Evaluating a province-wide early grade mathematics intervention: The case of R-Maths

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Presentation overview

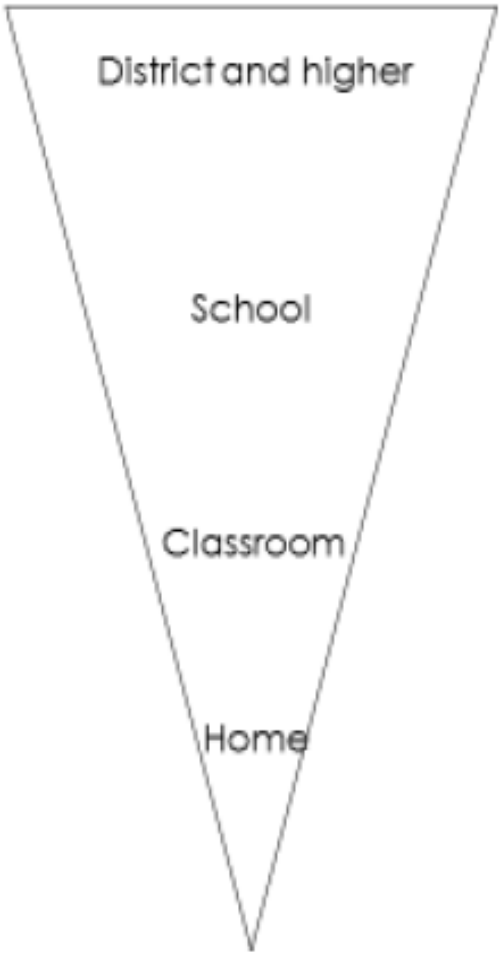
1. R-Maths project design
2. R-Maths evaluation design
3. Test design
4. Findings from testing:
   - Subject advisors
   - Teachers
   - Learners
5. What are reasonable expectations for shifts in test attainment?
6. And so?

Spoiler alert 1: Stuff we knew in 2007

Taylor (2007)
Factors influencing learning outcomes

- **Language of instruction**
- **Time management** (including homework and adjusting pace to pupil ability)
- **Curriculum coverage** (including teacher knowledge)
- **Reading and writing** (including access to books and stationery)
- **Assessment** (including monitor results, quality assure tests, guide and support, assess)

Taylor (2007)
Levels in schooling system



Zenex implementation framework
COMPONENT 1: TARGET GROUPS
A: Target Level(s)

Spoiler alert 2! More stuff we knew in 2007:

1. **School change takes time.** It takes about three years to see changes in a primary school, and five years to see changes in a secondary school, depending on size and complexity.
2. **The core of education is the teacher in their classroom.** This is the hardest part to change. To make real changes this core must be reached.
3. There is no proven way of **changing the dynamics of individual schools other than working closely with them.**

Paraphrased from Christie, Butler and Pottering (2007) *Schools That Work,* Ministerial Report to the Minister of Education, South Africa

1. R-Maths project design

R-Maths

- Led by the **Western Cape Education Department**
- In collaboration with the **UCT Schools Dev Unit (SDU)**
- **Programme training & materials** developed by the SDU in collaboration with the WCED
- Funded and supported by donors

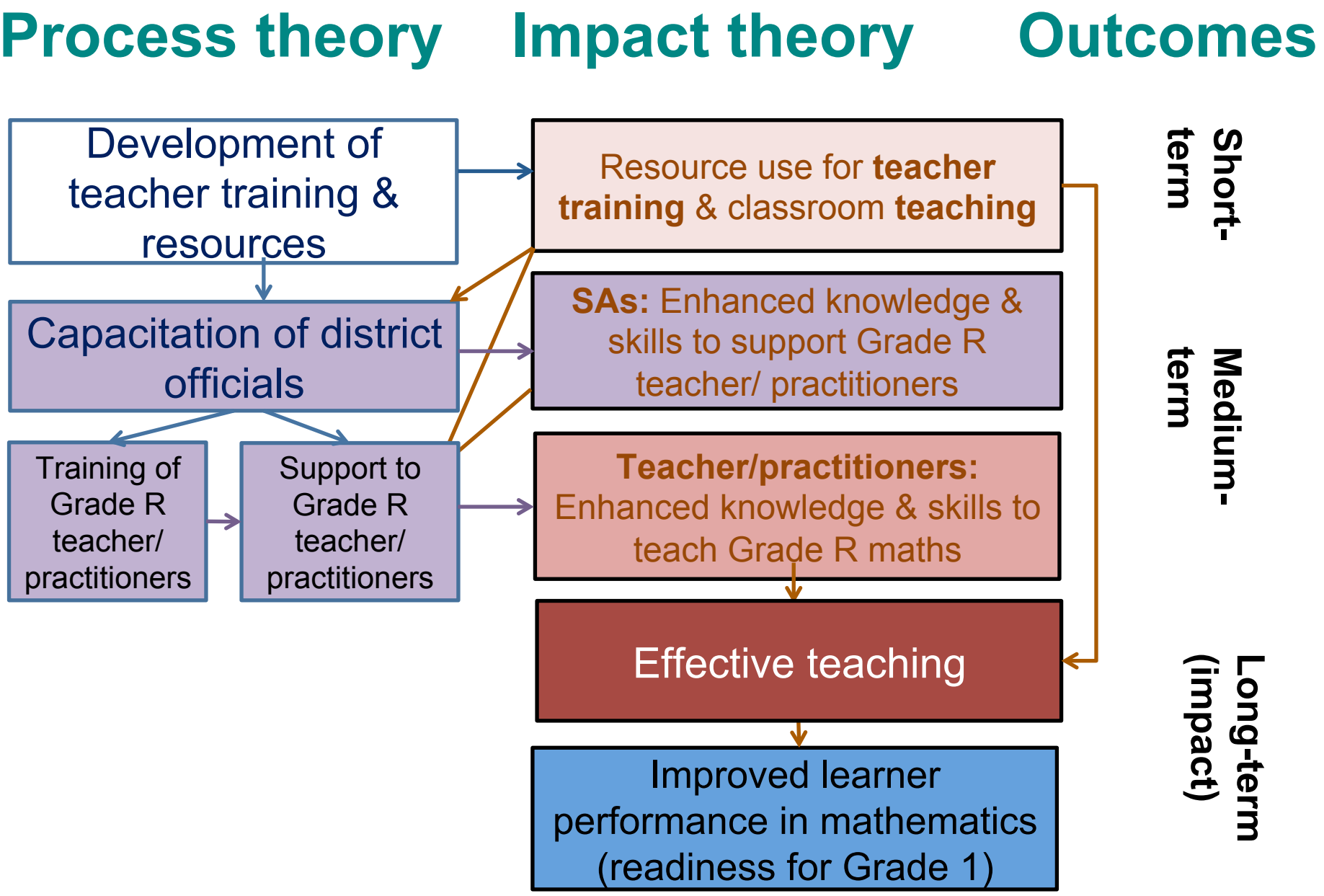
Goal:
Improve the conceptual understanding and Mathematical skills of Grade R learners in the Western Cape

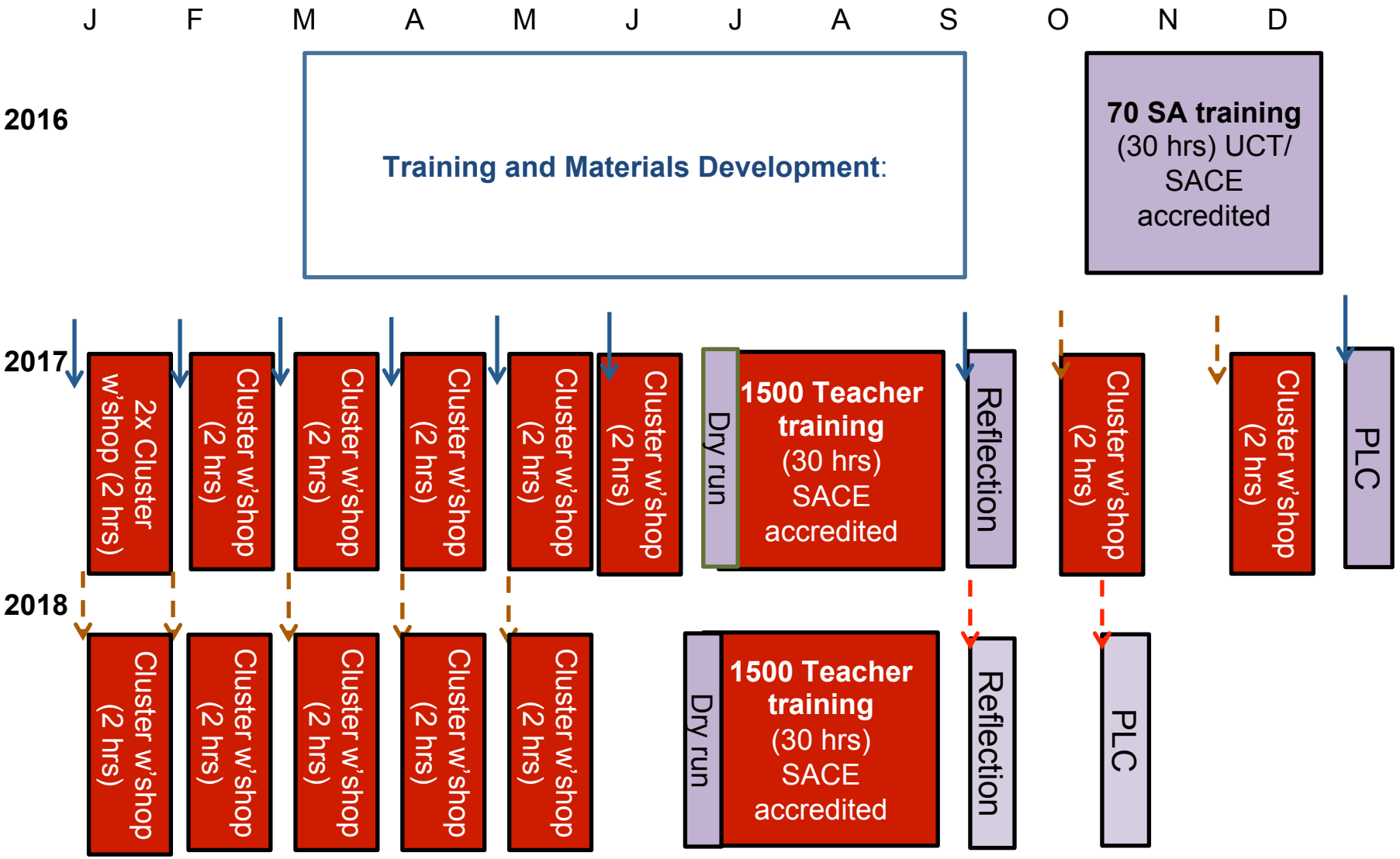
R-Maths 'Form': Modified cascade

The R-Maths training – including course materials and cluster notes – **is backbone of R-Maths**

SA's receive 30 hrs block training, UCT/SACE assessment/PoE/accreditation, +/- 30 hours support ('dry runs')

Teachers receive 14 hrs cluster w'shops, 30 hrs training, SACE accreditation provided by the SA's, reflection workshop, PLC on R-Maths. Fidelity of implementation is supported through full set of **teacher resources**


Process theory
Impact theory
Outcomes
Development of teacher training & resources
Capacitation of district officials
Training of Grade R teacher/ practitioners
Support to Grade R teacher/ practitioners
Resource use for teacher training & classroom teaching
SAs: Enhanced knowledge & skills to support Grade R teacher/ practitioners
Teacher/practitioners: Enhanced knowledge & skills to teach Grade R maths
Effective teaching
Improved learner performance in mathematics (readiness for Grade 1)
Short-term
Medium-term
Long-term (impact)



R-Maths 'Dosage'

R-Maths training and support to subject advisors

Block training:
5 days / 30 hours x 1

"dry-runs" prior to cluster workshops (2 hours x 7) & block training

R-Maths teacher materials

R-Maths: 'substance'

- Explicit theory of **Grade R learning**: Play in mathematics
- **7 principles** of R-Maths learning
- Explicit integration of maths in **daily programme**
- **Added to and expanded CAPS** per term
  - Integrated number into all the other topics
  - Focused on 1 topic per week
  - Specific guidance on topic for the week and small group work, repeated over 1 week
  - Explicit developmental framework for number work
  - A few powerful representations, consistently applied (eg dot cards, numeral cards, structured bead string

CAPS reference to play in mathematics

The approach to learning Mathematics should be based on the principles of **integration and play-based learning**.

The **teacher should be pro-active, a mediator** rather than a facilitator.
Make most of learning opportunities that arise spontaneously during a range of c**hild-centred activities**:

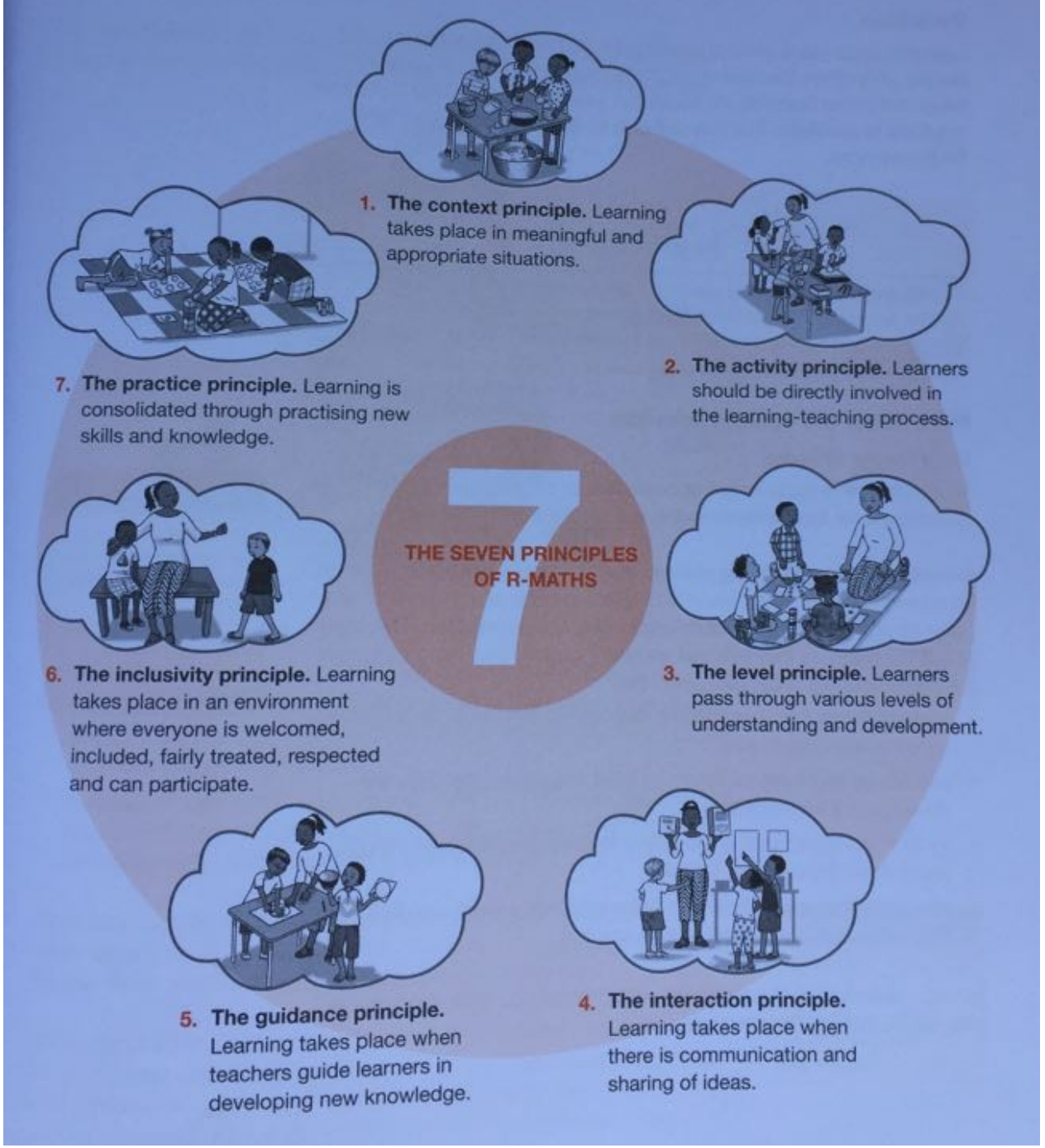
- **free play** in the fantasy corner or block construction site, sand and water play activities
- **teacher-guided** activities that focus on mathematical concepts such as counting, number concept development, space and shape, patterns, time and other emergent mathematics activities

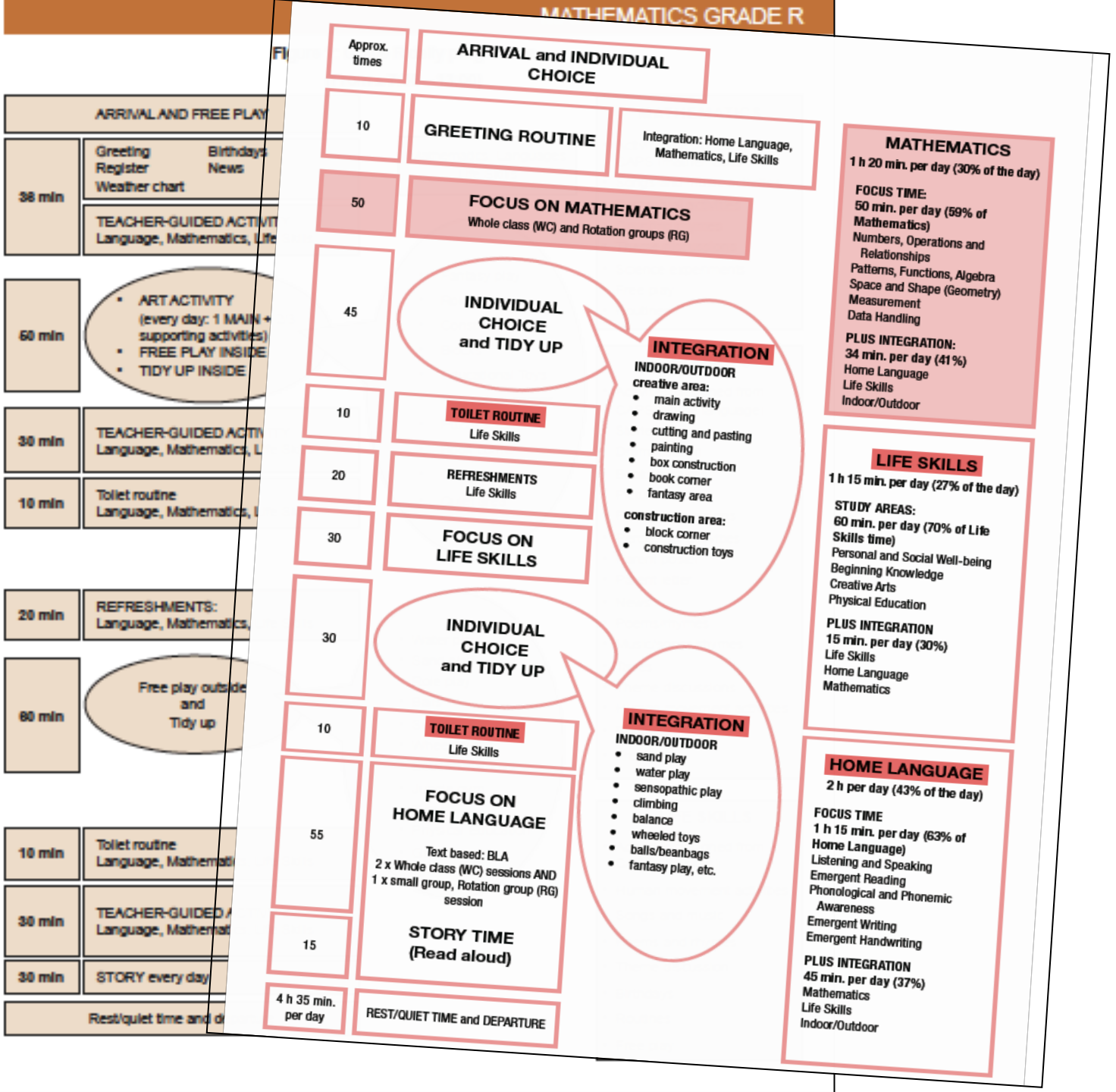
During free play the teacher can promote emergent mathematics through the appropriate structuring of the free-play area

(CAPS Grade R Mathematics, page 14; Grade 1 – 3, page 13)

7 Principles of R-Maths

1. Context
2. Activity
3. Level
4. Interaction
5. Guidance
6. Inclusivity
7. Practice




MATHEMATICS GRADE R
ARRIVAL AND FREE PLAY
38 min
Greeting
Register
Weather chart
Birthdays
News
TEACHER-GUIDED ACTIVIT
Language, Mathematics, Life
60 min
ART ACTIVITY
(every day: 1 MAIN +
supporting activities)
FREE PLAY INSIDE
TIDY UP INSIDE
30 min
TEACHER-GUIDED ACTIV
Language, Mathematics, L
10 min
Toilet routine
Language, Mathematics, L
20 min
REFRESHMENTS:
Language, Mathematics,
60 min
Free play outside
and
Tidy up
10 min
Toilet routine
Language, Mathemati
30 min
TEACHER-GUIDED A
Language, Mathemat
30 min
STORY every day
Rest/quiet time and d
Approx. times
ARRIVAL and INDIVIDUAL CHOICE
10
GREETING ROUTINE
Integration: Home Language, Mathematics, Life Skills
50
FOCUS ON MATHEMATICS
Whole class (WC) and Rotation groups (RG)
45
INDIVIDUAL CHOICE and TIDY UP
INTEGRATION
INDOOR/OUTDOOR
creative area:
main activity
drawing
cutting and pasting
painting
box construction
book corner
fantasy area
construction area:
block corner
construction toys
10
TOILET ROUTINE
Life Skills
20
REFRESHMENTS
Life Skills
30
FOCUS ON LIFE SKILLS
30
INDIVIDUAL CHOICE and TIDY UP
INTEGRATION
INDOOR/OUTDOOR
sand play
water play
sensopathic play
climbing
balance
wheeled toys
balls/beanbags
fantasy play, etc.
10
TOILET ROUTINE
Life Skills
55
FOCUS ON HOME LANGUAGE
Text based: BLA
2 x Whole class (WC) sessions AND
1 x small group, Rotation group (RG) session
15
STORY TIME (Read aloud)
4 h 35 min. per day
REST/QUIET TIME and DEPARTURE
MATHEMATICS
1 h 20 min. per day (30% of the day)
FOCUS TIME:
50 min. per day (59% of Mathematics)
Numbers, Operations and Relationships
Patterns, Functions, Algebra
Space and Shape (Geometry)
Measurement
Data Handling
PLUS INTEGRATION:
34 min. per day (41%)
Home Language
Life Skills
Indoor/Outdoor
LIFE SKILLS
1 h 15 min. per day (27% of the day)
STUDY AREAS:
60 min. per day (70% of Life Skills time)
Personal and Social Well-being
Beginning Knowledge
Creative Arts
Physical Education
PLUS INTEGRATION
15 min. per day (30%)
Life Skills
Home Language
Mathematics
HOME LANGUAGE
2 h per day (43% of the day)
FOCUS TIME
1 h 15 min. per day (63% of Home Language)
Listening and Speaking
Emergent Reading
Phonological and Phonemic Awareness
Emergent Writing
Emergent Handwriting
PLUS INTEGRATION
45 min. per day (37%)
Mathematics
Life Skills
Indoor/Outdoor

Content Area Focus: Numbers, Operations and Relationships

Topics
- Oral counting
- Counting objects

New knowledge
- Oral counting 1–5
- Counting objects 1–3
- One-to-one correspondence
- Sequencing: daily programme

New maths vocabulary

count	five
one	before
two	after
three	next
four	sort

Getting ready

For the activities this week, you will need to:
- make finger puppets of the R-Maths characters (page 78)
- copy and colour pictures of each of the R-Maths characters (on the last page of the *Poster Book*)
- make 6 six-piece puzzles (page 88)
- collect number-related storybooks
- collect blocks (or make these from wood offcuts)
- collect 2 cups, 2 bowls, 1 dog bowl, 1 saucer

Whole class activities

What you need
- *Poster Book*, last page
- Classroom rules poster (see page 6)

Day 1

1. **Introduction:** Talk about how we listen to each other, take turns and help each other.
2. **The R-Maths characters:** Show learners the last page of the *Poster Book*. Talk about each of the characters and read the information about them. Together count the members in this family.
3. **Discuss the learners' families:** Work through the questions below.

   Guiding questions:
   - How many people are in your family?
   - Who lives at home with you?
   - Do you have any sisters/brothers? How many?
   - What does _____ in your family do when you are at school?
4. **Introduce small group activities:** Explain that learners will be working in small groups each day. Show learners the five workstations. Explain the daily rotation. Remind learners of group names. Remind them of class rules. Explain and show the activity for each station. Explain the tidy-up process.

TIP
Talk about how families are structured in different ways.

Integration

Life skills (Creative art): My family

Small group activities

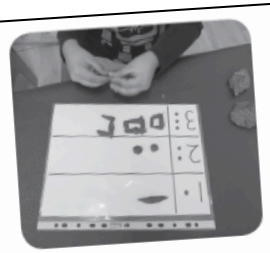
Workstation 1 (Teacher-guided activity)

1. **Counting objects – one-to-one correspondence:** Place a pile of different coloured counters in front of each learner. Learners touch and count them.
2. **Sorting:** Learners sort their animal counters according to colour. They count how many of each colour they each have.
3. **Practising number '1':** Place the 8 objects for which you have made matching picture cards on the mat. Ask each learner to choose one object from the pile in the middle of the circle that matches their picture card. Learners match the number symbol card to their picture cards. Learners swop picture cards with each other and repeat.

   Give each learner three plastic yoghurt tub lids. Ask learners to place one animal counter from their tubs on each lid. Learners place dot cards, number symbol and word cards next to each lid. Place a few extra animal counters on one of each learner's lids. Ask the learners to remove the counters to make each lid have 'one' again.

   Form/write '1' in the air. Give each learner a small amount of playdough and ask them to make the shape of the number '1' symbol.

Check that learners are able to:
- sort the counters according to colour
- count a group of objects using one-to-one correspondence
- match one object to the picture symbol card
- match the number '1' symbol to a picture card symbol for '1' and one object



Workstation 2

What you need

- 1 prepared page (as alongside) per learner
- Playdough

Learners make playdough objects of their choice and place them next to each number.

Workstation 3

What you need

- 1 prepared page (as alongside) per learner
- Crayons

Learners draw a number of any objects that match the numbers in the shapes on their pages.

Workstation 4

What you need

- 1 prepared page (as alongside) per learner
- Cut-outs of 2 trees, 1 moon and 3 stars in a tub for each learner
- Glue and crayons

Learners create a picture by pasting 3 stars, 2 trees and 1 moon. They decide what should be up in the sky and what should be down on the ground and draw other details of their choice.

TIP

Provide puzzles that are developmentally appropriate.

Workstation 5

What you need

- 1 puzzle (minimum 6 pieces) per learner

Learners build puzzles.

Integration

Outdoor activities: While the learners play outdoors, use directional vocabulary, for example, up the ladder, down the slide. Play a jumping in and out game. Use a rope and pretend that the one side is a river and the other side is the riverbank. Learners jump into the river and then jump out before the 'crocodile' gets to them.

CAPS Mathematics: Five topics

Number operations and relationships

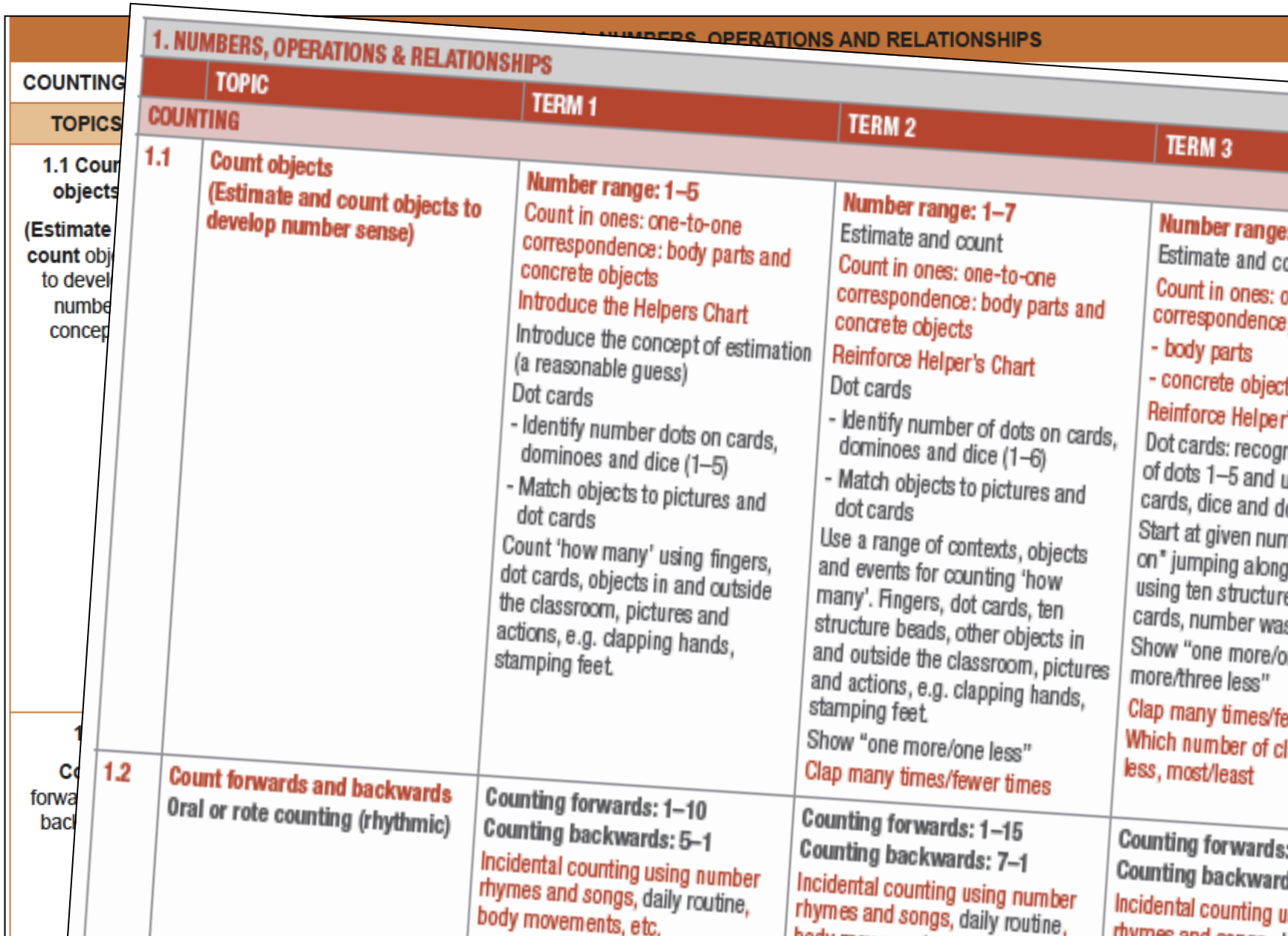
Patterns, functions and algebra

Shape and space (geometry)

Measurement

Data handling

Grade 1	Grade 2	Grade 3
65%	60%	58%
10%	10%	10%
11%	13%	13%
9%	12%	14%
5%	5%	5%



1. NUMBERS, OPERATIONS & RELATIONSHIPS

	TOPIC	TERM 1	TERM 2	TERM 3
COUNTING				
1.1	Count objects (Estimate and count objects to develop number sense)	Number range: 1–5 Count in ones: one-to-one correspondence: body parts and concrete objects Introduce the Helpers Chart Introduce the concept of estimation (a reasonable guess) Dot cards - Identify number dots on cards, dominoes and dice (1–5) - Match objects to pictures and dot cards Count 'how many' using fingers, dot cards, objects in and outside the classroom, pictures and actions, e.g. clapping hands, stamping feet.	Number range: 1–7 Estimate and count Count in ones: one-to-one correspondence: body parts and concrete objects Reinforce Helper's Chart Dot cards - Identify number of dots on cards, dominoes and dice (1–6) - Match objects to pictures and dot cards Use a range of contexts, objects and events for counting 'how many'. Fingers, dot cards, ten structure beads, other objects in and outside the classroom, pictures and actions, e.g. clapping hands, stamping feet. Show "one more/one less" Clap many times/fewer times	Number range Estimate and co Count in ones: o correspondence - body parts - concrete object Reinforce Helper' Dot cards: recogn of dots 1–5 and u cards, dice and d Start at given num on" jumping along using ten structure cards, number was Show "one more/o more/three less" Clap many times/fe Which number of cl less, most/least
1.2	Count forwards and backwards Oral or rote counting (rhythmic)	Counting forwards: 1–10 Counting backwards: 5–1 Incidental counting using number rhymes and songs, daily routine, body movements, etc.	Counting forwards: 1–15 Counting backwards: 7–1 Incidental counting using number rhymes and songs, daily routine,	Counting forwards: Counting backward Incidental counting u

Theories underpinning R-Maths

- Number word list (**ordinality**)
  - acoustic/oral, stories, songs, rhymes, 'washing line'
- **Cardinality** (how many in a set)
  - resultative counting, perceptual-conceptual subitizing, compare then count to find 'how many more/fewer'
- **One-to-one correspondence**
  - extend accuracy to larger sets
- **Number symbols**
  - representing numbers: concrete, iconic, symbolic

2. R-Maths evaluation design

1. Focused on ‘product and process’ as well as ‘outcomes and impact’
2. Purposively selected 2 districts: 1 urban and 1 district, and case study schools within those districts
3. Phased implementation over 2 years allowed for a counter-factual learners in the same district (not possible for SAs)
4. Mixed methods to get to different levels of the system

Evaluation questions

Product and process evaluation questions
1. What does the R-Maths Project entail?
2. What is the context (e.g. rural/urban, socio-economic status of the school community, number of teachers and lea is taking place?
3. Is the project
4. What is the na teacher/practitio
5. What is the le
6. What are the
7. What are the implemented?
8. What are the
Outcome and impact evaluation questions
9. What is the impact of the project on FP Subject Advisors, Grade R teacher/practitioners and Grade R teacher/practitioners' teaching practice?
10. Does the R-Maths Project have an impact on Grade R learners' Mathematical knowledge and skills?
11. What are the successes of and barriers to scalability and embeddedness into the WCED?
12. Has the project met its intended outcomes outlined in the theory of change and logic model?

10. What is the impact of R-Maths on the **Subject Advisors and Grade R teacher/practitioners'** and teaching practice?

11. Does the R-Maths project impact on **Grade R learners** mathematical knowledge and skills?

Data collection methods and sources

Activities:	Level				
	Project/ province	District/ Subject Advisor	HoD	Teacher	Learner
Key stakeholder interviews	x	x			
Subject Advisor test	x	x			
Teacher test		x		x	
Training & training dry-run observation	x	x			
CT & dry-run observation		x			
Monitoring fidelity, tracking "dosage"	x	x		x	
Case studies		x	x	x	
Learner test		x			x

3. Test design

How do we assess the knowledge of:

- Subject Advisors
- Teachers
- Learners

for supporting, teaching and learning Grade R mathematics?

…and in 3 different languages?

Subject Advisor test

What is our expected 'knowledge for teaching Grade R mathematics", for Subject Advisors?

- No common standards…
- No agreed/common assessments items…
- No validated instruments…
- Comparability of any test instrument across languages?

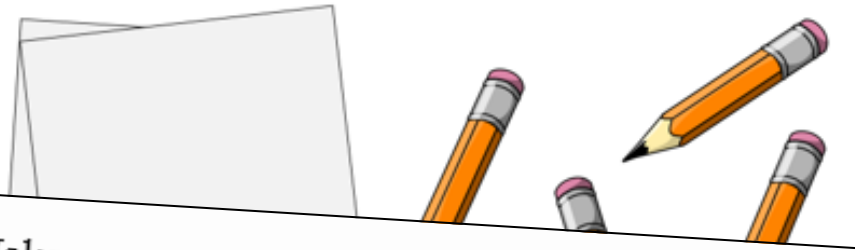
So, (30 min) test developed based on training guides and teacher concept guide (drawing on expert knowledge):

- Mix of WCED policy requirements
- Subject matter knowledge
- Pedagogical content knowledge

about Grade R (at the level of what was being t

Example SA test items

A Grade R teacher shows you an assessment task she has set for her children:



There are some pencils hidden under the paper.
How many pencils are under the page?

Make up a new word problem for Grade R learners.
Use the same numbers (6-5-1) and the same problem situation (pencils), but your new word problem should easier for Grade R children to solve.

Notice:

1. Your word problem should use the relationship 6-5-1
2. Your word problem should be about pencils

(1)
(1)

B. Group A has 5 objects. Group B
C. Group A's attribute is circles. Group B's attribute is black.
D. Group A has 7 objects. Group B has 9 objects.

Teacher test

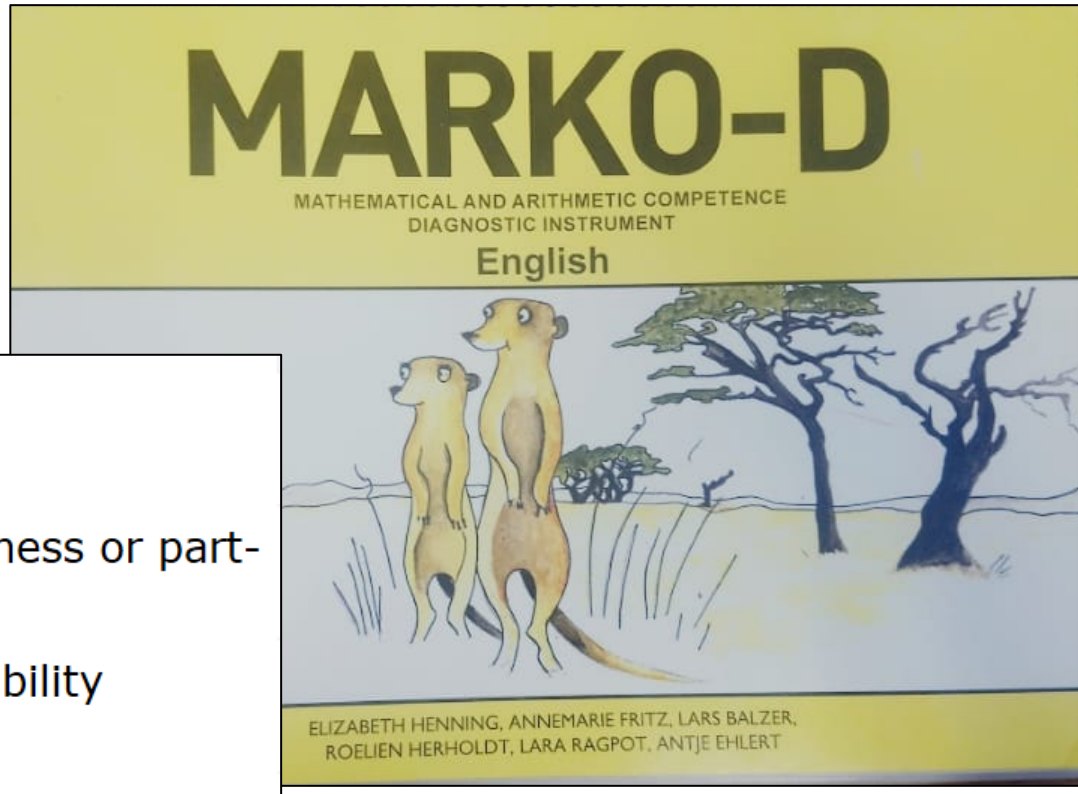
1. The same issues as for SA test
2. Shorter and with fewer items.
3. Questioned re-phrased as from perspective of a teacher

- You observe a Grade R teacher's maths lesson ….

to

- In your Grade R maths lesson…

Learner test



V	Relationality
IV	Class inclusion, embeddedness or part-part-whole
III	Cardinality and decomposability
II	The mental number line or ordinal number
I	Counting

Adaptation of German test

48 item one-to-one oral interview

Validated in Gauteng for English, Afrikaans and isiZulu (+2)

HL learners

Learner test

1. Test conducted orally in schools, one child at a time, administered by trained test administrators
2. Children completed the test in their LoLT
3. Baseline in Feb/Mar 2017; endline in Oct/Nov 2017
4. Initial simple random sample of learners in 2 districts:

- 168 in each of the intervention and comparison groups,
- 168 in comparison group
- Due to attrition etc., there was a total of 622 matched tests

4. Test findings

What did we find about the knowledge of:

- Subject Advisors
- Teachers
- Learners

for supporting, teaching and learning Grade R mathematics?

SA test results

Pre-Test Results (*n* = 47)

- Mean score of 48.6%.
- Scores ranged from 20% to 80%

Post-Test Results (*n* = 47)

- Mean score of 66.1%.
- Scores ranged from 46% to 92%
- **Increase of 17.5pp pre to post test = significant at 95% confidence level**
- **Large effect (1.44 sd).**

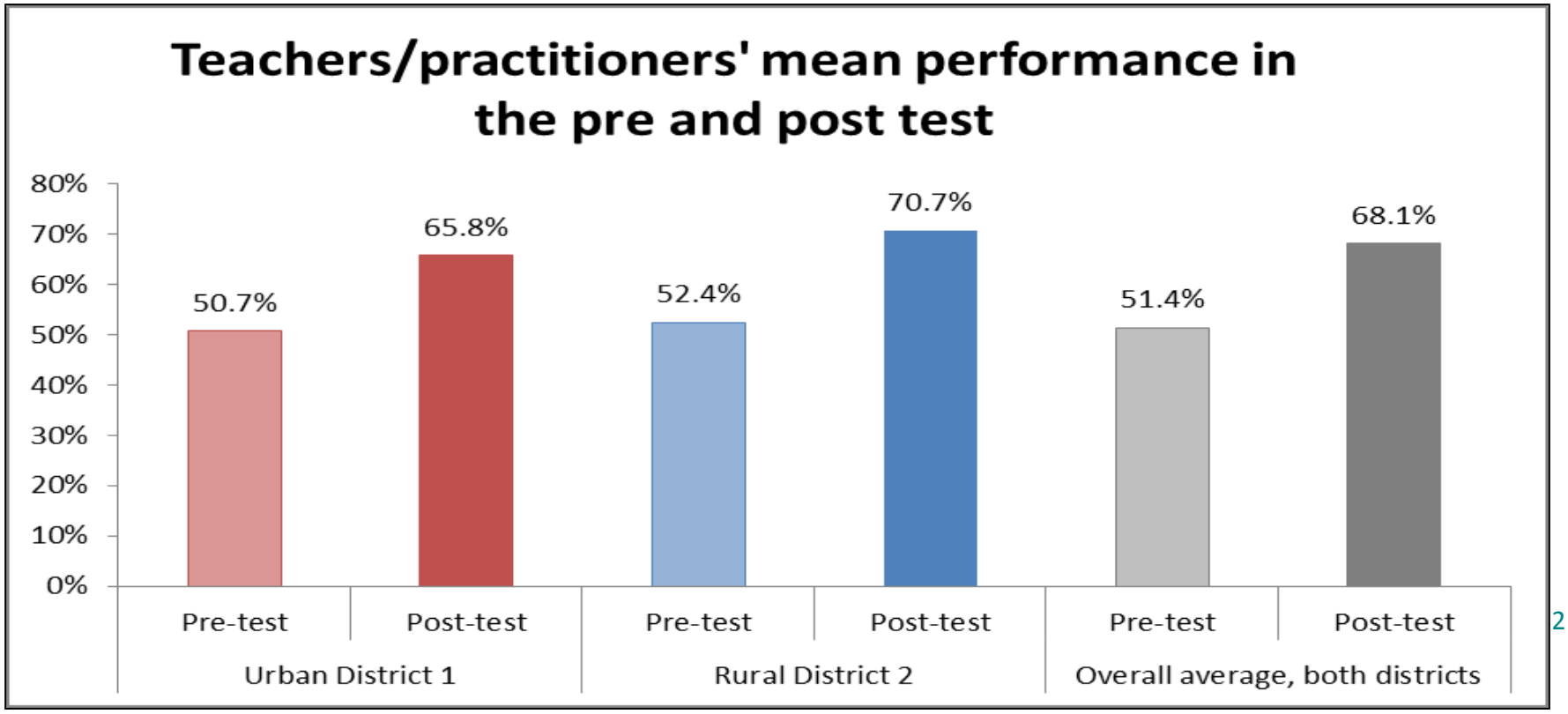
Teacher/practitioner test results

Pre Test results (*n* = 157)

- Mean score of 51.4%.
- Scores ranged from 16% to 88%.

Post Test results (*n* = 157)

- Mean score of 68.1%.
- Scores ranged from 28% to 96%.
- Increase of 16.7pp pre-post test
- **Significant, large effect (1.37 sd).**



Learner findings: Urban District 1

- Most learners (≈70-80%) were assessed in English.
- A small minority of these were ELLs (i.e. were assessed in English but were not English HL)
- Almost all remaining learners were learning Mathematics in their HL of isiXhosa.

Group	Test phase	N	Minimum	Maximum	Mean	Standard error of the mean	Standard deviation
Intervention	Baseline	160	8.5%	87.2%	37.8%	1.2%	15.3%
	Endline	160	19.1%	95.7%	57.5%	1.3%	16.7%
Comparison	Baseline	157	2.1%	83.0%	35.0%	1.3%	16.5%
	Endline	157	14.9%	95.7%	55.3%	1.5%	18.9%

Not significant

Learner level findings: Rural District 2

- Most learners (≈75% in the intervention group, and 100% in the comparison group) were assessed in Afrikaans.
- All remaining learners were learning Mathematics in their HL of isiXhosa.

Group	Test phase	N	Minimum	Maximum	Mean	Standard error of the mean	Standard deviation
Intervention	Baseline	150	2.1%	91.5%	42.0%	1.5%	17.9%
	Endline	150	12.8%	97.9%	58.4%	1.5%	18.6%
Comparison	Baseline	155	0.0%	89.4%	40.7%	1.3%	16.2%
	Endline	155	17.0%	87.2%	54.0%	1.3%	15.8%

Significant, with a small effect size.

Learner level findings: General linear model of whole sample – set up

Fixed effects:

- Baseline test scores,
- District (urban, rural), and
- Group (intervention, comparison)

Dependent variables:

- Marko-D endline total scores, and
- Marko-D endline scores, by level (L1, L2, L3, L4, L5)

Factors included:

- Gender (Male; Female),
- Quintile (1; 2; 3; 4; 5),
- LoLT (E, A, X), and
- Age

General linear model on whole result: findings 1

1. Greatest (medium) effects on Marko-D performance were:
   a. **LoLT** (isiXhosa- and Afrikaans-speakers improved best; English-speakers least) – for all levels and total, and
   b. **District** (urban learners improved more, at L3 to L5, and total)
2. Weaker (small) effect on Marko-D performance were:
   a. **Group** (intervention group learners performed better at L2, L3 and L5 and on whole test), and
   b. **Age** (older learners performed better at L2, L3 and L4)
3. No significant effects on Marko-D performance for:
   a. Gender
   b. Quintile

General linear model on whole result: findings 2

Impact of group

Intervention group learners performed better on whole test and at **L2, L3** and **L5**

Marko-D level	Probability	Cohen's d	No. of percentage points that intervention group is better	No. of standard deviations that this net shift represents
2	0.013	0.20	5.42	0.19
3	0.017	0.19	4.77	0.17
5	0.003	0.24	4.63	0.24
Total	0.013	0.20	2.93	0.17

General linear model on whole result: conclusions

- Biggest effects were on **Levels 2 and 3** of the Marko-D.

- Grade R children in the intervention group were performing similarly to those Grade R learners in the comparison schools who were **six months older** (when assessed at Levels 2 and 3 of Marko-D).

- Expecting large differences in improvements in learner scores in a short space of time is unrealistic.
- Overall, therefore, the fact that the R-Maths intervention had a **generally small but positive effect** on the Mathematics results of children whose teachers had been exposed to the intervention is **encouraging.**

5. When is an effect on learner outcomes, good enough?

Is a statistically **significant difference** between intervention and comparison enough?

Is it enough when the differences are only **a few pp**?

Is it enough when **effect is about a fifth of a SD**?

Is '**6 months gain'**, relative to 'age advantage', good? Is it good over 10 months in Grade R?

What about **washout** over time?

Meta-analyses of impact of interventions

- Education interventions in Gr1-3 have average effect size of **0.18 SD** (Hill, Bloom, Black and Lipsey, 2008)

- Sub-Saharan African meta analysis (Conn, 2017):
  - Overall effect size for all education intervention types : **0.18 SD**
  - Education interventions focusing on pedagogy: **0.92 SD**

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Total	0.013	0.20	2.93	0.17

Comparisons with findings from other SA studies

1. ELOM (50-59 and 60-69 month)

Difference between >5 y.o and <5 y.o norms for emergent Maths is only **2.5 pp**

2. Reading catch-up research project (Grades 1-3)

The study showed an overall improvement from both control and intervention schools, with intervention schools showing **a slightly better performance** particularly in specific areas of reading (spelling and grammar)

3. WCED LitNum

Grade 1 Numeracy mean: **4 pp:** 27% (2009) to 31% (2012)

4. E-Lit (2016 lit/lang intervention in Grade R across Gr R)

6 months after the intervention training began (Mid-Grade R): **0.41 SD**

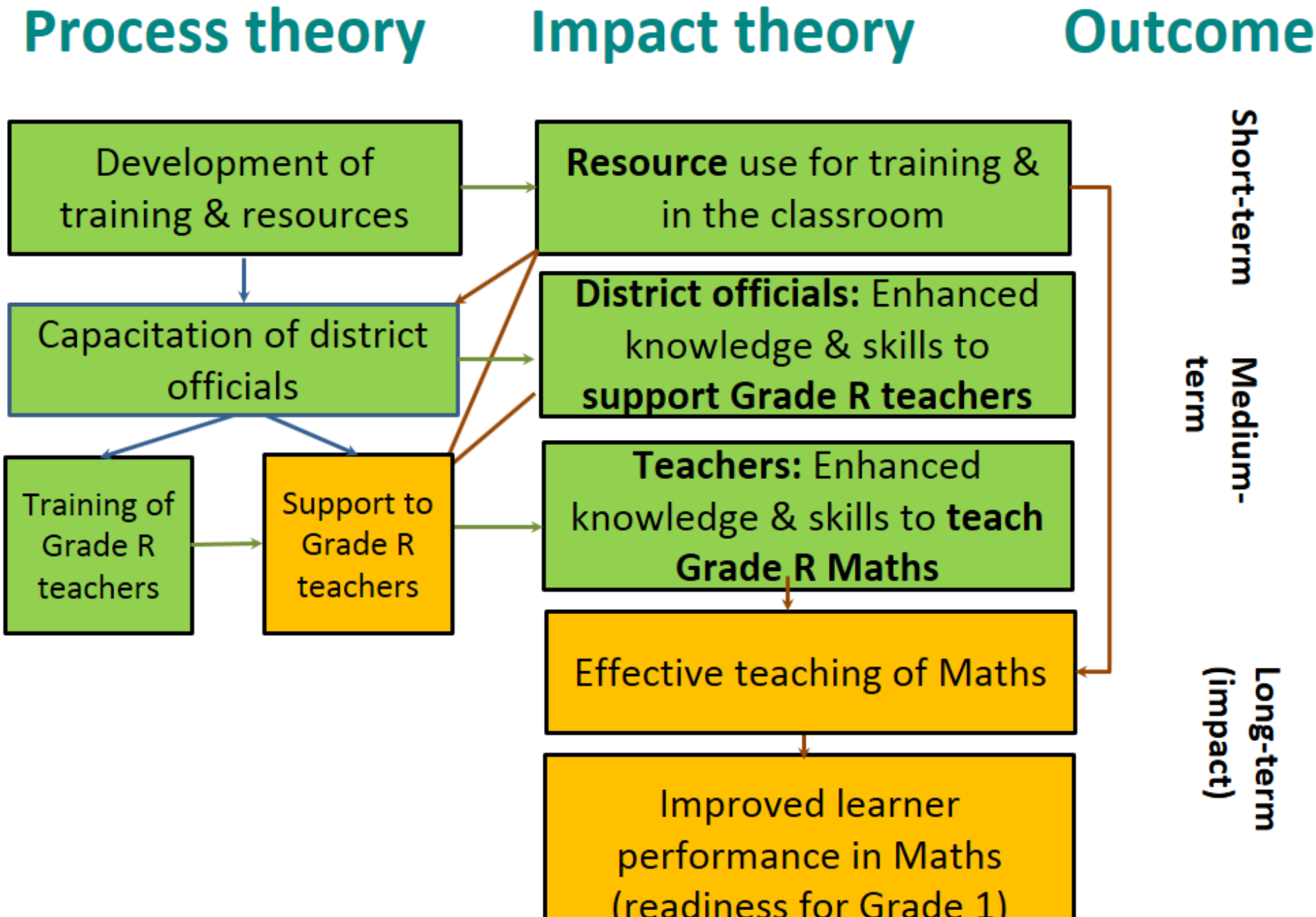
End of Grade R: **0.24 SD**

End of Grade 1: **No significant difference.**

6. So what?

Was R-Maths “successful”?

What does this R-Maths example highlight about our education research landscape?


Process theory
Impact theory
Outcomes
Development of training & resources
Capacitation of district officials
Training of Grade R teachers
Support to Grade R teachers
Resource use for training & in the classroom
District officials: Enhanced knowledge & skills to support Grade R teachers
Teachers: Enhanced knowledge & skills to teach Grade R Maths
Effective teaching of Maths
Improved learner performance in Maths (readiness for Grade 1)
Short-term
Medium-term
Long-term (impact)

Issues that hinder

1. Qualitative and quantitative realms are at times **different universes** (cold&clinical numbers vs warm&fizzy people)
2. **Enough of pilots.** We can easily change a few schools. But we need to get **change "at scale".** But then, we go **big. Immediately.** Without taking into account the stability/robustness of our treatment (which is still being conceptualised and/or theorised)
3. Change is urgent. Things are dire. So we must **implement now.** The budget is for this financial year…only in this administrative term…
4. **To measure: RCT is "gold standard"** (irrespective of the phase of intervention design…)
5. **Teaching CAPS and not children.** Tightly monitoring compliance on form ("supporting") daily/weekly/termly curriculum pace and 'coverage'.

Where our research is improving

Bog standard (now…):

- Enrolment (gross and nett), drop-outs, throughput, NCS attainment
- Total cohort (with GHS and DBE data)
- Inequality (class: school, household, child; race, gender)

Increasingly:

- Theories of change,
- Intervention input: level, purpose and 'form', (eg curriculum coverage, dosage, fidelity of "uptake")
- Learner outcomes: curriculum-based and international assessments, pre and post-intervention or change over time

Seldom:

- Delayed post tests, or
- Tracking of more than one academic year for SAs, teachers and learners

What do we are still not doing well – not measuring or describing:

- Joined-up family services in ECD
- Level of the system and why
- Costs & cost effectiveness
- Differentiation/remediation at school level
- Sensible sampling for system-wide feedback on learning
- Our instrumentation for standardised measurement for learning outcomes/ knowledge
  - Validity of the instruments we use
  - Standard/common assessments cross studies
  - Comparability of our instruments across languages
- The 'substance' and not just the form, of our interventions

What is the 'substance'?

Our **theory of learning:**

- How our children of this age learn x?
- Our children's expected developmental trajectory for x?

Our **pedagogic theory:**

- Our envisaged and actual role and capacity of our Subject Advisors for x (what do they do, know and feel about x?)
- Ditto for HODs: What do they do, know and feel about x?
- Ditto for teachers: What do they do know and feel about x?

Our REALISTIC **expected learning outcomes for children and caring adults:**

- Knowledge for x – eg "teaching maths to Grade Rs (in this school context)"

Thank you

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