Assessing countries' competencies

The 4D index: ranking of skills, character and meta-learning

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STRATEGIC
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Leading educational thinking and practice

Acknowledgements

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The series is intended to encourage discussion of major issues in education. Views expressed by the authors do not necessarily represent views of the Centre for Strategic Education. Comments on papers are most welcome.

Preamble

This report is not a Research Paper; it is a Discussion Paper. It is intended to advance the imperative for multidimensional assessments of countries' competencies. The authors fully and openly recognise the methodological challenges – in conceptualisation, in data sources, in construction and in establishing validity. This paper does not claim to have resolved those challenges.

However, we wish to point out that:

1. The process used is not unusual, even in education circles: for instance, the construction of university rankings,[1] with several competing views about which parameters matter, and their weights.

   Similarly, *The Economist*, financed by the Yidan prize,[2] has published its 'Worldwide Education for the Future Index' in 2018 and 2019,[3] with arguably opaque parameters, such as:

1.3. Curriculum framework (upper secondary)			25%
1.3.1. Framework			
a. Curriculum transparency	EIU analysis	Rating 1–2	
b. Problem-based learning	EIU analysis	Rating 1–3	
c. Curriculum framework review	EIU analysis	Rating 1–4	

2. There is a tendency by the education research community to focus on 'demonstrable validity', which, if pushed too far, impedes progress. There are limits to demonstrability, and even the best instruments like PISA have their share of uncertainties.

   Furthermore, implying resolution of validity problems misrepresents the quality of the underlying data (for instance, debating the weight given to a parameter, when the error bar of the parameter might exceed the weight variation). The Centre for Curriculum Redesign (CCR) paper 'Theory of Change and Research Process'[4] describes this complexity under the section 'Evidence'.

3. The parameters at stake are hard to define to begin with, although CCR has established specific criteria during its research. CCR is collating large statistical surveys with variable validity, so it considers that *triangulation is the best way to ascertain the hard-to-measure Skills, Character, and Meta-Learning abilities* described here. This is a clear demarcation from, and complementary approach to, the traditional psychometrician approach of 'few data points with high validity'.

If readers are keen to learn more details of the proxy parameters used in this study, please contact the Centre for Curriculum Redesign. CCR is committed to further investigation and development of this work and sincerely welcomes constructive feedback to this Discussion Paper.

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1. www.timeshighereducation.com/world-university-rankings/2021/world-ranking. www.shanghairanking.com/. www.topuniversities.com/qs-world-university-rankings. www.niche.com/colleges/rankings/. www.usnews.com/best-colleges/rankings/national-universities.
2. yidanprize.org/.
3. educatingforthefuture.economist.com/the-worldwide-educating-for-the-future-index-2019/.
4. curriculumredesign.org/wp-content/uploads/CCRProcessPaper-Jan152021.pdf.

Rationale

An unmet global need

In 2020, the Center for Curriculum Redesign (CCR), in collaboration with the Brookings Institution, unveiled a landmark report[5] and website[6] describing how 22 jurisdictions did or did not cover the education of Competencies.[7] The disappointing findings were that, in spite of having been an intention for years,[8] *none of the jurisdictions surveyed offered, via their education systems, either pedagogy for, or assessments of, these competencies.*

This situation posed the following questions.

1. While PISA gives indications about Knowledge and its understanding, how could one quantify proficiency levels in the Competencies? *(outside of the explicit assessment of a jurisdiction's students).*

2. Could an index benefit countries in the way PISA did?

This present research attempts at answering the first of these two questions, and jurisdictional interest will answer the second.

Figure 1 shows the jurisdictions that were analysed in the CCR report.

Figure 1. Jurisdictions whose education of Competencies were analysed in CCR and Brookings Institution report

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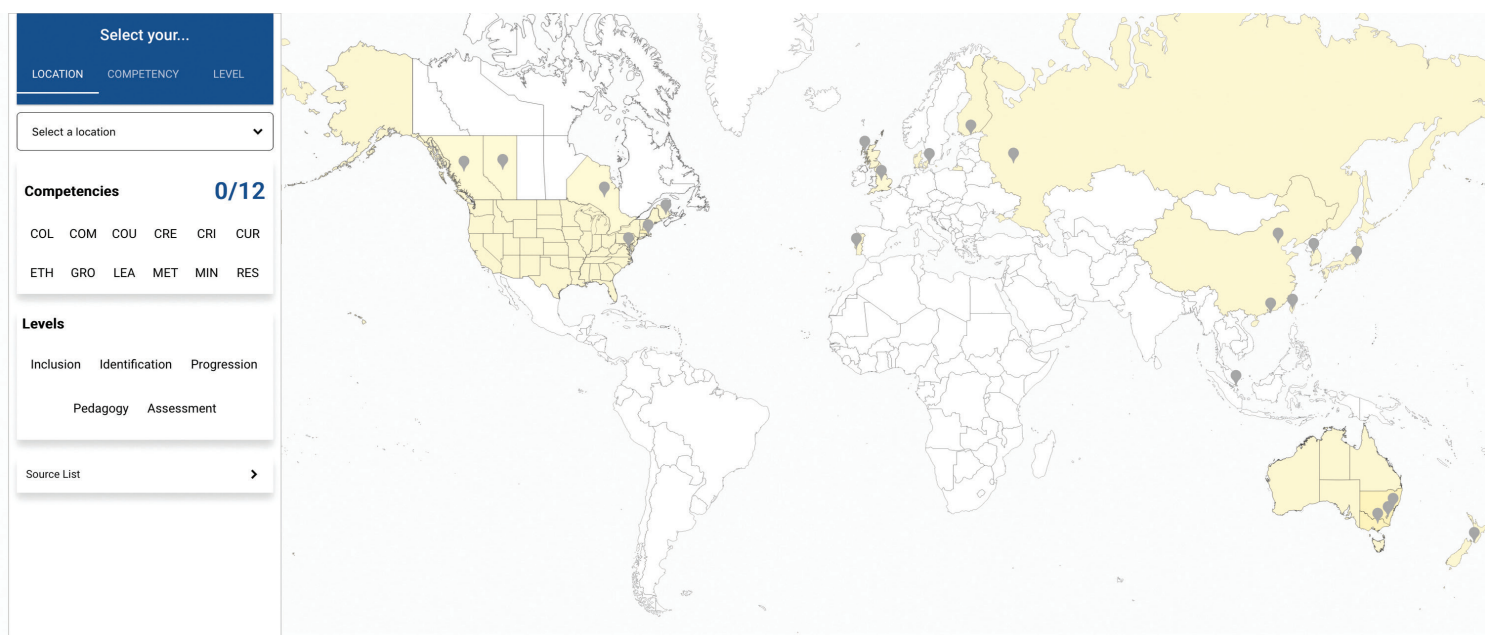
5. CCR/Brookings 2020 – Competencies for the 21st Century – Jurisdictional Progress" (Rob Tayler et al).
6. brookings.edu/research/competencies-for-the-21st-century-jurisdictional-progress/.
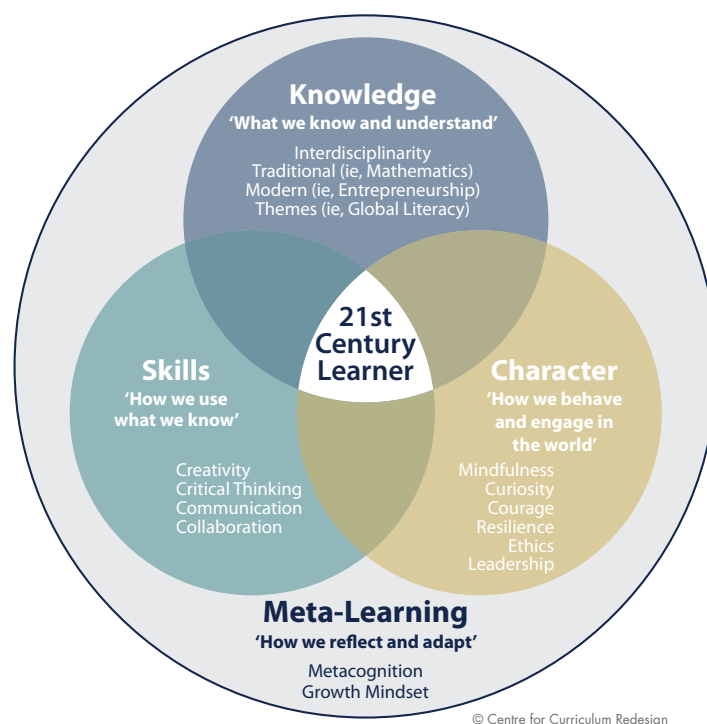7. curriculumredesign.org/framework/.
8. Brookings 2016 – *Visualizing the Breadth of Skills Movement across Education Systems* (Esther Care, et al).

Goals for all

The CCR framework[9] is a highly researched[10] synthesis of more than a hundred frameworks from around the world; developing a clear ontology and taxonomy solved an otherwise vexing incompatibility problem across syntaxes.

This 'Four-Dimensional' (4D) framework (Figure 2) represents the commonly accepted goals of an education of Knowledge + Competencies, the latter defined as Skills + Character + Meta-Learning dimensions.

Figure 2. The CCR Four Dimensional Framework of the goals of education

Knowledge
'What we know and understand'

Interdisciplinarity
Traditional (ie, Mathematics)
Modern (ie, Entrepreneurship)
Themes (ie, Global Literacy)

21st Century Learner

Skills
'How we use what we know'

Creativity
Critical Thinking
Communication
Collaboration

Character
'How we behave and engage in the world'

Mindfulness
Curiosity
Courage
Resilience
Ethics
Leadership

Meta-Learning
'How we reflect and adapt'

Metacognition
Growth Mindset

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9. curriculumredesign.org/framework/.
10. See CCR Theory of Change & Research Process – curriculumredesign.org/wp-content/uploads/CCRProcessPaper-Jan152021.pdf.

Index Construction

Finding the right proxy parameters

It is immediately clear that no single measure can represent Competencies as complex as critical thinking, curiosity or metacognition. CCR embarked on creating a suite of proxies from available global indices, as shown below for Ethics as an example.

Figure 3. Suite of proxy components for one Competency, Ethics

Competency		Year	Type	Source	Details
Ethics					
19	9.1	2012	INDIVIDUAL	OECD	INDIVIDUAL: HELPING OTHERS: Likelihood of reporting to volunteer at least once a month, by educational attainment. OECD Education at a Glance 2015: A8.
173	9.2	2017	COLLECTIVE	TRANSPARENCY INTERNATIONAL	COLLECTIVE: ACTING ETHICALLY: Corruption Perception Index (CPI) Index, Transparency International [reflects public sector behaviour].
133	9.3	2017–2018	COLLECTIVE	WORLD ECONOMIC FORUM	COLLECTIVE: ACTING ETHICALLY: Ethical behaviour of firms. World Economic Forum Global competitiveness Index, Indicator 1.17 (or entire first 'pillar').
143	9.4	2017	COLLECTIVE	CAF	COLLECTIVE: GIVING: Ranking in the world giving index, includes government money.
191	9.5		COUNTRY	UNSTATS	COUNTRY: ACTING ETHICALLY: Renewable energy share in total final energy consumption. SDG Indicator 7.2.1.
37	9.6		COUNTRY	OECD	COUNTRY: GIVING: Foreign aid as a % of GDP. OECD Development Finance data.
179	9.7	2018	COLLECTIVE	GLOBAL SLAVERY INDEX	COLLECTIVE: ACTING ETHICALLY: Global Slavery Index: Prevalence by country.
37	9.8	2015	INDIVIDUAL	GESIS	INDIVIDUAL: VALUING ETHICS: Share of population who agree that it is important that in my work I can help other people. ISSP Work Orientation.

To do so, it

- relied on trusted sources (OECD, UN, WEF, WB, etc);
- used 4–8 proxy parameters per competency (eg, corruption index etc for Ethics) [If you are interested in the complete list of proxy parameters, please email CCR at info@curriculumredesign.org];
- weighted the proxy composite (50 per cent, 35 per cent, 15 per cent depending on proxy closeness).

Of course, as in any such exercise, every single proxy and every weight can be debated ad nauseam for bias, accuracy, fairness etc. CCR has attempted to devise a meta-index that is, in its opinion, as fair and balanced as possible.

Figure 4. Overlap between the 4D Index and the UN's Human Development Index
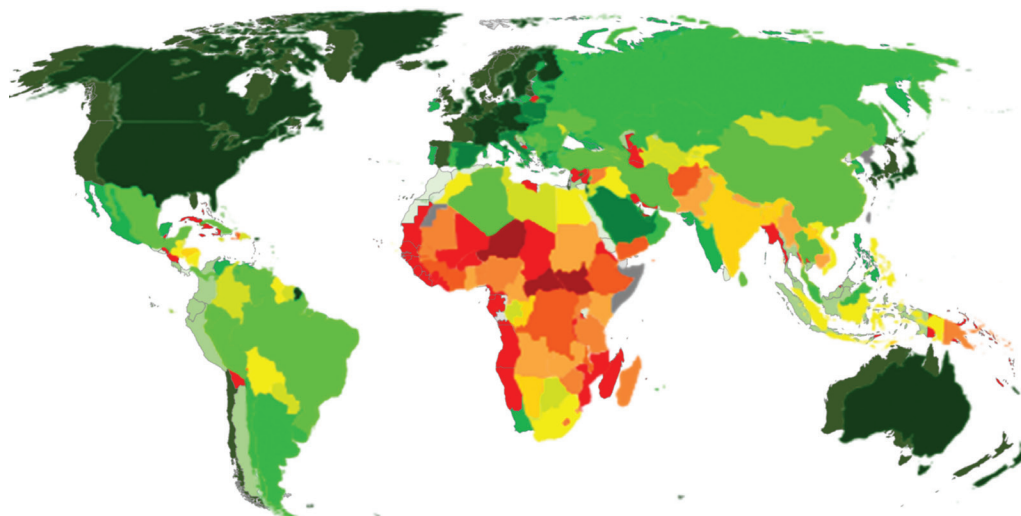

Figure 4 shows the overlap between the 4D Index and the UN's Human Development Index. Due to the different number of countries represented on both maps, with different colors, the visual similarity is applicable for the most part to the top 25 countries. It has been found that the correlation between these two measures is relatively strong ($R^2 = 0.52$),[11] which seems to validate the CCR approach.

No doubt some eyebrows will be raised at the individual country level, given a country's self-perception; but they are encouraged to *question and reflect*.

Gathering country data

As many middle-income and low-income countries are not tracked well enough to provide a fair and complete picture, *only the 51 countries listed herewith enjoy significant enough data*, and will be analysed further in this report: Argentina; Australia; Austria; Belgium; Brazil; Canada; Chile; China; Chinese Taipei; Colombia; Croatia; Czech Republic; Denmark; Estonia; Finland; France; Georgia; Germany; Greece; Hungary; Iceland; India; Ireland; Israel; Italy; Japan; Korea; Latvia; Lithuania; Luxembourg; Mexico; Netherlands; New Zealand; Norway; Peru; Philippines; Poland; Portugal; Romania; Russian Federation; Singapore; Slovenia; South Africa; Spain; Sweden; Switzerland; Thailand; Turkey; United Kingdom; United States of America; and Uruguay.

Two independent assessments of performance relevant to the measures of Competency provided in this paper are the Program for the International Assessment of Adult Competencies (PIAAC) and the Programme for International Student Assessment (PISA). These two international assessment programs are conducted every few years by the Organisation for Economic Cooperation and Development (OECD).

Furthermore,

- for PIAAC, data was only referenceable for 22 countries;
- for PISA, data was only referenceable for 30 countries.

11. with the interesting caveat that some middle-income countries do better with a more complete set of parameters, as will be shown later in this paper.

Results

Overall – all 12 Competencies

For all 12 Competencies combined, the results are represented in the graph below and, as discussed above, track the Human Development Index by and large.

Figure 5. Total 4D Index (4Di) Score
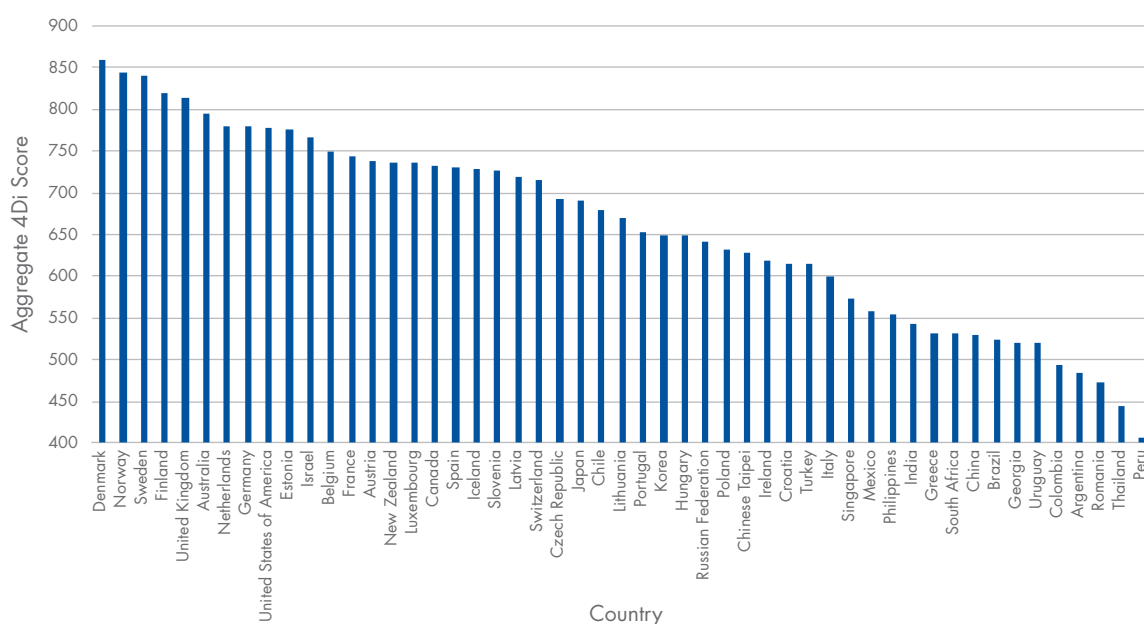
The graphs that follow (Figures 7–18), by Competency, are even more instructive: the top 3 countries for each Competency are shown in Figure 6. While Nordic/Baltic countries do very well in Competencies, we also see the emergence of middle-income champions (Brazil, Mexico, Thailand, for instance).

Figure 6. Countries that are ranked 1–3 for each of the defined Competencies, as shown in Figures 7–18

RANK	SKILLS				CHARACTER						META-LEARNING	
	Creativity	Critical thinking	Communi-cation	Collabor-ation	Mindful-ness	Curiosity	Courage	Resilience	Ethics	Leadership	Meta-cognition	Growth Mindset
#1	Latvia	Norway	Sweden	Iceland	Thailand	Canada	Brazil	Estonia	Norway	Norway	Norway	Mexico
#2	Brazil	Turkey	Australia	Denmark	Iceland	Australia	Romania	Japan	Sweden	Netherlands	Ireland	Spain
#3	Sweden	Sweden	Estonia	Norway	Norway	France	India	Russia	Denmark	Canada	Denmark	Finland

Results by Competency

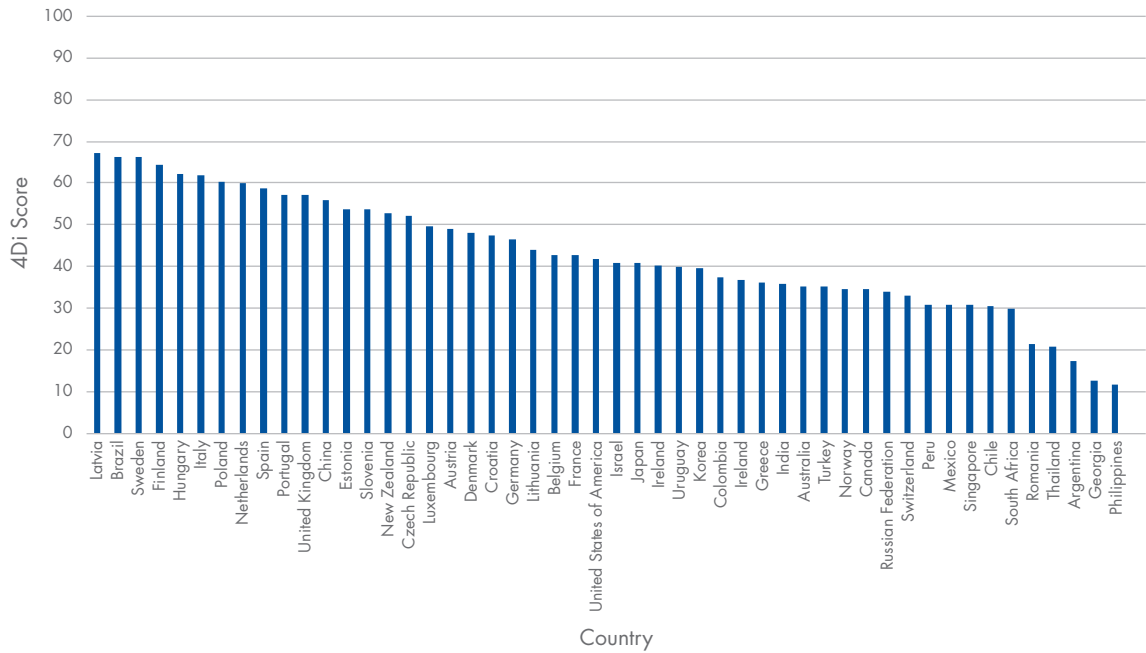## Figure 7. 4Di – Creativity

Figure 8. 4Di – Critical Thinking
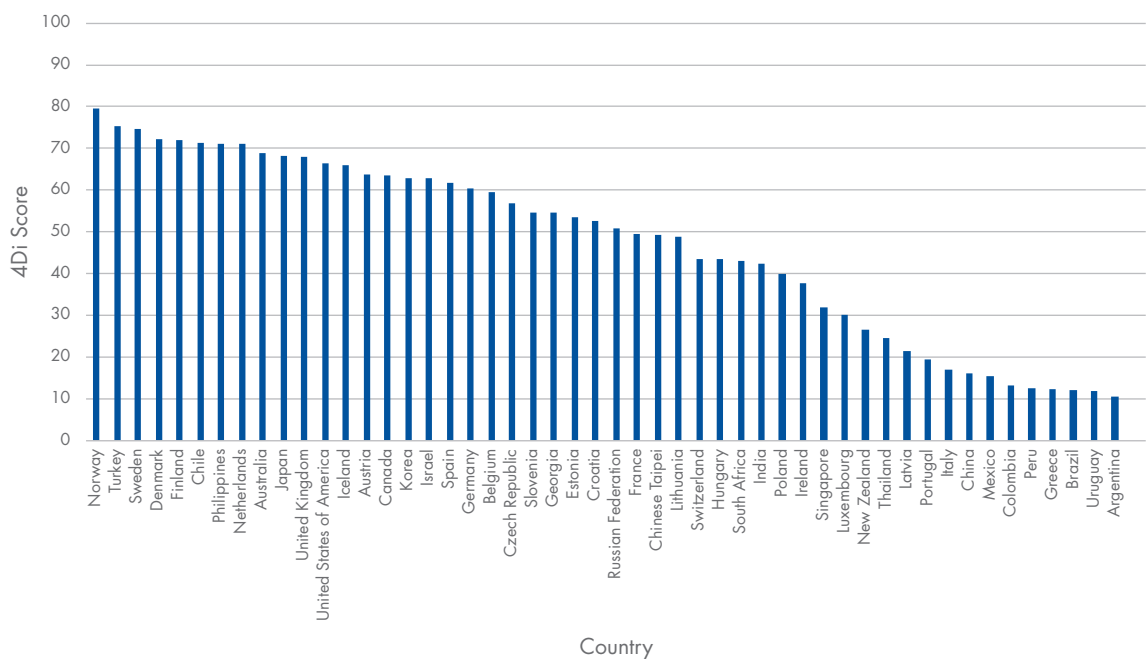
Results by Competency (cont.)

Figure 9. 4Di – Communication

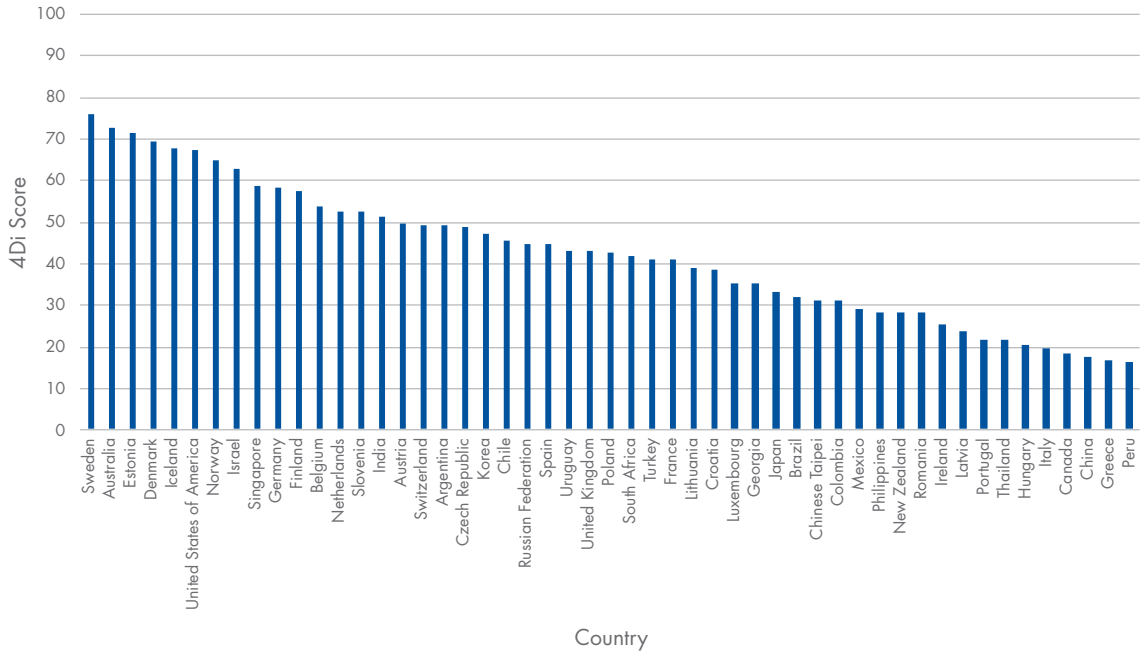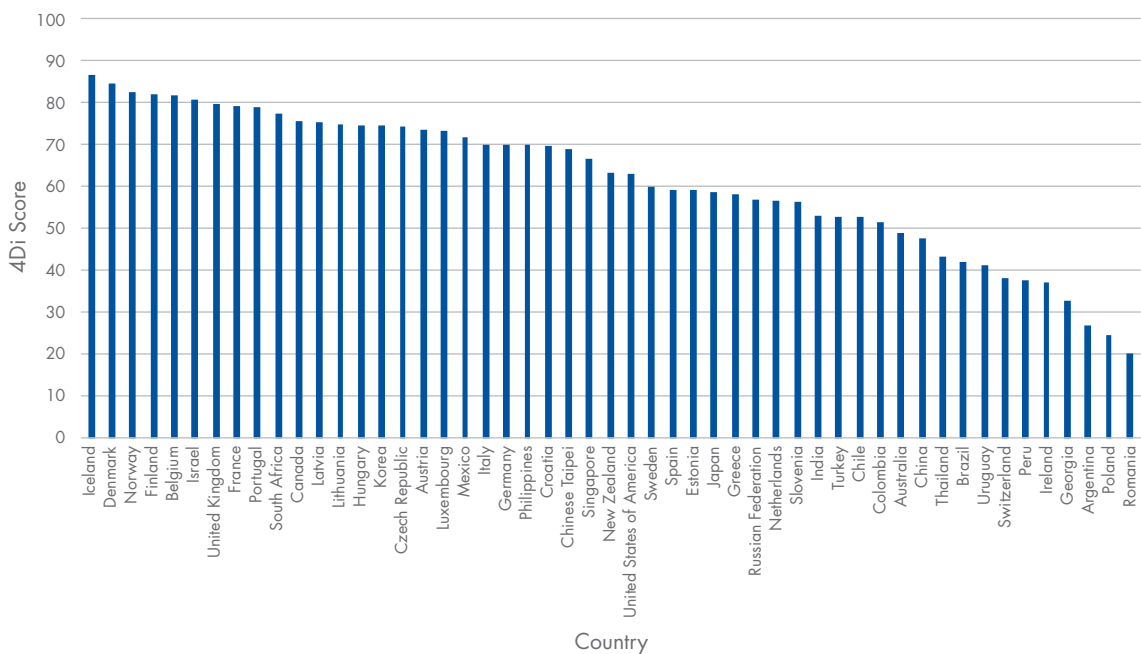**Figure 10. 4Di – Collaboration**
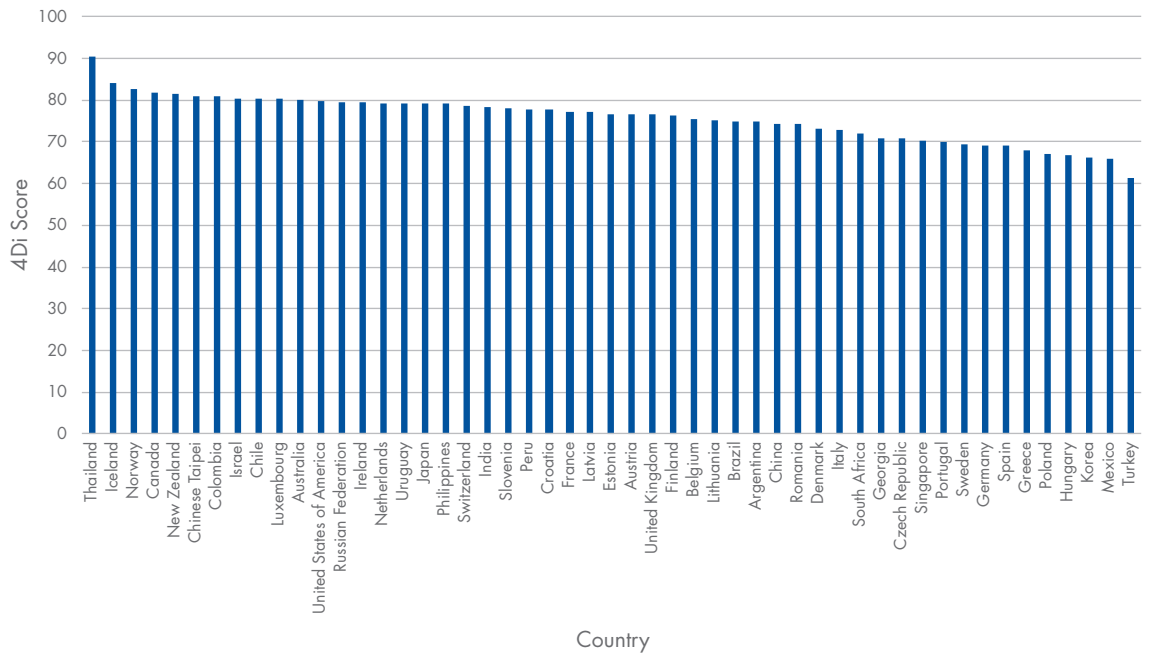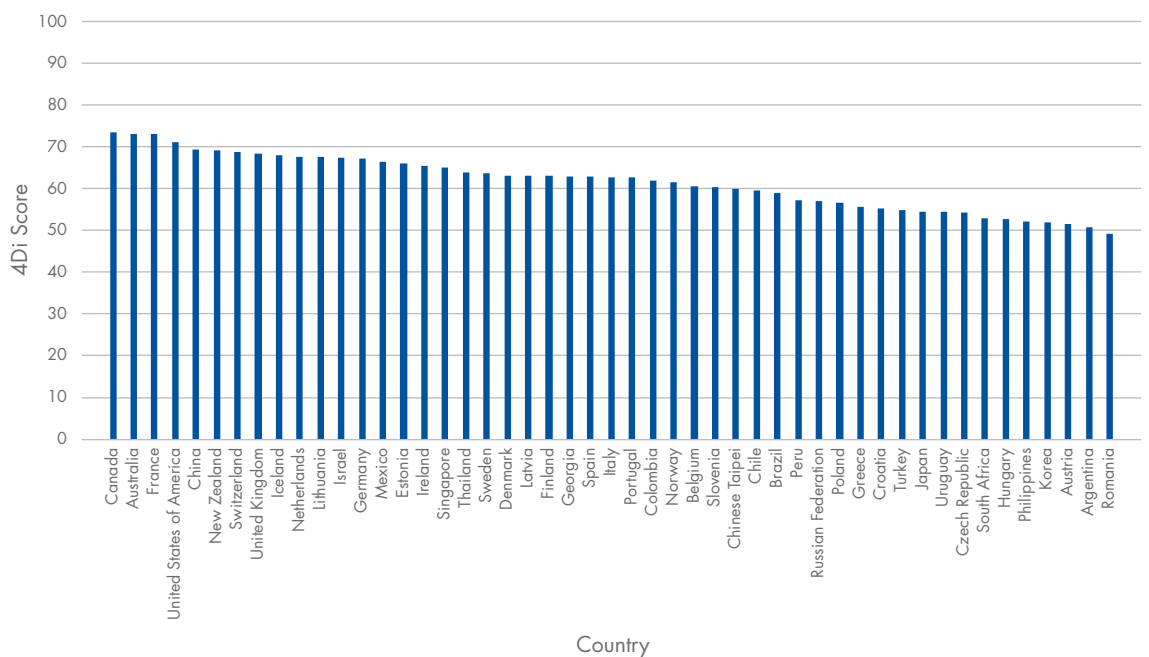
Figure 11. 4Di – Mindfulness

Figure 12. 4Di – Curiosity

Results by Competency (cont.)

Figure 13. 4Di – Courage
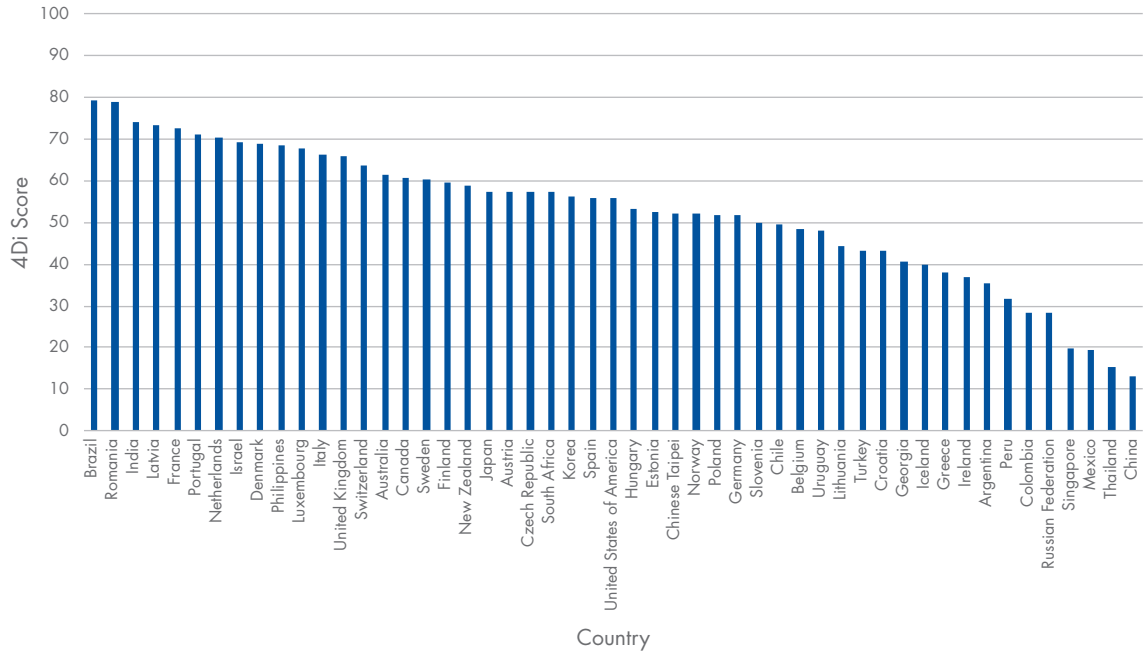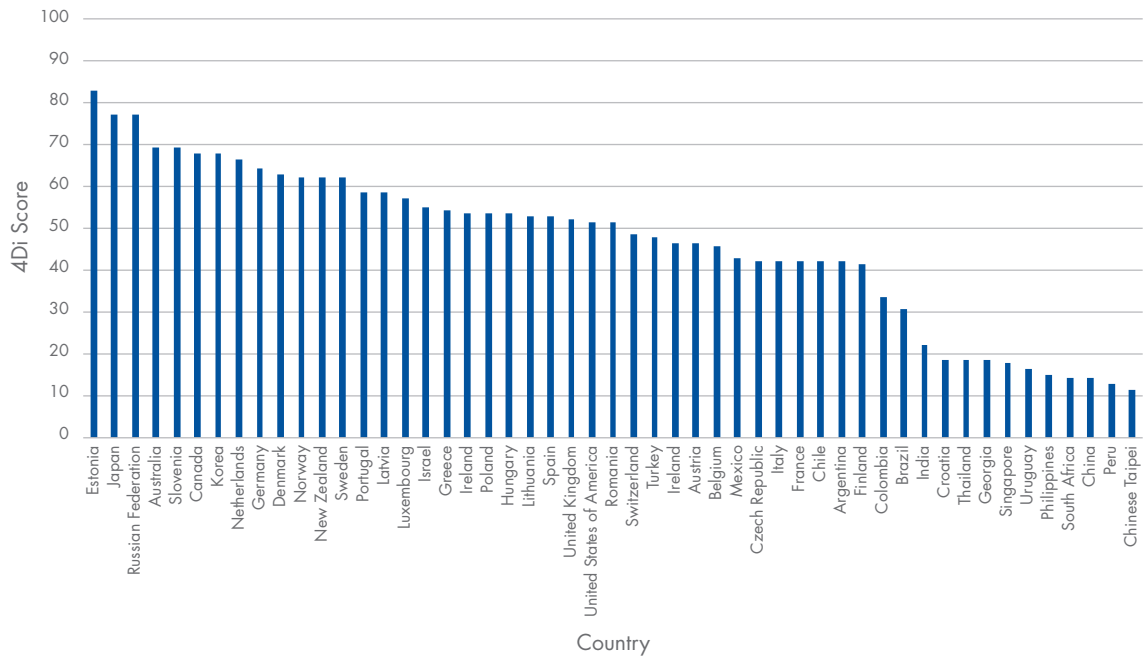

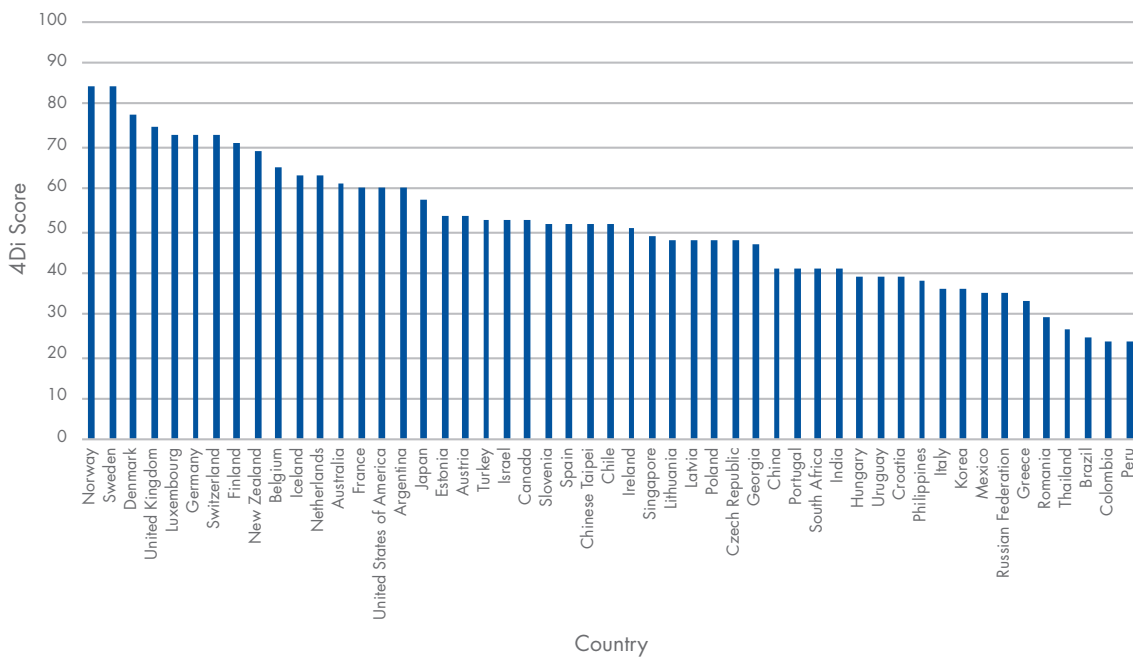**Figure 14. 4Di – Resilience**

Figure 15. 4Di – Ethics

Figure 16. 4Di – Leadership
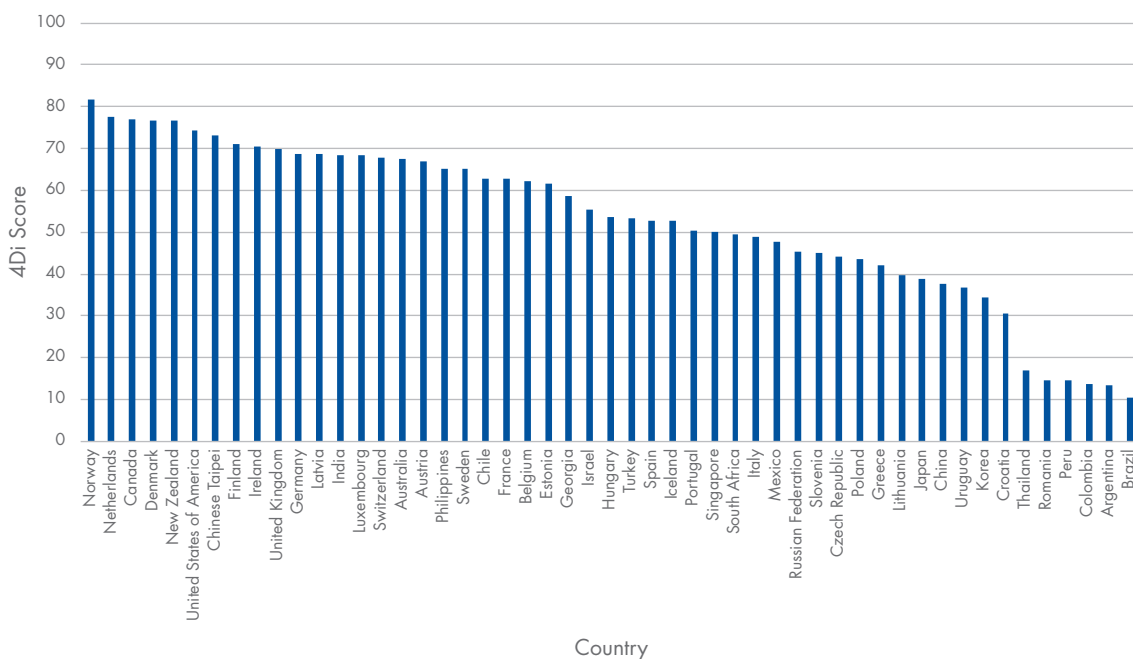
Results by Competency (cont.)

Figure 17. 4Di – Metacognition
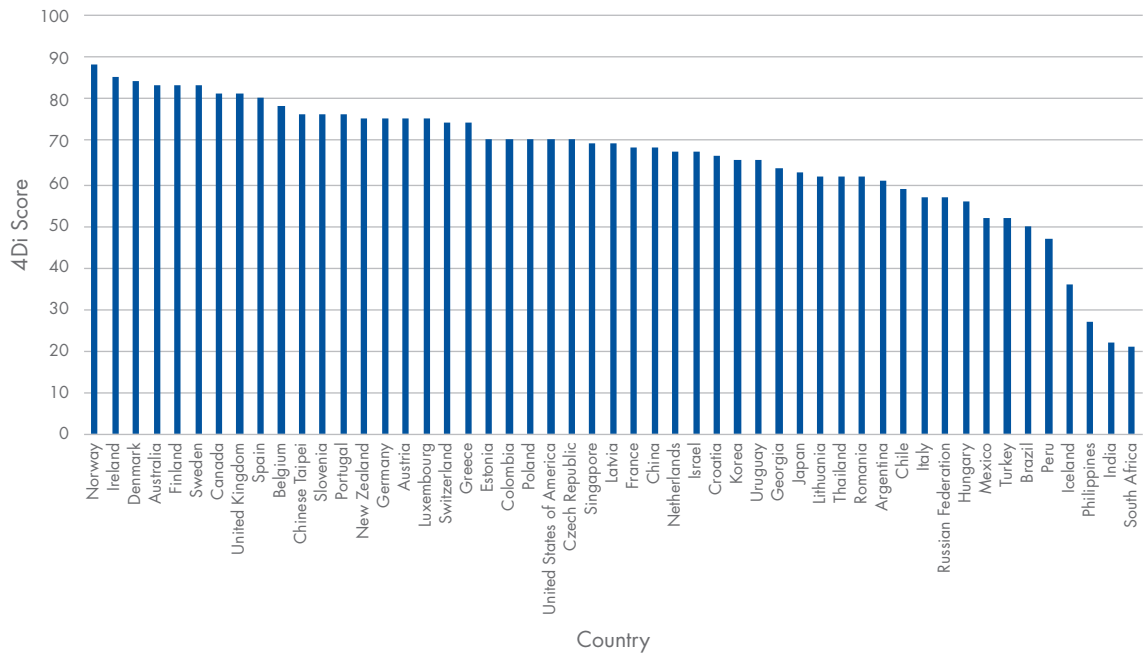
Figure 18. 4Di – Growth Mindset
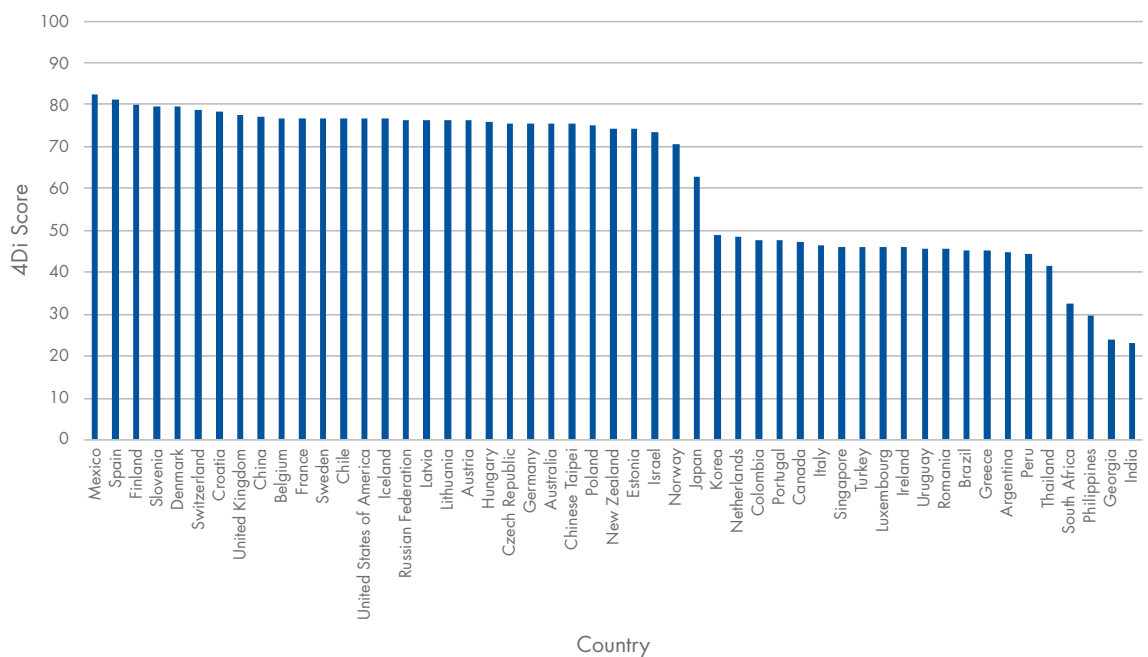
Comparison with PIAAC

Relative ranking

Since we are looking at a country's present state, the OECD's PIAAC, which measures Literacy, Numeracy, and Problem Solving in technology-rich environments, in adults 16–65, seems appropriate as a comparison with CCR's country-level competencies.

Figure 19. PIAAC Composite Ranking compared with 4D Index Competencies Ranking for 22 Countries (Coloured arrows show countries whose rankings differ substantially. PIAAC ranking higer [red]; 4D Index ranking higher [blue])

PIAAC Composite Ranking	4D Index Competencies Ranking
Japan	Denmark
Finland	Norway
Netherlands	Finland
Norway	Netherlands
New Zealand	Germany
Czech Republic	United States of America
Denmark	Estonia
Austria	Israel
Estonia	France
Germany	Austria
Canada	New Zealand
Korea	Canada
Hungary	Spain
United States of America	Slovenia
Poland	Czech Republic
Ireland	Japan
Slovenia	Chile
Israel	Korea
France	Hungary
Italy	Poland
Spain	Ireland
Chile	Italy

How are such ranking differences possible? Five possible reasons are offered.

1. There is a lot more to formal education than the three areas measured by PIAAC.
2. Lifelong training is far better in some countries than others.
3. There is a lot more to informal education within a country than just its formal system – its *societal structures matter.*
4. They are measuring different attributes.
5. There are differences between the measurement instruments, their calibration, their validity, reliability, precision and their accuracy.

Of these, the first three are considered more deeply in this paper.

Correlation

The graph below (Figure 20) plots the CCR Competencies composite data against the PIAAC data for the top 22 countries that take the PIAAC test. The graph shows the two measures have a very low correlation (R^2=0.1455). This demonstrates the necessity for measuring other dimensions of an education, outside of literacy, numeracy, and digital skills.

Figure 20. 4D Index Aggregated Competency values vs PIAAC scores
(Estimated line of best fit shown as dotted red line with correlation shown as R^2 in red)
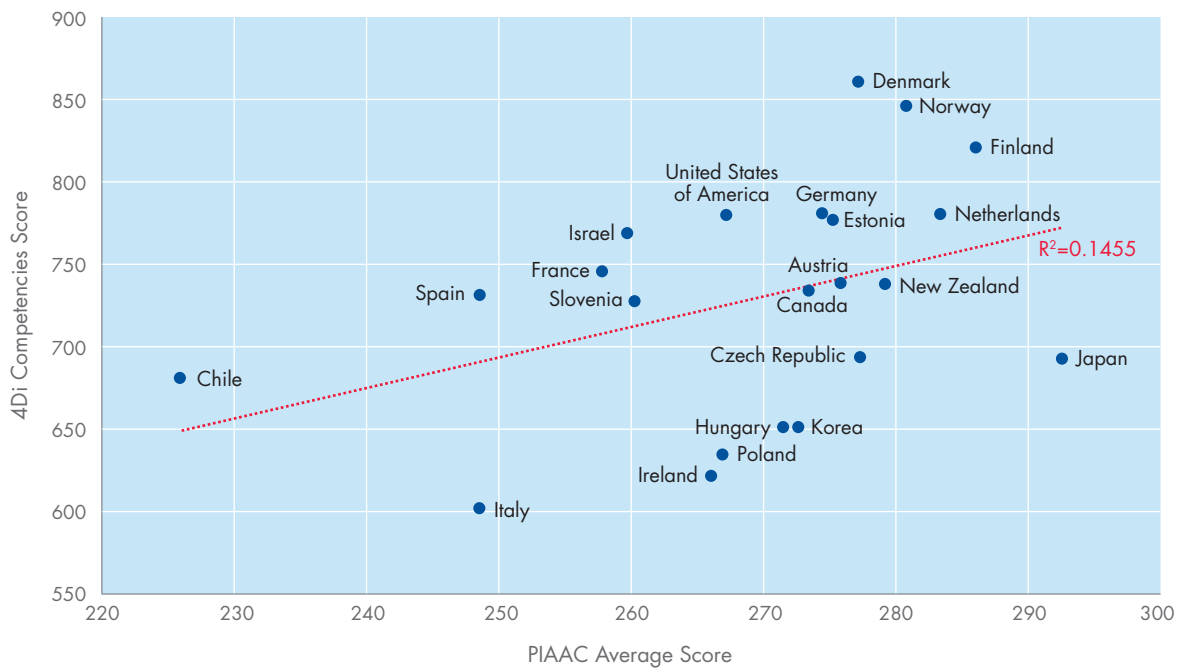
Two dimensions measured by PIAAC and the 4D Competencies that appear on face value to be similar are 'Problem-solving in digital rich environments' (PIAAC) and 'Critical Thinking Competency' (CCR). The components of the CCR Critical Thinking Competency are shown in Figure 21. However, what about the seemingly obvious correlation, narrowly, between PIAAC's 'Problem-solving in digital rich environments', and CCR's Critical Thinking Competency?

Figure 21. Suite of proxy components for Critical Thinking Competency

Competency	Type	Source	Details
Critical thinking			
34	INDIVIDUAL	GESIS	INDIVIDUAL: DISPOSITION TO THINK: Percentage of population who 'try understand reasoning of other people…
20	INDIVIDUAL	OECD	INDIVIDUAL: ACHIEVING CRITICAL THINKING: Percentage of adults with good information and communication techniques…
34	COLLECTIVE	GESIS	COLLECTIVE: SOCIAL DESIRABILITY OF THINKING TO ACT: Percentage of population who 'always vote in elections'…
103	COLLECTIVE	UNESCO	COLLECTIVE: CONSUMPTION OF CRITICAL THINKING: Newspaper circulation per capita. Covers 104 countries, 1998–…
56	COUNTRY	OECD PISA	COUNTRY: PROMOTING CRITICAL THINKING (high income): Attainment in collaborative problem solving amongst…
30	INDIVIDUAL	WCI	INDIVIDUAL: DISPOSITION TO THINK: Hours per week reading per person, Source: NOP World Culture Score Index,…

The results shown in Figure 22, with virtually zero correlation, indicate that there is no relationship between what CCR considers country-level critical thinking vs problem-solving as defined by PIAAC.

Figure 22. 4D Index Critical Thinking Competency values vs PIAAC Problem-solving in Digital Rich Environments scores (Estimated line of best fit shown as dotted red line with correlation shown as R^2 in red)
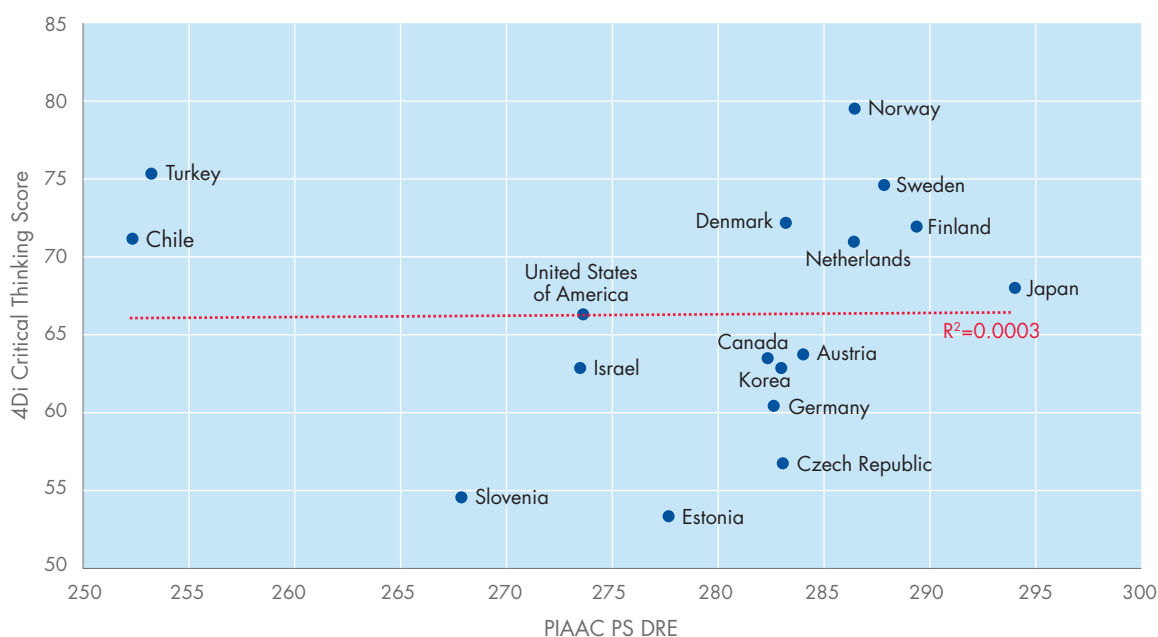
Comparison with PISA

Relative ranking

Whereas PIAAC measures adult performance, PISA measures 15-year-old students and, as such, is an early indicator. *For the top 30 countries*, the comparison between the CCR Competencies index and aggregate PISA scores (Maths, Science, Language) looks as below.

Figure 23. PISA Composite Ranking compared with 4D Index Competencies Ranking for 22 Countries (Coloured arrows show countries whose rankings differ substantially. PISA ranking higer [red]; 4D Index ranking higher [blue])

PISA Composite Ranking	4D Competencies Ranking
Singapore	Denmark
Hong Kong	Norway
Japan	Sweden
Estonia	Finland
Chinese Taipei	United Kingdom
Canada	Australia
Finland	Netherlands
Korea	Germany
China	United States of America
Slovenia	Estonia
Ireland	Israel
Germany	Belgium
Netherlands	France
Switzerland	Austria
New Zealand	New Zealand
Norway	Luxembourg
Denmark	Canada
Poland	Spain
Belgium	Iceland
Australia	Slovenia
Vietnam	Latvia
United Kingdom	Switzerland
Portugal	Czech Republic
Sweden	Japan
France	Chile
Austria	Lithuania
Russian Federation	Portugal
Spain	Korea
Czech Republic	Hungary
United States of America	Russian Federation

These results indicate that

- a number of Nordic countries improve their already relatively strong PISA results through Competencies;
- Asian countries drop off significantly, and some disappear from the top 30;
- most Anglo-Saxon countries improve significantly, while most Germanic countries maintain/improve their showing.
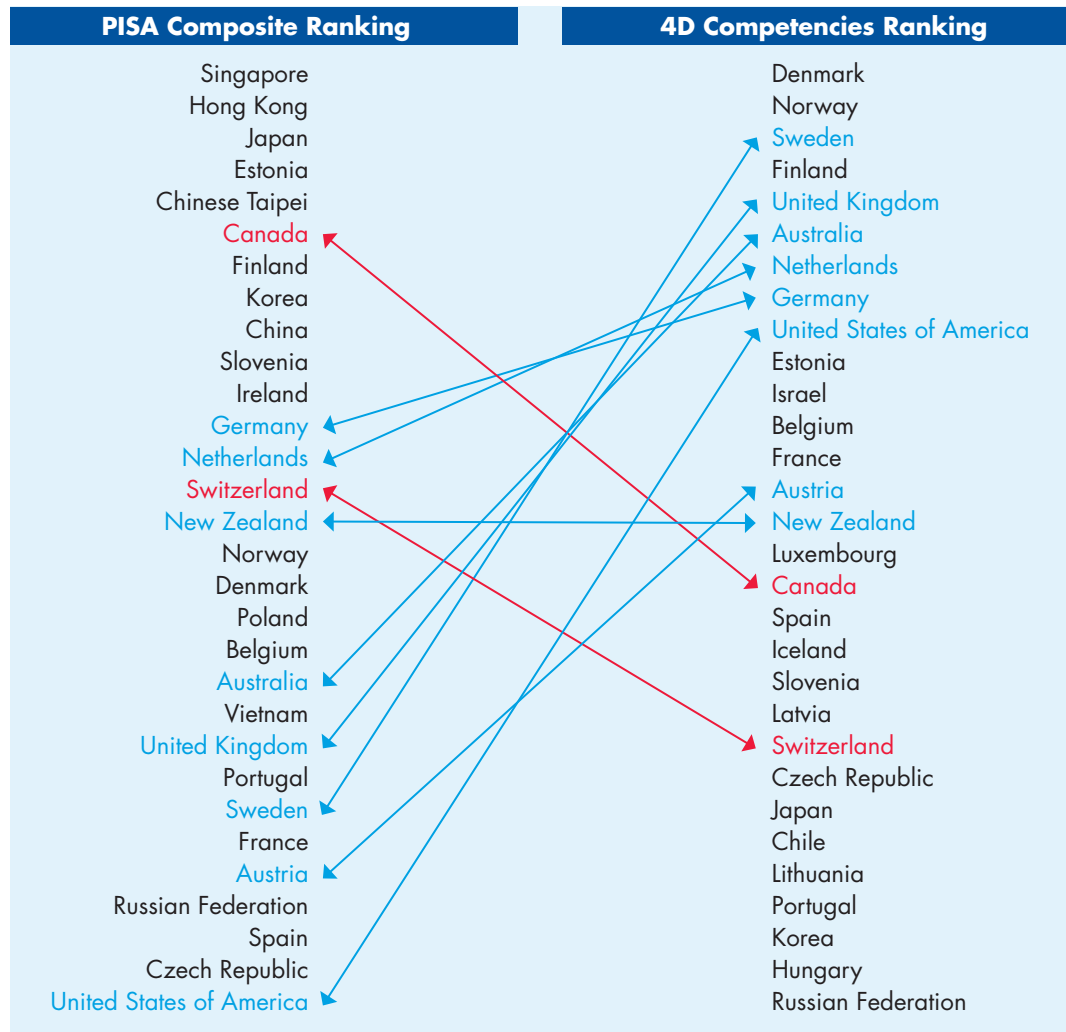
Figure 24. PISA Composite Ranking compared with 4D Index Competencies Ranking for 22 Countries (Coloured arrows show countries whose rankings differ substantially. PISA ranking higer [red]; 4D Index ranking higher [blue])

PISA Composite Ranking	4D Competencies Ranking
Singapore	Denmark
Hong Kong	Norway
Japan	Sweden
Estonia	Finland
Chinese Taipei	United Kingdom
Canada	Australia
Finland	Netherlands
Korea	Germany
China	United States of America
Slovenia	Estonia
Ireland	Israel
Germany	Belgium
Netherlands	France
Switzerland	Austria
New Zealand	New Zealand
Norway	Luxembourg
Denmark	Canada
Poland	Spain
Belgium	Iceland
Australia	Slovenia
Vietnam	Latvia
United Kingdom	Switzerland
Portugal	Czech Republic
Sweden	Japan
France	Chile
Austria	Lithuania
Russian Federation	Portugal
Spain	Korea
Czech Republic	Hungary
United States of America	Russian Federation

Correlation

The graph below shows that PISA and the CCR Competencies composite are very uncorrelated for the top 30 countries. This demonstrates the necessity for measuring other dimensions of an education, outside of traditional disciplines of maths, science and language.

Figure 25. 4D Index Aggregated Competency values vs PISA scores

(Estimated line of best fit shown as dotted red line with correlation shown as R^2 in red)
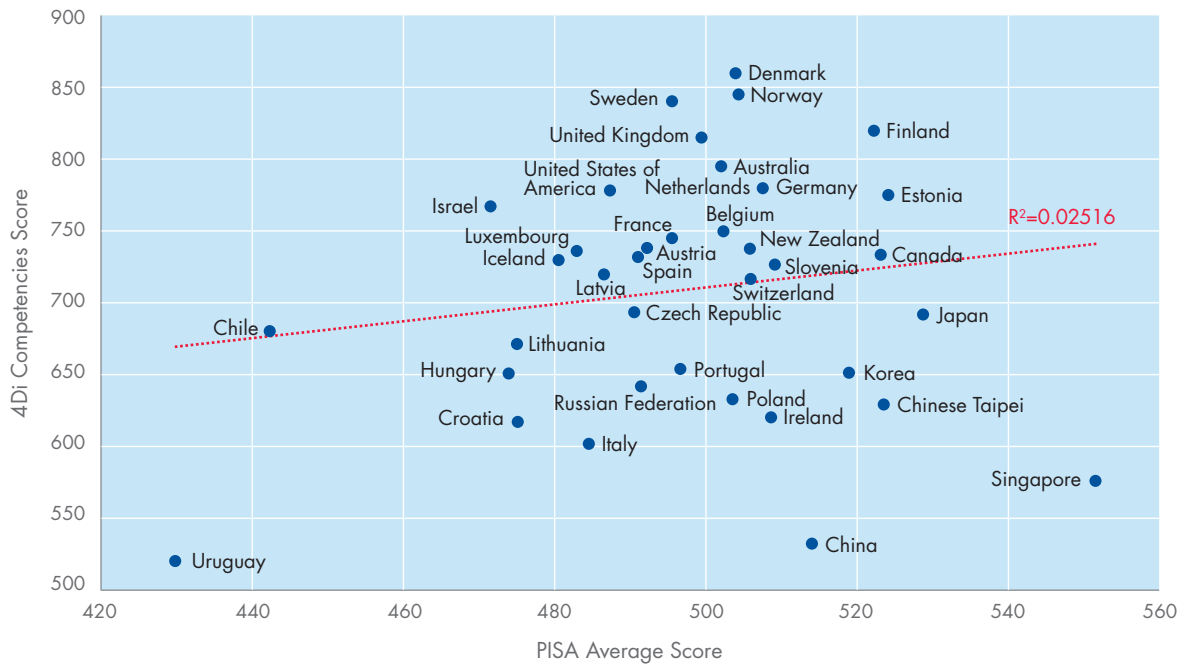
Comparison with intended curriculum

The OECD's Education 2030 content mapping exercise has produced data describing how countries embed specific topics or skills in their curriculum. One particular example, that is 'Cooperation/Collaboration',[12] can be used here for comparison. First, at right (Figure 26) is the data from a few jurisdictions that responded to the survey.

Of these, only 11 are also represented in the 4Di index, namely the ones *italicised* in the table. Nevertheless, exploring the correlation between a country's stated embedding of Collaboration in its education curriculum, and its Collaboration score, is disappointing to say the least. We might hope that, over time, there would be more convergence here, if countries' efforts in their curriculum is having any impact.

Figure 26. Percentage of total curriculum mapped to OECD Collaboration skill in some countries

Jurisdiction	Percentage of total curriculum mapped to Collaboration
Korea	*71%*
China	*57%*
Northern Ireland	55%
Estonia	*53%*
Kazakhstan	53%
Lithuania	*44%*
Japan	*37%*
British Columbia	36%
Israel	*35%*
Saskatchewan	27%
Greece	*21%*
Russia	*19%*
Australia	*16%*
Portugal	*15%*
Sweden	*9%*

Figure 27. 4Di composite score vs % inclusion on curriculum for Collaboration
(Estimated line of best fit shown as dotted red line with correlation shown as R^2 in red)
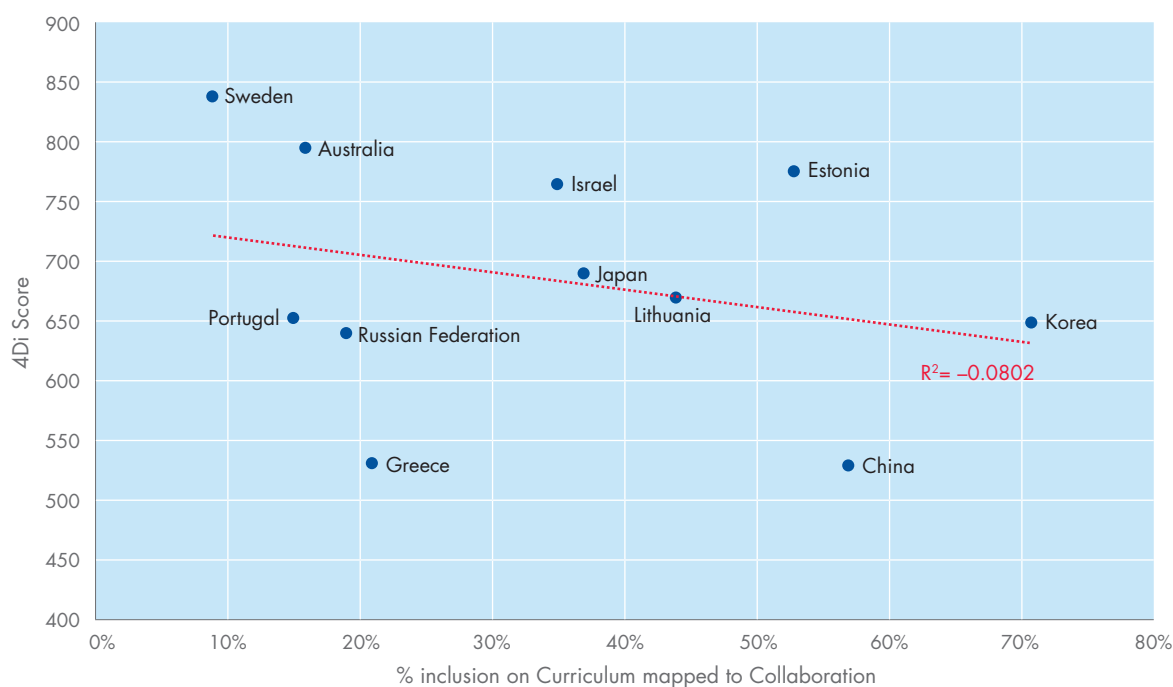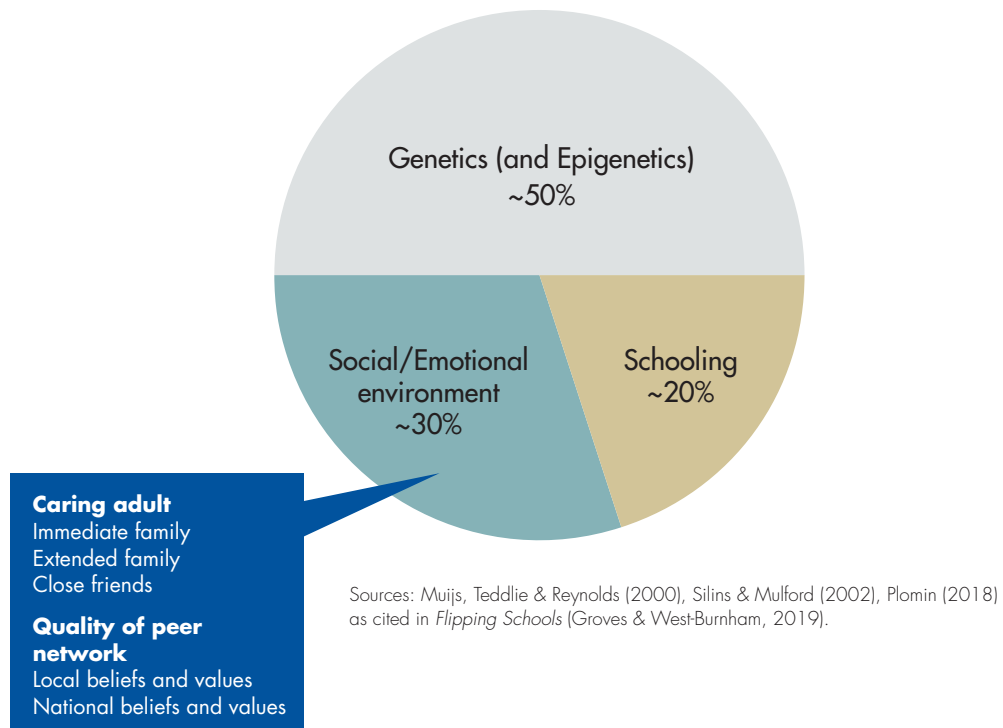

12. doi.org/10.1787/888934196005.

Discussion

It would be easy to derive conclusions that are overly far-reaching. The reader is encouraged to keep in mind that

1. like all indices, the choice of parameters is a natural bias. This is also found in similar indices, such as University rankings and others. Nevertheless, this serves the purpose of opening a conversation about the insufficiency of Knowledge measures;

2. the parameters themselves cannot be measured precisely and are not, in international comparative data, provided with an estimate of measurement error. This adds some unknown loss of precision, a problem that is likewise common to most rankings;

3. many countries do not have sophisticated-enough infrastructure to provide many of the parameters used (hence the truncation at 22 for PIAAC and 30 for PISA). *Therefore, there is no way to tell whether Somalia isn't the global leader in Resilience, or Nepal in Mindfulness, etc*; and

4. *how much of the results are due to societal structures, vs formal education?* Figure 28 shows the importance of the social/emotional environment of a student.

Figure 28. Life 'Success' depends on...

Sources: Muijs, Teddlie & Reynolds (2000), Silins & Mulford (2002), Plomin (2018) as cited in *Flipping Schools* (Groves & West-Burnham, 2019).

Conclusion

In this investigation we have attempted to remain mostly descriptive, and unearthed that measuring knowledge (and all the more, **basic** measures of numeracy/mathematics, literacy/language, science and 'problem-solving') is vastly insufficient, hence the development of this 4Di scorecard. This also poses the following additional questions, of high importance for a world that desperately needs better outcomes.

- How can a jurisdiction improve its education system to match the desired outcomes in Skills, Character, and Meta-Learning? *Where should it put its educational energies, given its existing social capabilities?*

- Most critically in a troubled world, how can we measure the rate of change of a jurisdiction without longitudinal analysis over a decade? (time being of the essence). *Are there proxies to measuring the adaptability of a jurisdiction, and its willingness to change?*

Appendix

Proxy parameters[13]

SKILLS

Competency		Year	Type	Source
Creativity				
	126	2013–2017	ECONOMY	GLOBAL INNOVATION INDEX
	154	2003–2015	ECONOMY	UNCTAD
	11	2013	COLLECTIVE	UNESCO
	60	2019	COUNTRY	BLOOMBERG INNOVATION INDEX
	39	2013	COUNTRY	OECD
	11	2013	INDIVIDUAL	UNESCO
	25	2013	COLLECTIVE	OECD
	12	2013	COUNTRY	UNESCO
Critical thinking				
	34	2014	INDIVIDUAL	GESIS
	20	2012	INDIVIDUAL	OECD
	34	2014	COLLECTIVE	GESIS
	103	1998–2000	COLLECTIVE	UNESCO
	56	2015	COUNTRY	OECD PISA
	30	2005	INDIVIDUAL	WORLD CULTURE INDEX
Communication				
	59	2014	COLLECTIVE	WVS
	34	2014	INDIVIDUAL	GESIS
	35		INDIVIDUAL	EUROSTAT
	180	2004–2005	COLLECTIVE	NATIONMASTER
	60	2014	COLLECTIVE	WVS
Collaboration				
	56	2015	INDIVIDUAL	OECD
	60	2014	INDIVIDUAL	WVS
	149	2017–2018	COUNTRY	WORLD ECONOMIC FORUM
	37	2015	COLLECTIVE	GESIS
	194	2015–2016	COUNTRY	UIA
	150	2017–2018	ECONOMY	WORLD ECONOMIC FORUM
	34	2013	INDIVIDUAL	GESIS

13. If interested in the complete list of proxy parameters, their analysis, modifications or inclusions, please email CCR at info@curriculumredesign.org.

CHARACTER

Competency		Year	Type	Source
Mindfulness				
	184	2017	COLLECTIVE	THE LANCET
	144	2013	INDIVIDUAL	GALLUP
	26	2004	INDIVIDUAL	NATIONMASTER
	60	2014	COLLECTIVE	WVS
	183	2017	COLLECTIVE	THE LANCET
	181	2015	COLLECTIVE	WORLD RELIGION DATABASE
Curiosity				
	67	2015	INDIVIDUAL	OECD PISA
	143	2017	INDIVIDUAL	GALLUP
	37		INDIVIDUAL	GESIS
	150	2017–2018	COLL/ECON	WORLD ECONOMIC FORUM
	150	2017–2018	COLL/ECON	WORLD ECONOMIC FORUM
	46	2017	COLLECTIVE	OECD
Courage				
	26	2016	ECONOMY	OECD
	34	2014	INDIVIDUAL	GESIS
	37	2015	INDIVIDUAL	GESIS
	183	2018	COUNTRY	FREEDOM HOUSE
	66	2016	COUNTRY	CLEARLY CULTURE
	70	2016	COUNTRY	NATIONMASTER
Resilience				
	40	2015	INDIVIDUAL	OECD
	23	2008	ECONOMY	OECD
	136	2017	INDIVIDUAL	UNESCO
	60	2016	COLLECTIVE	WNS
	183	2016	COUNTRY	U OF NOTRE DAME
	74	2000	INDIVIDUAL	NATIONMASTER

Competency		Year	Type	Source
Ethics				
	19	2012	INDIVIDUAL	OECD
	173	2017	COLLECTIVE	TRANSPARENCY INTERNATIONAL
	133	2017–2018	COLLECTIVE	WORLD ECONOMIC FORUM
	143	2017	COLLECTIVE	CAF
	191		COUNTRY	UNSTATS
	37		COUNTRY	OECD
	179	2018	COLLECTIVE	GLOBAL SLAVERY INDEX
	37	2015	INDIVIDUAL	GESIS
Leadership				
	37	2015	INDIVIDUAL	GESIS
	34	2014	COLLECTIVE	GESIS
	150	2017–2018	COLLECTIVE	WORLD ECONOMIC FORUM
	34	2014	COUNTRY	GESIS
	35	2017	INDIVIDUAL	OECD

META-LEARNING

Competency		Year	Type	Source
Metacognition				
	65	2015	INDIVIDUAL	OECD PISA
	67	2015	INDIVIDUAL	PISA
	38	2017	COUNTRY	IPSOS
	144	2013	INDIVIDUAL	FORBES
Growth mindset				
	64	2012	INDIVIDUAL	OECD PISA
	69	2015	INDIVIDUAL	OECD PISA
	37	2015	INDIVIDUAL	GESIS
	184	2017	COUNTRY	UNDATA
	71	2015	INDIVIDUAL	OECD PISA

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About the Author

Charles Fadel is a global education thought leader and author, futurist and inventor; founder and chairman of Center for Curriculum Redesign; project director Harvard GSE; member President's Council at Olin College of Engineering; chair education committee at BIAC/OECD; co-author of *"Artificial Intelligence in Education"* (2019); *"Four-Dimensional Education"* (framework in 21 languages) and best-selling *"21st Century Skills"*; founder and president Fondation Helvetica Educatio (Geneva, Switzerland). Has worked with education systems and institutions in more than 30 countries. Spent 25 years in technology management (M/A-COM; Analog Devices); founder of Neurodyne AI; formerly Global Education Lead at Cisco Systems, visiting scholar at MIT ESG and Wharton/Penn CLO, angel investor with Beacon Angels. BSEE, MBA, seven patents.

About the Paper

Building on the initial work done in collaboration with Brookings Institution, the CCR has developed an Index to highlight the disconnects between measures of students and adults education on one side, with the aggregate results of their countries on the other side. It expects this report to serve as a mindful thought-provocation about the importance of societal learning, and Competencies learning rather than only Knowledge – Knowledge is critical but not sufficient.