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supporting primary maths

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ASSESSING EARLY NUMBER LEARNING: IS THE ANA USEFUL?

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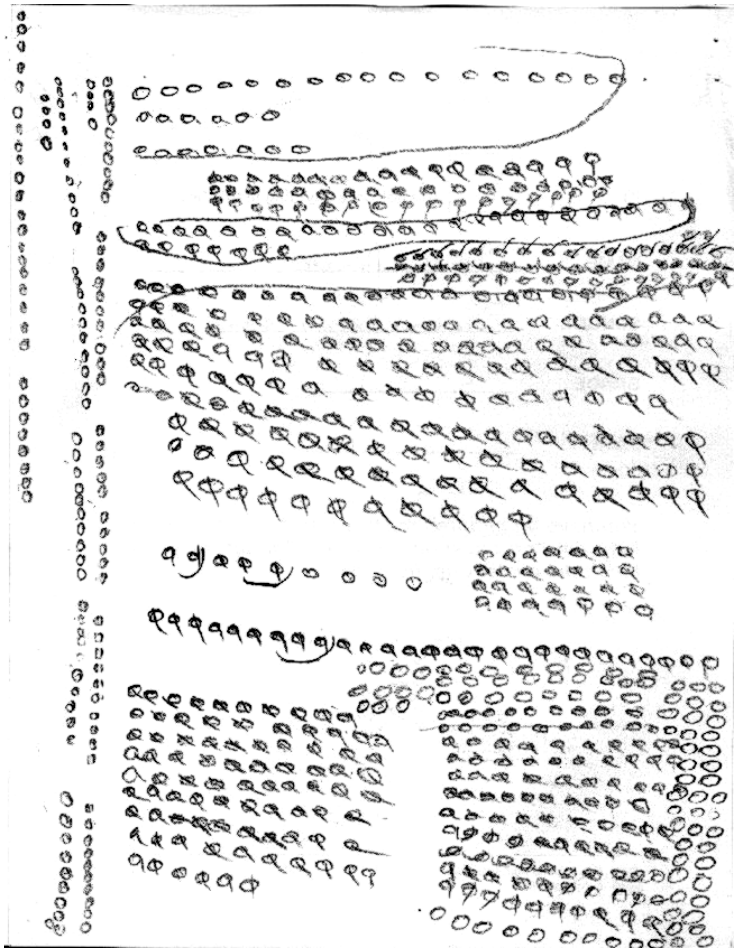
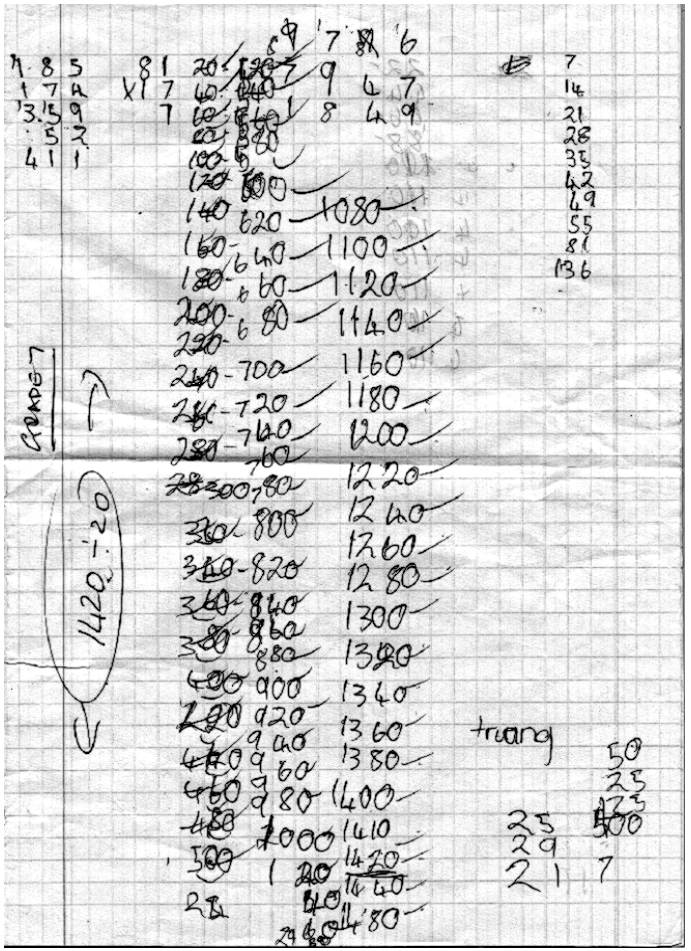
'Foundation Phase is ok'

ANA national mean scores	2012	2014
G3	41%	56%
G6	27%	43%
G9	13%	11%

Counting-based approaches to calculating





G5 & G7, Schollar, 2008

Findings lead to interest in …

- What is it about how mathematics (and esp number) are understood in FP that seem NOT to feed through into solid basis for IP and beyond?
- What are the limitations in our assessments and in our datasets relating to learners, schools and the broader context of education that restrict our understandings of, and ways of dealing with, learning problems?

What information is the ANA providing?

- 'Snapshot' in relation to grade-related curricula
- Concerns about:
  - differences in 'standards' across years
  - what assessment pitched towards curriculum rather than towards learning levels can usefully tell us
  - little information on trajectories of learning, as there are no cross-grade 'anchor' items
  - similarity of exemplar and test items
- So what might looking more broadly at mathematical assessments in FP tell us about learning?

Progression in early number

Stages of early Arithmetical Learning	
0	Emergent count
1	Perceptual count
2	Figurative count
3	Initial number sequence
4	Intermediate number sequence
5	Facile number sequence

Wright et al, 2006

Other aspects like extent of FWD/BWD counting, awareness of number after/before, and use of calculating using decimal structure support extension to higher stages

Assessing learners' understandings of early number

- Weitz (2014) compared results of a township learner sample on 2011 Grade 1 ANA number items and Wright et al's oral interview diagnostic tests.
- Using 60% cut off point - 'high'/'low' perf in Wright et al tests; 65% as cut off in ANA

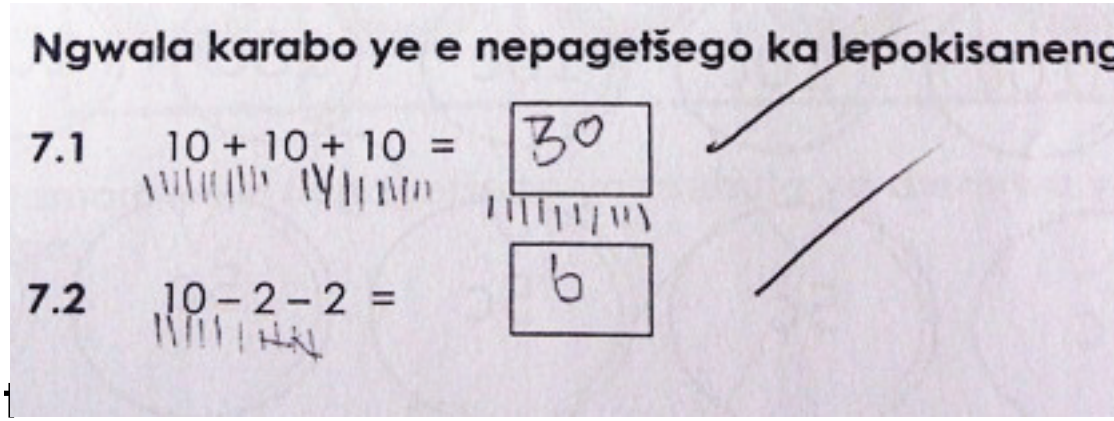
Groups	No in each group
High ANA / High Wright tests	2
Low ANA/ High Wright tests	1
High ANA/ Low Wright tests	14
Low ANA/ Low Wright tests	12

‘James’: 66.7% ANA vs 18.2% Wright

Wright

- Able to identify most numbers in 1-100 range
- Unable to state the number word after a given number beyond 1-10 range, without reverting to counting from 1
- Able to answer early addition/subtraction and missing addend/subtrahend problems with counters.

ANA



Weitz & Venkat, 2013

Lesson Starters Project 2011-14 outcomes, Grade 2

Stage	2011 (%, n=238)	2014 (%, n=60)
0	11.8	3.3
1	23.5	15
2	38.7	28.3
3		46.7
4		6.7
5		0

Count all or less sophisticated methods

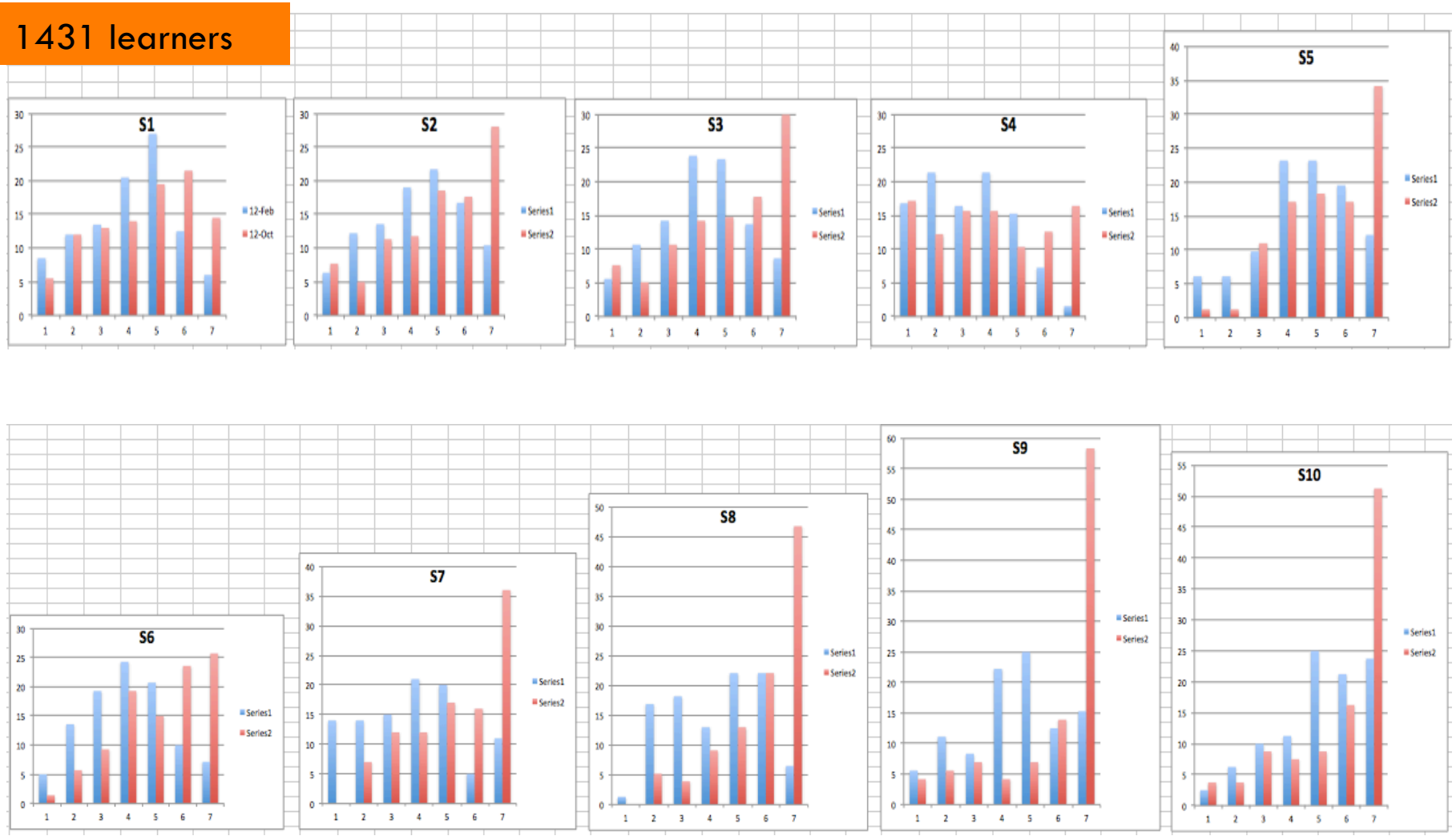
73.9%

Count on or more sophisticated methods

52.4%

Looking across ten schools: start and end G3, 2012

1431 learners



2012 – 2015 G3: multiple moving parts

- Repeating 2012 G3 assessment in 2015
- Can see larger proportions in the highest (80-100%) band …
- But also in the lowest (0-29%) band in Feb 2015 in 7/10 schools

Leads to attention to moving parts in the system

- ❑ Learner mobility within and between grades, as well as attendance issues.
- ❑ Teacher mobility
- ❑ Teacher knowledge

Two key issues

- Increasing learner numbers in most schools

School	1	2	3	4	5	6	7	8	9	10
Feb 2012 number	241	231	223	295	89	149	102	96	76	87
Feb 2015 number	223	320	299	308	145	167	117	172	80	87
% change	-7	39	34	4	63	12	15	79	5	0

- Some international evidence that moves to more prescriptive sequencing and pacing, while raising 'the middle', can create a learner 'underclass'

FP numeracy in partner schools

- Teaching with direction and coherence is improving
- Curriculum coverage is improving
- Home languages not being leveraged sufficiently for mathematical learning, e.g. for explaining structure of decimal number system:

  236 is 'makgolo pedi masome tharo tshela' – literally 'hundreds two tens three six' (Mdluli, forthcoming)

- AND
- Continually shifting ground in terms of learner mobility/ language base
- Teacher mobility and ongoing difficulties with recruitment

Improving primary maths assessments

- Include items and item formats that test for sophistication of strategies, not just answers
- Thinking about a mental mathematics assessment component
- Include skills trajectory-focused 'anchor' items alongside curriculum grade-related items
- Electronic marking templates for faster diagnostic feedback
- Monitoring shifts in central tendency measures, and developing initiatives over time for the low performing minority

THANK YOU

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