What is the Nature of Evidence that Makes a Difference to Learning?

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ACER Conference 2005

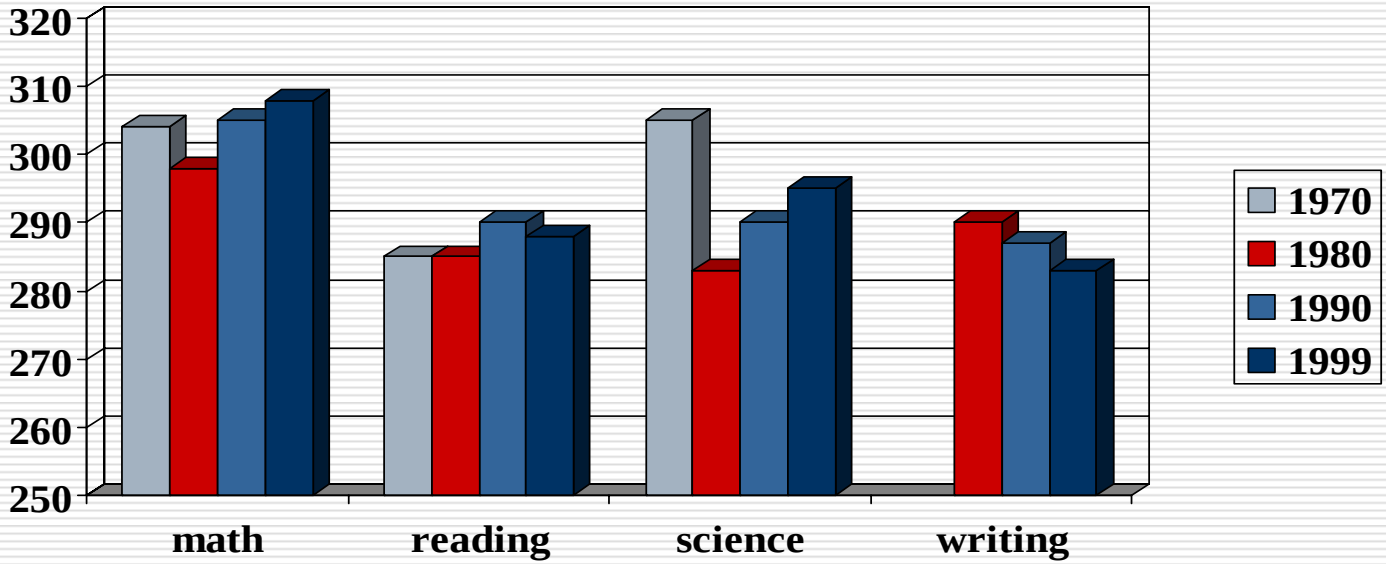
The claims …

- Schools are awash with data
- It’s the Interpretations - III
- While we collect and massage more data, teaching continues
- We invent accountability systems to improve teaching and learning
- National Testing (as per NCLB) is not the model worth moving towards
- But who is asking for more tests?
- Schools have failed in their reporting to parents

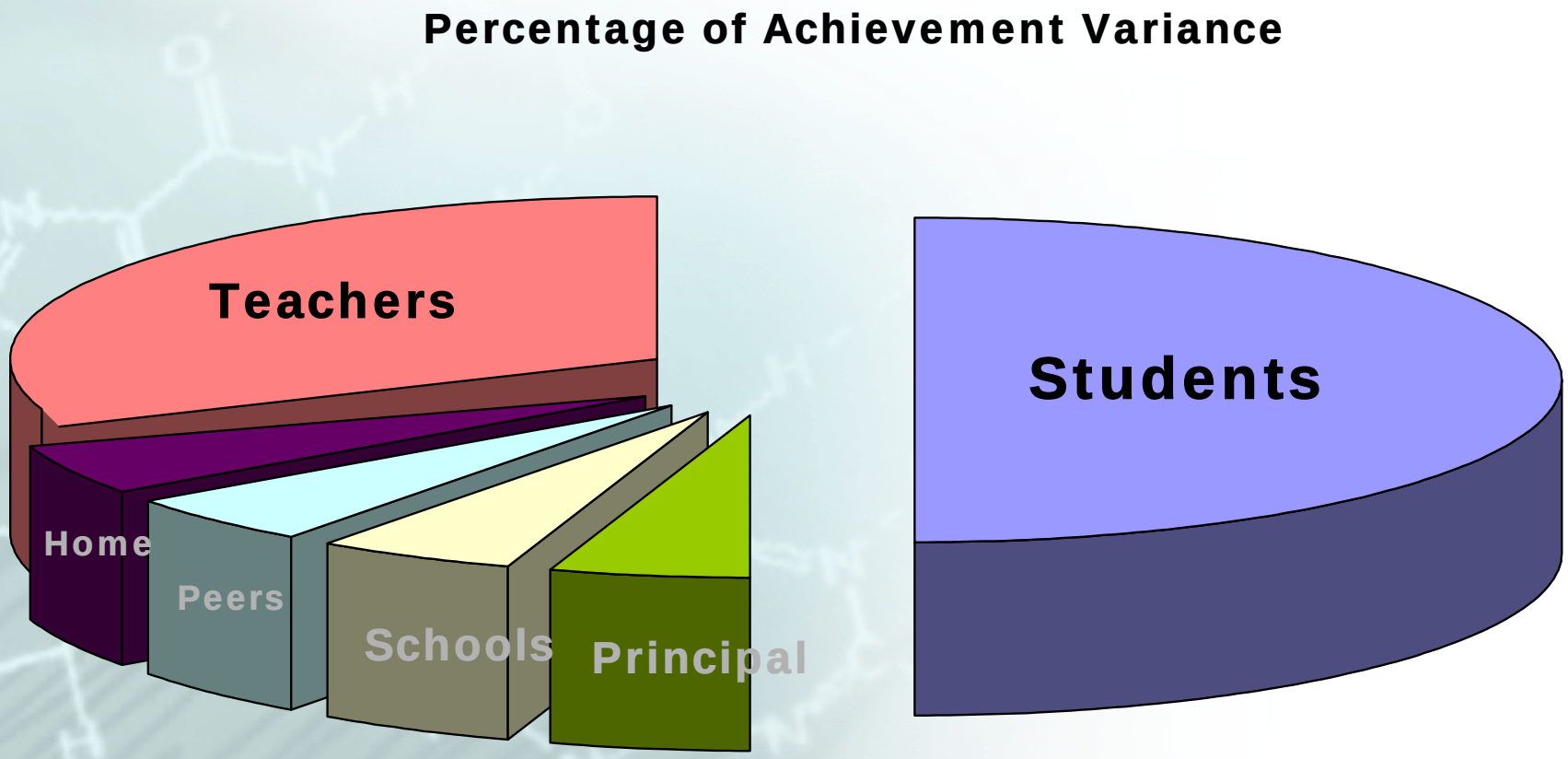
Public school resources, 1960-2000

	1960	1980	2000
Pupil-teacher ratio	25.8	18.7	17.3
% master's degree	24	50	56
Median experience	11	12	15
Spending/pupil	$2,235	$5,124	$7,591

U.S. NAEP performance
(17 year olds)



Identifying what matters



What are “learning outcomes”?

- What it is that we wish to enhance?
- OECD Key Competencies - thinking, making meaning, managing self, relation to others, and participating and contributing

A common understanding of the Achievement Progression

- Outcomes from curricula must have a sense of achievement progression
- One of the major purposes of an accountability system is to assist in teachers sharing/articulating a common language of progression
- Teachers talking about Teaching/ and sharing a common understanding of progression, using Evidence

The Nature of Evidence …

- The data must relate to what teachers are teaching and students are learning:
  - not generalised surrogates for ability measures
  - IF we wish to enhance teaching and learning
- The location of “evidence” starts in the classroom
- Target Setting
  - A demonstration

The Interpretations

- Once you have decided on the “Interpretations” that make the difference to learning and teaching
- Then create dependable data that leads to the Interpretations

- Demo the target/ expectations/ adequate yearly progress ideas

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Assessment Tools for Teaching and Learning

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He Pūnaha Aromatawai mō te Whakaako me te Ako

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Solving the Problem of National Testing

THE UNIVERSITY OF AUCKLAND
NEW ZEALAND

MINISTRY OF EDUCATION
Te Tāhuhu o te Mātauranga

University of Auckland for the New Zealand Ministry of Education

Multi-test Console Report for Subject: Mathematics
Group: All Test Candidates

Number of Tests: 3
Period Tested: February 2004 to February 2004

Interaction Effects

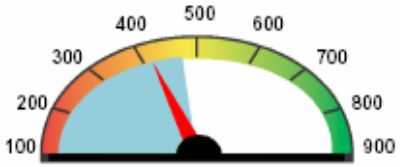
Ethnicity: All
Year: 4,5,6,7,8
Gender: All

Language: All
Cluster: South of Taupo, low decile, mostly Maori, Pacific and non-European, primary schools
NZ Performance:

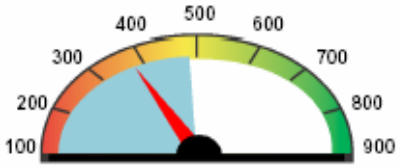
Location: All NZ Schools
Your Group Performance:

No. of Students: 195
No. of Results: [*n*]

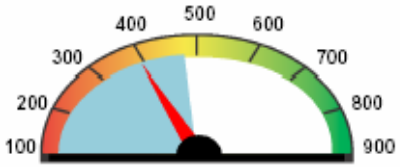
Curriculum Functions



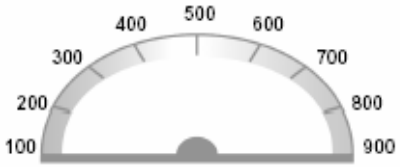
Number Knowledge [195]



Number Operations [195]

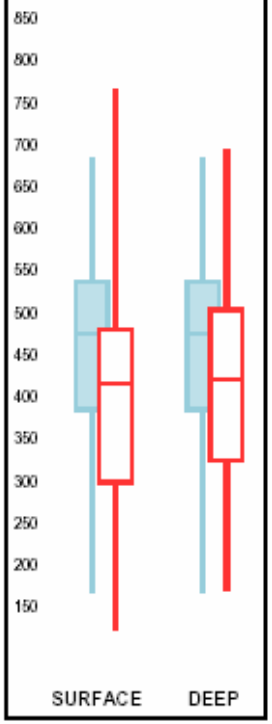


Algebra [195]

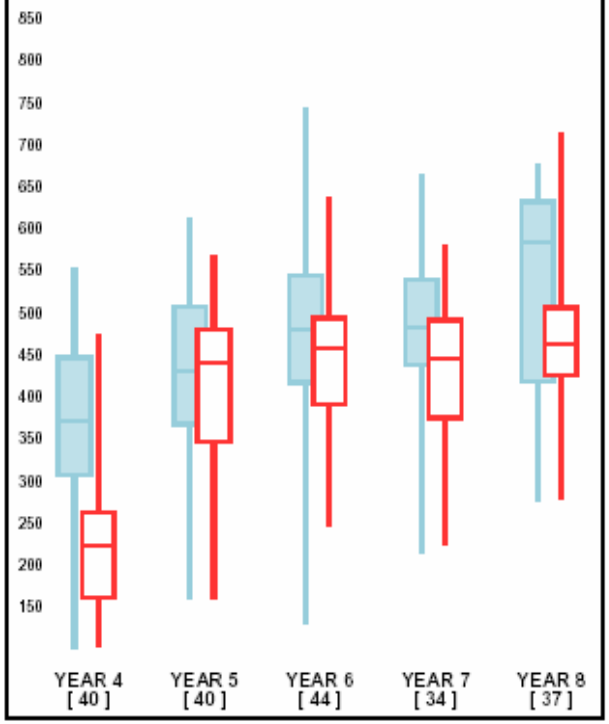


Measurement [0]

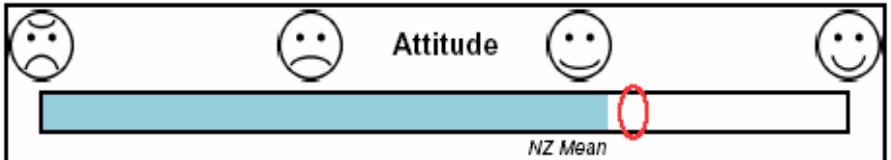
Depth of Thinking



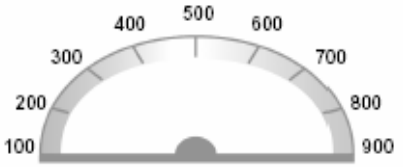
Mathematics Scale



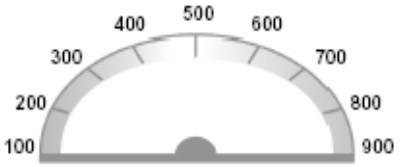
Attitude



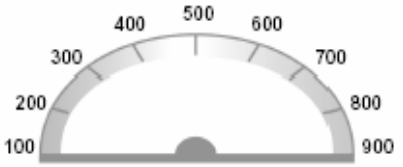
Curriculum Functions



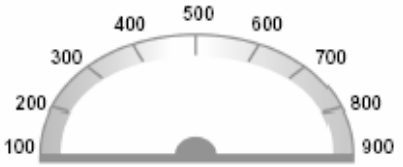
Geometric Knowledge [0]



Geometric Operations [0]



Probability [0]



Statistics [0]

Multi-test Console Report for Subject: Reading
Group: All Test Candidates

Number of Tests: 2
Period Tested: March 2004 to April 2004

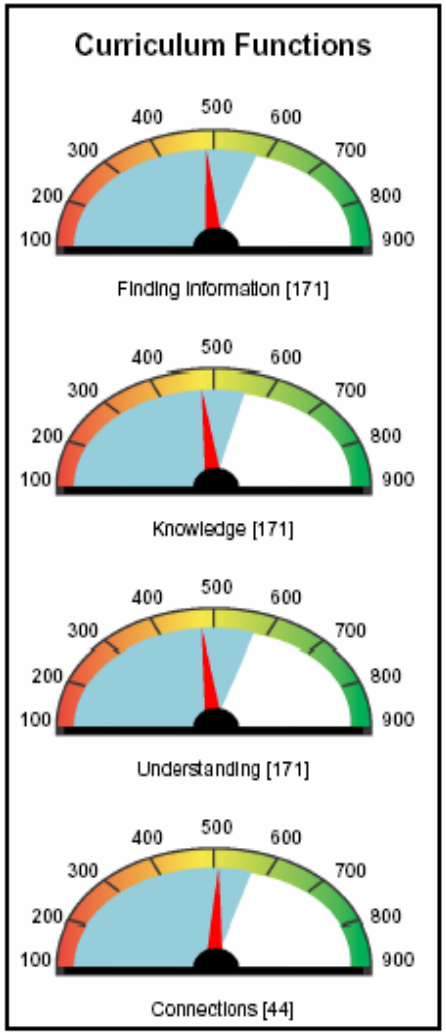
Interaction Effects

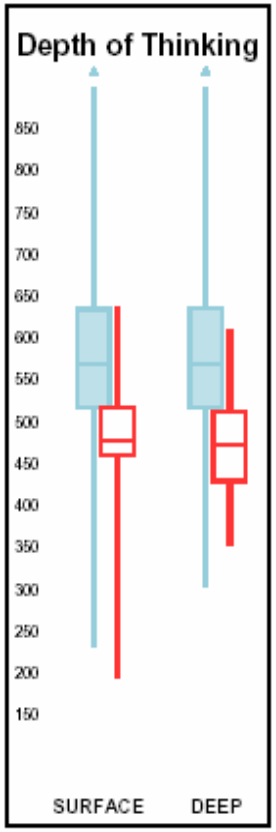
Ethnicity: All
Year: 7,8,9,10
Gender: All

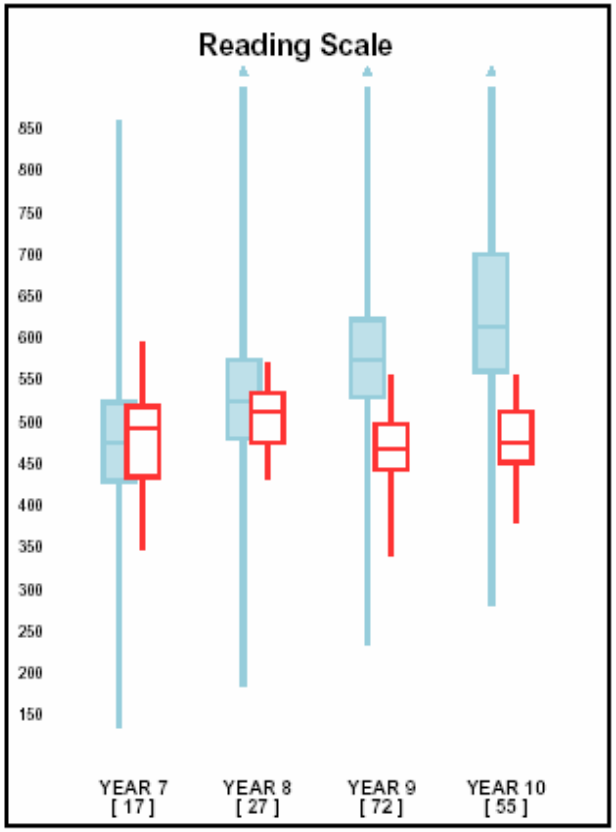
Language: All
Cluster: North Island, low-medium decile, mostly Maori, Pacific, other non-European, secondary schools
NZ Performance:

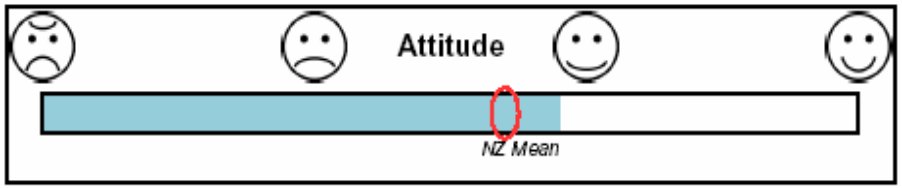
Location: All NZ Schools
Your Group Performance:

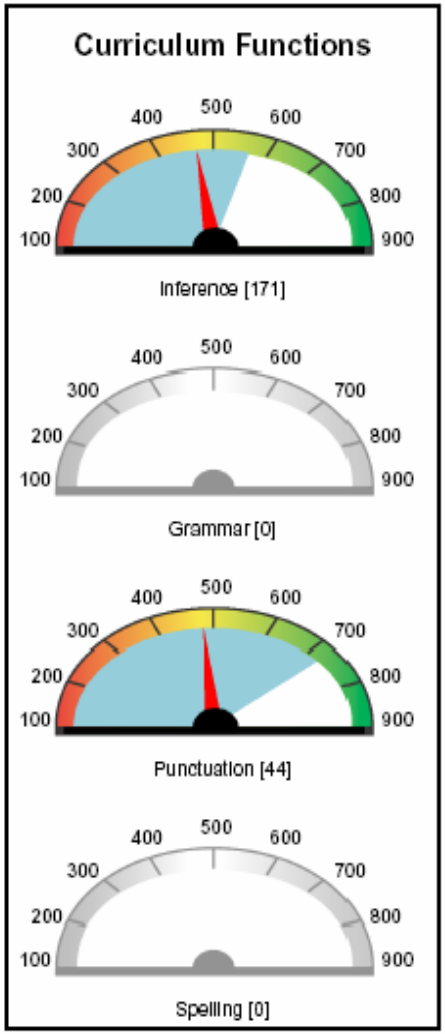
No. of Students: 171
No. of Results: [*n*]

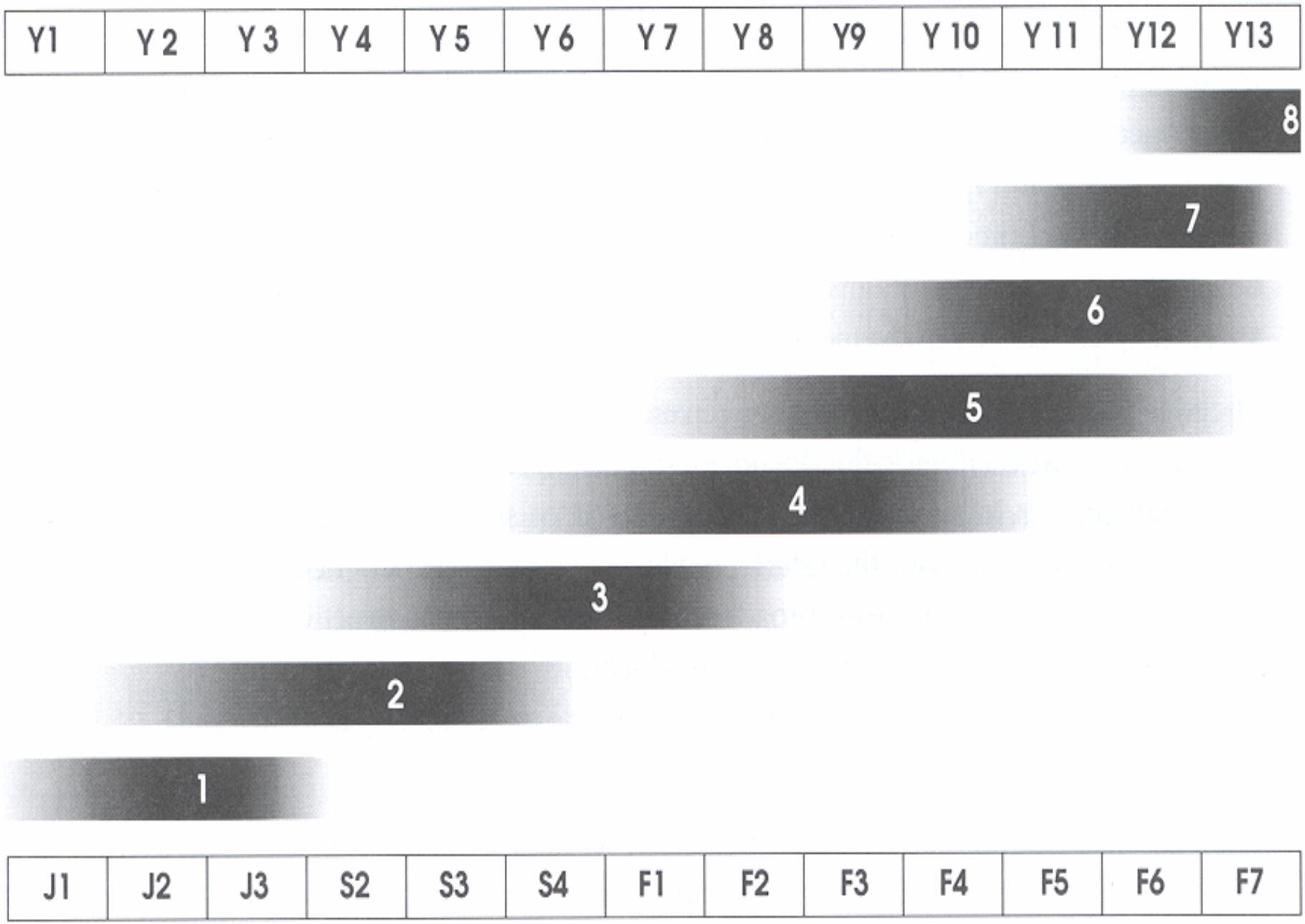











Y1
Y2
Y3
Y4
Y5
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Y10
Y11
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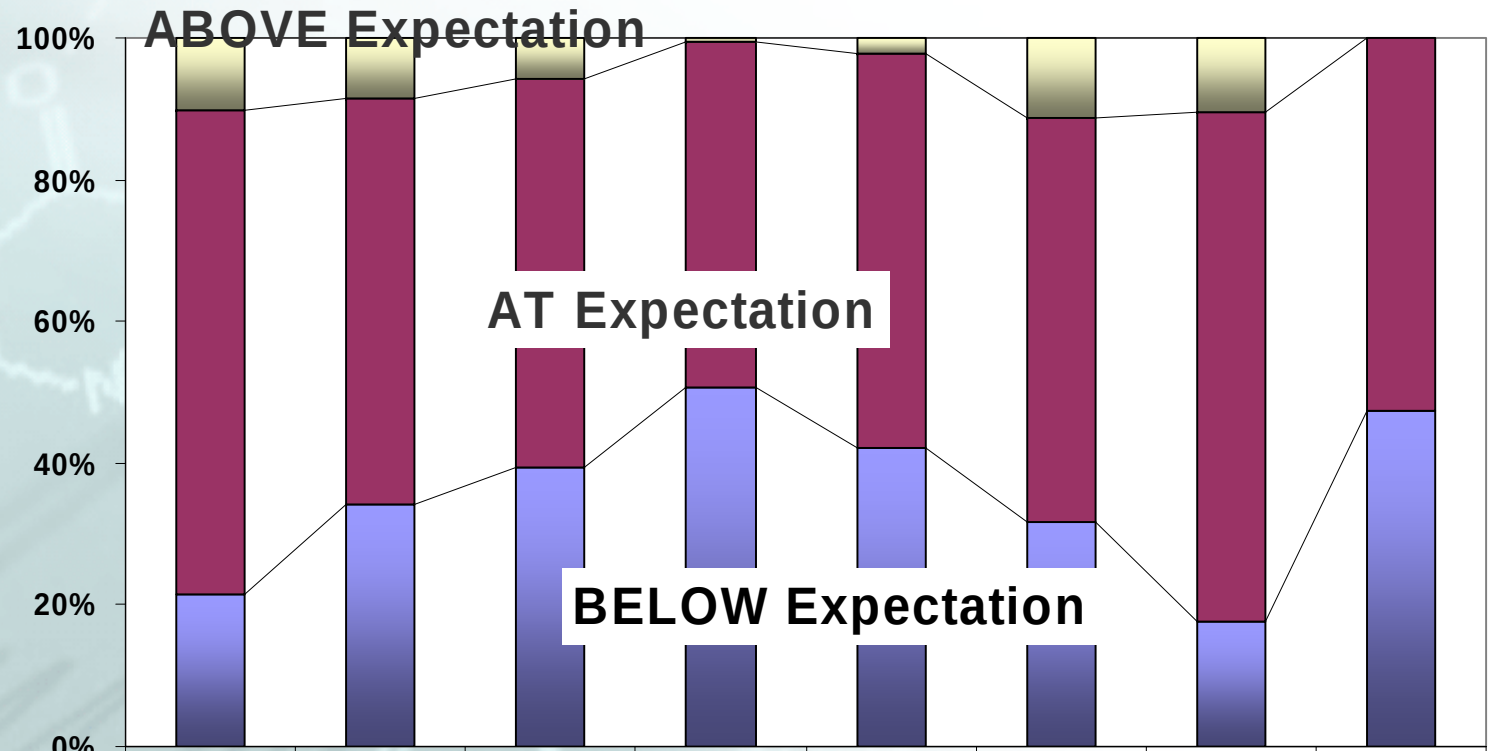
S3
S4
F1
F2
F3
F4
F5
F6
F7

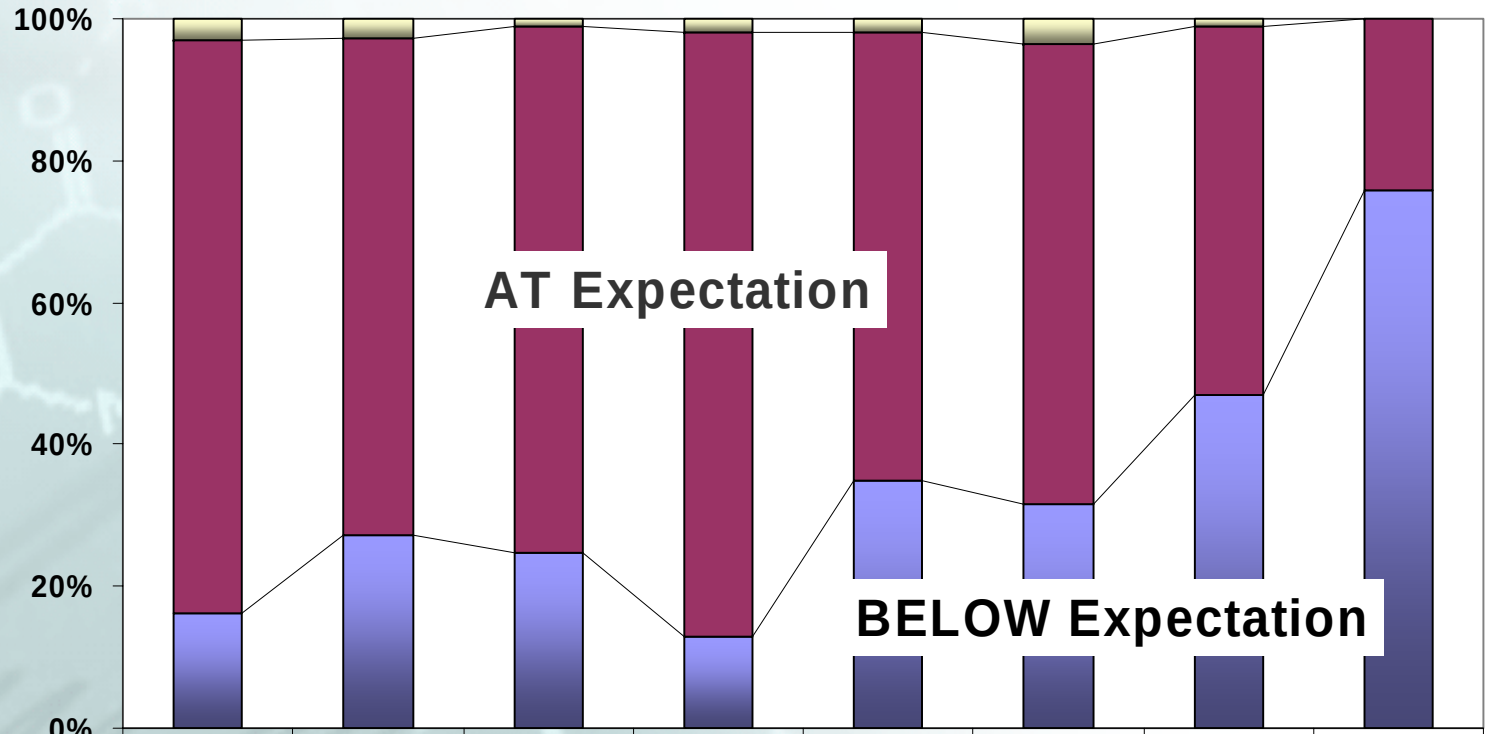
Reading



	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12
Above expectation	10	9	6	1	2	11	10	0
At expectation	68	57	55	49	53	57	72	53
Below expectation	22	34	39	51	40	32	18	47

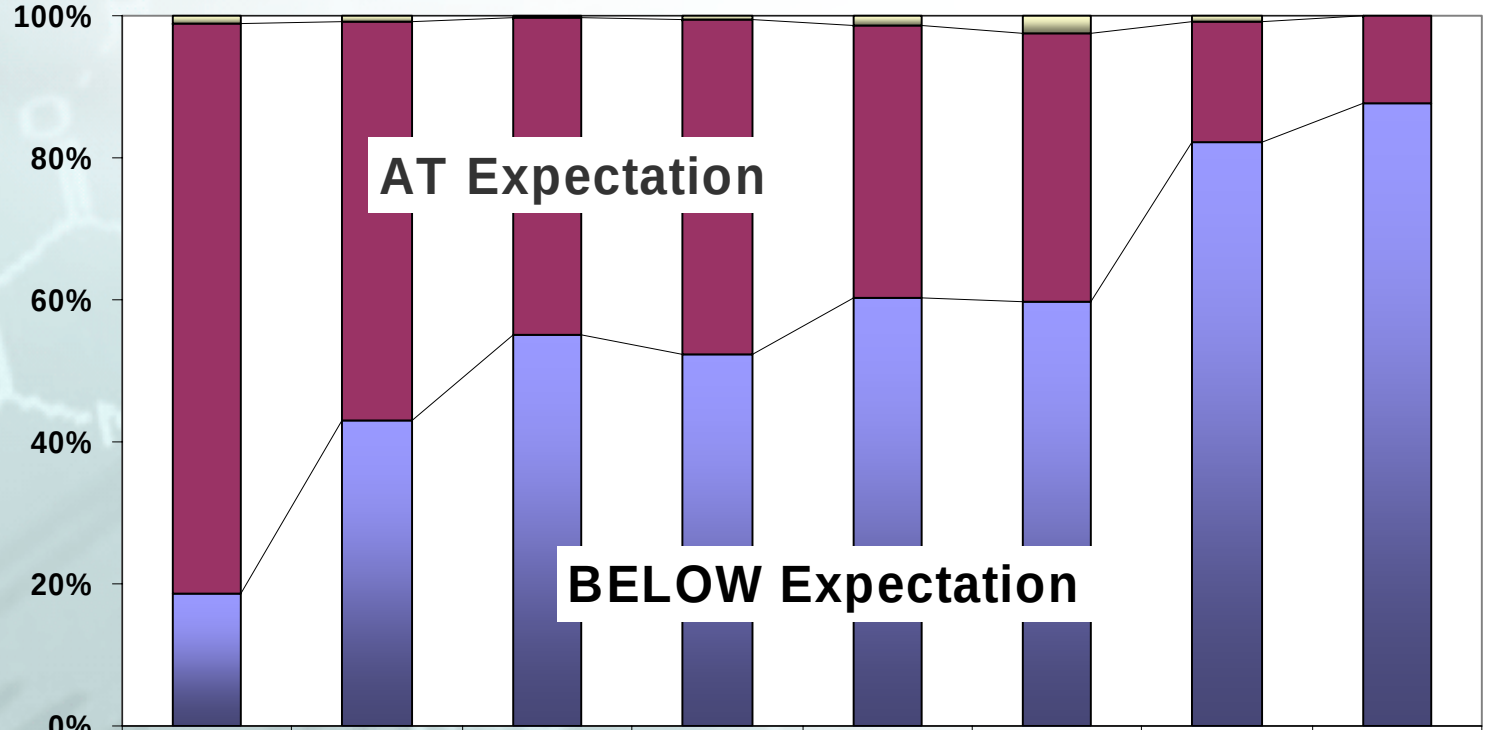
Below expectation At expectation Above expectation

Maths



	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12
Above expectation	3	3	1	2	2	4	1	0
At expectation	81	70	74	85	61	65	52	24
Below expectation	16	27	25	13	34	32	47	76

Writing



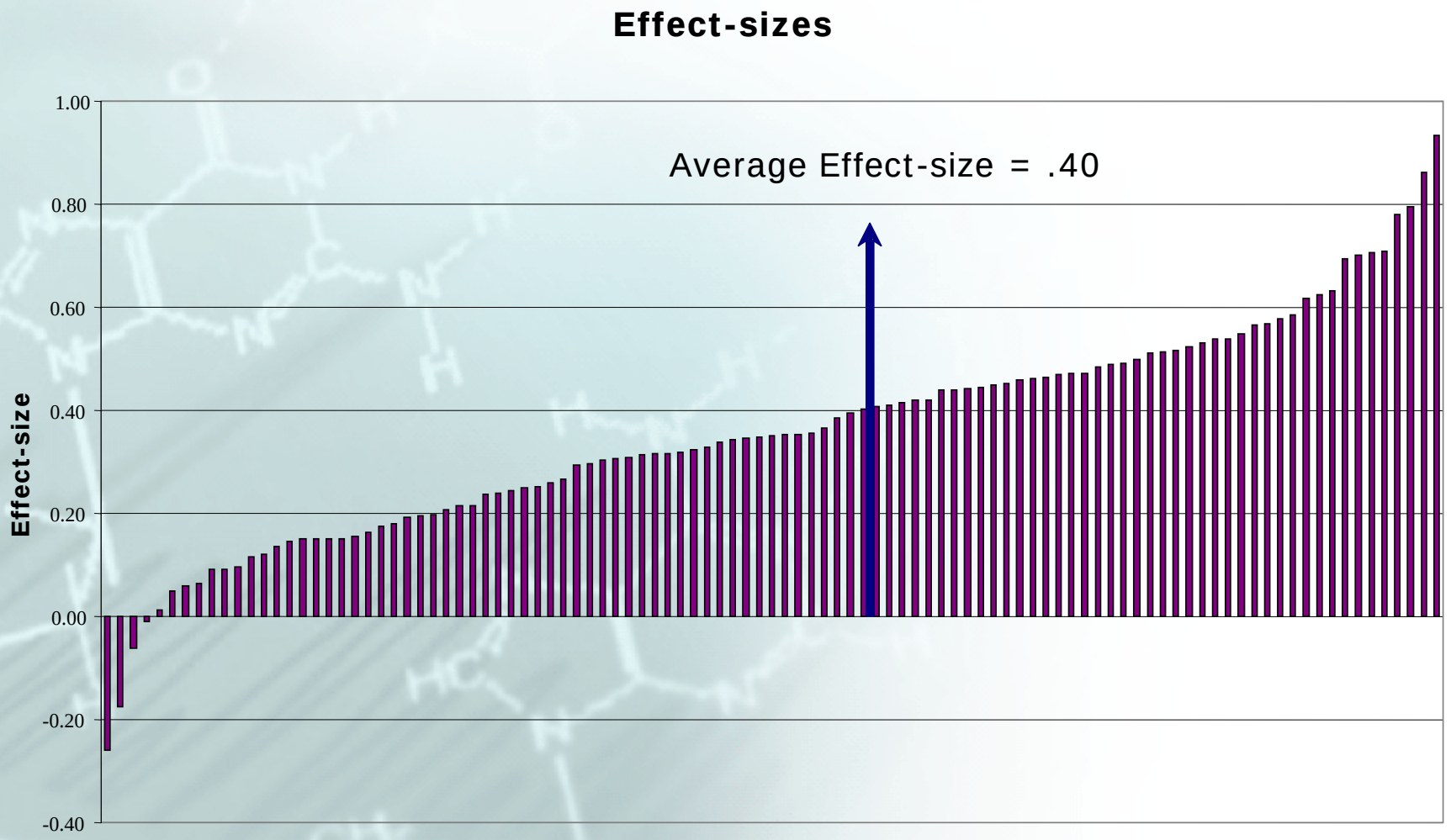
	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12
Above expectation	1	1	0	0	1	3	1	0
At expectation	80	56	45	47	38	38	16	11
Below expectation	19	43	55	52	59	60	80	81

The underlying questions …

- **Where are we going?**
- **How are we going?**
- **Where to next?**

- The evidence can also be used to contest deeply held beliefs:
  - SURPRISE
  - Questions of relative effectiveness

Effect-sizes of Influences on Learning



Rank These

(from 1 = highest effect to 10 = lowest effect)

1.	Feedback	13209
2.	Classroom behaviour	361
3.	Cooperative learning	1153
4.	Early intervention	30971
5.	Competitive learning	144
6.	Testing	1463
7.	Questioning	493
8.	Diet	255
9.	Class size	2559
10.	Retention (retain a year)	3636

Rank These

(from 1 = highest effect to 10 = lowest effect)

1.	Feedback	13209	.81
2.	Classroom behaviour	361	.71
3.	Cooperative learning	1153	.59
4.	Early intervention	30971	.49
5.	Competitive learning	144	.41
6.	Testing	1463	.31
7.	Questioning	493	.20
8.	Diet	255	.12
9.	Class size	2559	.05
10.	Retention (retain a year)	3636	-.17

The disasters ...

68	programmed instruction	801	.14
69	finances	1634	.14
70	problem based learning	41	.12
71	diet	255	.12
72	gender (female-male)	9020	.09
73	inductive teaching	570	.06
74	team teaching	41	.06
75	ability grouping	3355	.05
76	class size	2559	.05
77	open vs. traditional	3426	-.01
78	summer vacation	269	-.06
79	retention	3626	-.17
80	transfer of school	354	-.26
81	disruptive students	1511	-.78

The also rans ...

54	metacognitive intervention	921	.29
55	math programs	3326	.27
56	audio-visual	2699	.26
57	gifted programs	47	.25
58	coaching	1076	.24
59	behavior objectives	157	.24
60	calculators	238	.24
61	mainstreaming	1641	.21
62	questioning	493	.20
63	learning hierarchies	168	.19
64	attitude to math	1122	.19
65	desegregation	1590	.18
66	play	129	.16
67	television	4337	.15

More in the middle…

40	tutoring	136	.35
41	programs	674	.35
42	remedial programs	1438	.35
43	classroom climate	2726	.35
44	social skills training	5472	.35
45	time	1680	.34
46	CAI	18231	.32
47	teaching	2740	.32
48	preschool	242	.32
49	whole language	198	.31
50	within class grouping	2359	.31
51	testing	1463	.31
52	problem solving	1141	.30
53	background	692	.30

In the middle …

27	parent involvement	2597	.46
28	bilingual programs	1501	.46
29	adjunct aids	659	.45
30	concept mapping	18	.45
31	advance organizers	2106	.44
32	hypermedia instruction	317	.44
33	socio economic status	1657	.44
34	perceptual-motor skills	7592	.42
35	individualised instruction	5948	.42
36	homework	568	.41
37	competitive learning	144	.41
38	simulations	972	.37
39	expectations	912	.36

Worth having ...

14	self-assessment	152	.54
15	mastery learning	1933	.53
16	creativity programs	2340	.52
17	interactive video	1152	.52
18	psycho-linguistics	4404	.51
19	goals	959	.51
20	peer influence	366	.50
21	early intervention	30971	.49
22	outdoor education	294	.49
23	science	4124	.49
24	inservice ed	18644	.48
25	acceleration	371	.47
26	motivation	2196	.47

The MAJOR Influences …

	Influence	# effects	Mean
1	Direct instruction	1925	.93
2	Reciprocal teaching	52	.86
3	Feedback	13209	.81
4	Cognitive strategy training	7649	.80
5	Classroom behaviour	361	.71
6	*Prior achievement*	*2094*	*.71*
7	Phonological awareness	2630	.70
8	Home encouragement	25706	.69
9	Piagetian programs	786	.63
10	Cooperative learning	1153	.59
11	Reading programs	14945	.58
12	Quality of teaching	808	.55
13	Study skills	3224	.54

The Theory of Relativity
Interpretations are relative ...

- Ask questions of RELATIVE effectiveness
- Using effect-sizes in classrooms to underpin the discussion on effectiveness
- The importance of learning intentions and success criteria

Use of effect-sizes …

- McNaughton et al. – reading
- Timperley
  - Vast amounts of data
  - More dependable data seen as Principal's data
  - Many reasons to exclude dependable data
  - More anecdotal data seen as relevant/trustworthy to them
  - Saw data about the students, not about their teaching – particularly the more dependable data
    - ***Data/Interpretations are optimised when teachers conceive data about them.***

Concluding Comments

- Move from data towards interpretations
- A major theme should relate to developing a common understanding of what progression means over the school years
- And then collect EVIDENCE to help in sharing interpretations of our success in progression (e.g., via target setting, growth graphs, consoles across classes).
- The locus of accountability is the student learning, the focus of accountability is the teacher's teaching

It is possible to devise a national accountability model based on evidence critical to teachers and principals

- Such a model can also serve:
  - to evaluate the state of learning in the nation,
  - to provide evidence for curriculum reform,
  - to create debate about what is worth learning in our schools, and
  - to develop a common language about the progression of this learning as students advance through their schooling

What is the nature of evidence that makes a difference to (TEACHING) and learning?

- *It's the Interpretations*
- *It's about teaching and teachers, more than about the students*
- *It's about teaching and learning, and assessment the handmaiden to these*
- *It's about progression as well*
- *It's about making RELATIVE interpretations*
- *It's NOT about numbers, assessment literacy, national ability tests*
- *It's about evidence-based curriculum development*
- *If the teachers do not change what they do in a defensible manner, the assessment probably was a wasted/unfortunate accident*
- *Spend more effort listening, working with teachers/principals and THEN create the assessments*

What is the Nature of Evidence that Makes a Difference to Learning?

John Hattie
University of Auckland

ACER Conference 2005