



Performance Comparison between IB School Students and Non-IB School Students on the ISA

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Australian Council *for* Educational Research

International Schools' Assessment (ISA)

- Assess reading, mathematics and writing (narrative and opinion).
- Assess grade 3 to grade 10.
- Mix of multiple choice and open-ended questions in reading and mathematics & 2 essays.
- Aligned with OECD's Programme for International Student Assessment (PISA) construct.

Background to research



IB commissioned ACER to analyse ISA data.

- Phase I, completed in 2009.
 - Performance data from ISA 2007-08 and 2008-09 sittings;
 - Research report is available on IB website,
<http://www.ibo.org/announcements/pypandmypstudentperformancemeasured.cfm>
- Phase II, completed in 2011.
 - Performance data from ISA 2009-10 and 2010-11 sittings;
 - 270 ISA schools willing to be identified publicly from pool of 290.

Background to research



Phase II tasks

- Replication of Phase I using more recent data.
 - subject analysis on four ISA assessment areas;
 - analysis of strengths and weaknesses within assessment strands;
 - regional analysis;
 - country analysis in Asia (**new**);
 - top-performing IB schools analysis;
 - PISA benchmark analysis; and
 - multilevel analysis of school variance (**new**).

Background to research



- Closer examination of particular findings.
 - The impact of 1, 2, or 3 programme.
 - The length of programme authorization.

Schools Programme Status

Category	Authorized IB Programmes	
	No of Schools	Percentage (%)
No IB Programme	80	29.6
PYP Only	18	6.7
MYP Only	1	0.4
DP Only	58	21.5
PYP + MYP + DP	61	22.6
PYP + MYP	10	3.7
MYP + DP	14	5.2
PYP + DP	28	10.4
Total	270	100.0



Background to research

- ACER classified IB cohort at grade level.

IB cohort

A student is either in grade 3 to 5 and in a PYP school, or in grade 6 to 10 and in a MYP school.

Non-IB cohort

A student is either in grade 3 to 5 but NOT in a PYP school, or in grade 6 to 10 but NOT in a MYP school.

IB and Non-IB Schools and Students Distribution (October 2009 to February 2011)

Grade	Number of Schools		Number of Students	
	IB	non-IB	IB	non-IB
3	96	90	6,647	2,927
4	62	78	3,831	2,009
5	99	88	6,960	2,597
6	44	79	3,201	2,039
7	64	60	4,944	2,023
8	48	51	3,704	1,601
9	50	49	3,411	1,717
10	30	35	1,992	1,111
Total	n/a*	n/a*	34,690	16,024

*Total number of schools is not applicable here as each school may have more than one grade.

ISA students across regions (October 2009 to February 2011)



Grade	Asia		Europe		Africa		Americas		Oceania		Total	
	IB	non-IB	IB	non-IB	IB	non-IB	IB	non-IB	IB	non-IB	IB	non-IB
3	3,478	1,973	2,057	354	587	406	456	59	69	135	6,647	2,927
4	2,084	1,282	1,011	262	561	395	109	18	66	52	3,831	2,009
5	3,528	1,717	2,201	332	669	386	472	42	90	120	6,960	2,597
6	1,791	1,282	977	424	346	257	12	30	75	46	3,201	2,039
7	2,446	1,455	1,791	295	380	180	252	39	75	54	4,944	2,023
8	1,993	1,070	1,197	192	400	223	39	116	75	0	3,704	1,601
9	1,729	1,138	1,081	179	321	218	256	182	24	0	3,411	1,717
10	1,198	557	585	285	179	118	0	151	30	0	1,992	1,111
Total	18,247	10,474	10,900	2,323	3,443	2,183	1,596	637	504	407	34,690	16,024

Countries in Geographic Regions

Asia	Europe	Africa	Americas	Oceania
Bahrain	Austria	Botswana	Bahamas	Fiji
Bangladesh	Belgium	Congo	Chile	Papua New Guinea
Brunei	Czech Republic	Egypt	Mexico	
Cambodia	Denmark	Ethiopia	Netherlands Antilles	
China	Finland	Ghana	Us Virgin Islands	
Cyprus	France	Kenya	USA	
Hong Kong SAR	Germany	Malawi	Venezuela	
India	Greece	Morocco		
Indonesia	Italy	Mozambique		
Japan	Latvia	Nigeria		
Jordan	Luxembourg	South Africa		
Kuwait	Netherlands	Sudan		
Malaysia	Norway	Tanzania		
Myanmar	Romania	Uganda		
Oman	Russian Federation	Zimbabwe		
Pakistan	Spain			
Philippines	Sweden			
Qatar	Switzerland			
Republic of Korea	Ukraine			
Saudi Arabia	United Kingdom			
Singapore				
Sri Lanka				
Thailand				
Turkey				
United Arab Emirates				
Uzbekistan				
Vietnam				

Methodology



Subgroup comparison:

- Statistical difference : t- test
- Practical difference : effect size, independent of sample size.

Symbols:

- + Statistically significant difference (higher), small effect size ($0.1 \leq d < 0.2$)
- ++ Statistically significant difference (higher), medium effect size ($0.2 \leq d < 0.5$)
- +++ Statistically significant difference (higher), large effect size ($d \geq 0.5$)
- Statistically significant difference (lower), small effect size ($0.1 \leq d < 0.2$)
- – Statistically significant difference (lower), medium effect size ($0.2 \leq d < 0.5$)
- – – Statistically significant difference (lower), large effect size ($d \geq 0.5$)



MATHEMATICAL LITERACY

Mathematical Literacy (Phase I, 2007/2008)

- IB students outperform non-IB
G3, 6, 7 & 10
(Effect size **medium** or **large**)
- No difference G4, 8 & 9
- **Non-IB outperform IB G5**



Mathematical Literacy

- IB students outperform non-IB
G6, 9 & 10
(Effect size **medium**)
- No difference G4, 5 & 7
- **Non-IB students outperform IB**
G3 & 8

Performance of IB and Non-IB Students in Mathematical Literacy

Grade	IB			Non-IB			Significance of Difference	Effect Size
	Mean	S.D.	N	Mean	S.D.	N		
3	310	84	6,455	322	90	2,903	–	-0.13
4	379	84	3,788	376	89	1,995		0.03
5	425	83	6,872	425	89	2,577		-0.01
6	467	84	3,167	453	97	2,011	+	0.15
7	499	88	4,767	495	95	2,010		0.04
8	517	83	3,653	526	91	1,589	–	-0.10
9	551	85	3,227	535	87	1,699	+	0.18
10	570	91	1,948	529	84	1,085	++	0.46

Sub-strands



Change & relationships

- IB outperformed non-IB G6, 9 & 10
- no difference G4, 5 & 7
- Non-IB outperform IB G3 & 8

Quantity

- IB outperformed non-IB G6, 7, 9 & 10
- no difference G4 & 5
- Non-IB outperformed IB G3 & 8

Sub-strands

Space & Shape

- IB outperformed non-IB G6, 7, 9 & 10
- no difference G3, 4, & 5
- Non-IB outperformed IB G8.

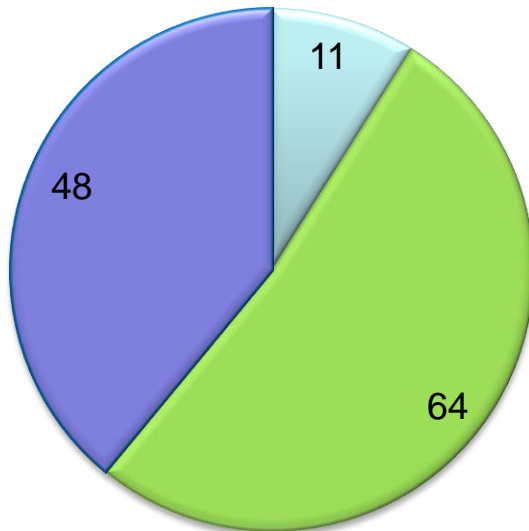
Uncertainty

- IB outperformed non-IB G4, 6, 7, 9 & 10
- no difference G5
- Non-IB outperformed IB G3 & 8.

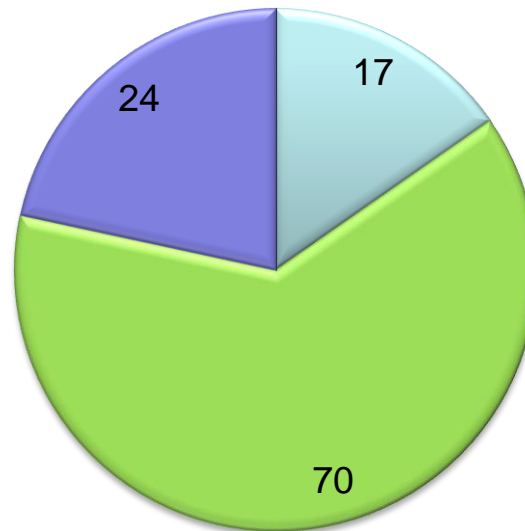
Regional comparison



Authorized IB Schools by Region



Non-IB Schools by Region



- Africa
- Asia & Oceania
- Europe & Americas

Americas combined with Europe because of small numbers, and Oceania combined with Asia for the same reason.



Asia & Oceania

- IB outperform non-IB at **G10**
(effect size **large**)
- no diff G6, 7 & 9
- **Non-IB outperform IB** G**3**, 4, 5 & **8**
(effect size **medium**)



Europe & Americas

IB outperform non-IB

- G4, 5, 6, 7, 8, 9 & 10
(effect size **medium** or **large**)

No difference G3



Africa

- IB outperform non-IB
in G3, 4, 5, 6, 7, 8, 9 & 10
(effect size **medium** or **large**)

Interpretation issue, i.e. relatively small sample

- 11 IB schools vs 17 Non-IB schools
- Up to 669 students in IB G5, up to 406 students in non-IB G3.



READING LITERACY

Reading

(Phase I, 2007/2008)

IB students outperform non-IB in all grades

- G3, 4, 5, 6, 7, 8, 9 & 10
(effect size **medium**)

Reading



IB students outperform non-IB in all grades except G8, i.e.

- G3, 4, 5, 6, 7, 9 & 10
(effect size **medium**)
- No difference in G8.

Performance of IB and Non-IB Students in Reading

Grade	IB			Non-IB			Significance of Difference	Effect Size
	Mean	S.D.	N	Mean	S.D.	N		
3	253	90	6,523	242	100	2,888	+	0.11
4	323	91	3,771	303	101	1,981	++	0.20
5	371	87	6,844	363	96	2,574	+	0.09
6	421	97	3,148	388	108	2,015	++	0.31
7	464	97	4,868	446	106	2,004	+	0.18
8	489	86	3,617	489	99	1,570		-0.01
9	533	90	3,352	504	94	1,694	++	0.31
10	568	94	1,924	529	100	1,076	++	0.40



Sub-strands

Reading: retrieving, interpreting and reflecting

- IB outperformed non-IB in all strands at all grade levels except G8 (Effect size small to **medium**)
- **Non-IB outperformed IB: G8**
 - Retrieving & Interpreting: small effect size
 - Reflecting : **medium** effect size



Asia & Oceania

Reading

- IB outperform non-IB
G4, 6, 7, 9 & 10
(effect size **medium**)
- no difference G3
- **Non-IB outperform IB: G5 & 8**



Europe & Americas

- IB mainly outperform non-IB
G3, 4, 5, 6, 7, 9, 10
(effect size **medium** or **large**)
- No difference G8



Africa

- Reading IB outperform non-IB in all grades.
G3, 4, 5, 6, 7, 8, 9, 10
(effect size medium or large)



WRITING



Narrative Writing (Phase I, 2007/2008)

- IB students outperform non-IB in G4, 6, 7, 8, 9 & 10 (effect size **medium**)
- No difference at G5
- **Non-IB outperform IB G3**



Narrative Writing

- IB students outperform non-IB in G4, 6, 9 & 10 (effect size **medium**)
- No difference at G3, 7 & 8
- **Non-IB outperform IB: G5**

Performance of IB and Non-IB Students in Narrative Writing

Grade	IB			Non-IB			Significance of Difference	Effect Size
	Mean	S.D.	N	Mean	S.D.	N		
3	364	59	6,540	365	62	2,895		0.00
4	411	62	3,759	406	67	1,987	+	0.08
5	452	64	6,826	456	68	2,565	-	-0.07
6	483	66	3,160	472	74	2,010	+	0.16
7	512	69	4,867	510	72	2,008		0.03
8	535	69	3,629	539	73	1,586		-0.06
9	557	74	3,337	545	77	1,697	+	0.16
10	578	74	1,934	551	80	1,085	++	0.35



Expository Writing (Phase I, 2007/2008)

- IB students outperform non-IB
in G5, **6, 7, 8, 9 & 10**
(effect size **medium or large**)
- No difference G3 & 4



Expository Writing

- IB students outperform non-IB in G4, 6, 7, 9 & 10 (effect size small or medium)
- No difference G3, 5 & 8

Performance of IB and Non-IB Students in Expository Writing

Grade	IB			Non-IB			Significance of Difference	Effect Size
	Mean	S.D.	N	Mean	S.D.	N		
3	395	50	6,506	394	54	2,879		0.02
4	433	54	3,771	426	60	1,979	+	0.11
5	469	57	6,831	471	62	2,565		-0.04
6	493	59	3,141	486	65	2,019	+	0.11
7	524	61	4,858	517	66	2,002	+	0.10
8	548	62	3,616	551	68	1,570		-0.04
9	571	69	3,341	553	71	1,682	++	0.26
10	594	66	1,921	563	81	1,073	++	0.43



Sub-strands

Narrative writing

IB outperformed non-IB

Content – G3, 4, 6, 7, 9 & 10 (not 5, 8)

Language – G3, 4, 6, 7, 9 & 10 (not 5, 8)

Spelling – 4, 6, 9 & 10 (not 3, 5, 7, 8)



Sub-strands

Expository writing:

IB outperformed non-IB

Content – G3, 4, 6, 7, 9, 10 (not 5, 8)

Language – G3, 4, 6, 7, 9, 10 (not 5, 8)

Structure – G4, 7, 9, 10 (not 3, 5, 6, 8)

Asia & Oceania

Narrative writing

IB outperform non-IB G4, 9 & 10

– no diff G3, 6 & 7

– Non-IB outperform IB G5 & 8

Expository writing

– IB outperform non-IB G4, 7, 9 & 10

– no diff G3 & 6

– Non-IB outperform IB G5 & 8

Europe & Americas

Narrative writing

- IB outperform non-IB
 - G3, 4, 6, 9 & 10
 - (effect size **medium** or **large**)
- No difference G5 & 7
- Non-IB outperform IB G8



Europe & Americas

Expository writing

- IB outperform non-IB
 - G3, 4, 6, 9 & 10
(effect size **medium** or **large**)
- No difference G5, 7 & 8



Africa

Narrative writing

- IB outperform non-IB G6, 8, 9 & 10
- no difference in other grades

Expository writing

- IB outperform non-IB G5, 8, 9 & 10
- no difference in other grades



Other Variables

ESB & NESB (Phase I)



- ESB outperformed NESB in all domains.
- The difference was greater in reading and writing than in mathematics for all schools.
- The difference was greater in non-IB schools than in IB schools for all domains.



The effect of 1, 2, or 3 Programme

Are there differences in student performance among 1, 2, or 3 programme?

- *continuum vs single*
- *continuum vs dual*
- *dual vs single*

Is the effect of performance difference related to year-level appropriate program?

Continuum vs PYP



Students from continuum schools outperformed students from PYP only schools:

- Reading: G4.


No differences in Mathematical Literacy and Narrative Writing.

Students from PYP only schools outperformed students from continuum schools.

- Reading: G5.
- Expository Writing: G3.

Continuum vs PYP

Domain	Grade	Continuum Programme			PYP			Significance of Difference	Effect Size
		Mean	S.D	N	Mean	S.D.	N		
Maths	3	309	82	4,179	306	81	624		0.03
	4	378	86	2,450	375	78	295		0.03
	5	425	84	4,420	431	76	586		-0.08
Reading	3	249	90	4,284	253	89	620		-0.05
	4	320	91	2,441	302	85	292	+	0.19
	5	368	88	4,404	376	83	586	-	-0.10
Narrative Writing	3	363	59	4,279	364	61	622		-0.03
	4	407	63	2,423	402	60	294		0.08
	5	450	64	4,402	452	64	585		-0.02
Expository Writing	3	393	49	4,262	399	53	619	-	-0.12
	4	430	54	2,440	432	56	293		-0.03
	5	467	56	4,404	468	53	572		-0.02



No sufficient sample size to compare
continuum programme to MYP.

Continuum programme vs “PYP & MYP”

Students from PYP & MYP schools outperformed students from continuum schools.

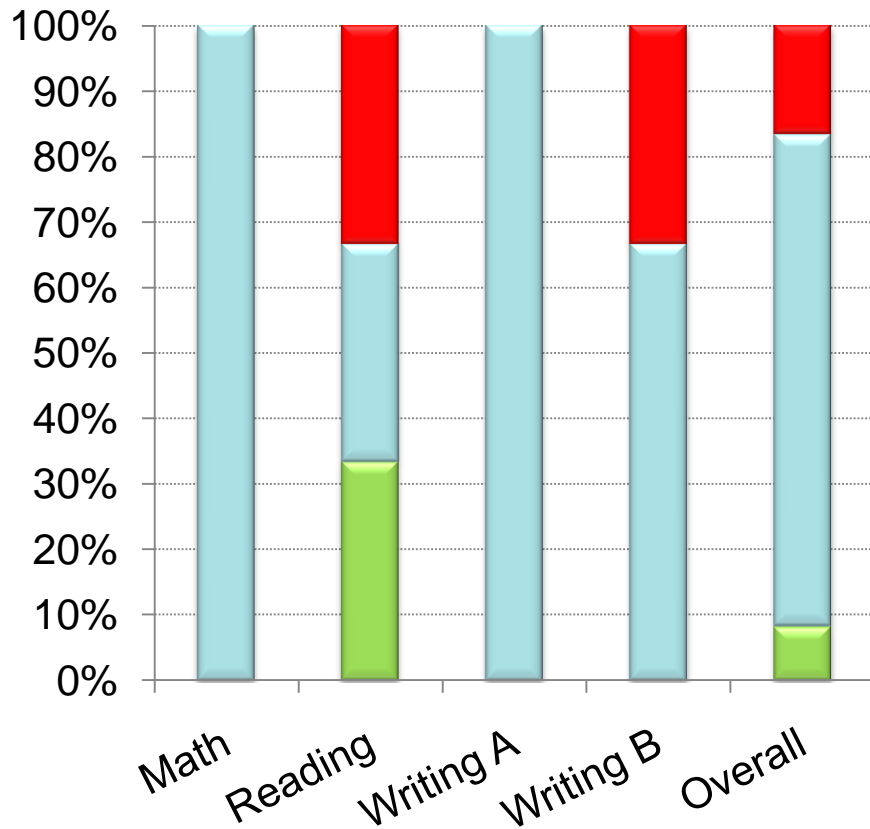
- Mathematical Literacy: G3, 4, 7 & 8
- Reading: G3, 4, 5, 6, 7 & 8
- Narrative Writing : G4, 6, 7 & 8.
- Expository Writing : G4, 6, 7 & 8.

No difference in other grades.

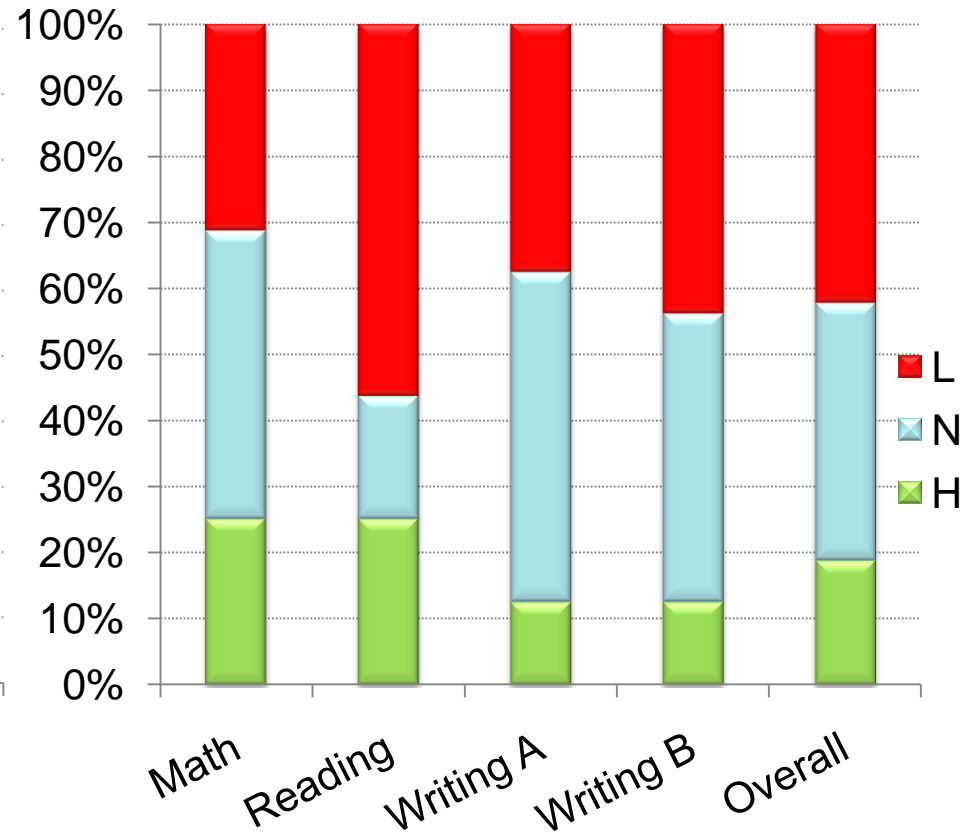
With year-level appropriate programme



Continuum Programme vs Single Programme



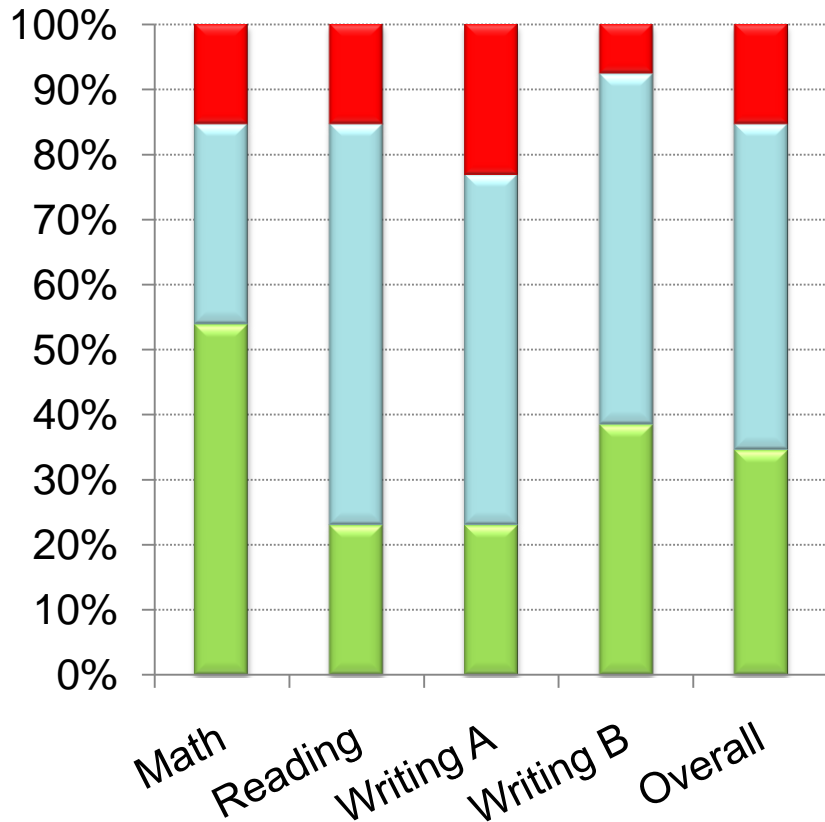
Continuum Programme vs Dual Programmes



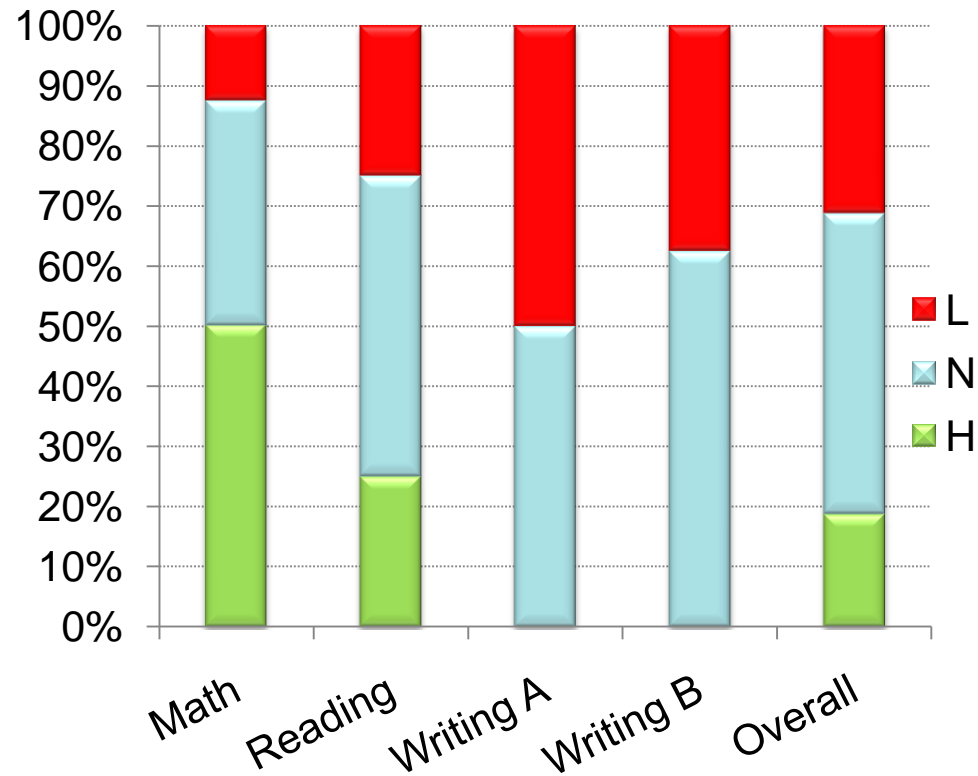
Without year-level appropriate programme



Continnum Programme vs Single Programme



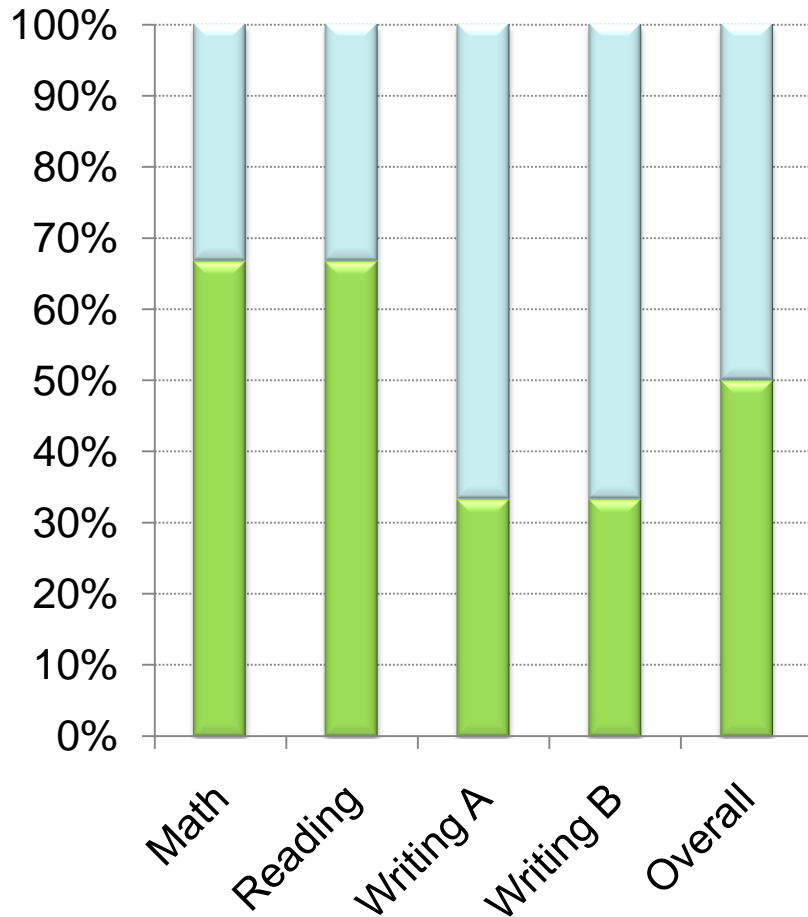
Continnum Programme vs Dual Programme



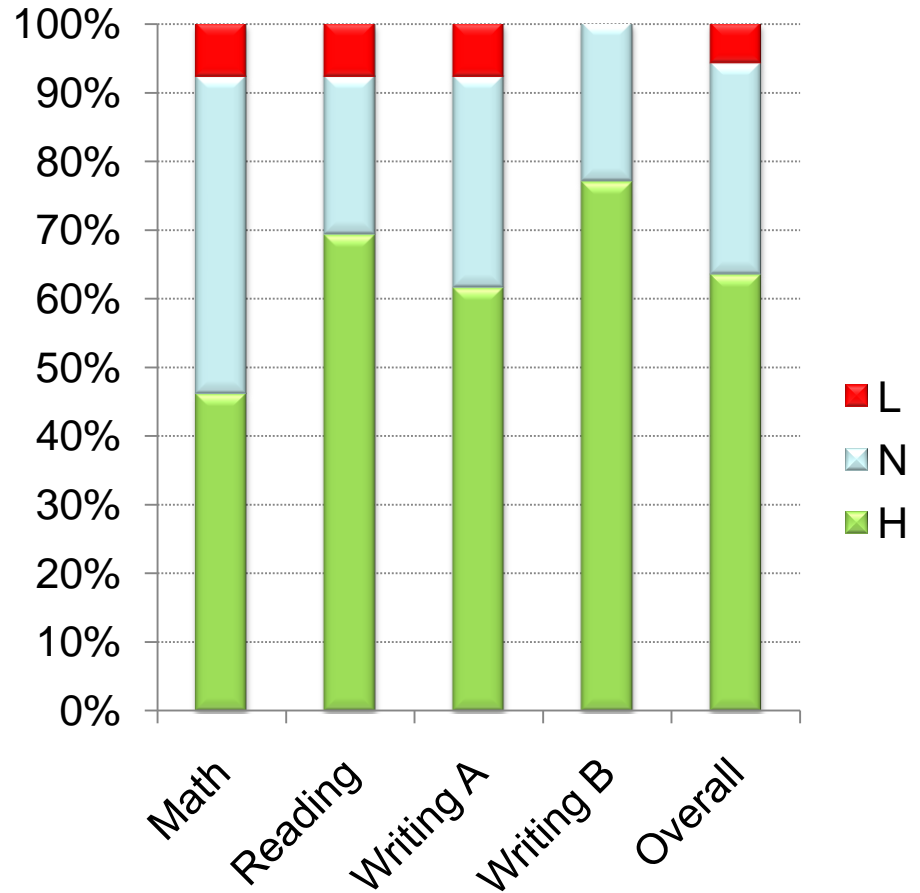
The effect of year-level appropriate programme PYP & MYP vs Single Programme



With year-level appropriate programme



Without year-level appropriate programme



L
N
H



Statistical terms

Correlation

determines a linear relationship

- $0.1 < r < 0.29$ small or weak
- $0.3 < r < 0.69$ moderate
- $0.7 < r < 1$ large or strong



Length of Implementation

	N*	Mean	Median	S.D.	Min.	Max.	33th Percentile	66th Percentile
MYP Years	390	7.2	6.5	4.4	1.0	18.0	4.0	9.5
PYP Years	455	6.2	5.6	3.6	1.0	13.0	4.0	8.5

N: Number of IB schools and year level.



Length of Implementation

- Weak to moderate positive correlation between the years of MYP implementation and ISA performance
 - Mathematical Literacy, $r = (0.14, 0.34)$
 - Reading, $r = (0.03, 0.29)$
- No positive correlation found between the length of PYP implementation and ISA performance.

Correlation between Length of IB Programme and ISA Performance

Grade	Domain	IB Implementation			Domain	IB Implementation		
		Year				Year		
		r	p<	N		r	p<	N
3	Mathematical Literacy	0.08	0.42	96	Narrative Writing	0.00	0.98	96
4		0.01	0.94	63		-0.16	0.22	63
5		0.07	0.47	99		0.04	0.71	99
6		0.34	0.02	44		-0.09	0.58	44
7		0.26	0.04	64		0.11	0.39	64
8		0.31	0.03	48		0.12	0.43	48
9		0.14	0.34	50		0.14	0.32	50
10		0.16	0.39	30		0.04	0.82	30
3	Reading	0.11	0.31	96	Expository Writing	-0.03	0.81	96
4		-0.08	0.55	63		-0.20	0.11	63
5		0.06	0.54	99		0.00	0.98	99
6		0.07	0.66	44		-0.14	0.38	44
7		0.25	0.05	64		0.08	0.53	64
8		0.29	0.05	48		0.01	0.96	48
9		0.03	0.84	50		-0.09	0.53	50
10		0.28	0.14	30		-0.03	0.87	30

Multilevel Analysis of School Variance between IB schools and non-IB schools



- The purpose is to examine if the factor of international curriculum (i.e. IB) influences students' achievement in the ISA.
- This analysis found that the proportions of **between-school variances among IB schools were smaller than those among non-IB schools** in all four ISA domains.
- This implied that **IB schools were more similar to each other than the non-IB schools were similar to each other** with respect to four domains of ISA performance.

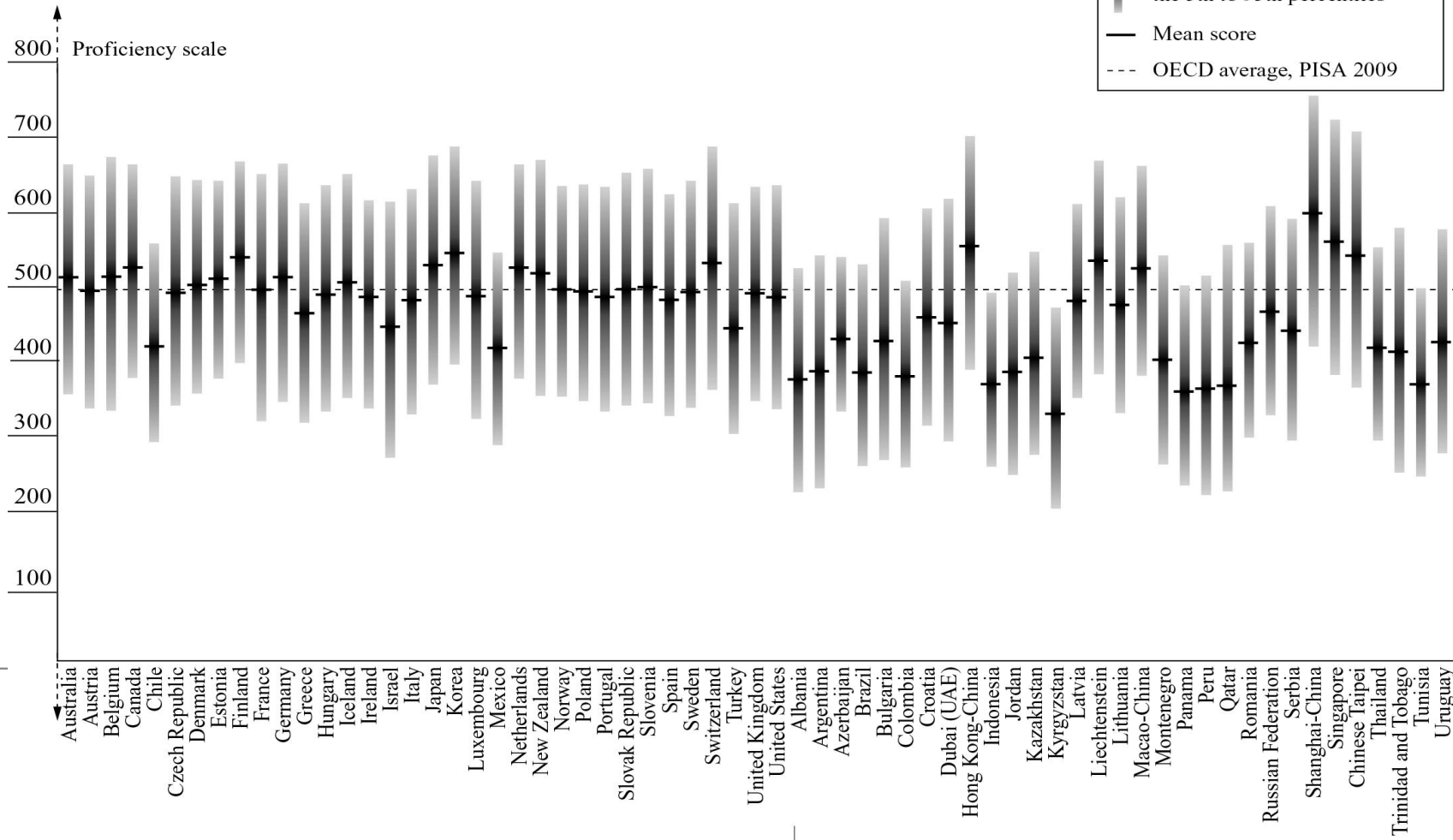
IB G9/10 Students on PISA Benchmark



Mathematical Literacy

How to read these results

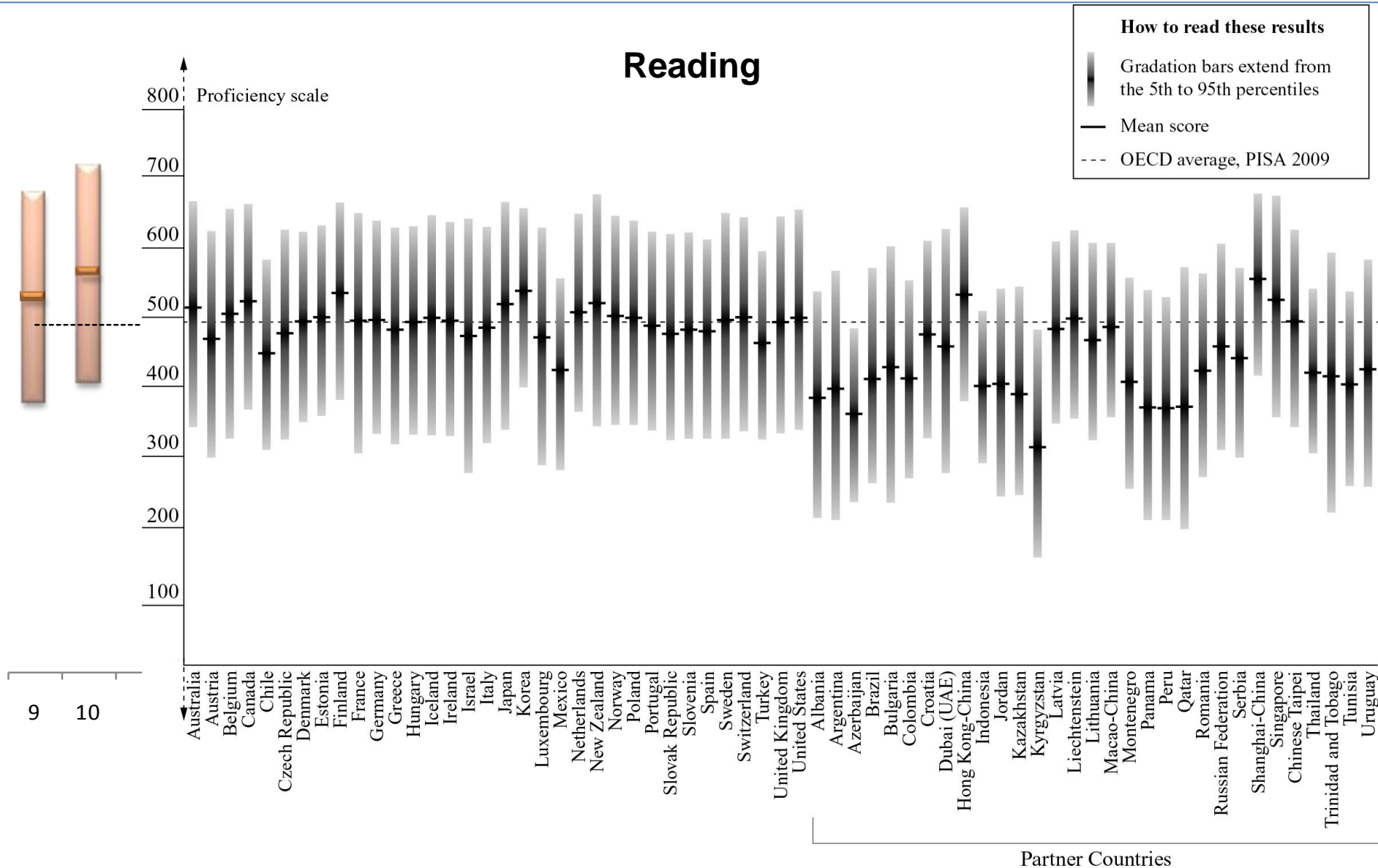
- Graduation bars extend from the 5th to 95th percentiles
- Mean score
- OECD average, PISA 2009



9 10

Partner Countries

IB G9/10 Students on PISA Benchmark



Top-performing IB Schools

- Top-performing IB schools (16 schools out of 190 IB schools) outperform the other schools. Effect sizes **medium** or **large**
 - Mathematical Literacy: medium (0.22 to 0.43)
 - Reading: medium or large (0.32 to 0.56)
 - Narrative Writing: medium or large (0.22 to 0.50)
 - Expository Writing: medium (0.22 to 0.46)
- Nine schools (**56%**) are from **Europe**, six schools (**38%**) are from **Asia**, and one school (**6%**) is from **Africa**.
- In terms of country, three of these top-performing IB schools each are located in **Germany** and in **Switzerland**, two schools in **China**, and one school in **Hong Kong SAR**.



Report

ACER & IB will release the Phase II report of these findings end of 2011.



Thank you !