



HSRC
Human Sciences
Research Council

**Changing lives of
ordinary people
through human and
social sciences**

Technology

LIFE ORIENTATION

Mathematics

20 years of TIMSS in South Africa: Building our analyses for in-country use

Vijay Reddy

Presentation to IEA, General Assembly

Vienna, October 2014

Storyline

How a newly democratised country, aspiring to be a knowledge economy, uses large scale assessments to provide insights of educational quality and uses TIMSS data to extend in-country analyses

TIMSS in South Africa

1994 – first democratic election. Some naivety of what it would take to achieve improve educational outcomes.

- **TIMSS 1995 & 1999:** participation at the grade 8-first national measurement of educational achievement. TIMSS 1999 results shocked the country on low levels of performance. Was the catalyst for major investments in math and science educational programmes.

- **TIMSS 2002:** national score does not tell the full story. Focus on disaggregation of the national average –performance of different groups

- **TIMSS 2011:** continue reporting on performance of groups; was an opportunity to report on trend; analysis moved beyond bi-variate.

- **TIMSS 2015:** extend the trend line; performance of groups. More sophisticated modelling analyses.

Country emphases of TIMSS analysis

(Trends) TIMSS: Only trusted measure of achievement trend over time

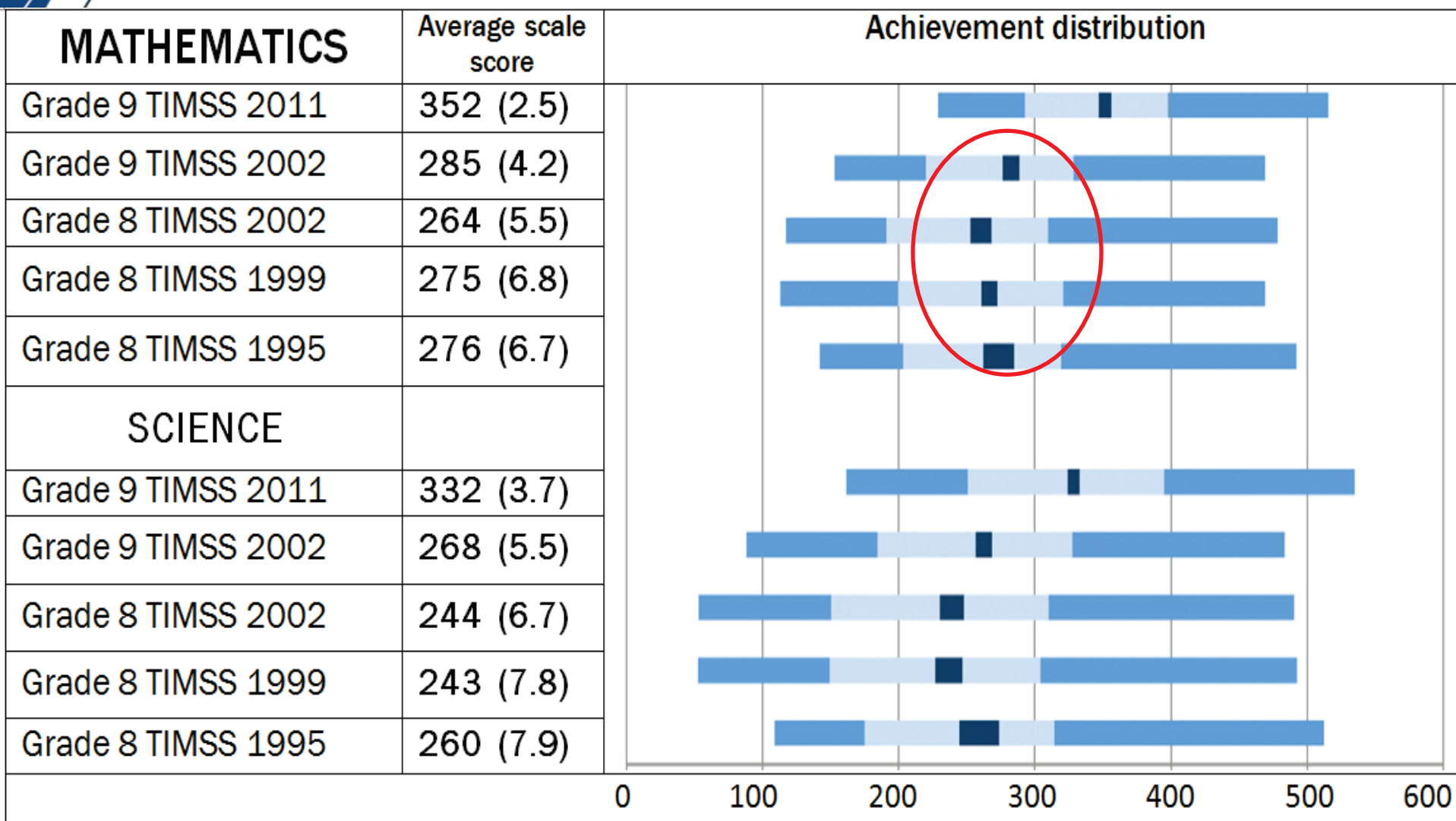
2. *Disaggregation*: Extending the analysis to report by provinces, schools by previous racial categories, public and private schools, SES of schools. Finding policy amenable factors to improve achievement
3. *Learning gains between grades*: In 2002 we administered at Gr 8 & 9 and in 2015 will try to administer the study in adjoining grades.
4. *Exploratory Panel*: TIMSS 2011 first wave for a panel of student pathways in and out of school to post-school institutions and to work.
5. Working in *Policy-Research Nexus*: close positive relationship between research & policy workers. TIMSS achievement is an indicator in key government strategies.
6. *Research Communication*: identified different important stakeholders. Working on a TIMSS-SA website and policy briefs

South Africa

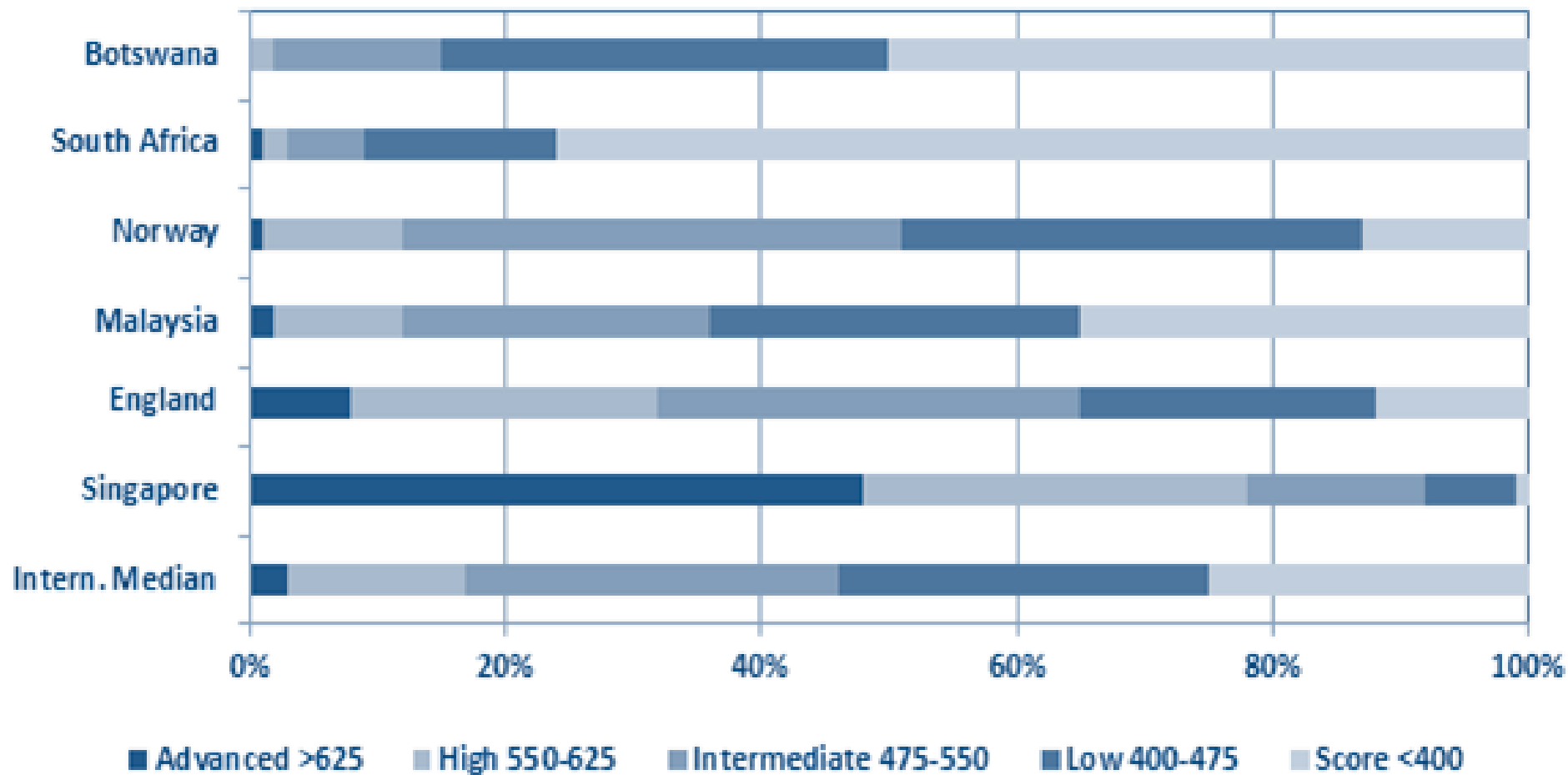
A big country with population of 50 million; 12 million school students; 28 000 schools and 350 000 teachers.

- GNI per capita: 7000 dollars - categorised as middle income
- High levels of poverty and high levels of inequality (Gini - 0.65)
- Bimodal system – challenge of low levels of education and skills and unemployment

1.1. Trends in math and science achievement



1.2. South Africa and other countries



1.3. Forward trajectory.....

- Work towards improvement of both lower and top end of performance.
- With the effort and commitment of schools, teachers and learners and support from the educational departments we should set the target for an improvement by **30 points to reach a score of 382 in 2015 & 40% of learners score above 400 points & 2% above 625 points.**

YEAR	Grade 9 Math scores
2023	442
2019	412
2015	382
2011	352
2002	285
1999	296 (extrapolated)
1995	294 (extrapolated)

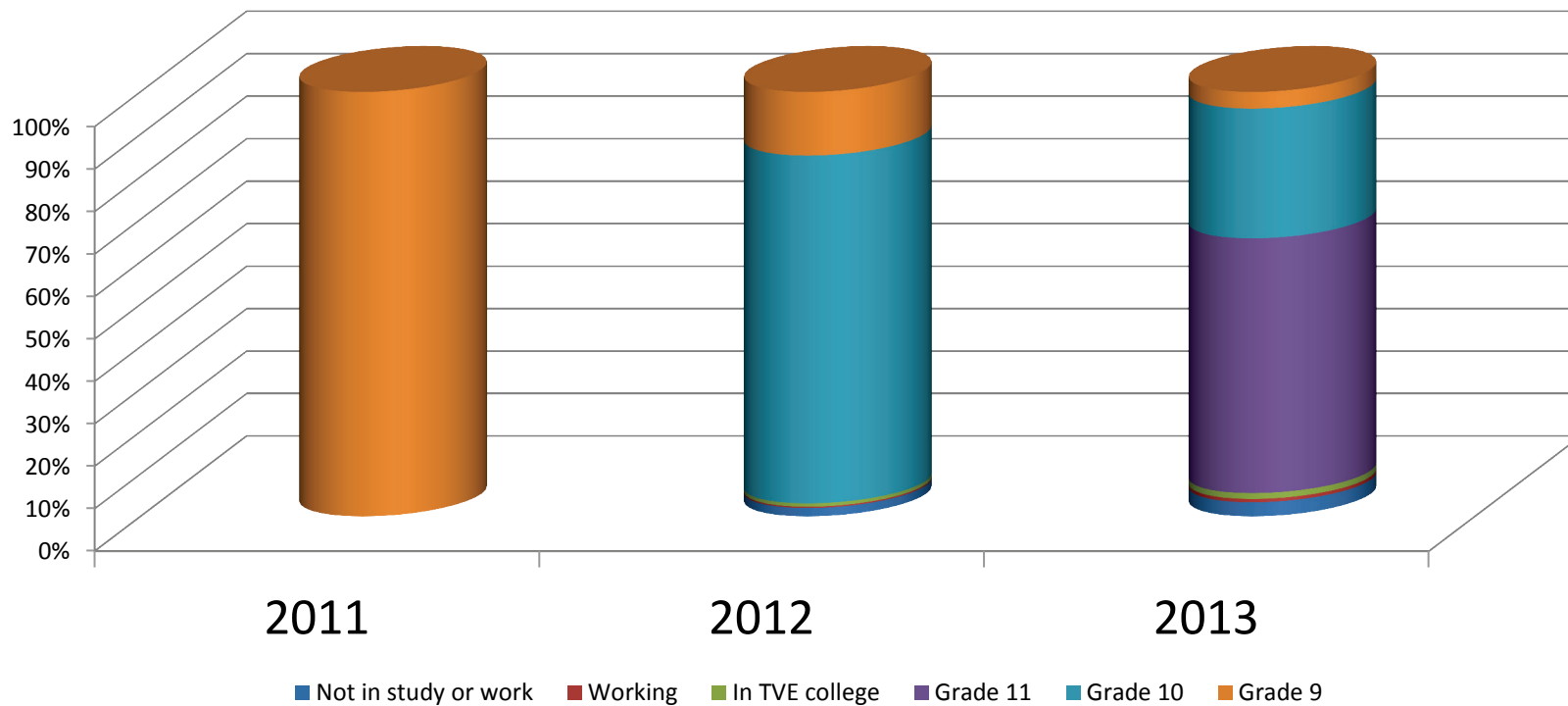
2.1.Home Resources(SES) in different school types

Resource at home	Public schools (2002)	No Fee (2011)	Fee paying (2011)	Independent (2011)
Computer	 33%	 23%	 44%	 77%
Own books		 60%	 68%	 82%
Internet connection		 21%	 38%	 69%
Own cellphone		 74%	 81%	 92%
Dictionary	 78%	 63%	 81%	 94%
Electricity	 80%	 79%	 92%	 98%
Running tap water	 64%	 59%	 80%	 92%
Television	 82%	 82%	 92%	 98%
Radio	 92%	 79%	 85%	 89%
Water flushed toilets	 48%	 31%	 66%	 86%
Motor car	 38%	 29%	 47%	 78%
Telephone	 54%	 27%	 34%	 56%
Fridge	 73%	 71%	 86%	 95%

2.2. School Characteristics by type

	NO FEE	FEE PAYING	INDEPEND
ACHIEVEMENT			
Average mathematics score	324 (2.7)	397 (6.0)	474 (17.1)
% achieving at or above 400 in math	12% (0.9)	44% (2.8)	71% (6.7)
LEARNERS			
Average age of learners in years	16.2 years	15.8 years	15.4 years
HOME RESOURCES			
<u>Maternal education</u> above grade 12	14%	29%	49%
Parent with university education	13%	28%	57%
Always or almost always speaking the <u>language</u> of the test at home	17%	31%	56%
SCHOOL PHYSICAL RESOURCES:			
Textbooks as basis for instruction	71%	71%	83%
Workbooks as basis for instruction	47%	34%	36%
SCHOOL SAFETY			
Bullying: almost never experienced	19%	36%	42%

4. Student Pathways from 2011 to 2013



	2011	2012	2013
Not in study or work		2%(318)	3.4% (327)
Working		0.3%(320)	0.8 % (318)
In TVE college		0.8% (372)	1.4% (363)
Grade 11			61% (398)
Grade 10		82% (383)	31% (342)
Grade 9	100% (352)	15 %(330)	4% (315)

6. Research Translation and Communication: Policy Recommendations for Different Role Players

National	• Improvement in performance in national and international assessments based on realistic targets. • Embark on a differentiated strategy of interventions and support for improved learning outcomes in fee-paying and non-fee paying schools. • Improve on the provision of pedagogical infrastructure (e.g. libraries and labs) and pedagogical resources (e.g. workbooks and textbooks). • Develop policies and guidelines to curb school violence and bullying.
Provincial	• Provinces to improve their performance for learners achieving above the minimum competency level of 400 points. • Monitor the provision and use of pedagogical infrastructure and pedagogical resources in schools. • Emphasise quality of teaching and learning from Grade R. • Implement policies and guidelines to curb school violence and bullying.
District	• Design appropriate pedagogical interventions for teachers. • Monitor that teachers and learners are in school, on time and learning. • Monitor that textbooks, workbooks and pedagogical resources are in schools. • Monitor incidences of violence and bullying at schools and support principals/schools in managing school safety.

School	• Emphasis on safety, order and academic success. • Monitor and manage rates of absenteeism among teachers and learners. • Emphasise an academic culture in schools. • Offer appropriate support to grade repeaters -during school time or holidays.
Teachers & classrooms	• Emphasis on punctuality among teachers. • Evaluate and improve on teacher subject matter knowledge and pedagogy. • Teachers to evaluate their own professional knowledge and pedagogical practices. • Provide learners with practice examples involving written explanations.
Students	• Emphasis on punctuality among learners. • Improve proficiency in the language of the test. • Regular practice of mathematics and science examples with written homework.
Communities	• Motivate young children about the importance of education. • Monitor teacher and learner attendance at schools.
Households	• Motivate and inspire young children about mathematics and science. • Support and monitor homework and school reports. • Monitor learner attendance to schools. • Work with teachers and school officials about education delivery & performance

7. TIMSS for in-country use

- For countries with limited resources and technical capacities, it is important to gain maximum benefit from these expensive studies.
- We need to be scientifically rigourous, the advocacy and the responsibility to different stakeholders.
- Countries have the power to decide how to use the TIMSS resource

Social science that makes a difference

Human Development Index and Mathematics Achievement

