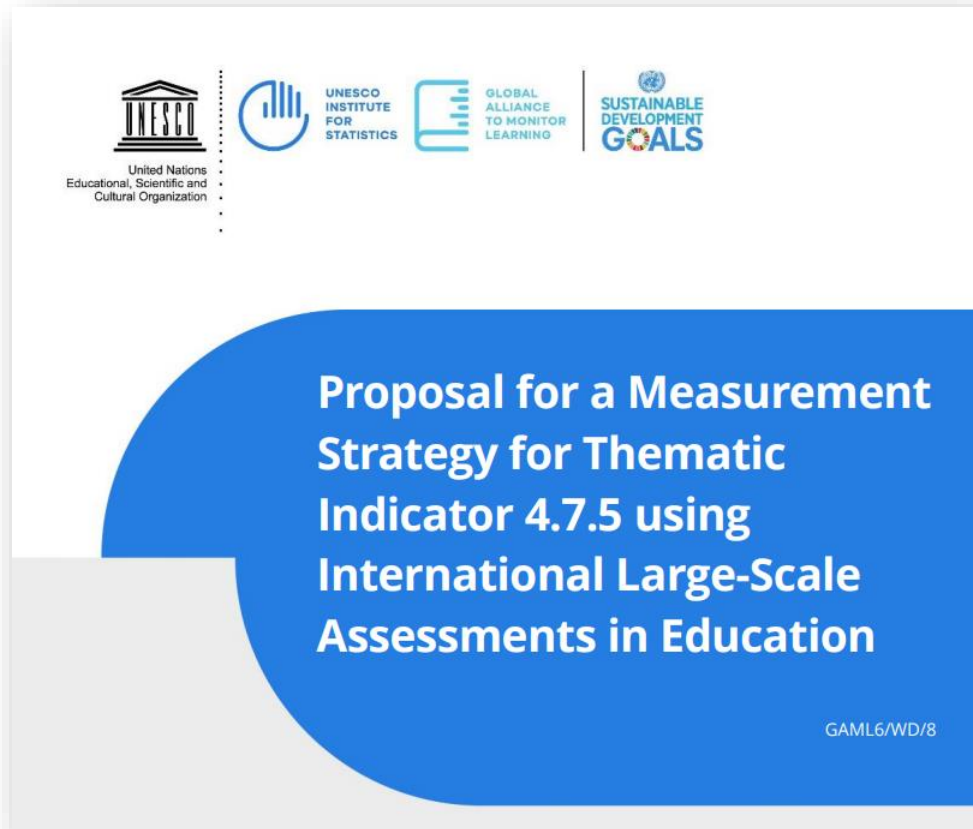


SDGs 4.7.4 & 4.7.5

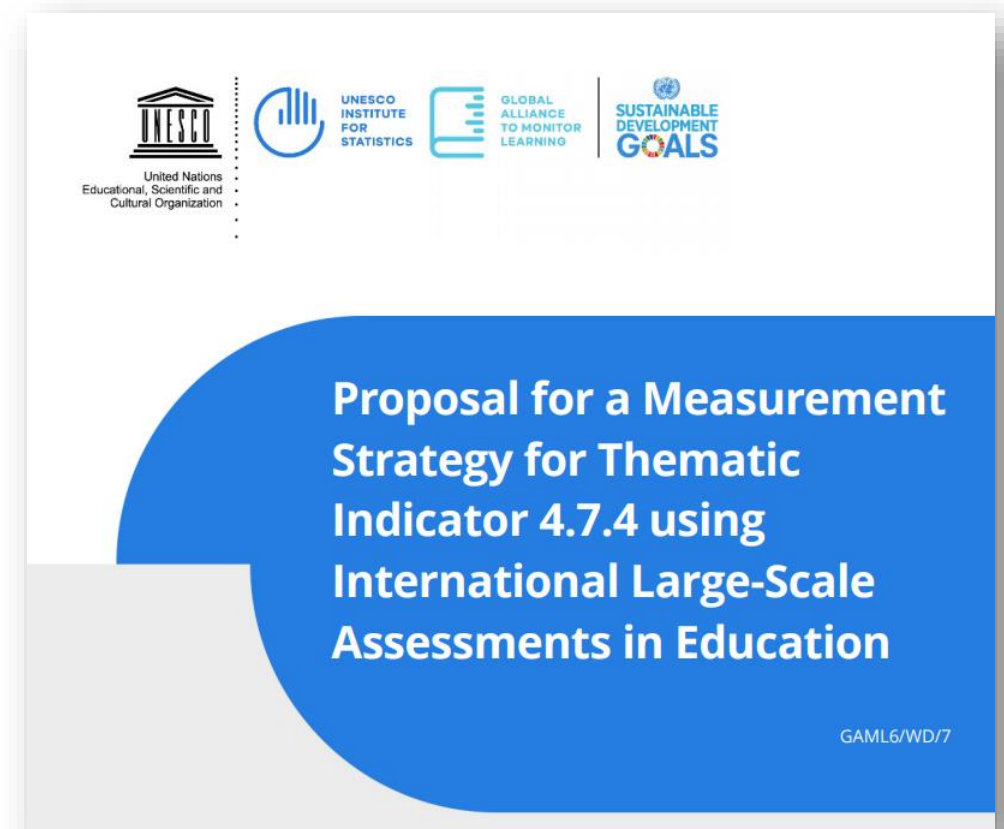
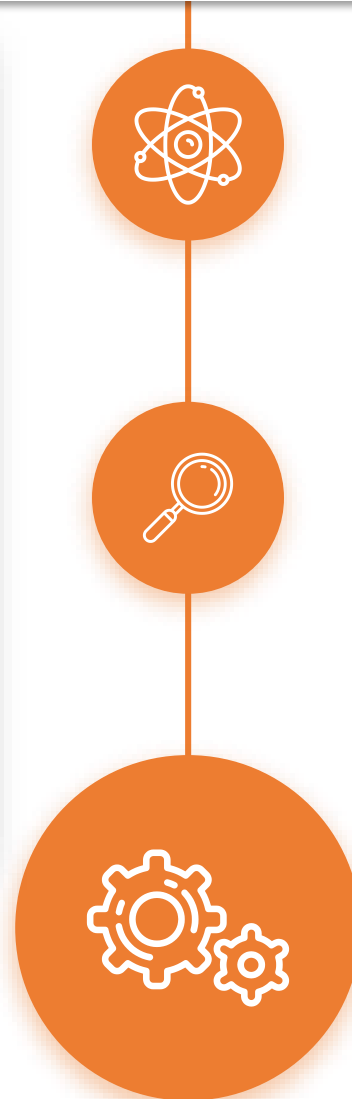
An applied framework to measure indicators  
on education for sustainable development  
and global citizenship education



4.7.1 Extent to which (i) global citizenship education and (ii) education for sustainable development, including gender equality and human rights, are mainstreamed at all levels in: (a) national education policies, (b) curricula, (c) teacher education and (d) student assessment



4.7.5 Percentage of 15-year-old students showing proficiency in knowledge of environmental science and geoscience.



4.7.4 Percentage of students by age group (or education level) showing adequate understanding of issues relating to global citizenship and sustainability.

# Steps

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4

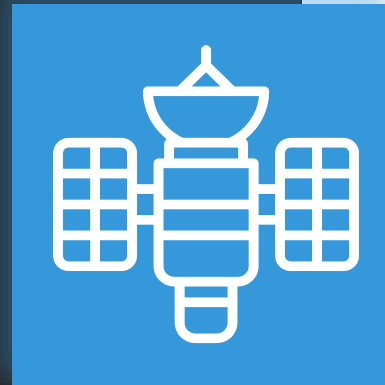


Definition of proficiency levels for SDG thematic indicators 4.7.4 & 4.7.5

SDGs 4.7.4 & 4.7.5

# 1. Global content framework

We build on previous work conducted by UNESCO (e.g. Hoskins, 2016; IBE, 2016; Sandoval-Hernández & Miranda, 2018; UIS, 2017; UNESCO, 2012a, 2012b, 2013, 2014, 2015)



**Global Citizenship Education (GCED):** nurtures respect for all, building a sense of belonging to a common humanity and helping learners become responsible and active global citizens. GCED aims to empower learners to assume active roles to face and resolve global challenges and to become proactive contributors to a more peaceful, tolerant, and inclusive and secure world.

**Education for Sustainable Development (ESD):** empowers learners to take informed decisions and responsible actions for environmental integrity, economic viability and a just society, for present and future generations, while respecting cultural diversity. It is about lifelong learning, and is an integral part of quality education.



Based on the coding scheme developed by the IBE and GEMR in team 78 countries (IBE, 2016)

	Category	Sub-category
Global Citizenship Education (GCED)	Interconnectedness and Global Citizenship	Globalization
		Global/international citizen(ship), global culture/identity/community
		Global-local thinking, local-global, think global act local, glocal
		Multicultural(ism)/intercultural(ism)
		Migration, immigration, mobility, movement of people
		Global Competition/competitiveness/globally competitive/international competitiveness
		Global Inequalities/disparities
	Gender Equality	Gender equality / equality / parity
		Empower(ment of) women/girls (female empowerment, encouraging female participation)
	Peace, Non-violence and Human Security	Peace, peace-building
		Awareness of forms of abuse/harassment/violence (school-based violence/bullying, household-based violence, gender-based violence, child abuse/harassment, sexual abuse/harassment)
	Human Rights	Human rights, rights and responsibilities (children's rights, cultural rights, indigenous rights, women's rights, disability rights)
Freedom (of expression, of speech, of press, of association/organisation), civil liberties		
Social justice		
Democracy/democratic rule, democratic values/principles		
Health and Well-being	Physical health/activity/fitness	
	Mental, emotional health, psychological health	
	Healthy lifestyle (nutrition, diet, cleanliness, hygiene, sanitation, *clean water, being/staying healthy)	
	Awareness of addictions (smoking, drugs, alcohol)	
	Sexual and/or reproductive health	
Sustainable Development	Economic sustainability, sustainable growth, sustainable production/consumption, green economy	
	Social sustainability, (social cohesion re sustainability)	
	Environmental sustainability/environmentally sustainable	
	Climate change (global warming, carbon emissions/footprint)	
	Renewable energy, alternative energy (sources) (solar, tidal, wind, wave, geothermal, biomass...)	
	Ecology, ecological sustainability (ecosystems, biodiversity, biosphere, ecology, loss of diversity)	
	Waste management, recycling	
Environmental Science (geoscience)	Physical systems	
	Living systems	
	Earth and space systems	
Education for Sustainable Development (ESD)	Interconnectedness and Global Citizenship	Globalization
		Global/international citizen(ship), global culture/identity/community
		Global-local thinking, local-global, think global act local, glocal
		Multicultural(ism)/intercultural(ism)
		Migration, immigration, mobility, movement of people
		Global Competition/competitiveness/globally competitive/international competitiveness
		Global Inequalities/disparities
		Gender equality / equality / parity
		Empower(ment of) women/girls (female empowerment, encouraging female participation)
		Peace, peace-building
		Awareness of forms of abuse/harassment/violence (school-based violence/bullying, household-based violence, gender-based violence, child abuse/harassment, sexual abuse/harassment)
		Human rights, rights and responsibilities (children's rights, cultural rights, indigenous rights, women's rights, disability rights)
Freedom (of expression, of speech, of press, of association/organisation), civil liberties		
Social justice		
Democracy/democratic rule, democratic values/principles		
Physical health/activity/fitness		
Mental, emotional health, psychological health		
Healthy lifestyle (nutrition, diet, cleanliness, hygiene, sanitation, *clean water, being/staying healthy)		
Awareness of addictions (smoking, drugs, alcohol)		
Sexual and/or reproductive health		
Economic sustainability, sustainable growth, sustainable production/consumption, green economy		
Social sustainability, (social cohesion re sustainability)		
Environmental sustainability/environmentally sustainable		
Climate change (global warming, carbon emissions/footprint)		
Renewable energy, alternative energy (sources) (solar, tidal, wind, wave, geothermal, biomass...)		
Ecology, ecological sustainability (ecosystems, biodiversity, biosphere, ecology, loss of diversity)		
Waste management, recycling		
Physical systems		
Living systems		
Earth and space systems		

### Cognitive:

To acquire knowledge, understanding and critical thinking about global, regional, national and local issues and the interconnectedness and interdependency of different countries and populations.

### Socio-emotional:

To have a sense of belonging to a common humanity, sharing values and responsibilities, empathy, solidarity and respect for differences and diversity.

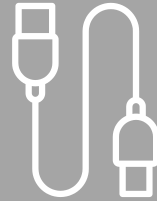
### Behavioural:

To act effectively and responsibly at local, national and global levels for a more peaceful and sustainable world.

SDGs 4.7.4 & 4.7.5

## 2. Mapping from ILSAs into SDG

We build on previous work conducted by UNESCO (e.g. Hoskins, 2016; IBE, 2016; Sandoval-Hernández & Miranda, 2018; UIS, 2017; UNESCO, 2012a, 2012b, 2013, 2014, 2015)



- Assessment criteria:
  - the assessment framework should refer to the concepts relevant to SDGs,
  - the instruments provide information on the categories and sub-categories, and
  - they should allow long-term monitoring.

### Mapping exercise for SDG global indicator 4.7.4

- OECD PISA & IEA ICCS
- ICCS was the most comprehensive

### Mapping exercise for SDG global indicator 4.7.5

- OECD PISA & IEA TIMSS
- TIMSS was the most comprehensive



Based on the  
Global Content  
Framework and  
ILSAs' Frameworks

Cognitive test

Background  
questionnaires

		<b>Cognitive</b>	<b>Socio- emotional</b>	<b>Behavioural</b>
	<b>GCED and ESD as a general concept</b>	<b>X</b>	<b>X</b>	<b>X</b>
<b>GCED</b>	Interconnectedness and Global Citizenship	<b>X</b>	<b>X</b>	<b>X</b>
	Gender Equality	<b>X</b>	<b>X</b>	<b>X</b>
	Peace, Non-violence and Human Security	<b>X</b>	<b>X</b>	<b>X</b>
<b>ESD</b>	Human Rights	<b>X</b>	<b>X</b>	<b>X</b>
	Health and Well-being	<b>X</b>	<b>X</b>	<b>X</b>
	Sustainable Development	<b>X</b>	<b>X</b>	<b>X</b>

## 4.7.4 Example

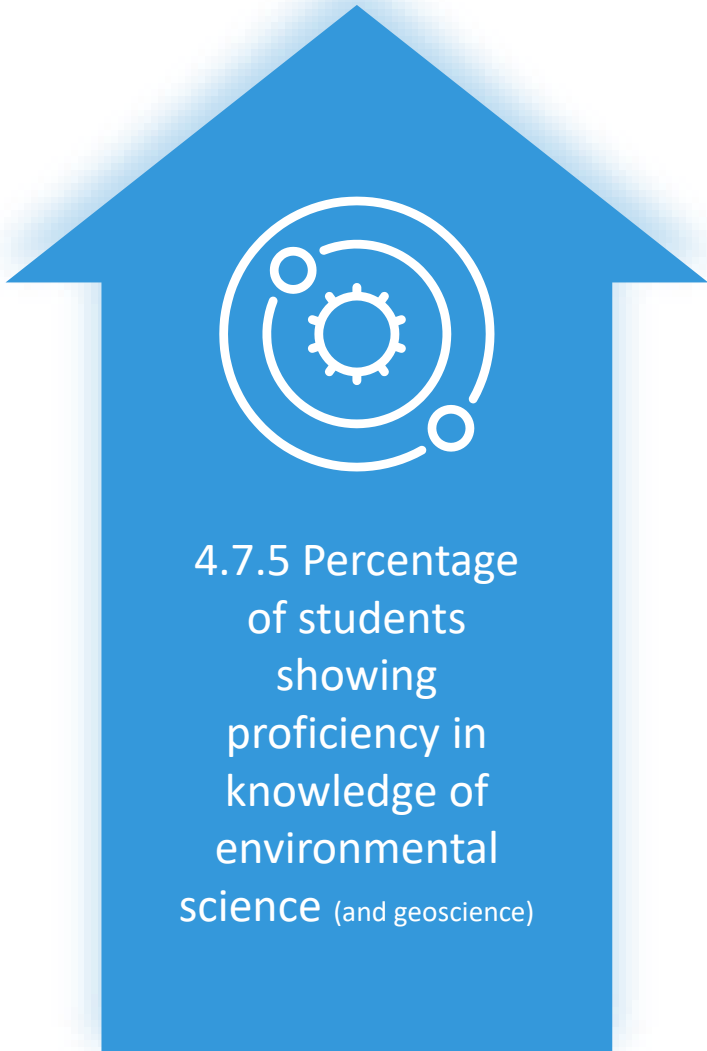


4.7.4 Percentage of students showing adequate understanding of issues relating to global citizenship and sustainability.

Category / Sub-category	Dimension		
	Cognitive	Socio-emotional	Behavioural
Human rights, rights and responsibilities (children's rights, cultural rights, indigenous rights, women's rights, disability rights)	ICCS assessment test; Content domain 2: Civic principles; Sub-domain: Rule of law; Key concept: Human rights	ICCS student background questionnaire; Affective-behavioral domain 1: Attitudes; Content domain: Students' attitudes toward civic principles; Construct: Students' attitudes toward gender rights, Students' attitudes toward equal rights for all ethnic/racial groups, Students' attitudes toward equal rights for immigrants (European regional questionnaires)	
Freedom (of expression, of speech, of press, of association/organisation), civil liberties	ICCS assessment test; Content domain 2: Civic principles; Sub-domain: Freedom; Key concept: Human rights	ICCS student background questionnaire; Affective-behavioral domain 1: Attitudes; Content domain: Students' attitudes toward civic principles; Item: Which of the following situations do you think would be good, neither good nor bad, or bad for democracy? - People are allowed to publicly criticize the government One company or the government owns all newspapers in a country, People are able to protest if they think a law is unfair	
Social justice	ICCS assessment test; Content domain 2: Civic principles; Sub-domain: Equity; Key concept: Social justice	ICCS student background questionnaire; Affective-behavioral domain 1: Attitudes; Content domain: Students' attitudes toward civic society and systems; Construct: Students' perception of the importance of social movement related citizenship	ICCS student background questionnaire; Affective-behavioral domain 1: Engagement; Content domain: Behavioural intentions; Construct: Expectations to participate in legal and illegal forms of civic action in support of or protest against important issues
Democracy/democratic rule, democratic values/principles	ICCS assessment test; Content domain 1: Civic society and systems; Sub-domains: State institutions and Civil institutions; Key concept: Democracy	ICCS student background questionnaire; Affective-behavioral domain 1: Attitudes; Content domain: Students' attitudes towards democratic values	



# 4.7.5 Example



Category / Sub-category	Dimension		
	Cognitive	Socio-emotional	Behavioural
<b>Environmental Science (geoscience)</b>			
Physical systems	TIMSS assessment test; Content domain: Physical science; Sub-domain: Physical States and Changes in Matter; Key concept: Changes in states of matter	TIMSS background questionnaire; Contextual framework level: Student attitudes toward learning; Construct: Students Like Learning Physics	TIMSS background questionnaire; Contextual framework level: Student attitudes toward learning; Construct: Students Confident in Physics
Living systems	TIMSS assessment test (eight grade); Content domain: Biology; Sub-domain: Life Cycles, Reproduction, and Heredity; Key concept: Life cycles and patterns of development, Sexual reproduction and inheritance in plants and animals TIMSS assessment test; Content domain: Biology; Sub-domain: Ecosystems; Key concept: The flow of energy in ecosystems, The cycling of water, oxygen, and carbon in ecosystems, Interdependence of populations of organisms in an ecosystem, Human impact on the environment	TIMSS background questionnaire; Contextual framework level: Student attitudes toward learning; Construct: Students Like Learning Biology	TIMSS background questionnaire; Contextual framework level: Student attitudes toward learning; Construct: Students Confident in Biology
Earth and space systems	TIMSS assessment test; Content domain: Earth Science; Sub-domain: Earth's Structure and Physical Features; Key concept: Earth's structure and physical characteristics, Components of Earth's atmosphere and atmospheric conditions TIMSS assessment test; Content domain: Earth Science; Sub-domain: Earth's Processes, Cycles, and History; Key concept: Geological processes, Earth's water cycle, Weather and climate TIMSS assessment test; Content domain: Earth Science; Sub-domain: Earth's Resources, Their Use and Conservation; Key concept: Managing Earth's resources, Land and water use TIMSS assessment test; Content domain: Earth Science; Sub-domain: Earth in the Solar System and the Universe; Key concept: Observable phenomena on Earth resulting from movements of Earth and the Moon, The Sun, stars, Earth, Moon, and planets	TIMSS background questionnaire; Contextual framework level: Student attitudes toward learning; Construct: Students Like Learning Earth Science	TIMSS background questionnaire; Contextual framework level: Student attitudes toward learning; Construct: Students Confident in Earth Science

SDGs 4.7.4 & 4.7.5

## 3. Definition of scores for SDGs



- Task: provide a “number” for each target!
  - This has not been done
  - These are our preliminary thoughts
  - We would like to ask for your thoughts and suggestions

# Procedure to generate scores



## Approach for cognitive dimension

- Replicate ILSA scaling process (IRT/PV)
- One single scale for the domain, across categories and sub-categories

### Some limitations

- Data is not public

Category / Sub-category	Content	Socio-emotional	Behavioural
Human Rights	ICCS assessment test; Content domain 2: Civic principles; Sub-domain: Rule of law; Key concept: Human rights	ICCS student background questionnaire; Affective-behavioral domain 1: Attitudes; Content domain: students' attitudes toward civic principles; Construct: students' attitudes toward gender rights; Students' attitudes toward equal rights for all ethnic/racial groups; students' attitudes toward equal rights for immigrants	
Freedom (of expression, of speech, of press, of association/organisation), civil liberties	ICCS assessment test; Content domain 2: Civic principles; Sub-domain: Freedom; Key concept: Human rights	ICCS student background questionnaire; Affective-behavioral domain 1: Attitudes; Content domain: students' attitudes toward civic principles; Item: Which of the following situations do you think would be good, either good nor bad, or bad for democracy? - People are allowed to publicly criticize the government One company or the government owns all newspapers in a country, People	
Social justice	ICCS assessment test; Content domain 2: Civic principles; Sub-domain: Equity; Key concept: Social justice	ICCS student background questionnaire; Affective-behavioral domain 1: Attitudes; Content domain: students' attitudes toward civic society and systems; Construct: Students' perception of the importance of	ICCS student background questionnaire; Affective-behavioral domain 1: Engagement; Content domain: behavioural intentions; Construct: Expectations to participate in legal and illegal forms of civic action in
Democracy/democratic rule, democratic values/principles	ICCS assessment test; Content domain 1: Civic society and systems; Sub-domains: institutions and Civil institutions; Key concept: Democracy	ICCS student background questionnaire; Affective-behavioral domain 1: Attitudes; Content domain:	



## Approach for socio-emotional & behavioral dimensions

### Different options being evaluated

- IRT / CFA / PCA
- One scale across domains?
- One scale per (sub)category
- One scale per domain?

### Some limitations

- Information is patchy

### ...and then, how to produce a single "number"?

- Remember... "4.7.5 Percentage of students..."
- Proportion of the students reaching the designated thresholds of each category + average of proportions?
- Latent Class Analysis?

SDGs 4.7.4 & 4.7.5

# 4. Definition of proficiency levels



- Task: provide the “percentage” of students reaching each target
  - This has not been done
  - These are our preliminary thoughts
  - We would like to ask for your thoughts and suggestions

# Procedure to generate proficiency levels



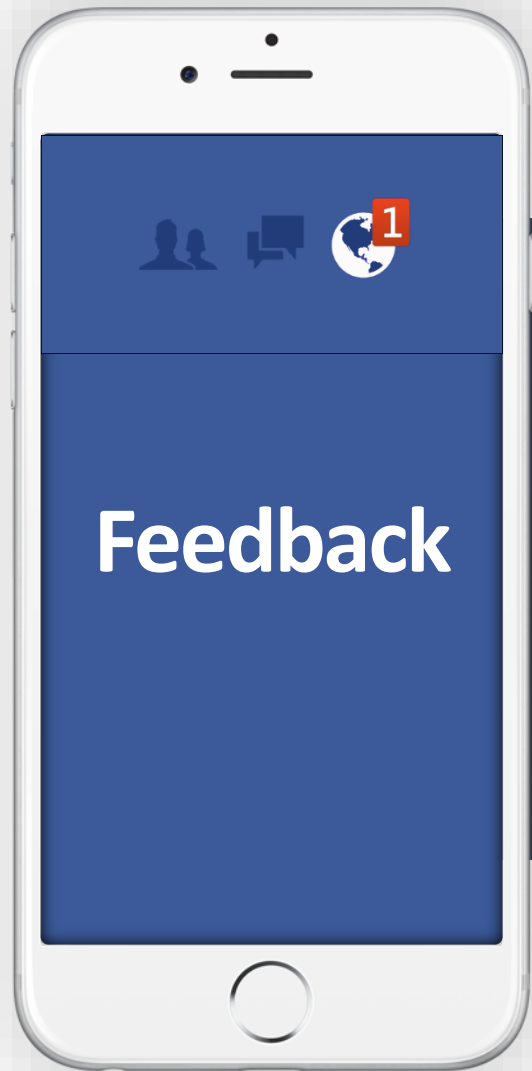
## Approach for cognitive dimension

- Replicate ILSA process to generate proficiency levels
- “...**adequate understanding** of issues relating to GCES”
- Use ICCS proficiency levels as a benchmark
- “Demonstrate familiarity / level C”



## Approach for socio-emotional & behavioral dimensions

- Replicate ILSA process to generate ordinal indices
- Set thresholds for high, middle, and low regions
- Provide a content-referenced interpretation for these regions
- High = agree a lot to at least 4 of the 7 statements and agree a little to the other 3



Scoring



Proficiency levels



Compromises  
Policy / Academia

# Thank you

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Daniel Miranda

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