



STEM According to HRD Strategy-2030 & NDP

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Partnering to innovatively develop SA's human potential

- NDP- 2030 is a National Development Plan for all sectors of the country. Chapter 9 deals with the education sector (Early Childhood, Schooling, FET& Skills Development and HE).

All developmental activities/forums /initiatives in education should be underpinned by NDP-2030

- The uniqueness of NDP-2030 is its specific targets for 2030.
- For the education sector, STEM features prominently.

“Foundational skills in areas such as mathematics, science...are essential components of a good education system” (NDP).

NDP'S Quantifiable Schooling Targets



Schooling :

- The acceptable level of performance be 50% in maths and science and above in 80% of schools by 2030
- Increase the number of students eligible to study maths & science at university to 450 000 per year.
- The number of people embarking on careers in science and technology should be at least three times the current level.

HE

- Increase university science and maths entrants to 450 000 by 2030
- *The number of science, technology, engineering and maths should increase significantly*

By 2030 science and maths should be revitalised !!!

HRDC & HRD Towards 2030



The HRDC, chaired by the Deputy President of the country, with the Minister of Higher Education and Training having oversight responsibility for, it **is intended to guide and shape the human resource development agenda;** provide a **platform** for dialogue and consensus building; **identify skills blockages and recommend solutions.**

Internationally, Human Resource Development Councils are seen to:
“... **act as a unifying force and catalyst for performance excellence** through people, fostering communication, coordination, integration and collaboration with and among stakeholders in human resource development **and providing expert leadership in performance improvement and evaluation.**”

This was a key recommendation within the HRDSA (2010 – 2030) and was approved by Cabinet in 2010.

- The key priorities of the Strategy (HRD-2030) are defined by five programmes:
- **Programme 1:** Foundation Education with Science, Technology, Engineering, Maths (STEM), Languages & Life Orientation/Skills.
- **Programme 2:** TVET and the rest of the college system.
- **Programme 3:** Higher Education and Training, Research and Innovation.
- **Programme 4:** Skills for the transformed society and the economy.
- **Programme 5:** Developmental/capable State.

Taking Stock of the NDP's Goals

2010 to 2014, the trend was 50% pass in maths for an average of 21% learners , hence the shortfall of **59% required in twelve years**

The average number of eligible students to study maths & science at university was 51 198 , a shortfall of 398 000 **required in twelve years** .

TABLE 1: National Achievement Trends in Mathematics (2010-2014)

Year	Total Students	# who wrote maths	% who wrote maths	% Achieved ≥ 50%	% Achieved ≥ 60%	General Pass %
2010	540 246	259 407	48	18	12	67,8
2011	496 735	221 355	44.6	18	11	70,2
2012	514 353	223 012	43.2	22	13	73,9
2013	562 467	238 370	42.4	26	16	78,2
2014	535 101	223 047	41.7	22	13	75,8

Literature on adolescence indicates that physical growth among adolescent is coupled with the unobserved drastic cognitive growth (Keating, 2004:45-84).

Giving adolescents **an array of newly acquired cognitive abilities.**

- There is **improvement in attention**, both **short and long term memory** for adolescents (Coleman and Hendry ,2004: 36)
- **Systematic thinking** which includes **capacity for abstract thinking** (Harris and Butterworth ,2002:306)
- Berks (2003:362) regards this cognitive growth as the attainment of formal operational stage which has two main features, namely, **hypothetico-deductive reasoning and propositional thought.**

Progress Towards NDP's Goals



“Build a properly qualified, professional, competent and committed teaching core..” (NDP : 263).

In 2015, DHET published the National Policy on the Minimum Requirements for Teacher Education Qualification (TEQ) , Govt Gazette, No.38487.

The policy states the pillar competence of beginning teachers to be “Sound knowledge of the subject”.

It also cites BEd and a B Degree with specialisation in subjects to be taught with a diploma in teaching, as pathways for TEQ.

In 2014, DBE released the protocol for Fundza Lushaka which also cites these two pathways for initial teacher education programmes.

- The former President Mbeki's SONA in 2000 & 2001 emphasised the centrality of mathematics and science **as part of our human resource development strategy.**
- Hence , the **National Strategy for Mathematics, Science & Technology Education** of July 2001 initiated.
 1. Poor output of mathematics and science graduates in grade 12
 - 2. Underqualified and unqualified mathematics, science and technology educators.**
 3. The vicious cycle of undersupply of good candidates that choose mathematics and science teaching.
 4. Lack of financial support for grade 12 graduates to train as educators majoring in mathematics, science and technology.

Preparation of Teachers Fundza Lushaka (FL)

FL was launched in 2007 & according to NDP it is an important strategy to attract learners into teaching, especially those with good passes in maths, science and languages.

However, FL has become a bursary for poor & unemployed youth to access a living through teaching anything but the set priorities (DBE Circuit Manager, 2018).

Intermediate Phase (Grade 4 – 6)	Senior Phase (Grade 7 – 9)	FET Phase (Grade 10 –12)
<ul style="list-style-type: none"> • Mathematics • Natural Sciences • Technology 	<ul style="list-style-type: none"> • Mathematics • Natural Sciences • Technology 	<ul style="list-style-type: none"> • Accounting • Agricultural Sciences • Agricultural Technology • Civil Technology • Computer Applications Technology • Economics • Electrical Technology • Engineering Graphics and Design • Geography • Information Technology • Life Sciences • Mathematics • Mechanical Technology • Physical Sciences

FL Maths & Science teachers in some rural circuit



School	No of FL Teachers	Qualifications of FL Teachers
1	3	B.Ed.
2	2	B.Ed.
3	2	B.Ed.
4	1	B.Ed.
5	1	B.Ed.
6	2	B.Ed.
7	1	B.Ed.
8	3	B.Ed.
9	2	B.Ed.
10	3	B.Ed.
11	3	B.Ed.
12	5	B.Ed.
13	2	B.Ed.
14	2	B.Ed.
15	2	B.Ed.
16	5	B.Ed.
17	5	B.Ed.
18	1	B.Ed.
19	3	B.Ed.
20	2	B.Ed.
21	5	B.Ed. & BA (PGCE)
22	4	B.Ed.
23	1	B.Ed.
24	3	B.Ed.
25	4	B.Ed.
26	2	B.Ed.

MATHS RESULTS FOR SOME RURAL SCHOOLS



	No.	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	No.
School	Wrote	0-9.9	10-19.9	20-29.9	30-39.9	40-49.9	50-59.9	60-69.9	70-79.9	80-89.9	90-100	Passed
1	12	0	6	4	2	0	0	0	0	0	0	2
2	23	3	12	6	2	0	0	0	0	0	0	2
3	26	3	12	6	3	2	0	0	0	0	0	5
4	29	0	5	21	3	0	0	0	0	0	0	3
5	18	4	9	3	1	1	0	0	0	0	0	2
6	26	11	13	1	1	0	0	0	0	0	0	1
7	24	14	6	1	3	0	0	0	0	0	0	3
8	16	1	13	2	0	0	0	0	0	0	0	0
9	21	0	0	8	12	1	0	0	0	0	0	13
10	30	24	6	0	0	0	0	0	0	0	0	0
Totals	225	60	82	52	27	4	0	0	0	0	0	31

- “Despite many positive changes in 1994, the legacy of low quality education in historically disadvantaged parts of the school system persist”.
- Theme : “Build a properly qualified, professional, competent and committed teaching core..” (NDP : 263).
- Vision : **By 2030 , the schooling system will be characterised by learners and teachers who are highly motivated.**

Legacy of the past

“Denied **access to technological and professional careers** requiring a strong basis in mathematics and science because of **the chronic inadequacy of teaching in these subjects**” (White Paper on Education and Training, 1995:17).

Today's reality

Scarcity of mathematics and science teachers and hence the country's continues to have problems in STEM skills .

Measuring Progress of NDP 2030 & HRD Towards 2030

NDP 2030 is a plan with quantifiable targets in STEM and HRDC **identifies blockages and provide advise on how these should be addressed.** (HRD-2030, p15).

To measure the progress towards NDP targets , research on STEM Education has to **be mixed methods , i.e. quantitative and qualitative.**

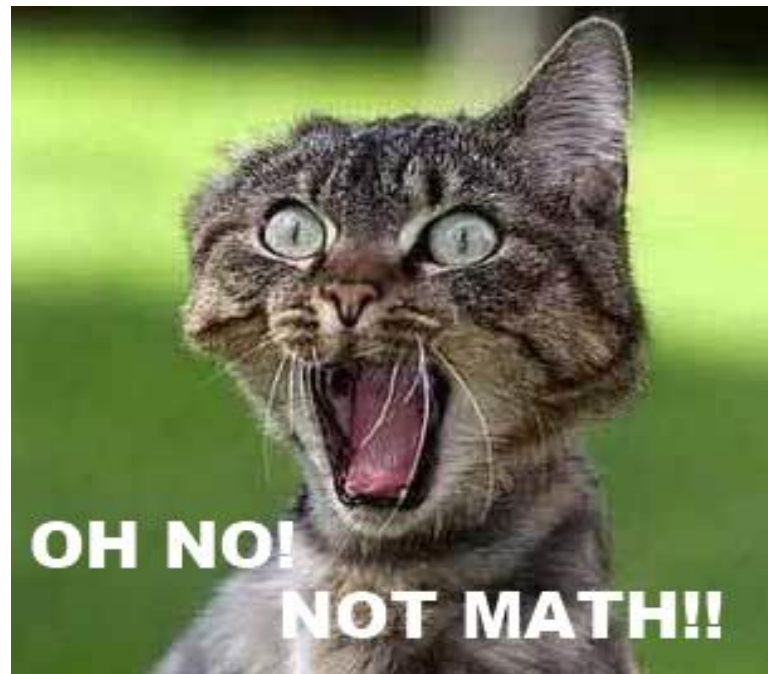
Currently , research on STEM Education is dominated by **qualitative research**

Final Remarks

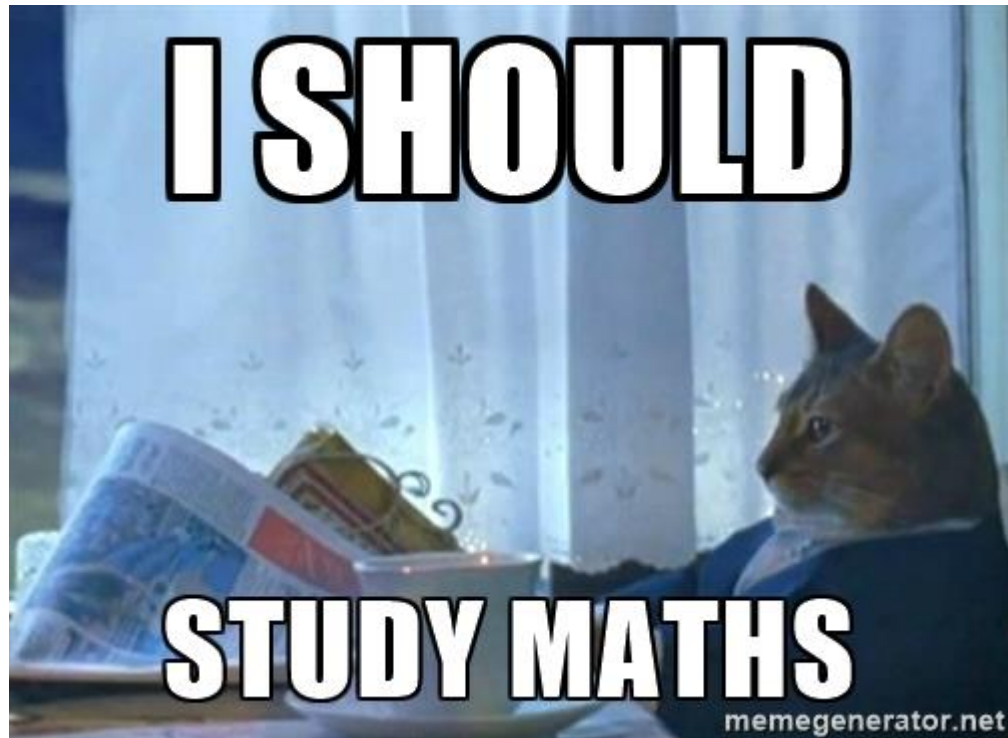
Strategy on STEM of 2001 achieved one of its goals :

- Fundza Lushaka
- **According to NDP 2030, FL has to be strengthened.**
- Finally, rural a students remain with untapped potential to pursue STEM.

There needs to be a shift from this ----



TO THIS





Thank you!