

The Framework and Development of the Contextual Questionnaires for PISA for Development *Educational Prosperity*

Presentation by J. Douglas Willms

The Learning Bar Inc.

Analyses conducted by Dr. J. Douglas Willms, Dr. Lucia Tramonte, and participating countries



Outline

A new approach to contextual questionnaires

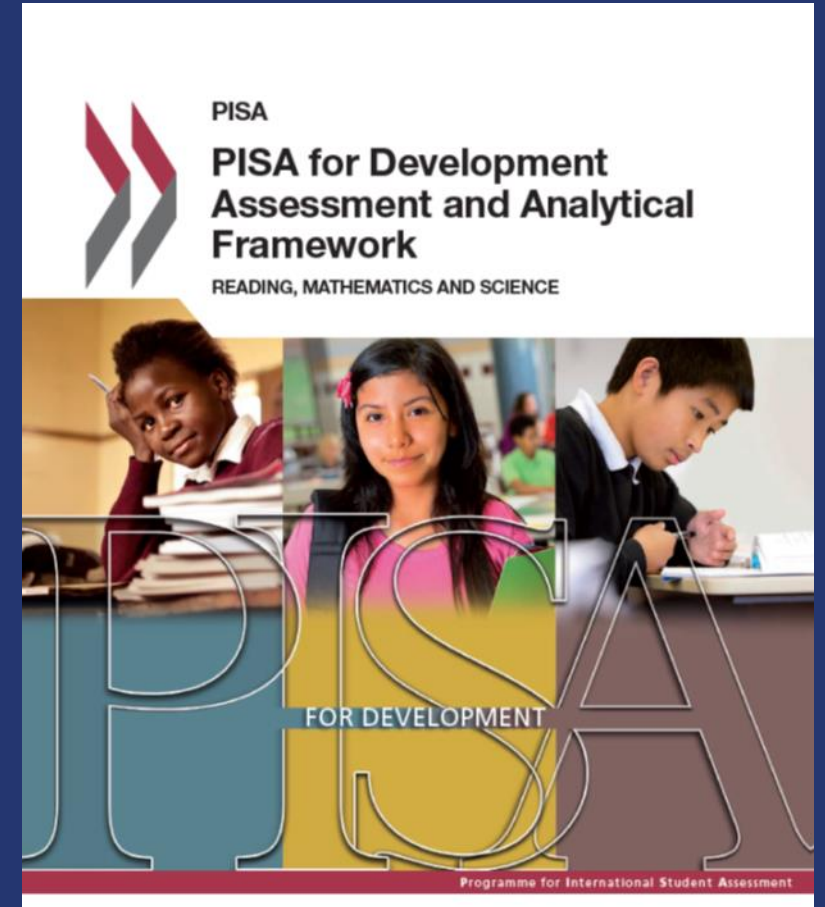
Educational Prosperity

a life-course framework for assessment and reform

four ways that success accumulates

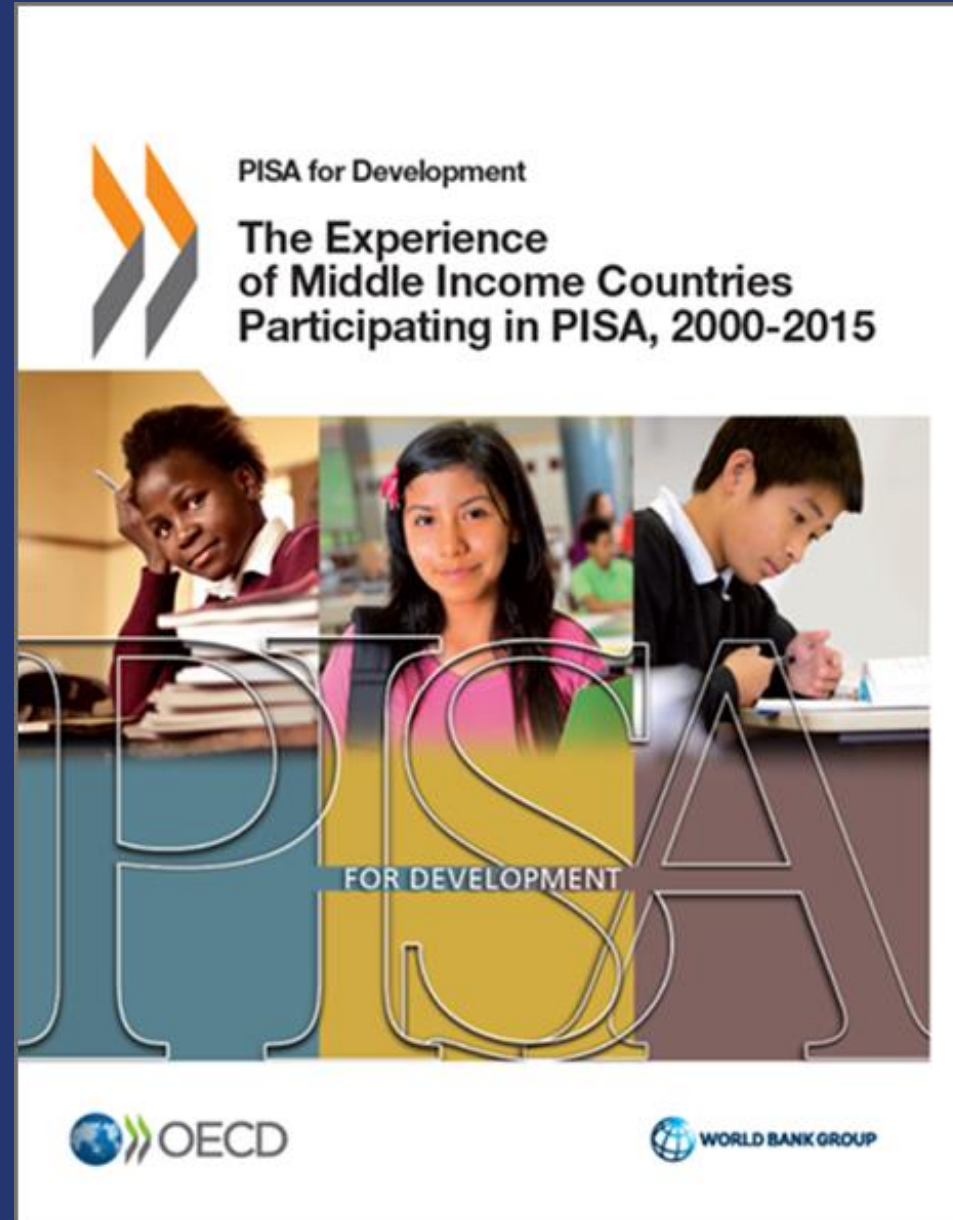
Core indicators and supporting content

Some findings

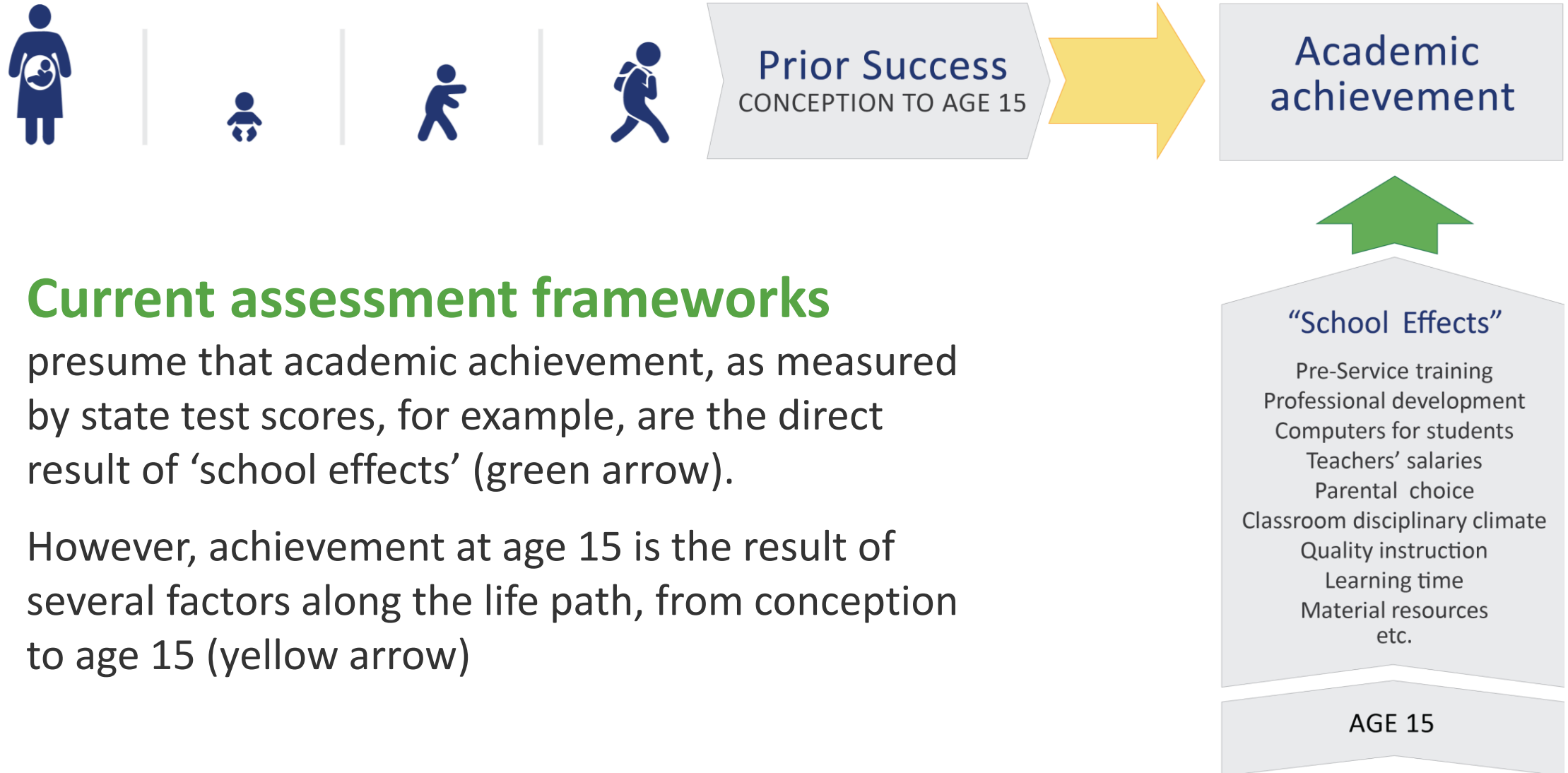


Why we need a new approach

To make the data captured on the students' context more relevant to Low-and-Middle-Income-Countries (LMIC)



The quest for classroom and school “effects”



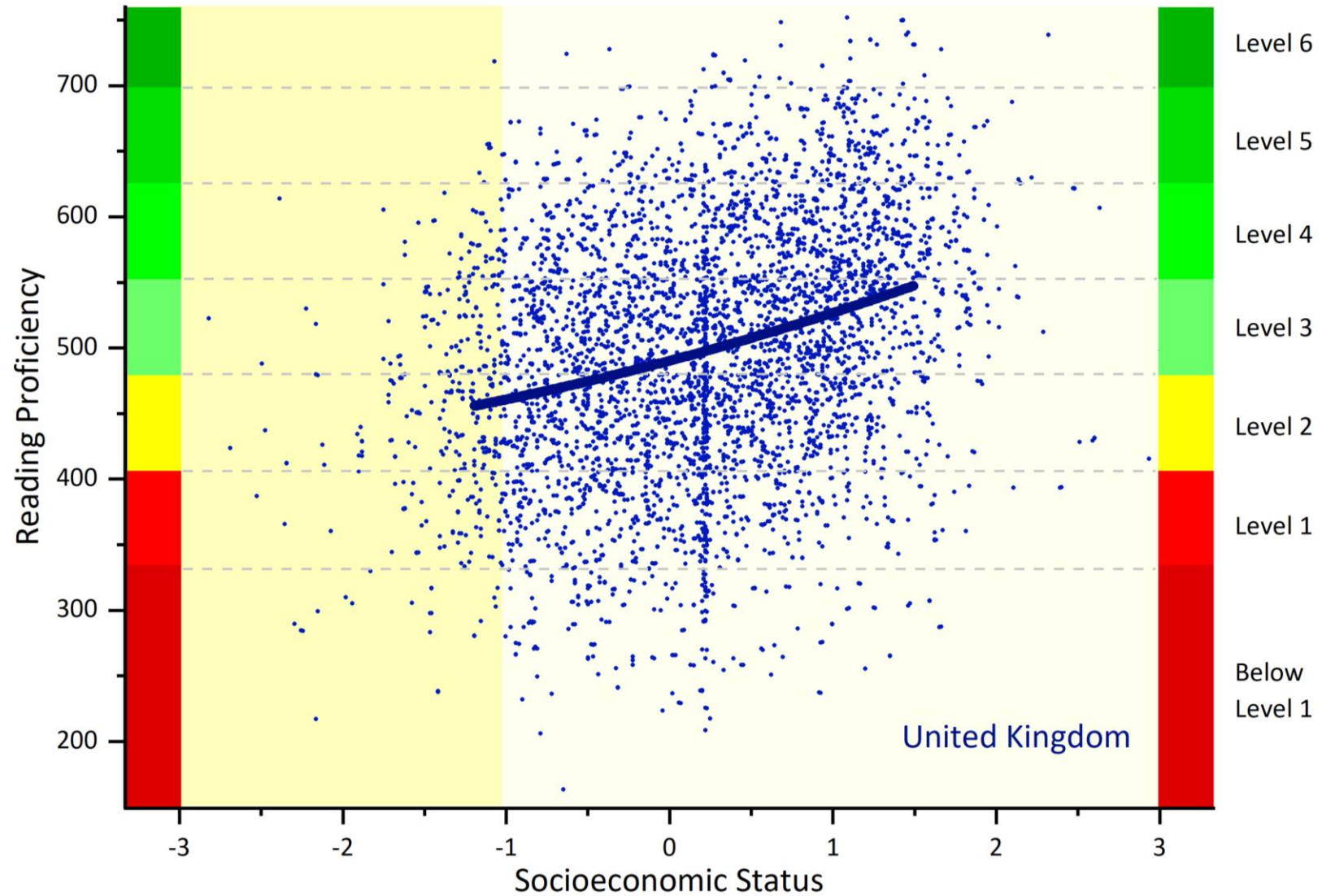
Current assessment frameworks

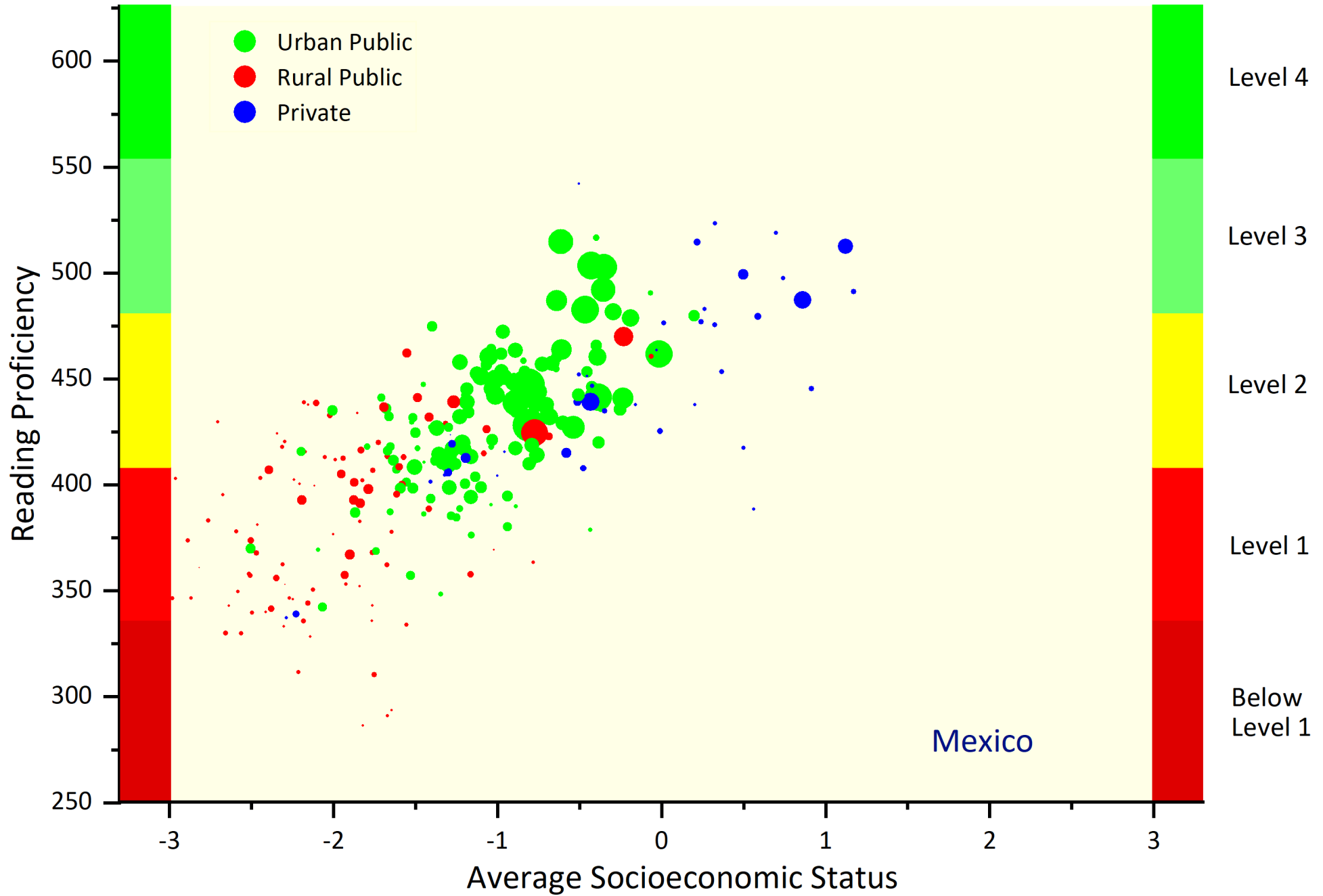
presume that academic achievement, as measured by state test scores, for example, are the direct result of ‘school effects’ (green arrow).

However, achievement at age 15 is the result of several factors along the life path, from conception to age 15 (yellow arrow)

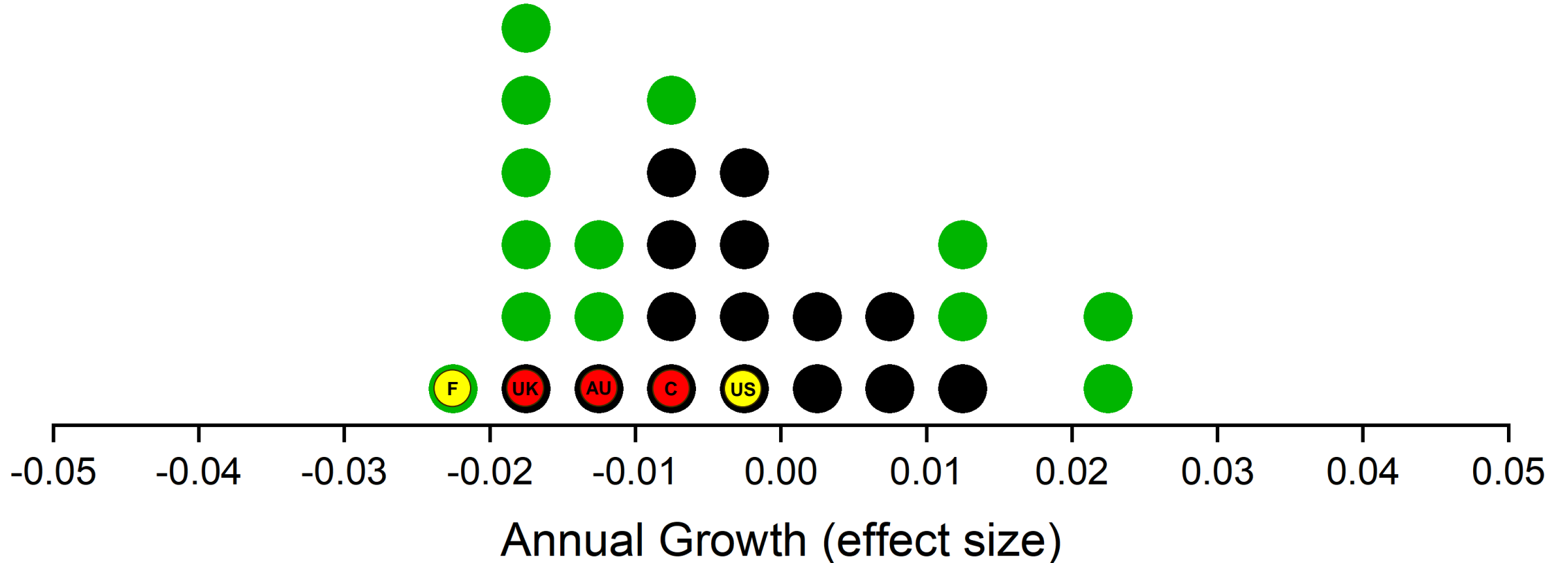
PISA-D not just about LMIC: About 18% of children in the U.K are 'vulnerable'

- About 18% of students at age 15 have only basic reading skills – in PISA this is Level 1, which corresponds to about a Year 2 or 3 reading level.
- A further 24% are at Level 2, with skills comparable to students in Years 4 or 5.
- 9.2% are at Levels 5 and 6





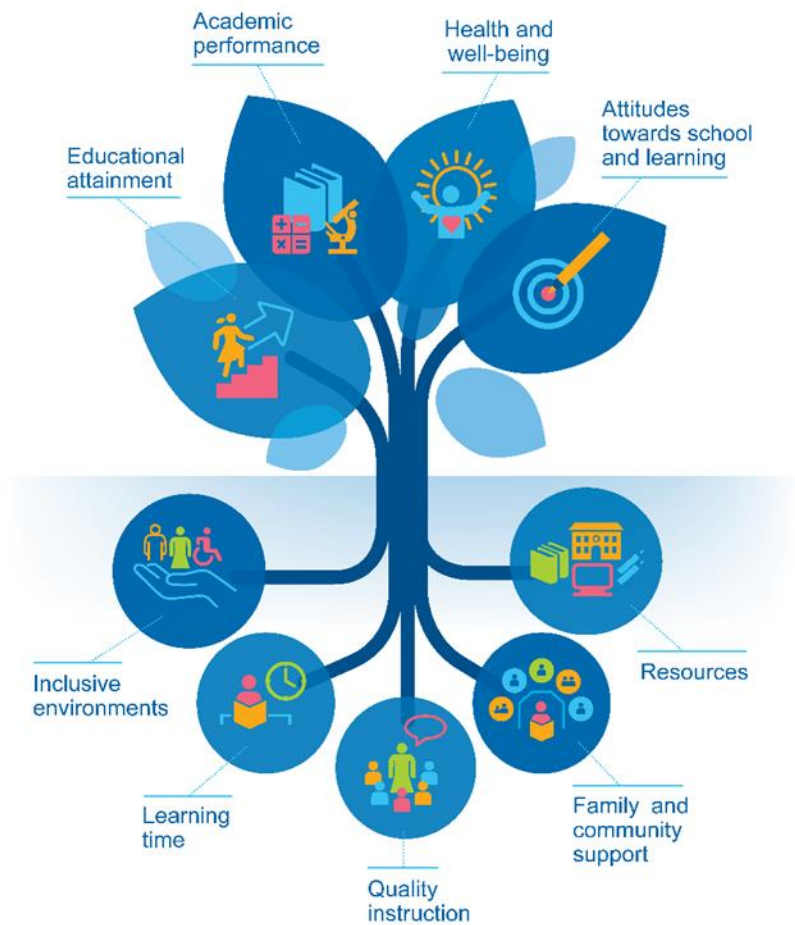
Literacy results have not improved over the last two decades



Annual Growth in PISA Reading Scores, 2000-2015

PISA-D uses the Educational Prosperity Model

A framework for assessment and reform





Educational Prosperity

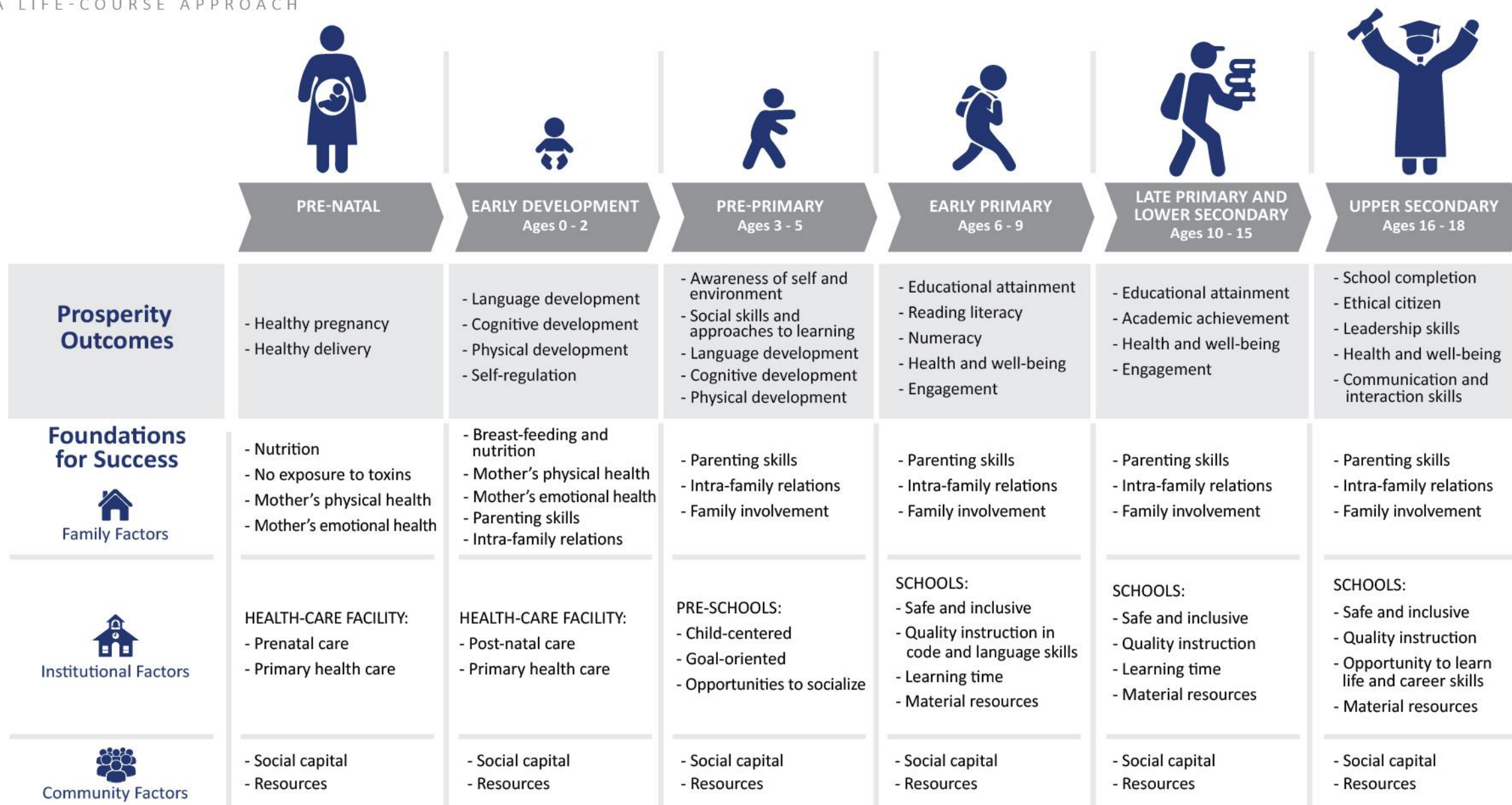
Educational Prosperity is an assessment framework for monitoring children's developmental outcomes and the key factors that drive these outcomes, as children develop from conception to adolescence.

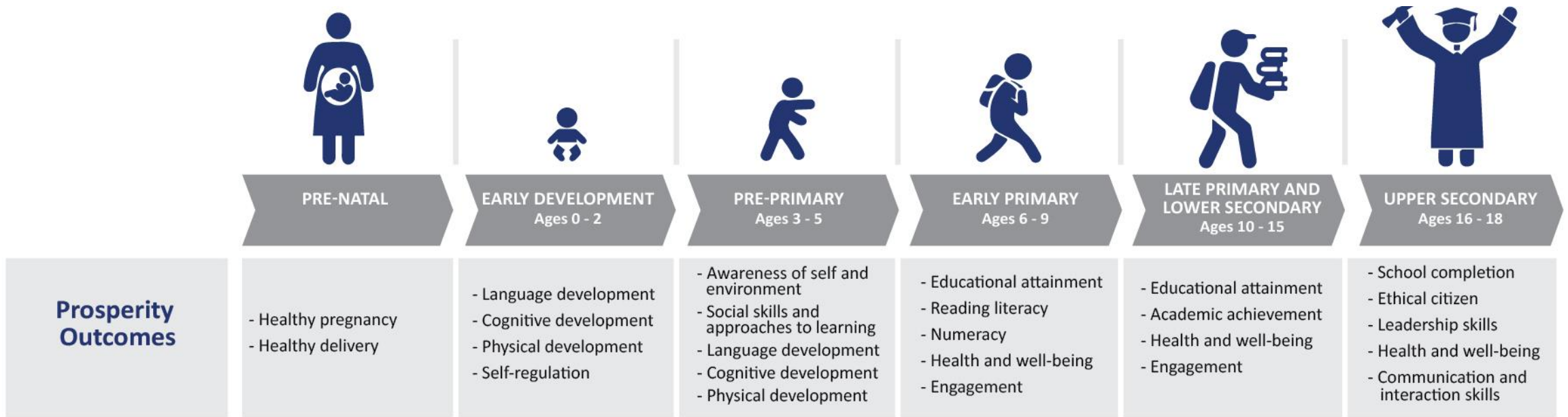
The outcomes, called **Prosperity Outcomes**, are indicators of children thriving at each stage of development.

The factors that support healthy childhood development are the **Foundations for Success**. They represent the capacity of a society to develop young peoples' literacy skills and well-being.

Educational PROSPERITY

A LIFE-COURSE APPROACH





Foundations for Success:

- were based on discussions with leaders from participating PISA-D countries;
- are universal in the sense that they are key markers of child development and are necessary for all children to thrive;
- are consistent with the Sustainable Development Goals (SDGs) set out by UNESCO (UNESCO Institute for Statistics, 2017).

Foundations for Success are based on research on school and classroom effects.

They are factors that are:

Potent

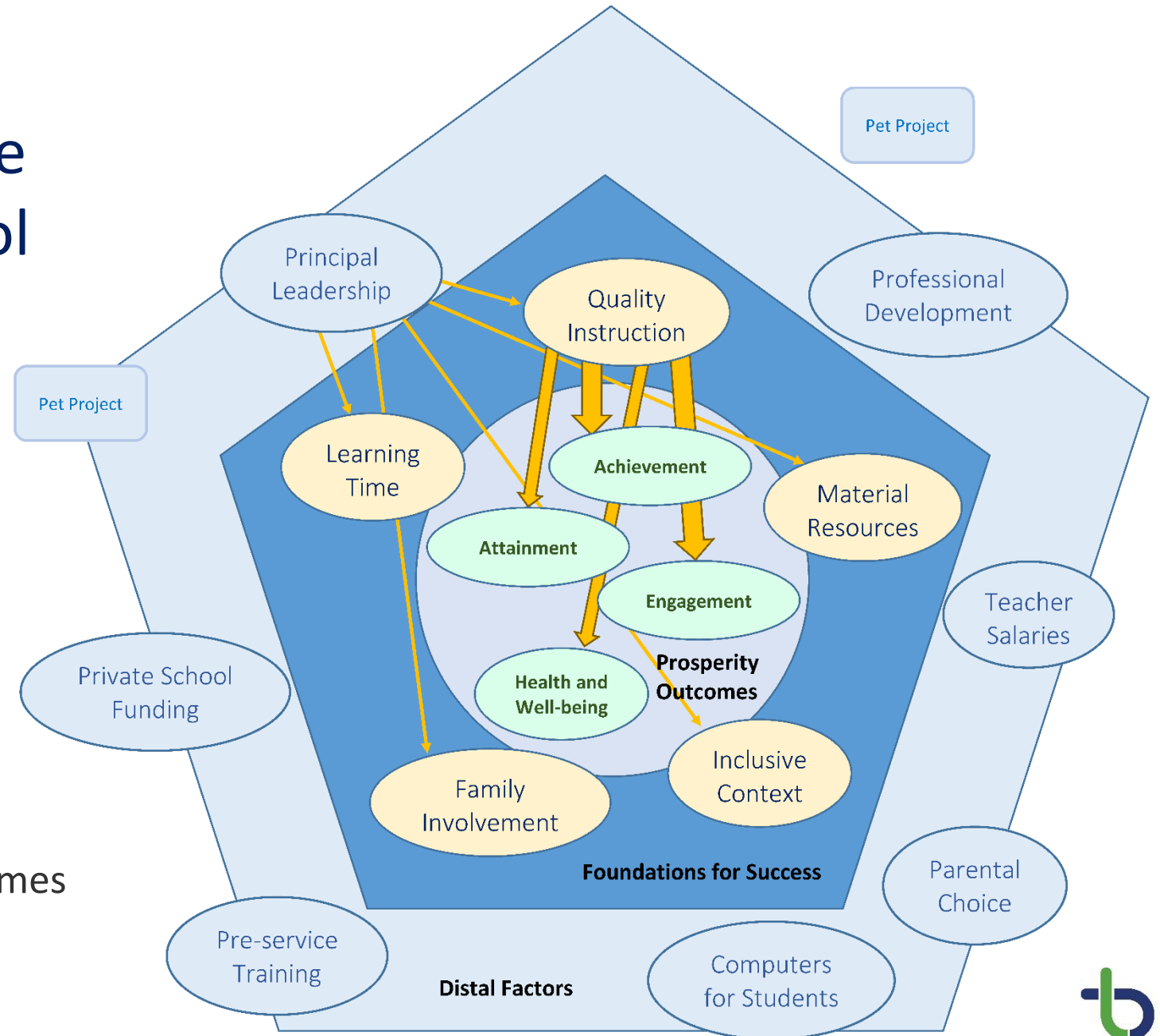
have strong effects on prosperity outcomes

Pervasive

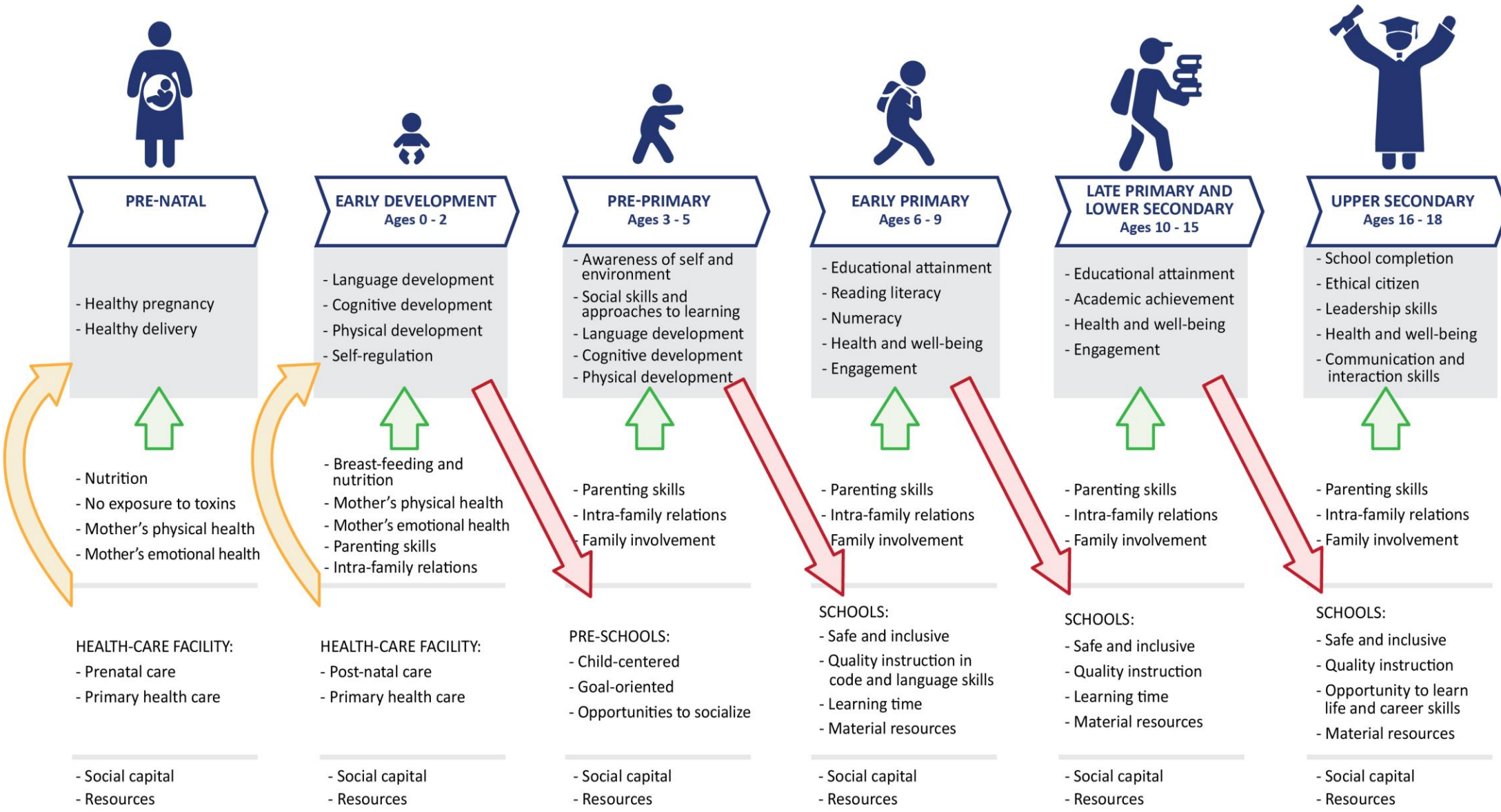
effect a range of outcomes

Proximal

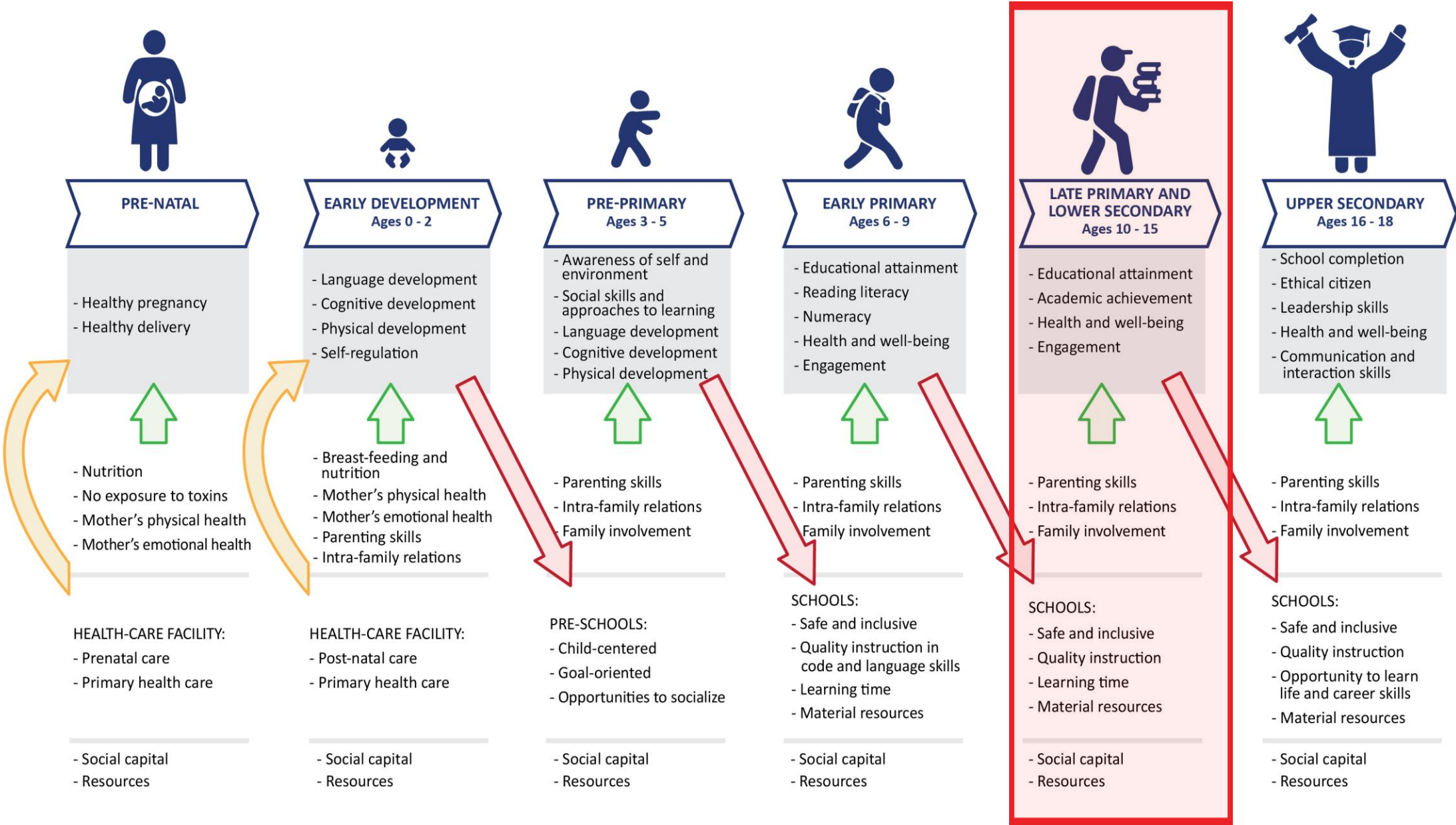
have a direct effect on the prosperity outcomes



Educational Prosperity identifies four ways that success accumulates



Educational Prosperity identifies four ways that success accumulates





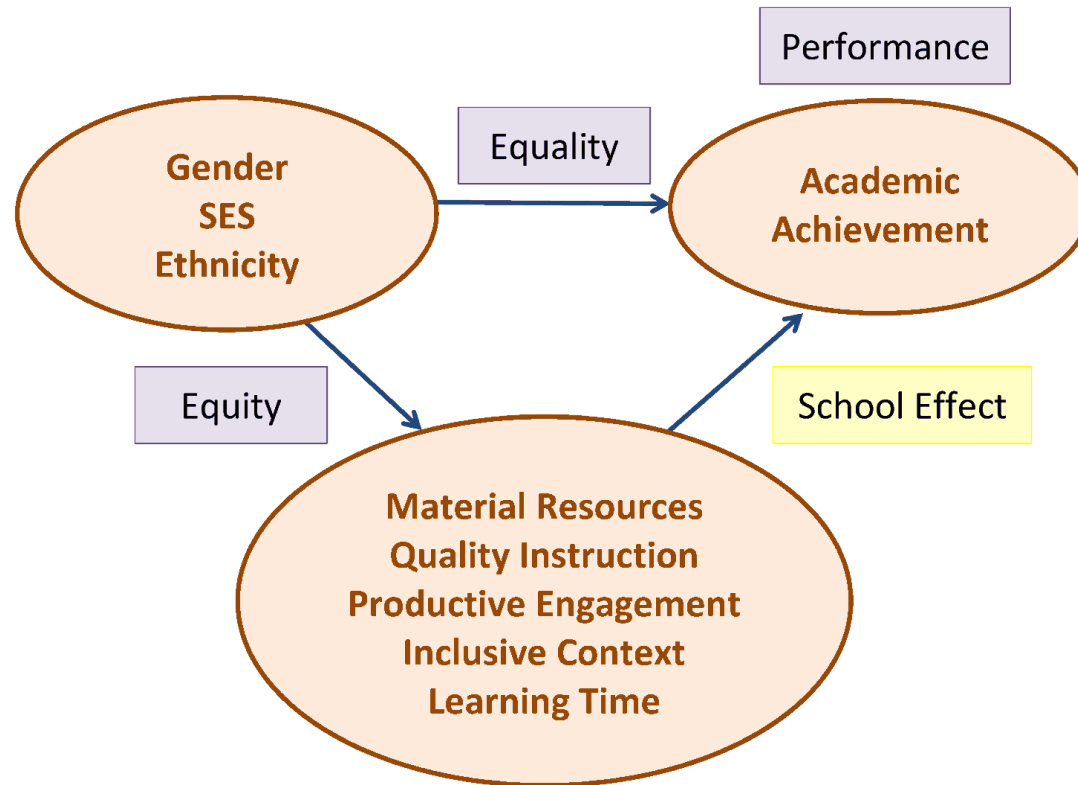
Measures for assessing equality and equity

Equality refers to differences in the distribution of outcomes among sub-populations

Equity refers to fairness – a just treatment of people from different sub-populations.

Willms (2011) argued in a contribution for the OECD's 2011 *Education at a Glance* (OECD, 2011), that equality and equity should be defined as separate concepts and measured with a consistent approach, with equality referring to differences among sub-populations in the distribution of their educational outcomes and equity referring to differences among sub-populations in their access to the resources and schooling processes that affect schooling outcomes.

This distinction can be characterized with a path model, as shown below modified from (Willms, Tramonte, Duarte, and Bos, 2012).

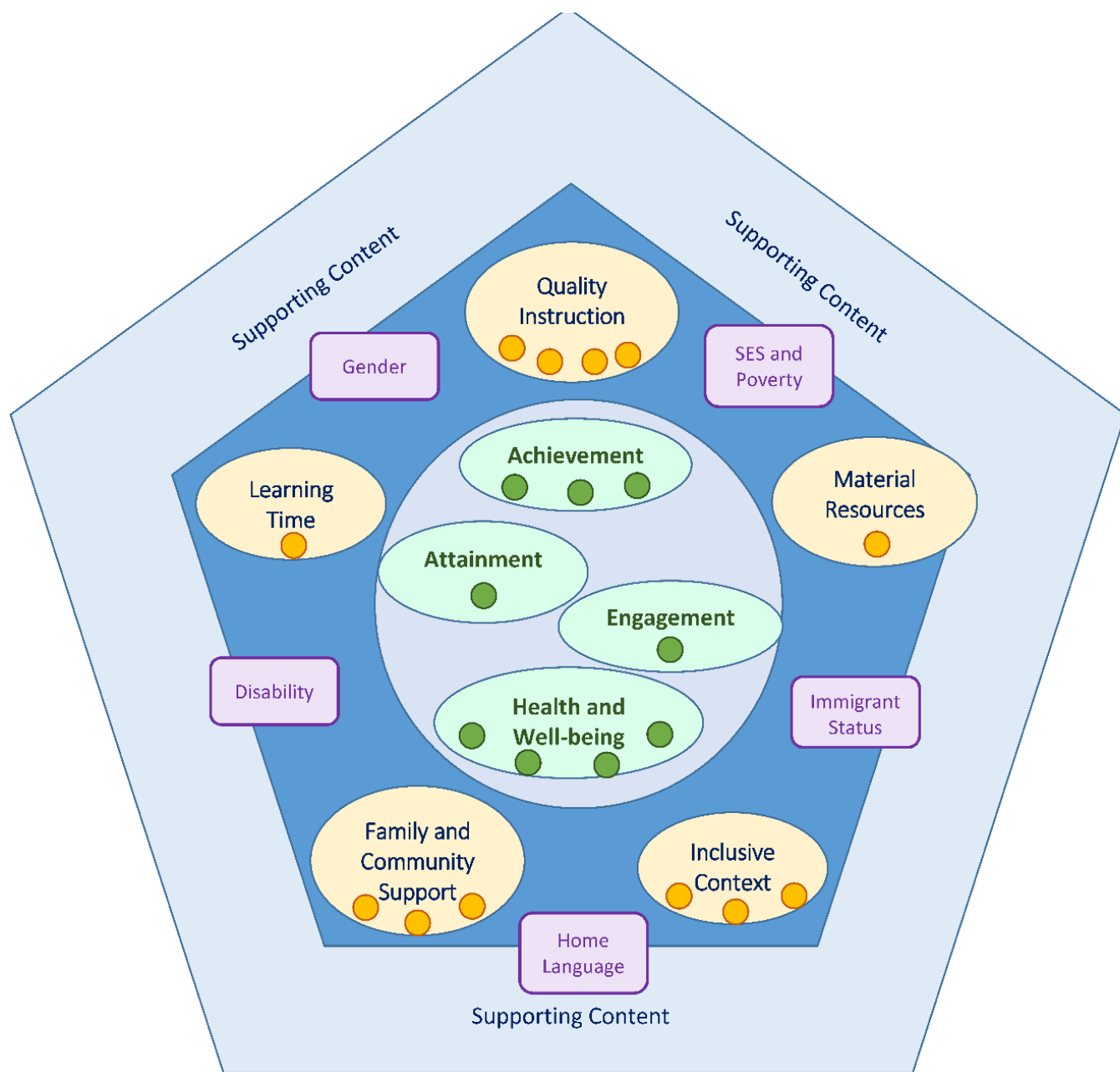




Core indicators and supporting content for PISA-D

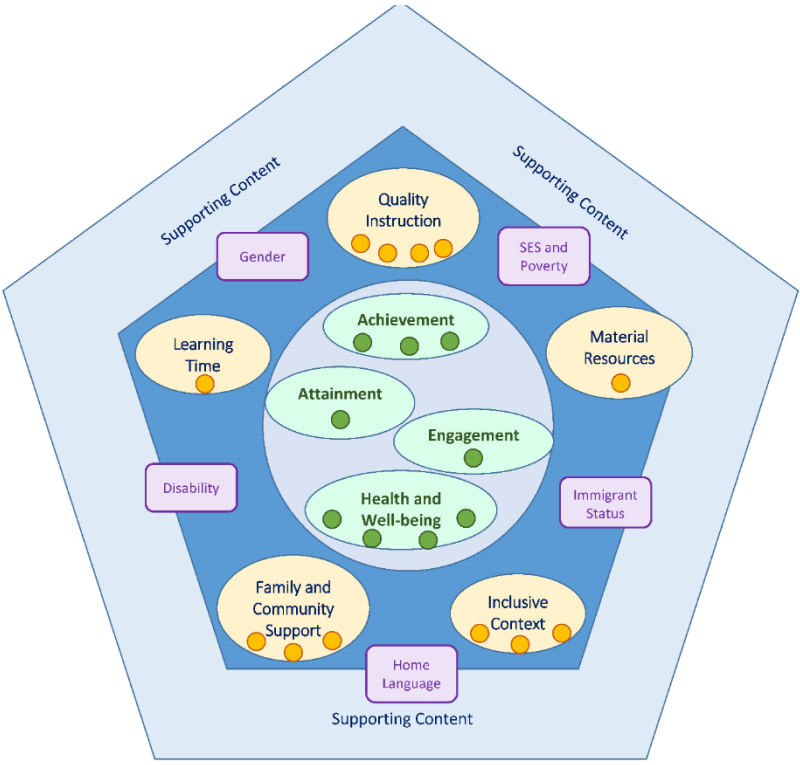
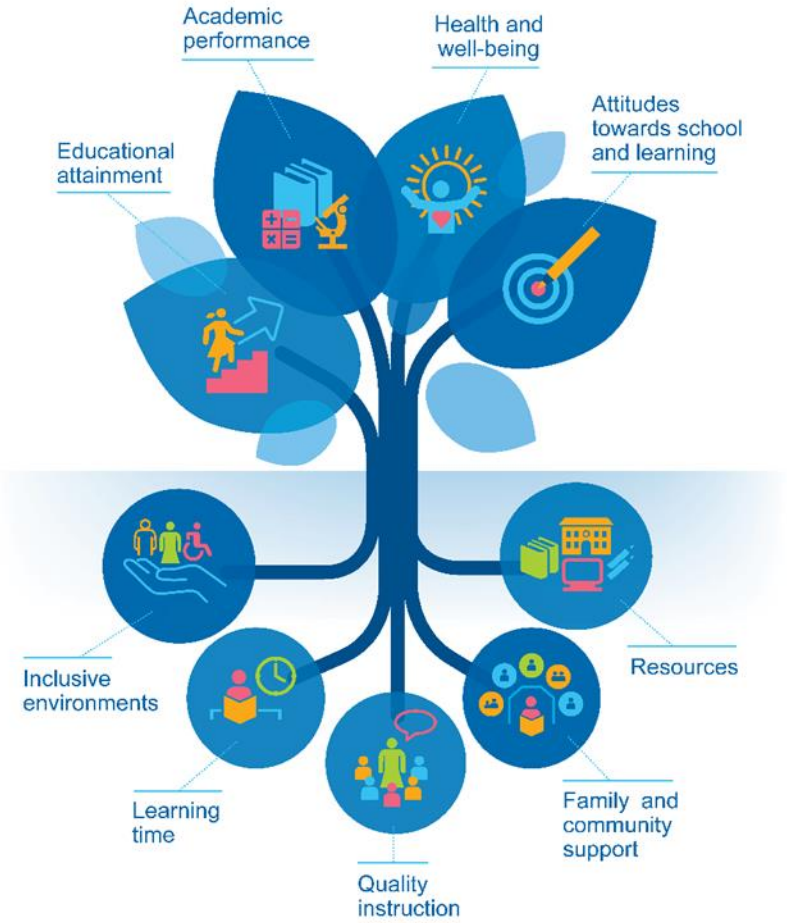
Rationale for proposed selection of questionnaire content

- Consistent with the contextual framework, which is based on the Educational Prosperity model.
- Over-arching goals:
 - Provide reliable measures of the core indicators
 - Include measures that can be used to link to 2015 main PISA
 - Provide the constituent components to measure SES and poverty
 - Include a number of measures of supporting content
- Considerable work was conducted to extend the measure of ESCS, to consider an alternate approach for measuring ISCO, and to develop a schema for assessing material possessions.




Educational Prosperity Model for PISA for Development

Educational Prosperity Model for PISA for Development



Nine indicators of Prosperity Outcomes
Twelve measures of Foundations for Success
Five equality and equity variables

OECD Programme for International Student Assessment (PISA) for Development



Kenya
Date of Test (PISA40 Mini Study 2017)

Day: _____ Month: _____ Year: 2017


School Questionnaire

School Name: _____

School ID: _____

English: 994

OECD Programme for International Student Assessment (PISA) for Development



Kenya
Date of Test (PISA40 Mini Study 2017)

Day: _____ Month: _____ Year: 2017

Teacher Questionnaire


School Name: _____

Teacher ID: _____

Teacher Name: _____
Surname

English: 994

OECD Programme for International Student Assessment (PISA) for Development



Kenya
Date of Test (PISA40 Mini Study 2017)

Day: _____ Month: _____ Year: 2017

Learner Questionnaire

School Name: _____

Learner ID: _____

Learner Name (optional): _____
Surname Firstname

Date of Birth: _____ / _____ / _____
Day Month Year

English: 994

Project Consortium

- eAptS&A Linguistic Quality Control Inc. (USA)
- Educational Testing Service (USA)
- Pearson (UK)
- The Learning Bar (Canada)
- Westat (USA)

	School-based assessment			Out-of-school assessment		
	Student	Teacher	School	Youth	Person most knowledgeable about the youth	Household
Prosperity Outcomes						
Educational attainment	••••			••••••••	•••	
Health and well-being	••••			••••		
Attitudes towards school and learning	•			••	•	
Foundations for Success						
Inclusive environments	••••	••	••••	•••		
Quality instruction	••••	•	•			
Learning time	•••••	•	••			
Material resources		••••••	•••••			
Family and community support	•	•	••	•	•	
Demographic factors to assess equity and equality						
Gender	•			•		
Socio-economic status and poverty	••••••••		••	••••••••	••••••••	••••••••
Language spoken at home	••••	•••		••••		
Urban/rural status			•			
Immigrant status	•			•••		
Disability	•			••		
Context factors		••••••••	••••••		•••••	••••••••
Total	49	33	28	77	19	14

Reliable measures of prosperity outcomes and the foundations for success



Internal Consistency

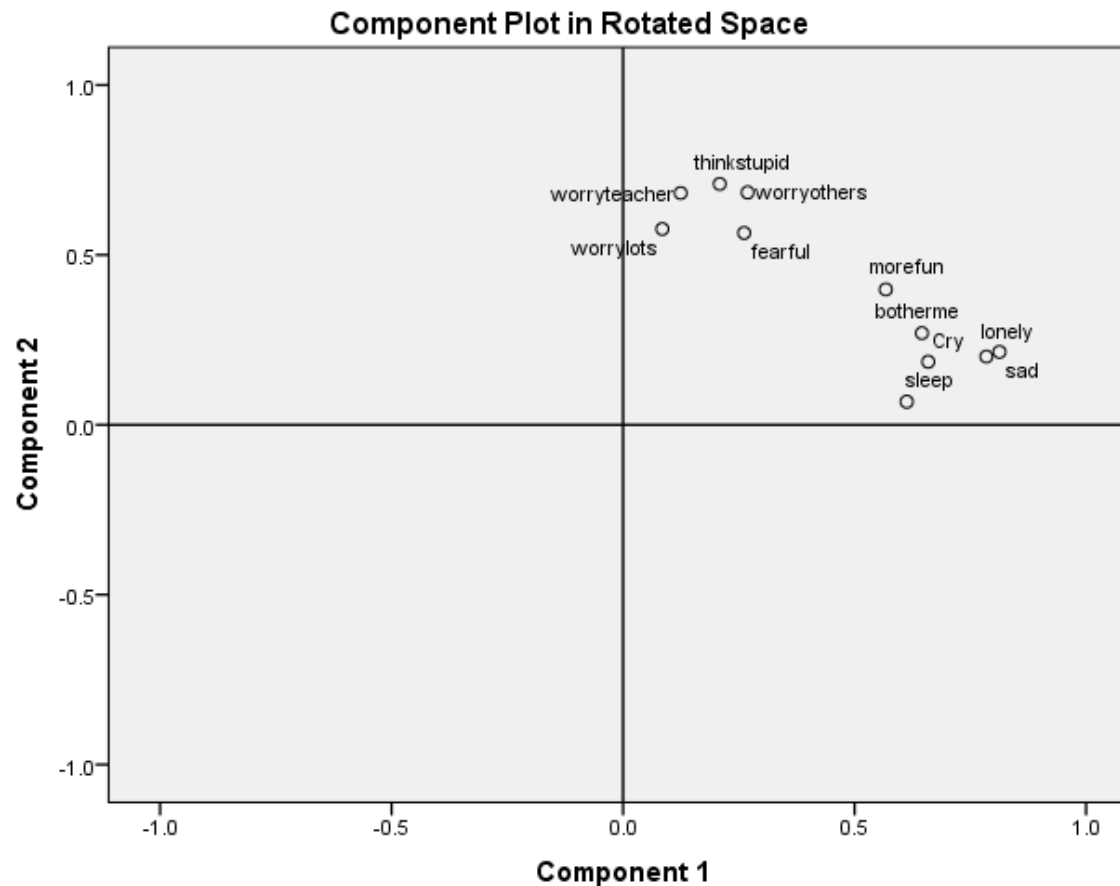
ST076 Quality of Instruction – Mathematics

	All Countries	ECU	GTM	HND	KHM	PRY	ZMB
Eigen Value 1	5.03	4.81	5.32	5.71	5.74	5.05	3.79
Eigen Value 2		1.11	1.04			1.02	1.17
Reliability	0.88	0.87	0.89	0.91	0.91	0.88	0.81
Mean Score (10-point scale)	7.68	7.35	7.85	8.20	7.50	7.73	7.49
	10.9	2.0	14.5	6.6	19.8	3.8	21.2

Factor Structure

Anxiety and Depression

The items split into two factors in a way that is consistent with the literature.



Item Response Theory

Question	Label	Difficulty1	Difficulty2	Difficulty3	Discrimination
63	TVs	-1.90	-0.19	0.82	1.97
64	Table to have meals	-1.59			2.35
62	Dictionary	-1.38			2.28
64	Stove	-1.37			2.22
62	Books	-1.36			1.11
63	Smartphones	-1.09	-0.42	0.12	2.18
62	Quiet place	-1.04			1.14
63	Bathrooms	-0.96	0.68	1.58	2.14
64	Fridge	-0.89			3.00
62	Room on your own	-0.85			1.03
62	Desk to study	-0.73			1.29
62	Internet	-0.19			2.83
63	PCs	-0.18	0.84	1.57	2.62
64	Washer	-0.16			2.26
62	PC	-0.13			2.88
62	Ref book	-0.00	-	-	0.97
62	Art books	0.06	-	-	1.18
63	Cars	0.07	1.13	2.01	1.87
62	Poetry books	0.20	-	-	0.53
63	Music instruments	0.47	1.76	2.73	1.14
62	Art work	0.48	-	-	0.98
62	Software	0.73			1.69
62	Classic Literature	0.92	-	-	1.24

IRT model 2PL, graded for three sets of home possessions.



New measures of socioeconomic status and poverty

The aims of the analyses were to:

- (1) Develop an extended measure of home possessions that can be integrated into the main PISA ESCS.
- (2) Compare ESCS using the traditional main PISA approach with an SES variable created using the new closed-format parental occupation questions.
- (3) Develop a measure of poverty that can be used across countries.

We conducted the following analyses:

(1) Developed derived dichotomous or ordinal variables for the following measures:

Private WC

Lighting with electricity

Food security

Piped water

Flush toilet

Cook with gas or electricity

Bank account

Finished flooring

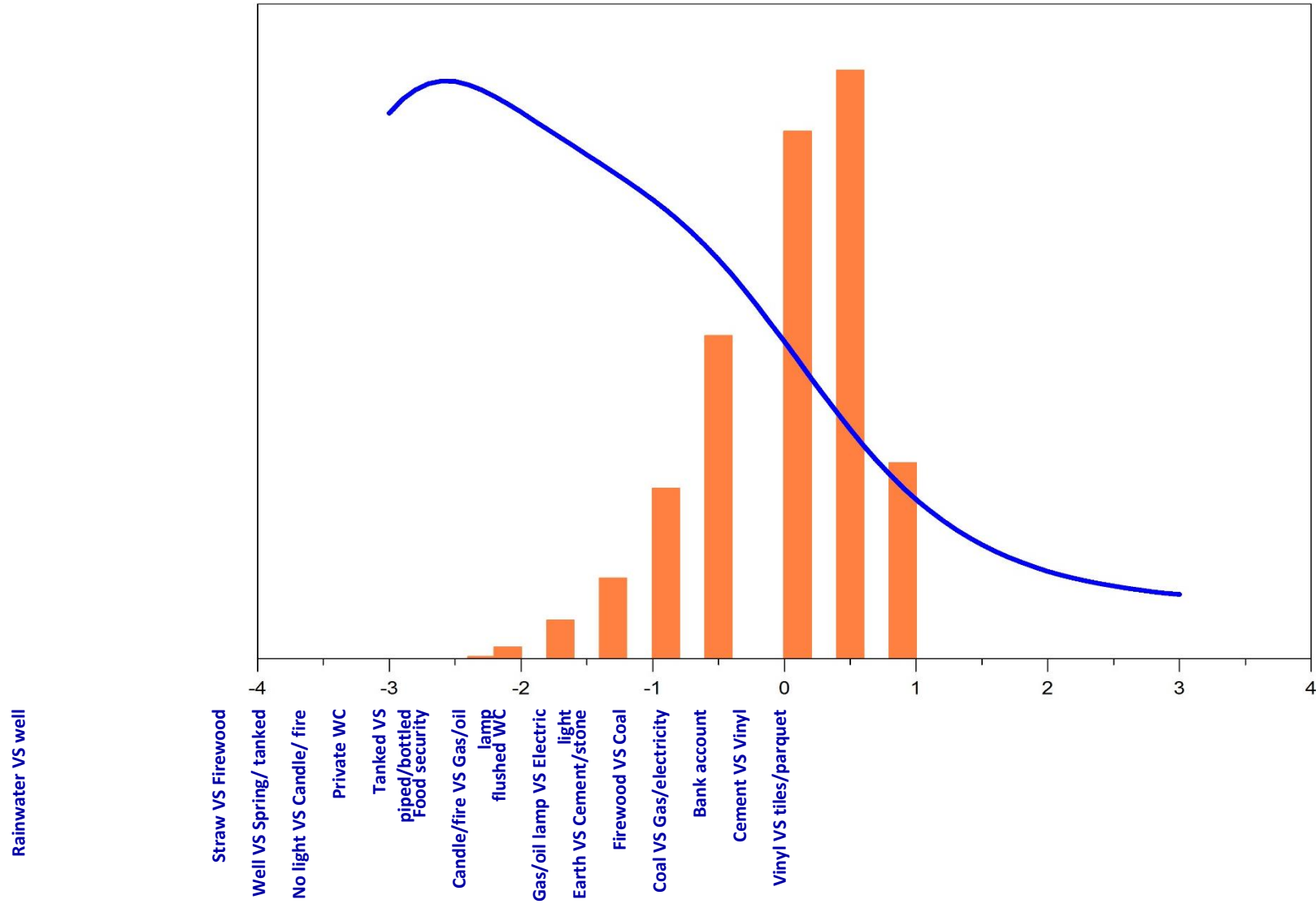
Uncrowded living space

(2) Combined these variables with dichotomous variables used in the extended measure of SES.

(3) Conducted DIF tests for selected items.

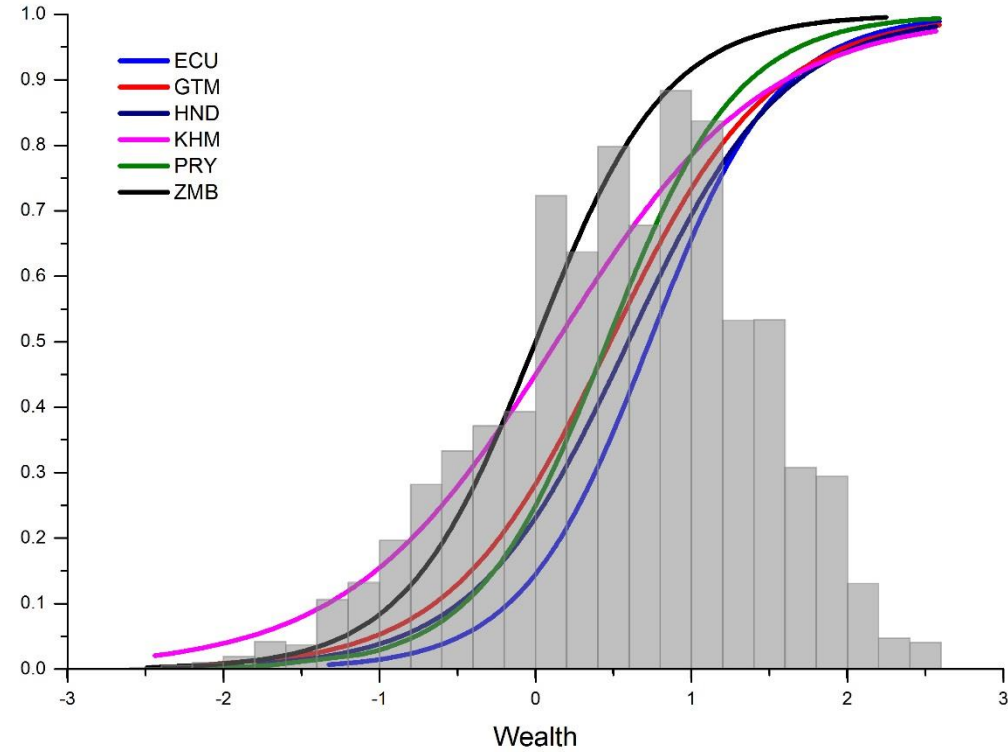
(4) Examined the distribution of item theta values versus the population theta values.

Extending the Scale of Home Possessions



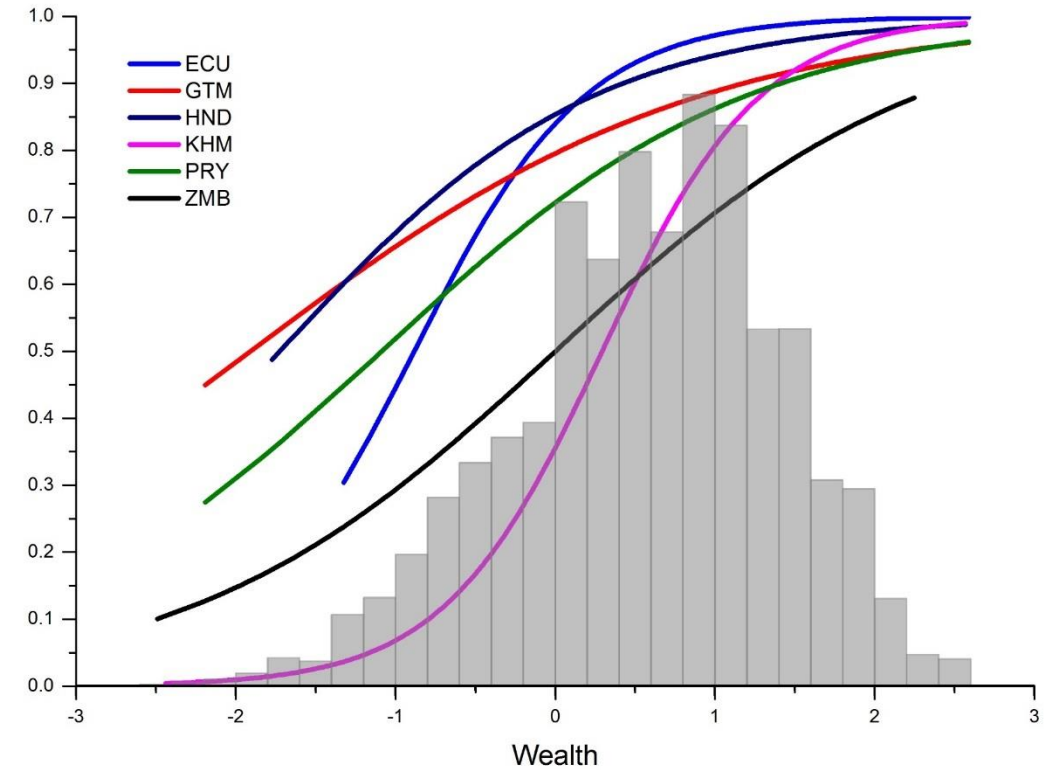
Differential Item Functioning

DIF Finished Floor in the Dwelling



Small DIF

DIF Piped Water in the Dwelling



Large DIF

ST037	What kind of job does your mother have?	
ST037Q01NA	(Please tick only one box.)	
	No Job (i.e., she is not working for pay)	<input type="checkbox"/>
	Armed forces (e.g., captain, lieutenant, sergeant, corporal, private)	<input type="checkbox"/>
	Labourer (e.g., hotel or office cleaner, farm labourer, mining labourer, factory labourer, kitchen helper, newspaper vendor, mail carrier)	<input type="checkbox"/>
	Machine Operator (e.g., miner, paper products machine operator, sewing machine operator, dry-cleaning machine operator)	<input type="checkbox"/>
	Craft and Trades Worker (e.g., house builder, dress maker, jewelry maker, building painter, mechanic, handicraft worker)	<input type="checkbox"/>
	Skilled Worker (e.g., cattle or dairy farmer, fisher, gardener)	<input type="checkbox"/>
	Services and Sales Worker (e.g., cook, waitress, hairdresser, street food vendor, grocer, store cashier, hospital orderly)	<input type="checkbox"/>
	Clerical Worker (e.g., secretary, data entry clerk, bank teller, hotel receptionist)	<input type="checkbox"/>
	Technical Worker (e.g., building inspector, nursing aide, bookkeeper, chef)	<input type="checkbox"/>
	Professional (e.g., engineer, nurse, doctor, school teacher, accountant, computer programmer, lawyer)	<input type="checkbox"/>
	Manager (e.g., government official, sales manager, building construction supervisor, hotel or restaurant manager)	<input type="checkbox"/>

We constructed an ESCS measure using the same approach as in the main PISA.

We scaled mother's and father's occupations for the closed items using two approaches – one based on levels of home possessions and another based on SEI values. These are called SES1 and SES2.

ESCS, SES1 and SES2 are highly correlated at the student and school levels:

Student Level				School Level			
	ESCS	SES1	SES2		ESCS	SES1	SES2
ESCS	1	.951	.956	ESCS	1	.953	.954
SES1	.951	1	.987	SES1	.953	1	.996
SES2	.956	.987	1	SES2	.954	.996	1



Supporting Content

ST018 In general, would you say your health is:

ST018Q01NA (Please tick only one box.)

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
0	1	2	3	4	5	6	7	8	9	10
<i>Poor</i>		<i>Fair</i>			<i>Good</i>		<i>Very Good</i>		<i>Excellent</i>	

ST019 During the past year, have you had any of the following health problems?

(Please tick one box in each row.)

		<i>Yes</i>	<i>No</i>
ST019Q01NA	A chronic disease (e.g., heart disease, lung or other respiratory problems, cancer, diabetes)	<input type="checkbox"/>	<input type="checkbox"/>
ST019Q02NA	An infectious disease (e.g., cholera, malaria, tuberculosis)	<input type="checkbox"/>	<input type="checkbox"/>
ST019Q03NA	Gastrointestinal problems (e.g., heartburn, stomach pain, constipation, diarrhoea)	<input type="checkbox"/>	<input type="checkbox"/>
ST019Q04NA	A cold or flu	<input type="checkbox"/>	<input type="checkbox"/>
ST019Q05NA	An injury that needed treatment	<input type="checkbox"/>	<input type="checkbox"/>
ST019Q06NA	Pain that was long-lasting or recurring	<input type="checkbox"/>	<input type="checkbox"/>
ST019Q07NA	Depression	<input type="checkbox"/>	<input type="checkbox"/>
ST019Q08NA	Panic and anxiety attacks	<input type="checkbox"/>	<input type="checkbox"/>
ST019Q09NA	Insomnia	<input type="checkbox"/>	<input type="checkbox"/>
ST019Q10NA	Fatigue that was long-lasting or recurring	<input type="checkbox"/>	<input type="checkbox"/>

Several questions were included in the questionnaire that were intended to provide supporting content for the core measures of Prosperity Outcomes, Foundations for Success, and the Equality-Equity factors.



Education in Cambodia

Findings from Cambodia's experience
in PISA for Development



Some Findings

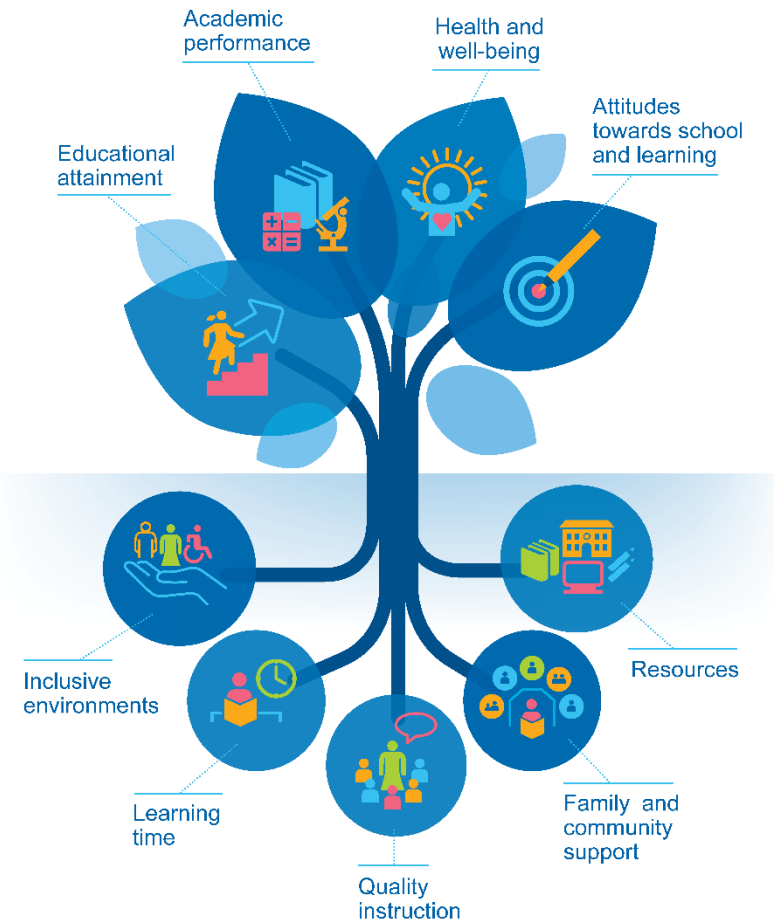


Figure 3. 2. Self-rated health among 15-year-old students

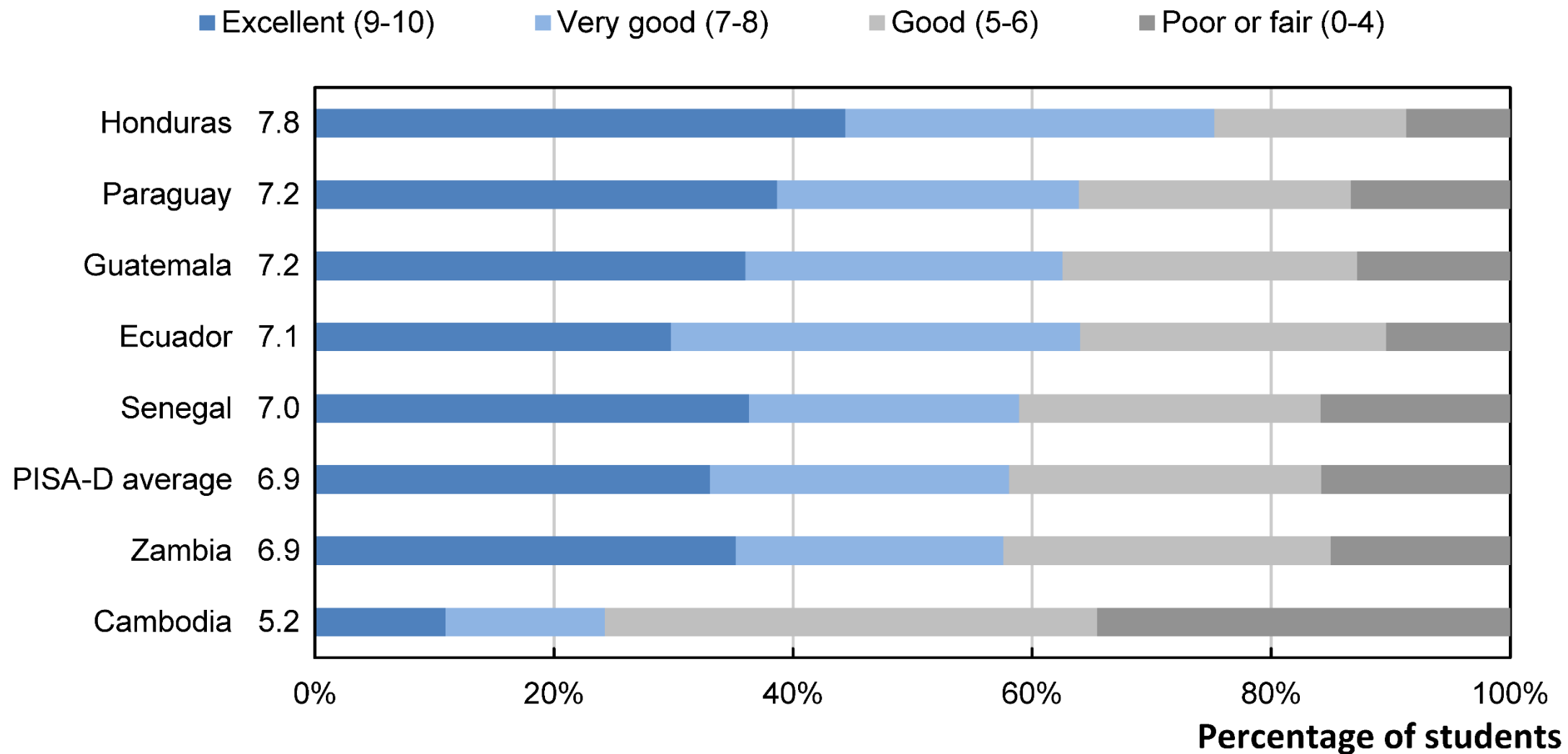
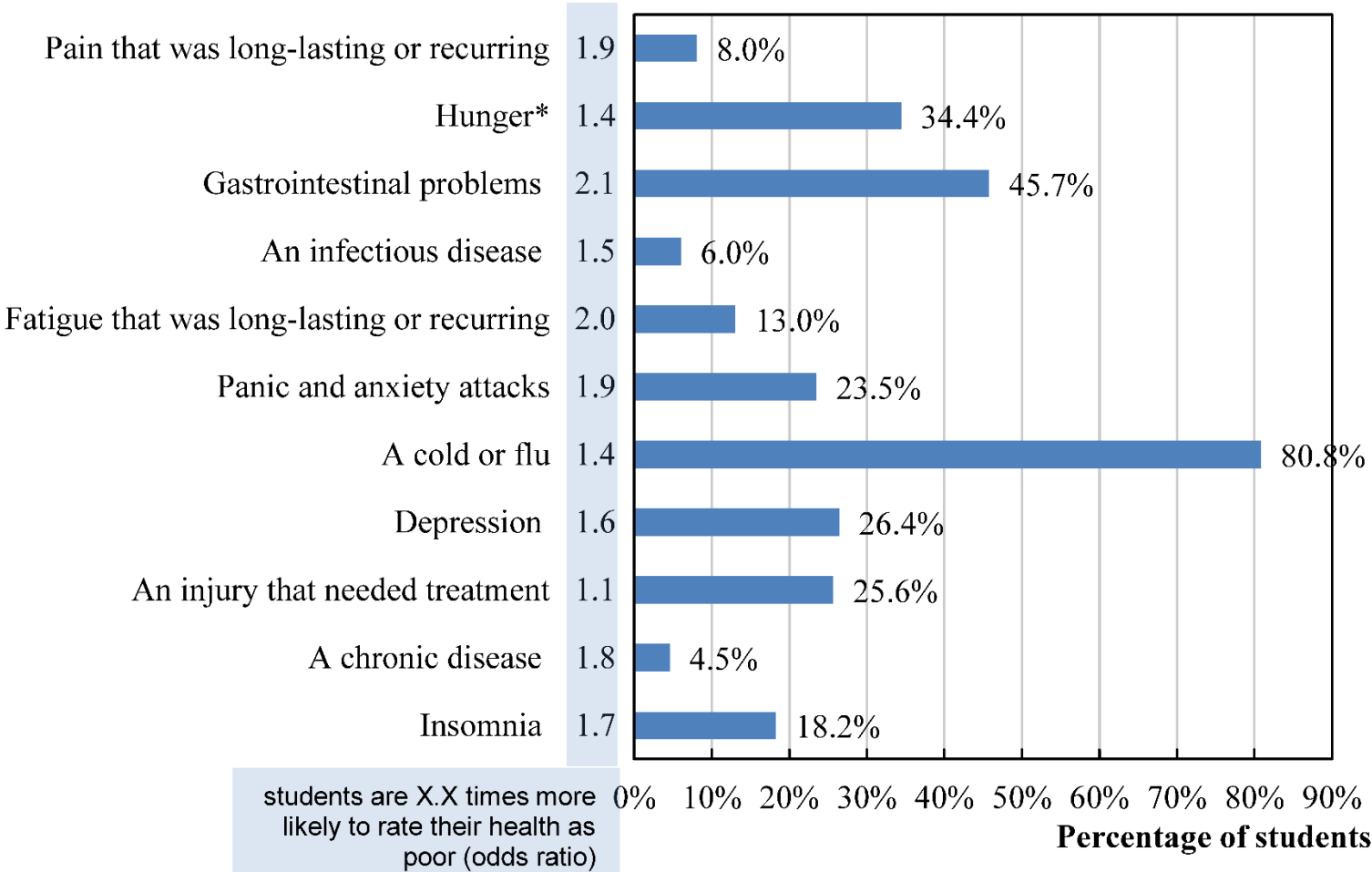


Figure 3. 3. Health problems among 15-year-old students

Percentage of students who reported the following health problems over the year prior to the PISA-D test



Food insecurity is a major threat to students' health and well-being.

In Cambodia, 34% of students reported that they had been hungry at least once a week during the past 30 days because there was not enough food, and 6% said they were hungry almost every day. Students who reported so were about 1.4 times more likely than those who did not to rate their health as poor.

Figure 3. 5. Snapshot of students' broader feelings of anxiety and depression

Percentage of boys and girls who reported having the following feelings about once a week or more often:

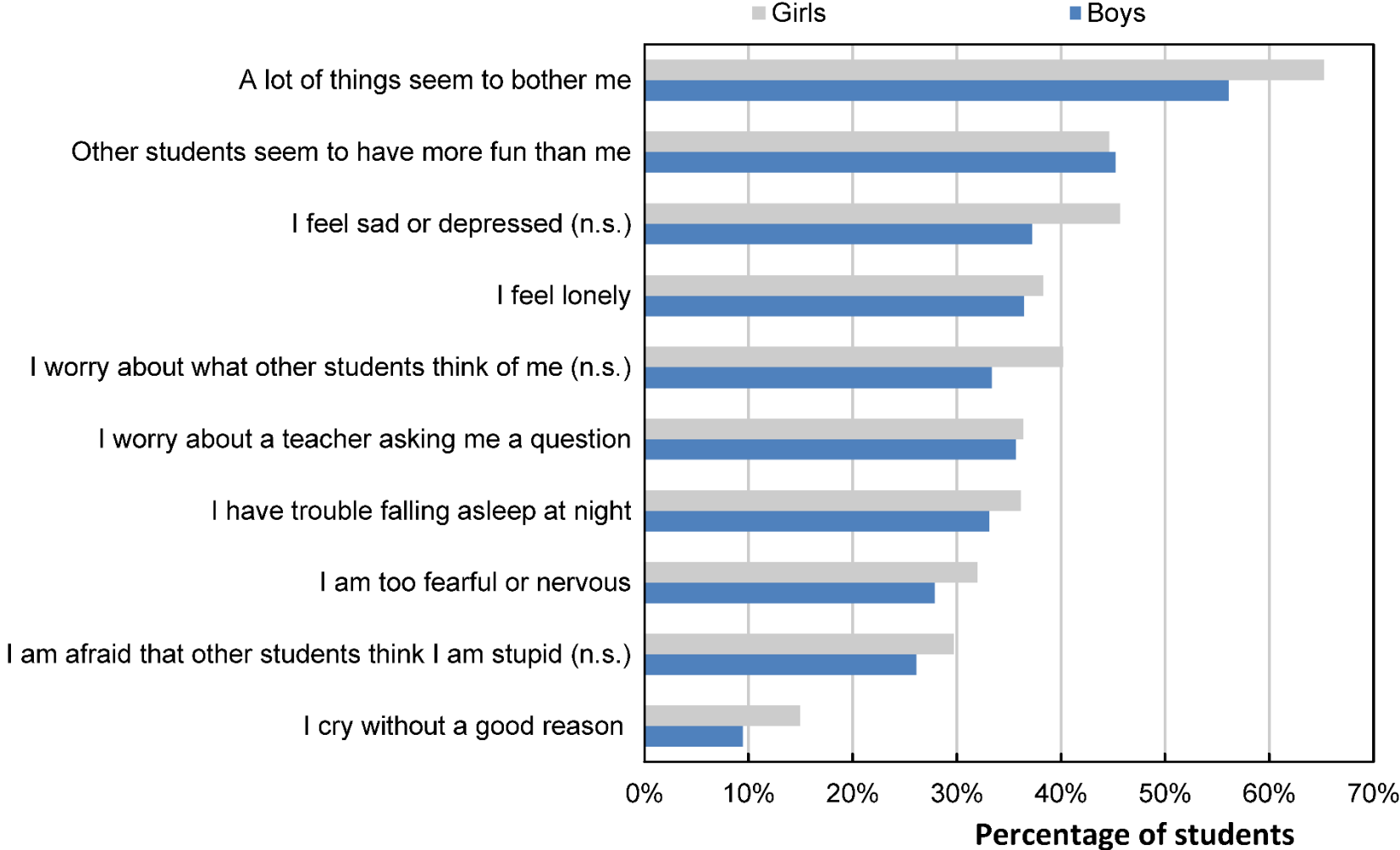


Figure 5.4. Sexual harassment at school among students in Cambodia

Percentage of students reporting having felt sexually harassed in the past 4 weeks:

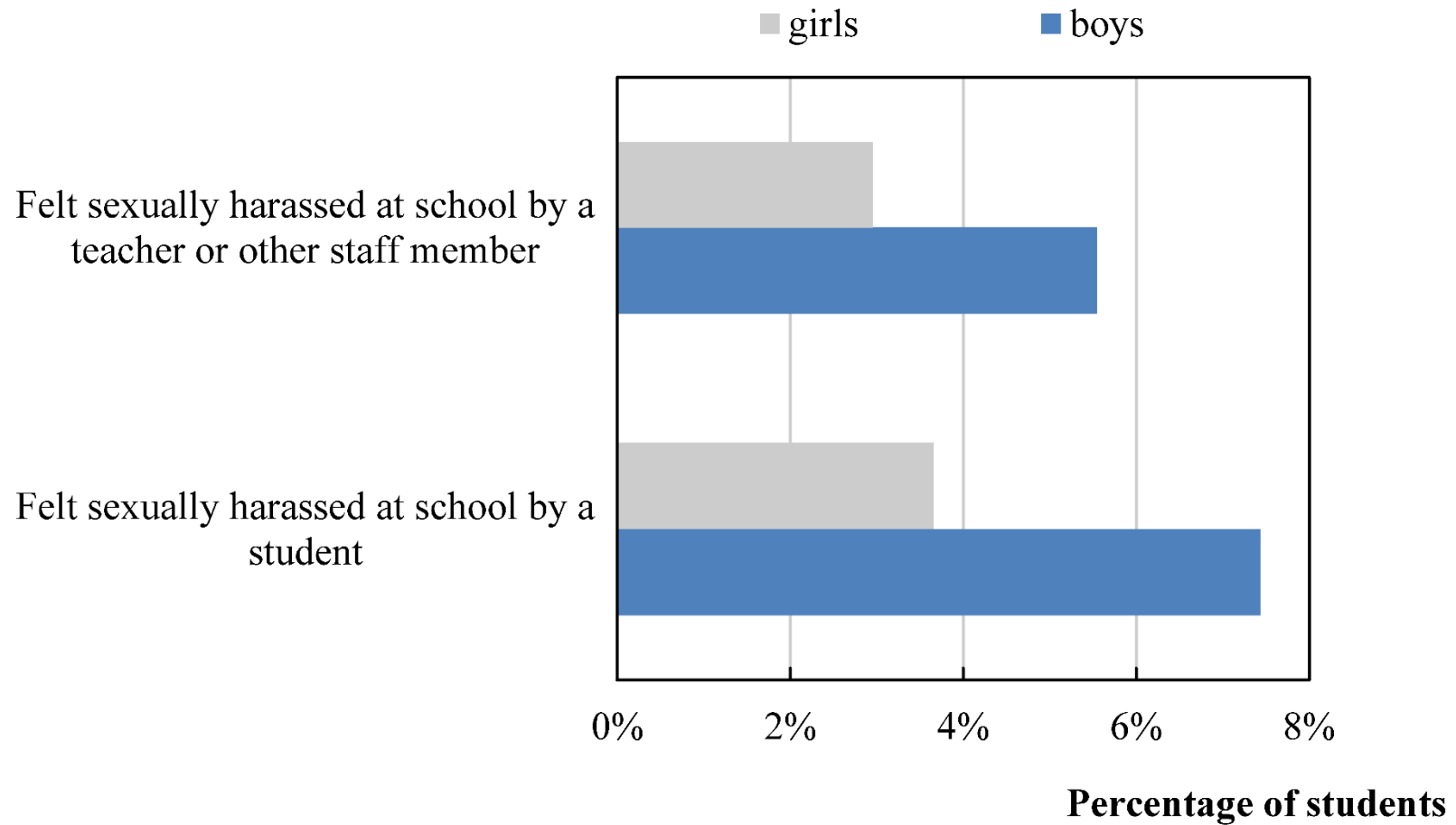
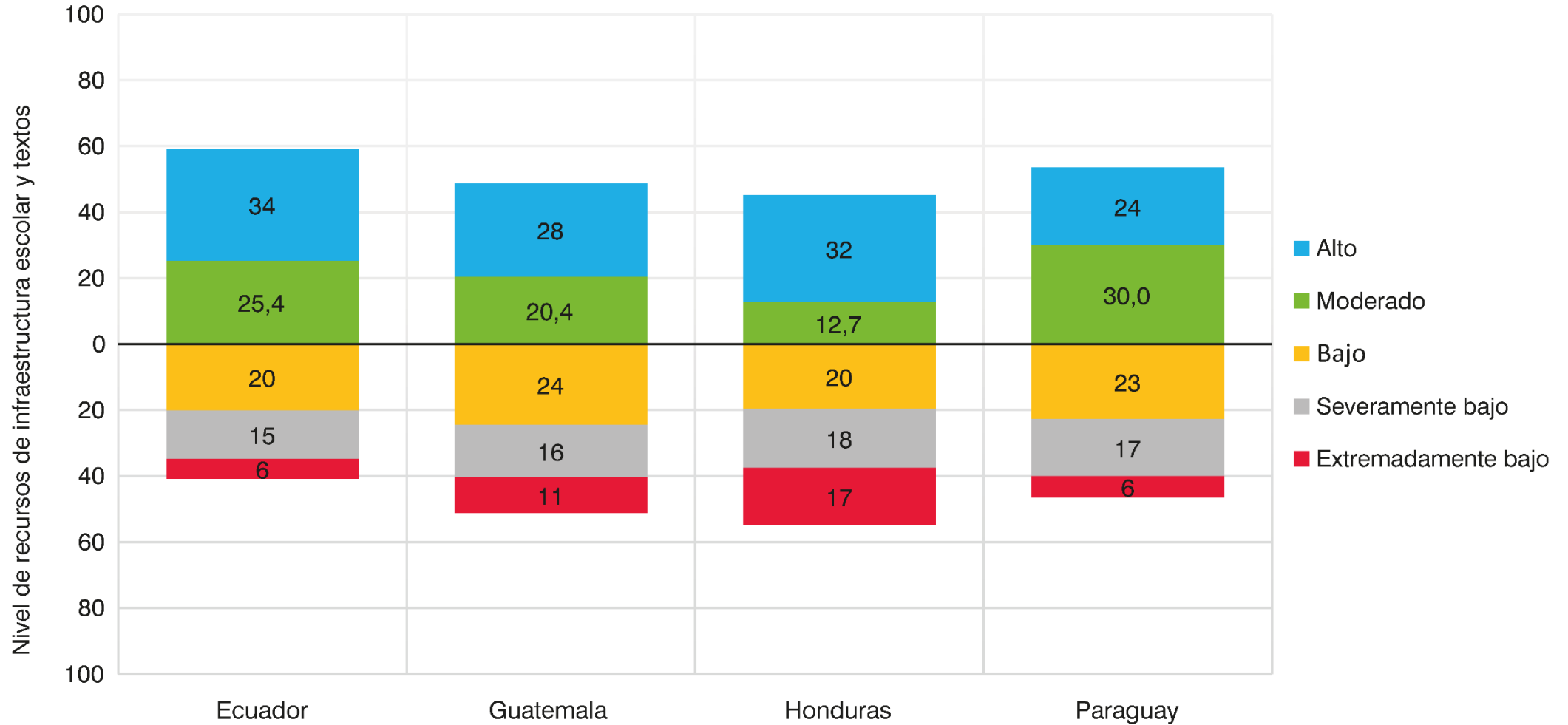
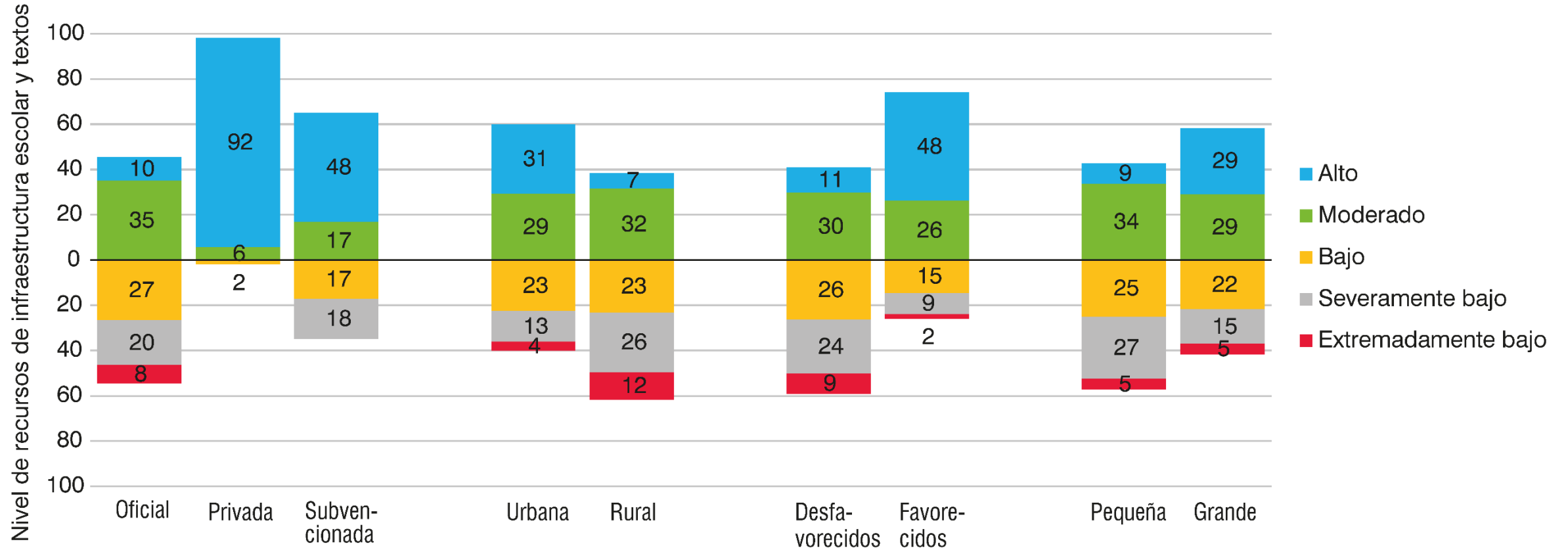


Figura 4.9. Nivel y condición de la infraestructura escolar y disponibilidad de textos en LAC



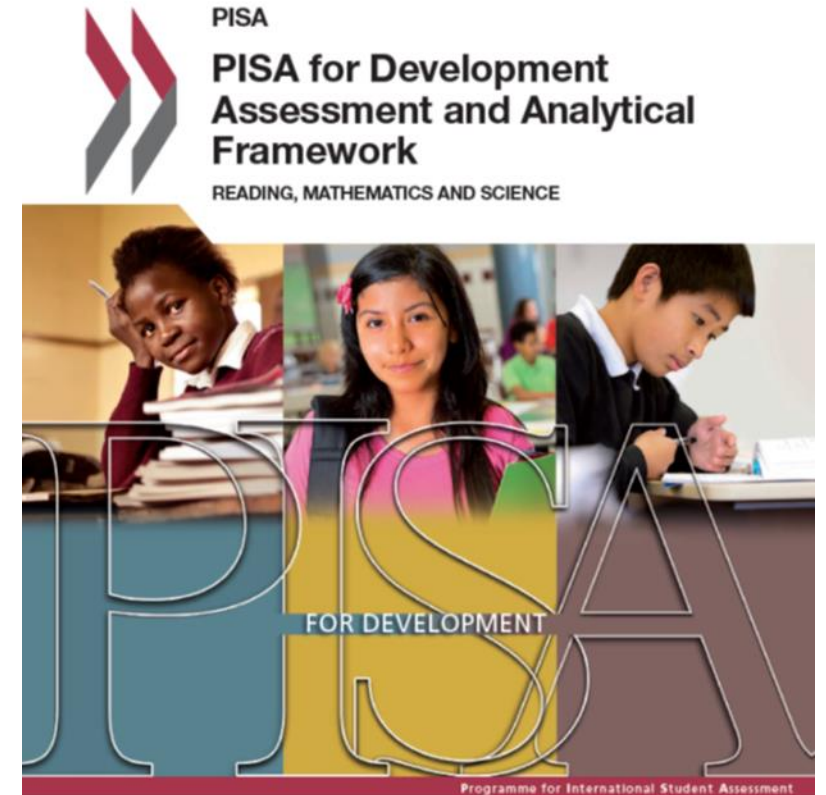
Fuente: PISA para el Desarrollo

Figura 4.10. Variación de los recursos de infraestructura y textos entre las instituciones educativas de Paraguay



PISA-D Achievement

- Contextual questionnaires were delivered successfully to in-school students and out-of-school youth.
- The constructs used in PISA can be adequately applied, adapted and operationalised in LMIC contexts
- The enhanced instruments are more relevant to LMIC while still being able to report results on the main PISA scale.
- PISA-D results have provided important policy insights to participating countries by identifying a range of factors that influence student performance and related outcomes
- The results of PISA-D allow participating countries to determine whether their policies differ from those of countries with a similar social and economic context, but whose students perform better and benefit from more equitable learning opportunities.



Thank You!

For further information please contact:

inquiry@thelearningbar.com

1-877-840-2424

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<http://uis.unesco.org/sites/default/files/documents/ip54-learning-divides-using-data-inform-educational-policy.pdf>

(English)

<http://uis.unesco.org/sites/default/files/documents/ip54-learning-divides-using-data-inform-educational-policy-spanish.pdf>

(Spanish)

<http://uis.unesco.org/sites/default/files/documents/ip54-learning-divides-using-data-inform-educational-policy-french.pdf>

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