Presentation of selected research in repository

Martin Gustafsson

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Background factors – at the personal level

- Having been a school teacher helped. Especially the subject history.
- As did some time spent doing political and union work.
- Organising socio-political frameworks: Marxism, economics, now also the science of the environment.
- The chance to learn another global language.
- Learning to touch-type!
- Learning programming.
- Occasional writing courses.
- Access to mountains of government microdata.
- The opportunity to grow as a researcher, and help others grow, through collaboration.
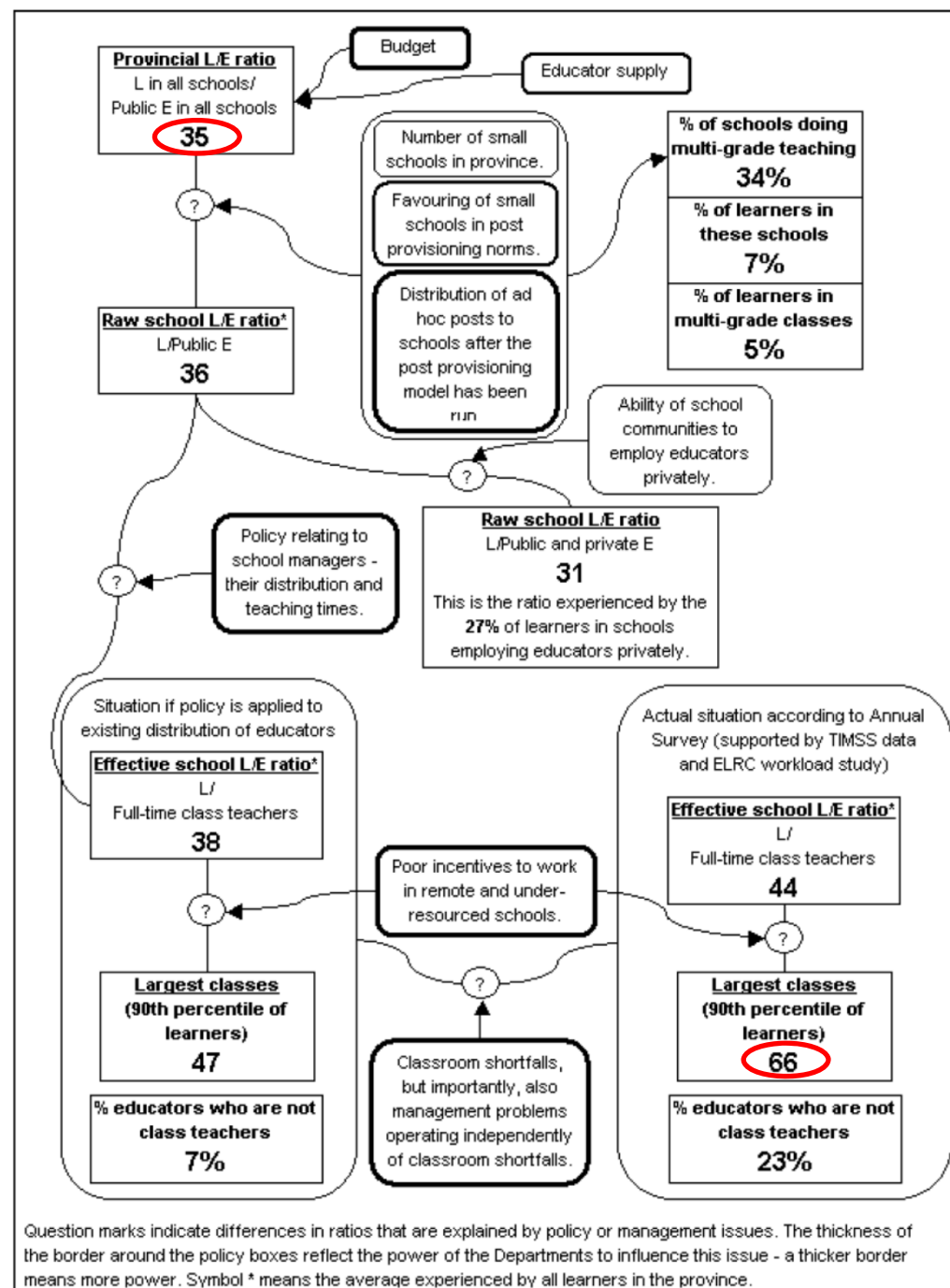
2006

Post provisioning: Conceptual framework, analysis of the data and way forward

The magic of flow diagrams, for LE ratios (as here), or per learner funding, time spent on teaching per teacher, etc.

This done shortly after I had started using Stata. For graphs, eventually moved back to Excel.

Our exceptionally large classes are in part due to a high overall LE ratio (difficult to change), but also poor utilisation of teacher time (can be changed).

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Figure 23: The overall teacher allocation picture: Mpumalanga in 2005

Question marks indicate differences in ratios that are explained by policy or management issues. The thickness of the border around the policy boxes reflect the power of the Departments to influence this issue - a thicker border means more power. Symbol * means the average experienced by all learners in the province.

Quality enhancement options for the schooling system: Learning from improvements in similar systems elsewhere
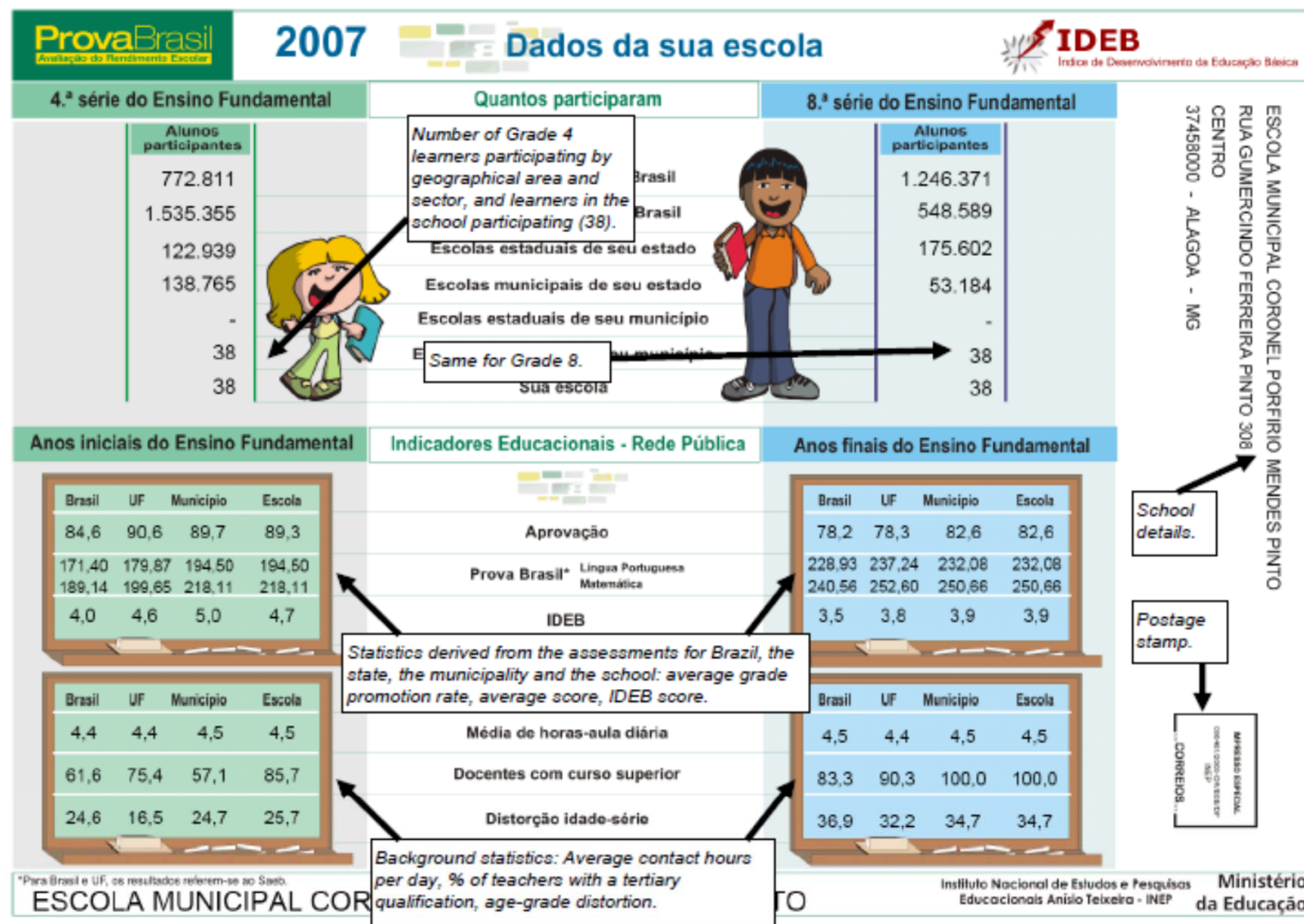
Looking at government websites around the world.

Let's look more at developing countries.

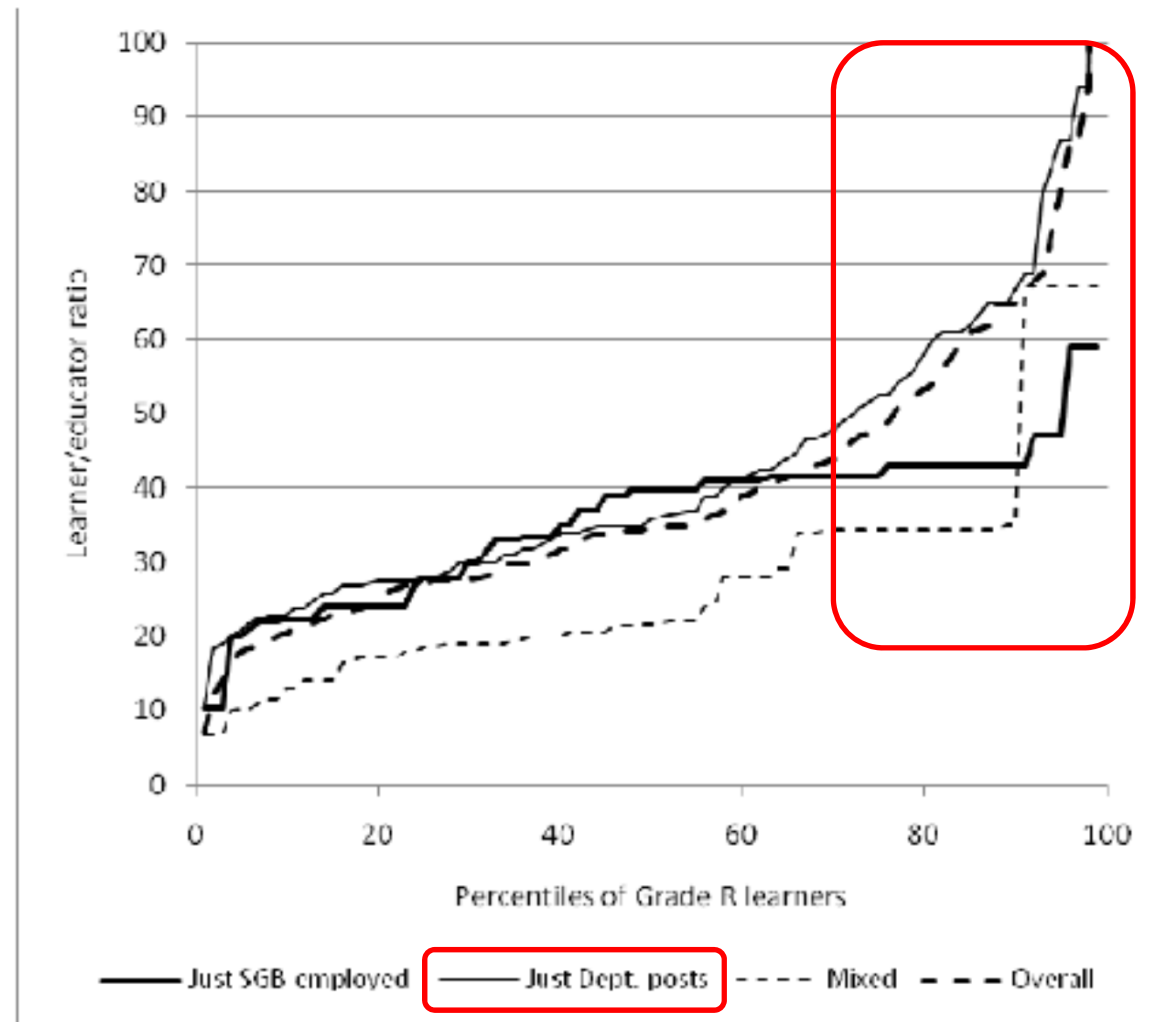Even more so today, school report cards should be on our policy agenda.

School funding and management in South Africa: Findings from the school survey

Letting (economic) theory guide you when you explore the data. The role of unions, accountability to communities.

The importance of weighted averages when talking about class size.

The importance of laying out the consequences of minimum standards. Especially important in South Africa.

Figure 16: Grade R class sizes

Note: Learner weights used.

Percentile plots!

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The state of mathematics, science and technology in our schools

Group-by tables can be more helpful than separate descriptive stats per variable. Applies to household possessions, school resources, and (here) what you teach.

Teacher training needs to be informed by these patterns.

Table 5: Grade combinations of teachers

Gr 1	Gr 2	Gr 3	Gr 4	Gr 5	Gr 6	Gr 7	Gr 8	Gr 9	>Gr 9	
X	X	X	X	X	X	X				1,008
X	X	X								2,683
X	X									2,553
X		X								703
X										24,843
	X	X								2,292
	X									18,361
		X								19,191
			X	X	X	X	X	X		1,598
			X	X	X	X				13,060
			X	X	X					14,906
			X	X		X				1,378
			X	X						7,384
			X		X	X				1,682
			X		X					1,900
			X			X				1,193
			X							11,163
				X	X	X				6,471
				X	X					5,209
				X		X				1,974
				X						7,642
					X	X	X	X		931
					X	X				8,752
					X					7,197
						X	X	X	X	852
						X	X	X		12,333
						X	X			1,827
						X		X		1,079
						X				9,603
							X	X	X	22,260
							X	X		10,095
							X		X	17,170
							X			3,325
								X	X	19,488
								X		3,236
									X	48,270
31,845	26,937	25,908	55,395	60,771	62,856	63,897	70,562	72,041	108,390	314,330
					Teachers with less typical combinations not reflected above					16,560
					Total teachers analysed					330,172

Note: The teachers above are from 21,426 schools.

Table 6: Percentage of teachers teaching in just one grade

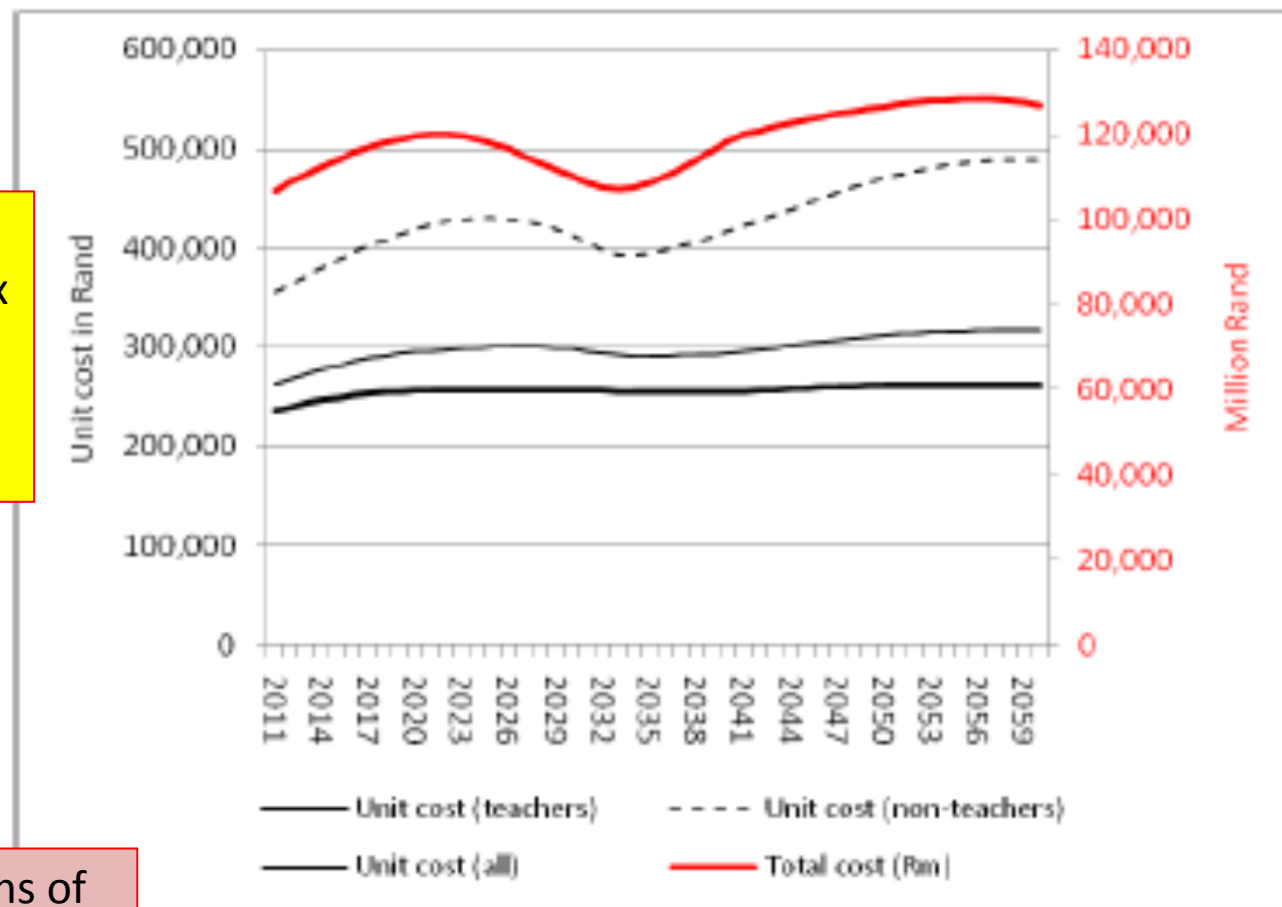|	Q1	Q2	Q3	Q4	Q5	Total
Gr 1	69	72	78	76	60	71
Gr 2	58	59	69	68	52	61
Gr 3	62	64	71	68	51	63
Gr 4	9	13	21	32	27	18
Gr 5	5	8	13	20	18	11
Gr 6	5	7	12	19	16	10
Gr 7	8	10	15	23	21	13
Gr 8	3	3	5	7	4	4
Gr 9	4	4	5	7	2	4
Gr 10	6	6	6	6	2	5
Gr 11	3	3	4	4	1	3
Gr 12	5	5	5	5	3	5

Incentives for teachers within the salary system

VBA in Excel! Good for building complex models which others can use to generate scenarios.

Figure 26: Unit costs to 2060 assuming generous notch progression

We ignore projections of relatively predictable things like enrolments and average teacher cost at our peril.

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Technical subjects in public schools in 2013

Race and gender breakdown of technical subject enrolments (I)

	Black African		Coloured		Indian		White		All		
	F	M	F	M	F	M	F	M	F	M	F + M
EC	372	1,107	36	184	2	7	86	392	496	1,691	2,187
FS	352	825	15	102	1	1	124	653	494	1,589	2,083
GP	1,146	2,324	70	255	57	199	909	3,451	2,186	6,260	8,446
KN	1,670	3,713	46	162	318	1,633	166	632	2,202	6,147	8,349
LP	365	1,018	1	10	0	0	112	362	481	1,391	1,872
MP	242	586	6	26	6	9	170	712	424	1,333	1,757
NC	103	178	56	158	1	1	14	132	174	469	643
NW	456	626	11	75	0	1	153	745	620	1,450	2,070
WC	155	296	441	1,836	4	15	282	1,249	882	3,405	4,287
SA	4,861	10,673	682	2,808	389	1,866	2,016	8,328	7,959	23,735	31,694

Race and gender breakdown of technical subject enrolments (II)

	Black African		Coloured		Indian		White		All		
	F	M	F	M	F	M	F	M	F	M	F + M
EC	1	4	2	10	2	8	6	29	1	5	3
FS	3	8	4	28	50	100	9	47	3	13	8
GP	3	8	3	14	5	19	13	51	4	16	9
KN	3	7	5	20	5	29	13	45	3	10	6
LP	1	3	2	30	0	0	17	57	1	4	2
MP	1	3	5	26	7	13	13	58	2	6	4
NC	4	7	2	9	9	10	3	29	3	10	6
NW	3	5	4	35	0	3	12	59	4	11	7
WC	2	5	3	18	2	9	8	36	3	17	9
SA	2	5	3	16	5	26	11	46	3	10	6

Insisting on getting race/population group in the microdata.

A part of the task of addressing the skills shortfall must be about resolving these inequalities, which require little in the way of 'hard' policy reform.

A check on item-level data patterns in the 2013 ANA associated with possible cheating

Freakonomics and uncovering the unexpected

Imagining the assessment scene, and looking for suspicious patterns in the item-level assessment data, should be standard practice.

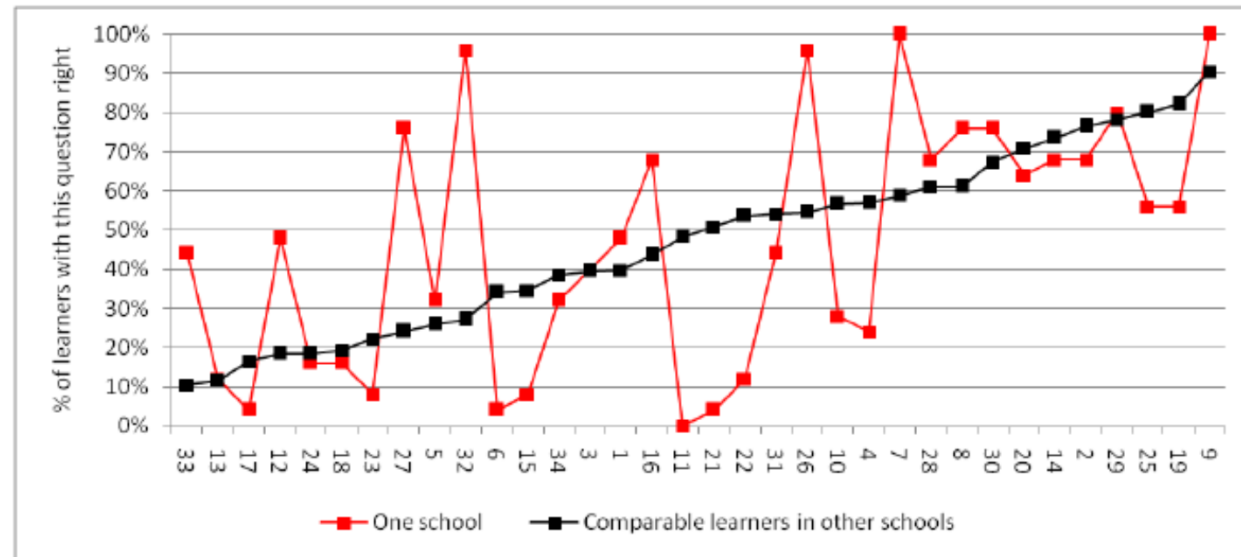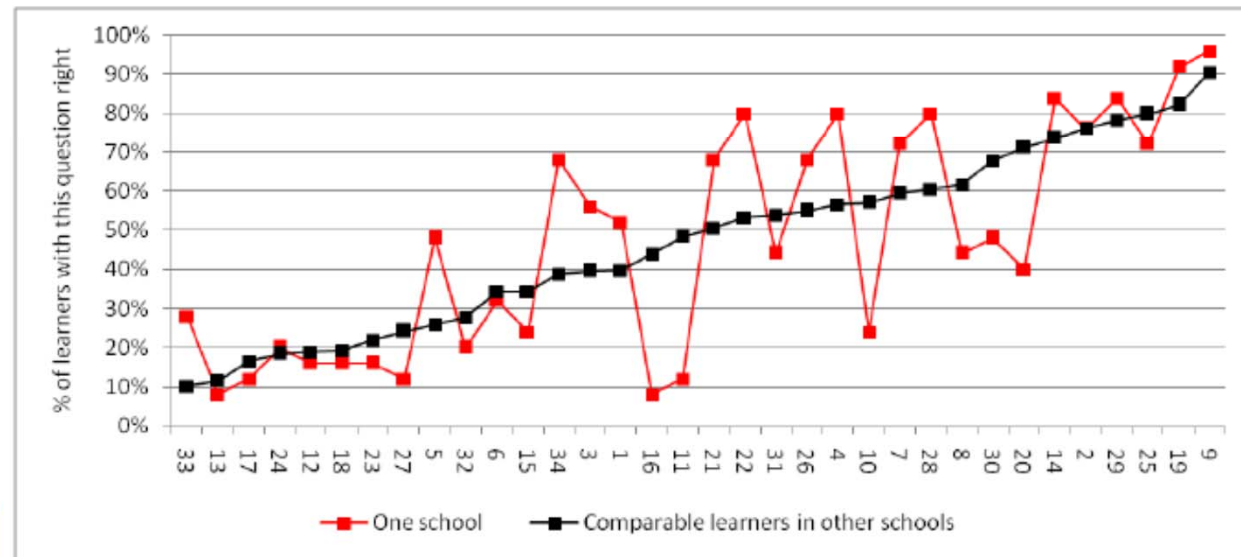Figure 6: Illustration of strange school (2)

Figure 7: Illustration of non-strange school (2)

Towards better generation and use of data within the basic education sector

A COMPARISON OF EDUCATION DEPARTMENT ANNUAL REPORTS				
	KwaZulu-Natal	**Western Cape**	**New South Wales (Australia)**	**New Zealand**
Name of organisation	KwaZulu-Natal Department of Education	Western Cape Education Department	New South Wales Department of Education	Ministry of Education
Report	*2014-2015 annual report*	*Annual report 2014/2015*	*Annual report 2015*	*The Ministry of Education Annual report: For the year ended 30 June 2015*
Length in pages	313	269	166	136
Tables with non-financial statistics	**68** tables spanning ±57 pages. If only tables including assessment or examination results are counted the figures are: **3** tables spanning ±6 pages.	**58** tables spanning ±35 pages. If only tables including assessment or examination results are counted the figures are: **7** tables spanning ±5 pages.	**29** tables spanning ±9 pages. No tables dealt with assessment or examination results.	**12** tables spanning ±15 pages. The only tables with assessment or examination results are those providing graph figures.
Financial statistics (in terms of pages)	102 pages.	54 pages.	59 pages.	24 pages.
Graphs	No graphs.	10 graphs, of which 6 with assessment or examination results.	34 graphs, of which 25 with assessment or examination results. (9 graphs deal with tertiary education)	9 graphs, of which 5 with assessment or examination results.
Pages with tabular narrative	33 pages.	44 pages.	1 page.	0 pages.
Non-financial indicators with average years covered	85 indicators spanning on average 2.0 years. If only indicators dealing with assessment or examination results are counted the figures are: 32 indicators spanning on average 2.0 years. (39 indicators are considered official 'programme performance indicators', of which 19 deal with assessments or examinations. All these official indicators span two years.)	103 indicators spanning on average 2.6 years. If only indicators dealing with assessment or examination results are counted the figures are: 27 indicators spanning on average 2.8 years. (47 indicators are considered official 'programme performance indicators', of which 19 deal with assessments or examinations. All these official indicators span two years.)	50 indicators spanning on average 6.0 years. If only indicators dealing with assessment or examination results are counted the figures are: 33 indicators spanning on average 5.8 years. (9 indicators in total deal with tertiary education.)	83 indicators spanning on average 2.2 years. If only indicators dealing with assessment or examination results are counted the figures are: 5 indicators spanning on average 4.2 years. (76 indicators, none dealing with learner assessments, but several dealing with client satisfaction, fall under the seven budget programmes. All these indicators span two years.)
Auditor-General's focus	Apart from financial statement, also performance indicator values and attainment of targets.	Apart from financial statement, also performance indicator values and attainment of targets.	Only financial statement	Apart from financial statements, also performance information.

Analysing plans: Fascinating stories of numbers, politics, language, pseudo-science.

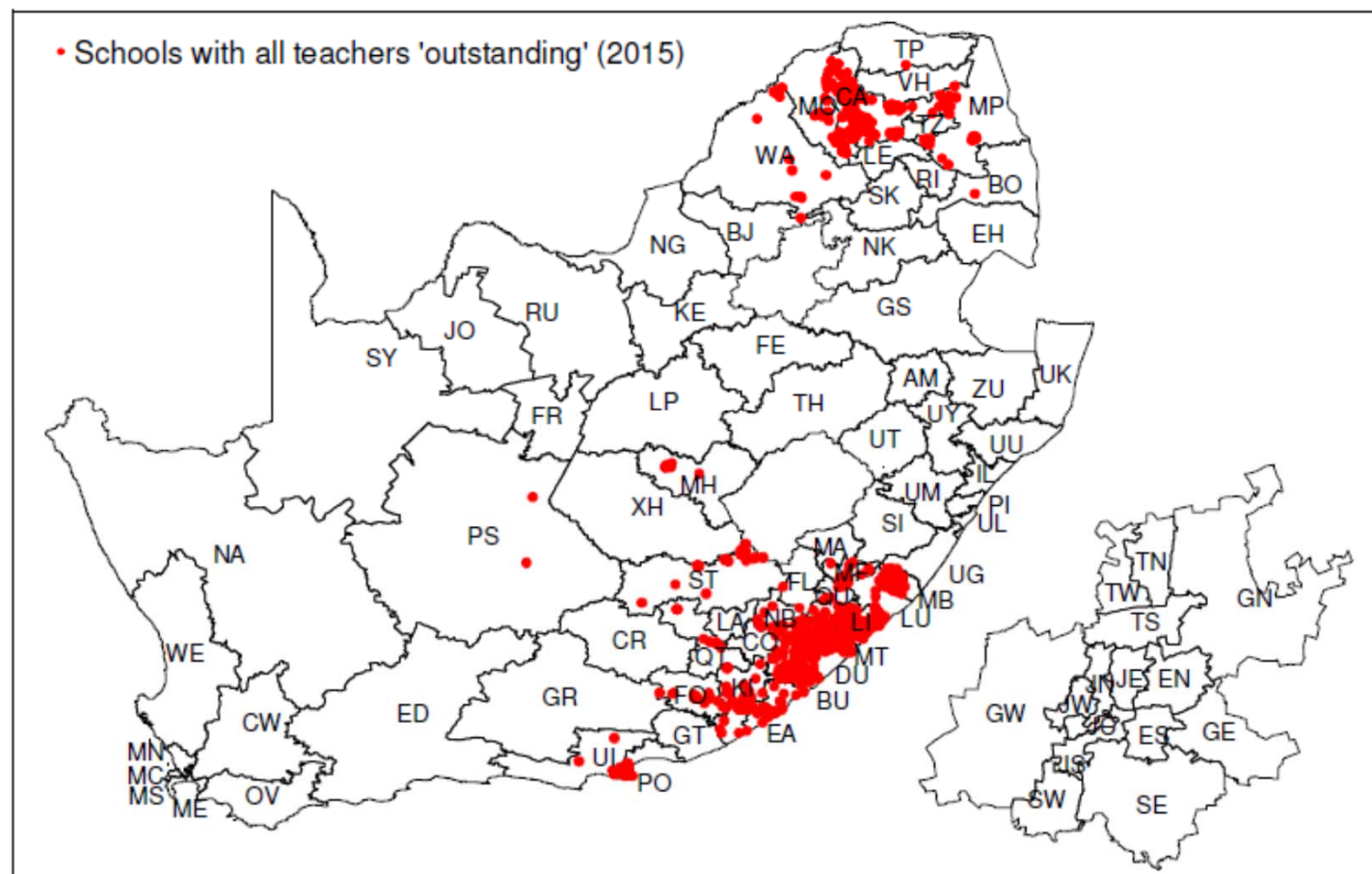Researchers can help in the push for better annual plans and reports.

Who becomes an HoD?

Maps! This is done in Stata. Excel too now, I believe.

Always examine school-level statistics when you have values below that level.

It's okay to speculate, as long as you're open about it.

Figure 5: Schools with all teachers 'outstanding'

• Schools with all teachers 'outstanding' (2015)

(I)QMS is not a lost cause. Schools such as the red ones above should receive attention. But we also need to understand the within-school variation cases.
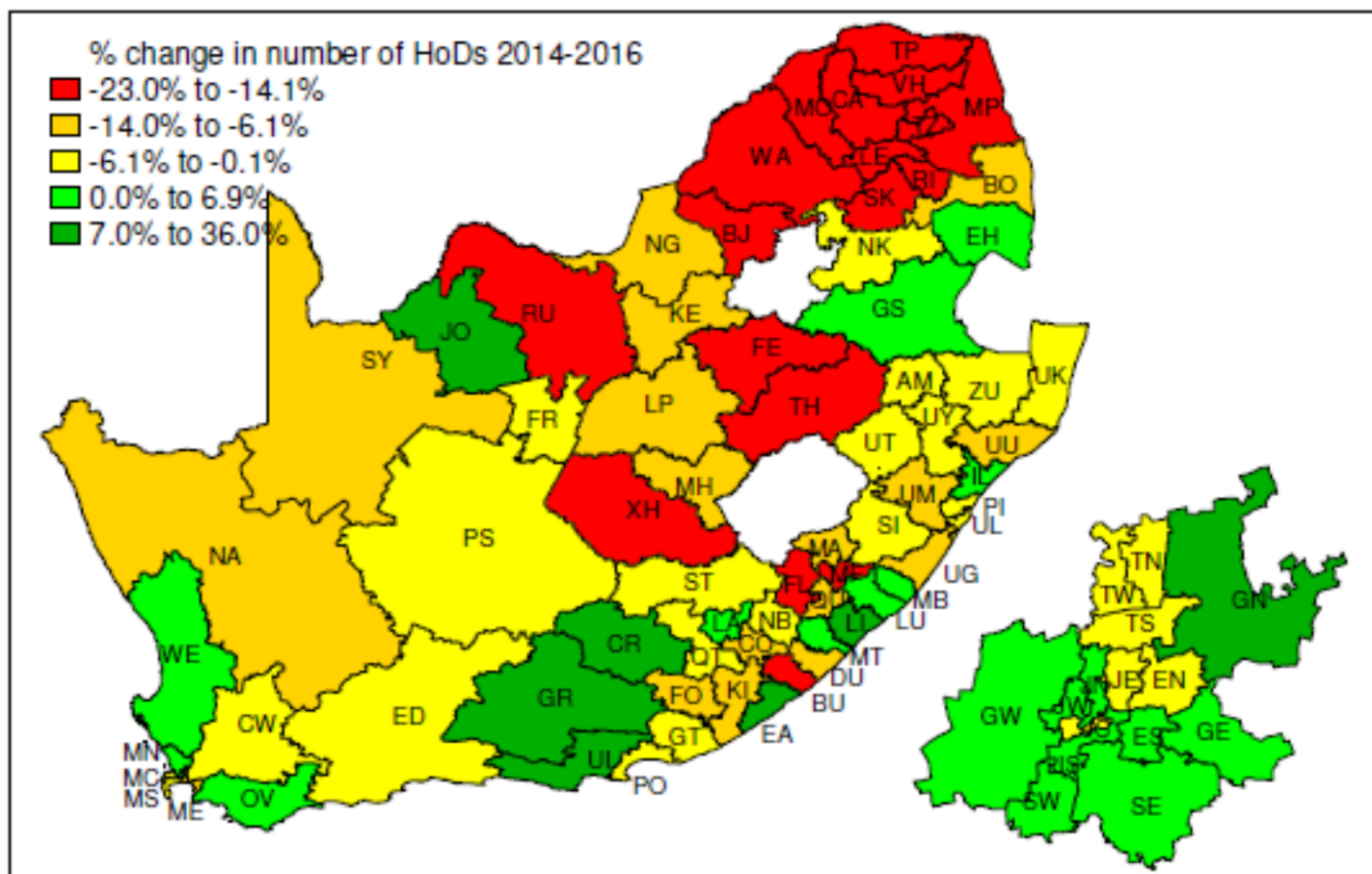
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Personnel spending pressures: Hiring and promotion cuts with enrolment growth

Monitoring (as opposed to 'research') is an honourable pursuit.

One reason we need microdata is for linking individuals across years.

Figure 19: 2014 to 2016 declines in HoDs by district

% change in number of HoDs 2014-2016
- -23.0% to -14.1%
- -14.0% to -6.1%
- -6.1% to -0.1%
- 0.0% to 6.9%
- 7.0% to 36.0%

The role of HoDs needs closer attention. This is a key component in the existing teacher incentive system.

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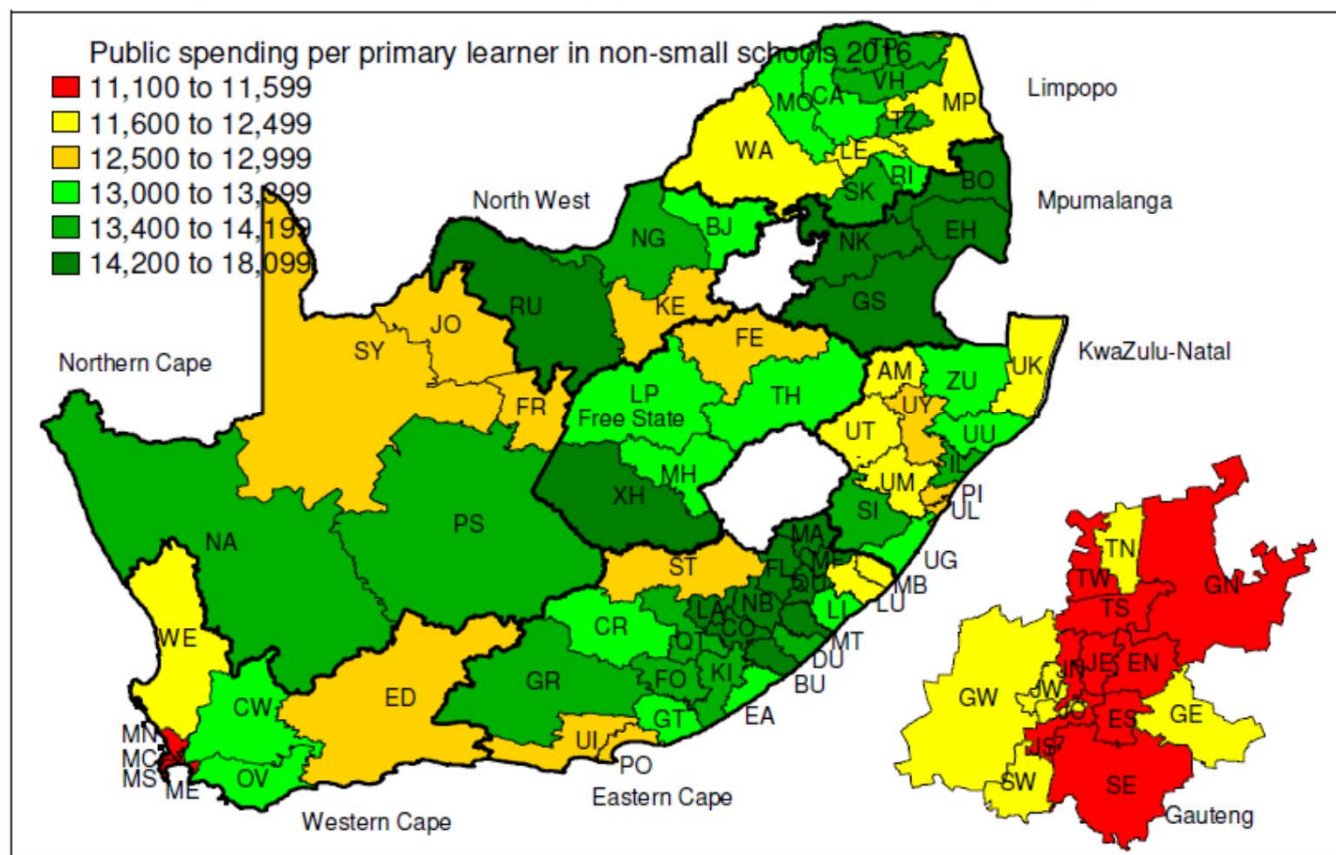
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Per learner spending inequities in 2016

All the work that has gone into fixing 'cost centres', i.e. schools, allows for this kind of analysis.

Myth-busting is needed.

Figure 7: Per learner funding per district – non-small primary (2016)

Public spending per primary learner in non-small schools 2016
- 11,100 to 11,599
- 11,600 to 12,499
- 12,500 to 12,999
- 13,000 to 13,399
- 13,400 to 14,199
- 14,200 to 18,099

Should per learner expenditure at the school level become more transparent? *Within* each province we are mostly pro-poor, but only just.

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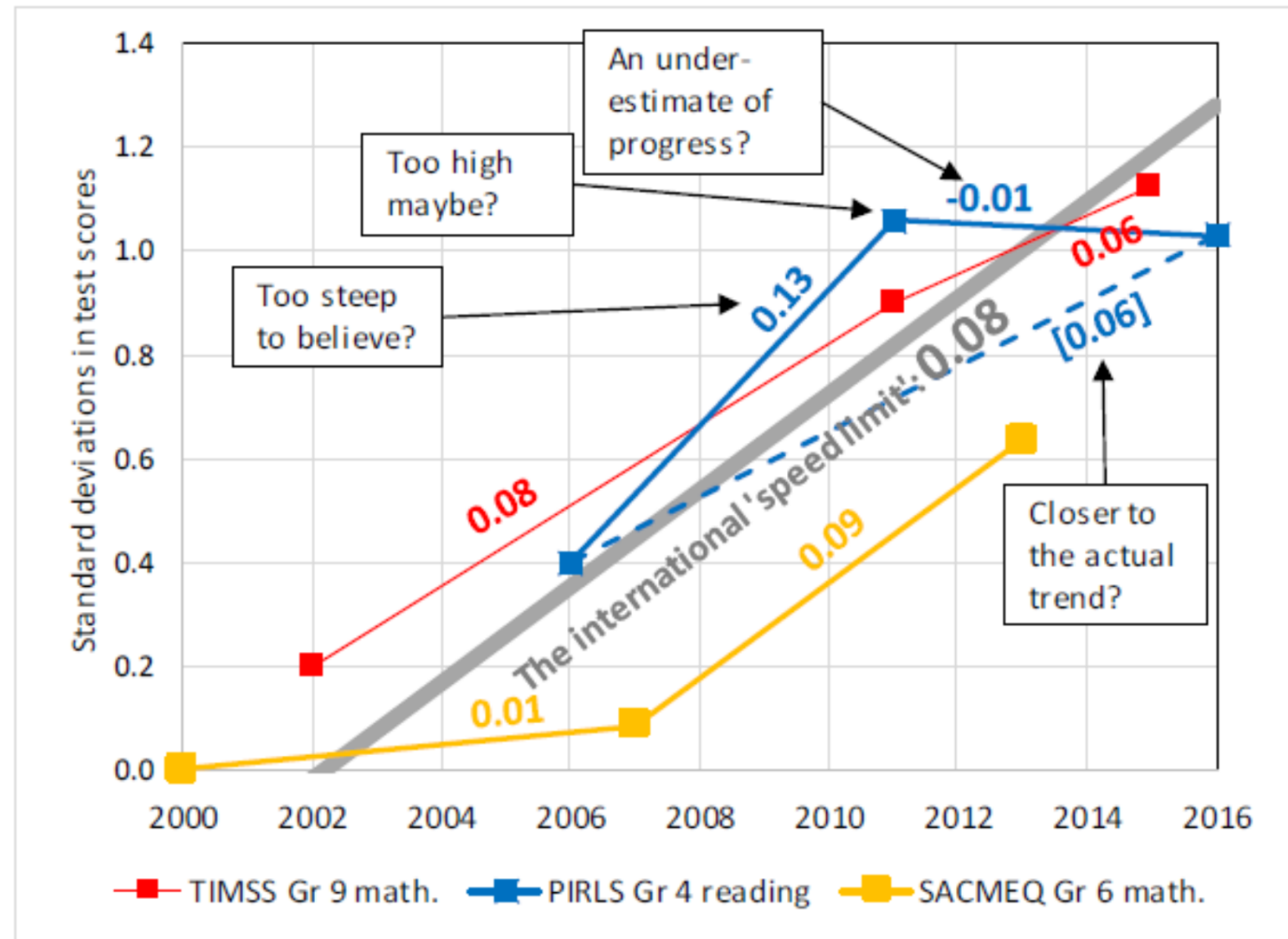
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TIMSS, SACMEQ and PIRLS: Data issues

Look for expected consistencies, and ask questions.

Patriotism is important, but...

Figure 1: Trends for South Africa for three testing programmes

We desperately need to continue growing capacity in the area of 'psychometrics' (i.e. item response theory, Rasch scores, matrix testing, plausible values).

Computer access in schools according to TIMSS

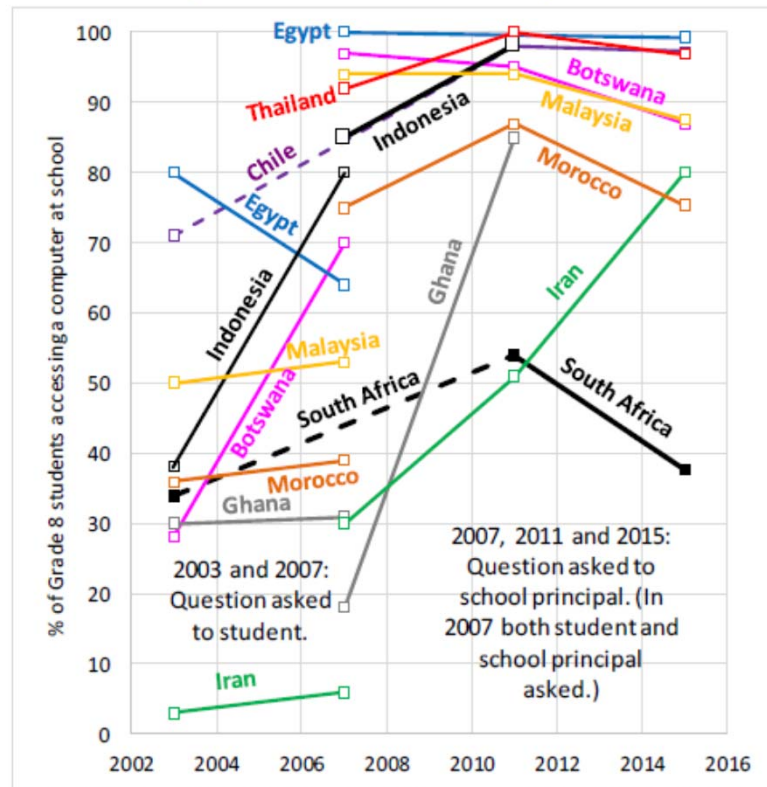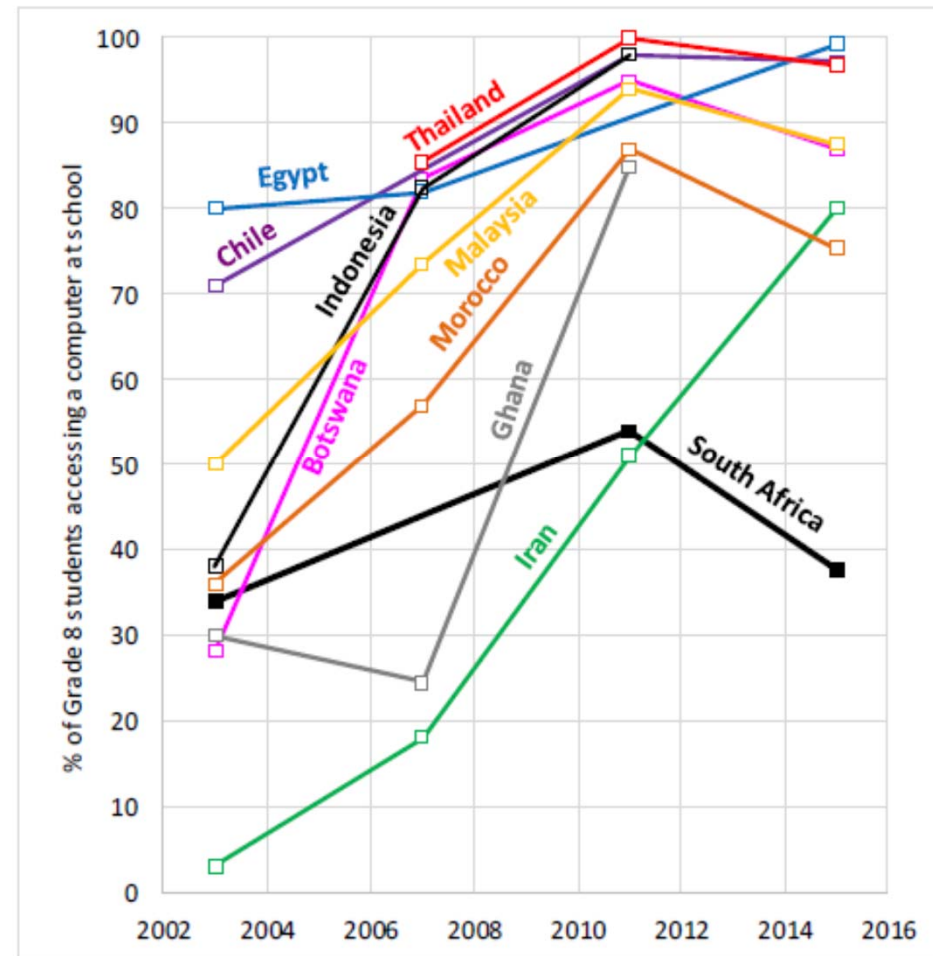Figure 1: Grade 8 access to computers

Figure 2: Grade 8 access to computers (simplified)

Data sources such as TIMSS and SACMEQ are not just about test data.

Often a need to do the analysis at two levels: the more in-depth level, the 'popular' level.

Key questions we face in the ICT area include primary-secondary prioritisation, and the role of traditional computer centres.

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