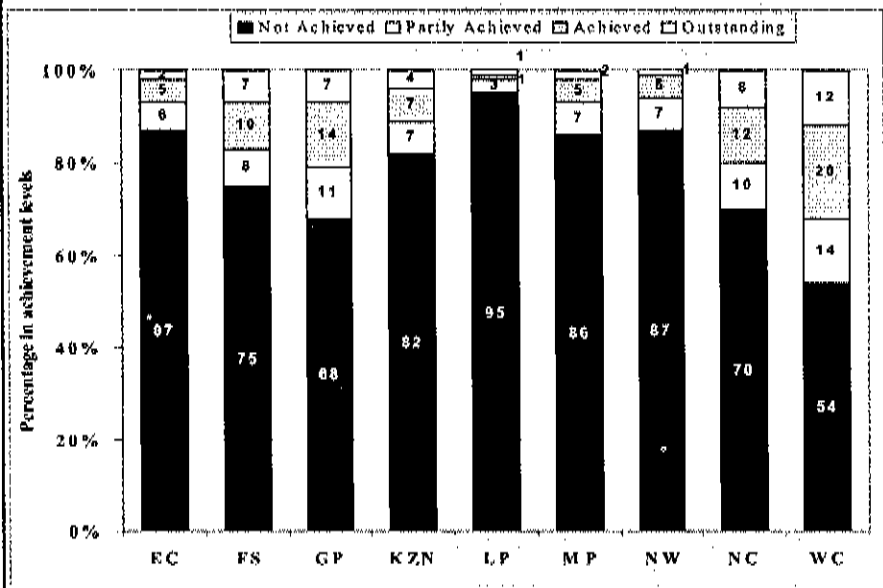
Matching similar sounds to words with different graphemes (Section 10):

This section requires an advanced knowledge of English phonics and letter-sound correspondences as learners are required to choose a word containing a matching sound to the target word, for example, "go" matched to "show" but not to "now". This demanding task will challenge the reading skills of the first language English speakers. Successful performance indicates well-developed decoding ability and familiarity with written English.

Example: Cross the word that sounds like the first word

go	you	now	two	show
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Reporting by curriculum levels – Gr 6 SE



Leaner responses

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3 6 9 12 15 18 21 24 27 30 33 36 39 42 45 48 51 54 57 60 63 66 69 72 75 78 81 84 87 90 93 96 99 102 105 108 111 114 117 120 123 126 129 132 135 138 141 144 147 150 153 156 159 162 165 168 171 174 177 180 183 186 189 192 195 198 201 204 207 210

70

In this example, a child has once again attempted to solve the problem $210 \div 3$ by repeatedly adding 3 to itself and counting the number of times it has been possible to do so once 210 was reached. However, he/she makes a basic mistake adding the three to itself (see last column $201 + 3 = 203$ and then $203 + 3 = 208$) and, consequently, arrives at 211 instead of the expected 210! The solution, consequently could not be counted and the question was subsequently abandoned.

It is evident that a basic knowledge of the times table makes this a very simple question indeed.


QLP: Matrix Sampling

Learning Area	Sub-domain	Items		
		Constructed Response	Multiple Choice	Total
English	Language structure and use	0	26	26
	Reading and viewing	4	39	43
	Thinking and Reasoning	11	21	32
	Writing	10	3	13
Total		25	89	114
Maths	Algebra	6	18	24
	Data	2	17	19
	Measurement	4	14	18
	Numeracy	4	27	31
	Shape and space	2	15	17
Total		18	91	109
Science	Earth and Beyond	7	14	21
	Energy and Change	6	30	36
	Life and the Living	6	32	38
	Matter and Materials	6	18	24
Total		25	94	119
Total number of Items		68	274	342

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**However
none of the LSAS
address teacher
assessment needs in
the classroom**

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Assessment information for teachers

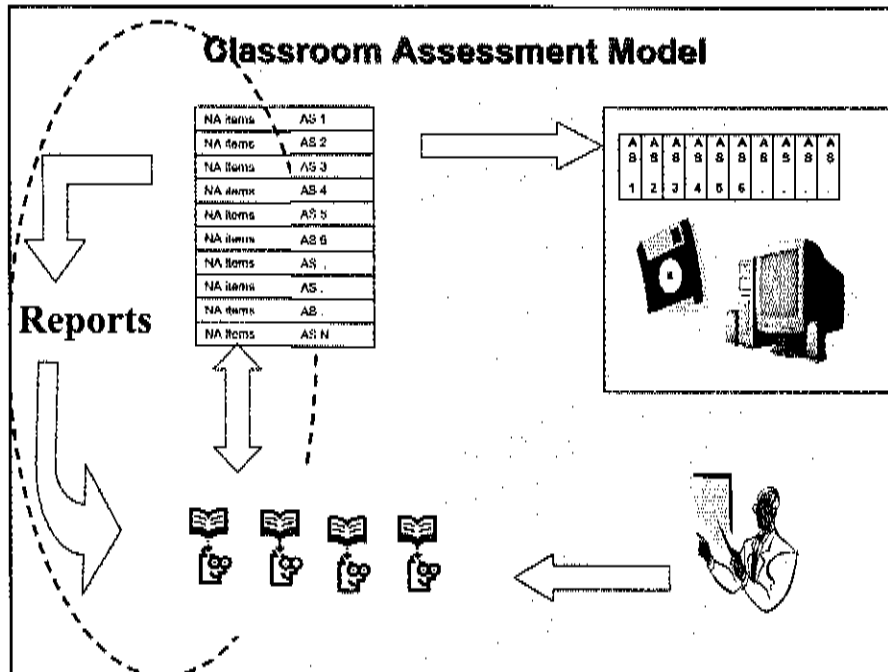
- Available when needed for **CURRENT** learners
- Identify learner strengths & weakness
- Determine appropriate interventions
- Records trends in performance over time
- Covers entire curriculum – i.e. all AS
- Integrated within teacher plans and timeframes
- **Reduce work load**



**So
How does this
classroom
assessment model
function?**



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- ## Challenges & Way Forward
- **Audit of structures and procedures at different levels of the education system to support/ implement assessment policies**
 - **In-dept qualitative studies of teacher understanding, needs and practices wrt assessment & implementation of assessment policies**
 - **Item development and national pilot – Intermediate Phase Maths and English (FAL) – i.e. Reading**
 - **Development & field trial of software**
 - **Randomised Experiment to trial to determine impact**
 - 2 districts – Mpumalanga & North West
 - **Costing exercise**

Apology

- Conference organisers – not submitting paper on time
- Discussant – paper only submitted on Monday

Thank You

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