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BROOKINGS

Competencies for the 21st century

Jurisdictional progress

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BRIEF

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Competencies for the 21st century: Jurisdictional progress

Introduction

The world is rapidly changing and faces increasingly complex global challenges, such as climate change, the migrant crisis, and health epidemics, that require creative collaboration across borders. With machine learning, artificial intelligence, and other technological advancements, jobs are changing as increasing numbers of tasks are automated. To be successful in learning, work, and life, today's citizen needs a wide range of competencies—beyond rote knowledge—to navigate the changing world. These competencies include, but are not limited to, critical thinking, communication, collaboration, resilience, and metacognition.

Fortunately, education systems recognize the need to broaden their learning goals to prepare students for the 21st century. A previous study by the Brookings Institution examined[1] the extent to which countries around the world are including "21st century skills"[2] and "social-emotional learning" in their national education policies so that students can develop these competencies. Although most countries acknowledged the importance of 21st century skills in their high-level education policies, the inclusion of these skills was less evident in curriculum and pedagogy policies, suggesting they may not be present in classrooms.

In the present study, the Brookings Institution and the Center for Curriculum Redesign (CCR) are building on the previous Brookings work by examining whether high-level aspirations in developing student competencies, as stated in education policies, are reflected in 22 different jurisdictions (see Table 1) using the skill, character and meta-learning dimensions from CCR's "4D Framework" 1.0.

[1] Care, E., Anderson, K., & Kim, H. (2016). Visualizing the breadth of skills movement across education systems. Center for Universal Education at the Brookings Institution, Washington, DC. https://www.brookings.edu/research/visualizing-the-breadth-of-skills-movement-across-education-systems/.

[2] Trilling, B., & Fadel, C. (2009). 21st century skills: Learning for life in our times. John Wiley & Sons. http://21stcenturyskillsbook.com/.

Table 1. Jurisdictions and their education authorities

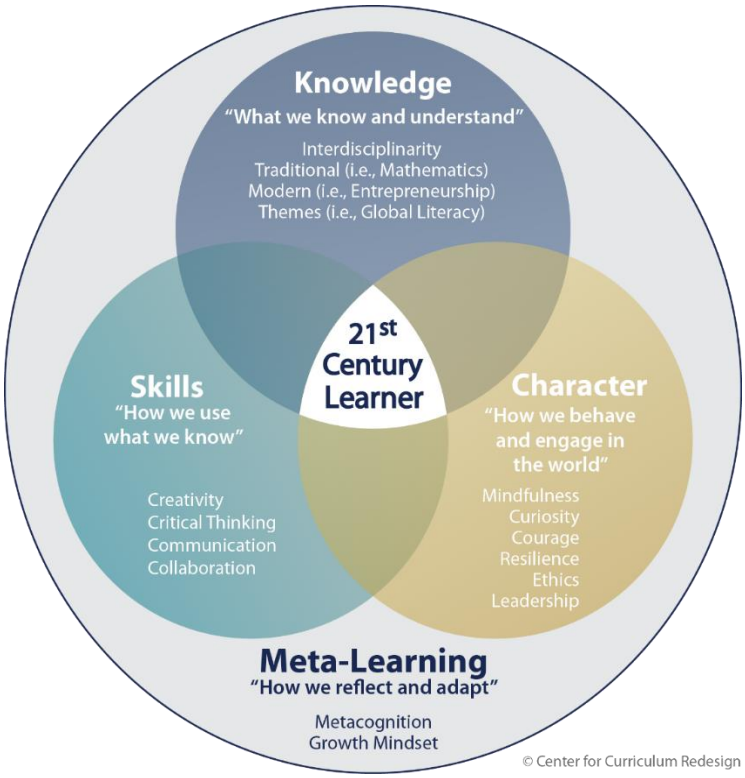
Jurisdiction	Education Authority
Australia (Federal)	Australian Curriculum, Assessment and Reporting Authority (ACARA)
Alberta (Canada)	Government of Alberta Department of Education
British Columbia (Canada)	Ministry of Education
China	Ministry of Education of People's Republic of China
Chinese Taipei (aka Taiwan)	Ministry of Education Republic of China
Denmark	Ministry of Children and Education
England (UK)	Department for Education
Finland	Finnish National Board of Education
Hong Kong (China SAR)	Education Bureau
Japan	Ministry of Education, Culture, Sports, Science and Technology
Massachusetts (USA)	Massachusetts Department of Elementary and Secondary Education
New Brunswick (Canada)	Ministry of Education and Early Childhood Development
New South Wales (Australia)	New South Wales Education Standards Authority (NESA)
New Zealand	Ministry of Education
Ontario (Canada)	Ontario Ministry of Education
Portugal	Ministry of Education
Russia	Ministry of Education and Science
Scotland (UK)	Education Scotland
Singapore	Ministry of Education
South Korea	Ministry of Education
USA (Federal)	US Department of Education
Victoria (Australia)	Victorian Curriculum and Assessment Authority

Note. Most jurisdictions were chosen on the basis of their leading large-scale assessment results (e.g., PISA 2018), while some were chosen for geographic and cultural representation.

The framework provides a consistent structure for 21st century education[3] and includes 12 competencies that are linked to the three dimensions of skills (also known as "21st century skills"), character (also known as "social-emotional learning"), and meta-learning (abilities often described as "learning to learn"), as well as 60 sub-competencies and a lexicon of more than 200 related constructs. Figure 1 depicts these three dimensions and their 12 competencies, in addition to the knowledge dimension.

[3] Fadel, C. (2015). Theory of Change & Research Process. Boston, Massachusetts: Center for Curriculum Redesign. https://curriculumredesign.org/wp-content/uploads/CCRProcessPaper_2015.pdf.

Figure 1. Center for Curriculum Redesign "4D Framework" 1.0



For the complete framework, please visit *https://curriculumredesign.org/framework/*.

Given that the interest of this study is the degree to which jurisdictions have developed their national commitment to developing student competencies, five sets of indicators were selected to demonstrate a jurisdiction's level of progress. These include:

- Whether a jurisdiction has **included** the 12 competencies in its curriculum documents;
- Whether a jurisdiction has **identified** these competencies in its curriculum documents across disciplines;
- Whether evidence exists as to how these competencies **progress** over time and across education levels;
- Whether there are **pedagogies** for teaching these competencies to students; and
- Whether there are **assessments** that measure students' progress on these competencies.

In any major education reform, where there is a shift or refocusing of learning goals, alignment across curriculum, pedagogy, and assessment is critical for implementation to

occur.[4] For example, some jurisdictions may aspire to produce critical thinkers; yet, they may not understand how critical thinking develops as students progress in their learning, suggesting that teaching and assessment of critical thinking is lacking. On the other hand, jurisdictions that aim to develop critical thinking skills, with evidence of the different levels of competencies embedded in their curriculum across different grade levels, and teacher guides with descriptions of pedagogical and assessment practices for critical thinking, may be more likely to see critical thinking happen in classrooms.

To accompany this research, an online interactive map was created. This interactive is intended to be a resource for policymakers, educators, and researchers to understand the level of progress the jurisdictions have made in articulating the competencies aspired to in high-level education policies. To access the interactive and the corresponding data, please see https://www.brookings.edu/4DCompetencies/.

Method

Research on each jurisdiction began with an investigation into each Ministry / Department of Education's published curriculum documents and mission and vision statements, which were accessed by a team of researchers from August through October 2019. Key words and phrases that aligned with the CCR "4D Framework" 1.0. were identified. Data were coded according to whether the documents referenced the competency itself, synonyms, and related constructs.[5] For each jurisdiction, each of the 12 competencies received a code of "1" when it was identified in one of the five categories (see below) and a code of "0" if it was not identified in that particular category. If a competency was mentioned multiple times within the same category for the same jurisdiction, it still received a code of "1" to indicate its presence. Relevant text from the curriculum documents was copied into a database and coded according to the following categories for each of the 22 jurisdictions:

1. Competency inclusion: Do the jurisdiction's curriculum documents include any of the 12 competencies within one subject area, as opposed to across subject areas?

2. Competency identification: Do the jurisdiction's curriculum documents identify any of the 12 competencies in a cross-disciplinary context?

3. Competency progressions: Is there specific documentation for how the 12 competencies progress over time and across different education levels, in an interdisciplinary context? This focuses on whether the education system has incorporated relevant information into their curricula that indicate whether competencies progress through grade levels according to the development of the students.

4. Competency pedagogies: Does the jurisdiction systematically include teaching strategies designed to teach students the competencies?

[4] Care, E., Kim, H., Vista, A., & Anderson, K. (2018). Education System Alignment for 21st Century Skills: Focus on Assessment. Center for Universal Education at The Brookings Institution. https://www.brookings.edu/research/education-system-alignment-for-21st-century-skills/.
[5] Center for Curriculum Redesign. (2019). Competencies / Subcompetencies framework. https://curriculumredesign.org/framework/.

5. Competency assessments: Does the jurisdiction have any large-scale assessments that include any of the 12 competencies targeted by the study?

After completing an initial analysis of all jurisdictions, additional iterations were undertaken to ensure consistency in the coding practices. The data for all jurisdictions were double coded by separate team members. Where there was disagreement, discussions occurred until a consensus could be reached.

Where possible, the most recent information from the jurisdiction's education authority were used. It should be noted that only publicly available information was sourced. Third party research was used to supplement gaps in publications, including research conducted by The Asia Society's Center for Global Education, the International Association for the Evaluation of Educational Achievement's TIMSS & PIRLS International Study Center, the Organisation for Economic Co-operation and Development, and the International Bureau of Education. Google-translated texts were used for primary, non-English texts in the cases of China, Denmark, Portugal, and Russia.

Jurisdictional assessment systems, including third-party tests, were also explored, with test objectives, subject content, and sample questions in the context of systematic measurement of competencies examined.

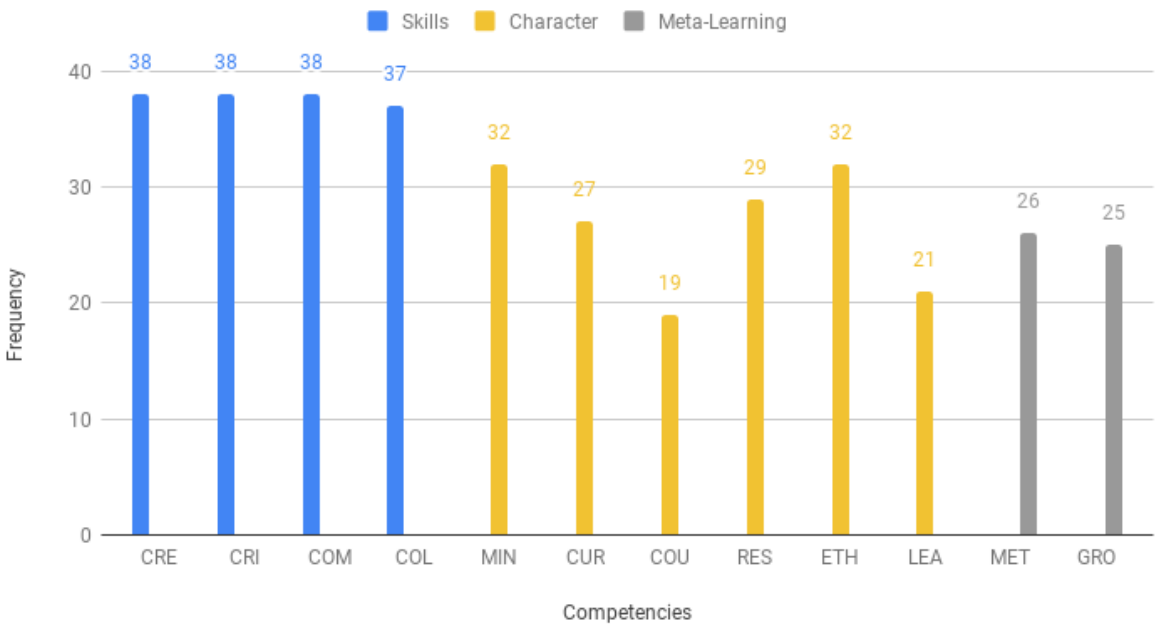
Results and discussion

Two distinct curricular approaches regarding competencies emerged across jurisdictions. Certain jurisdictions integrated competencies across all disciplines into the curriculum as an additional dimension of learning. Other jurisdictions included competencies only within subject-specific curriculum, such as critical thinking in math and creativity in art. The localized nature of subject-specific competencies involves multiple variables, including whether a competency was identified in different grade or school levels, or in mandatory or elective subjects. A coding distinction was devised to systematize the analysis. The inclusion category captures whether the competency appears anywhere in the curriculum only within a subject, while the identification and progression consider competencies in an interdisciplinary context. In this way, all of the categories "stack" and level of progress of implementation may be inferred. For example, a competency coded as progression also warrants coding as identification and inclusion.

How frequently are specific competencies identified?

Figure 2 shows how frequently a specific competency is identified across the five categories, or levels of progress, by the 22 jurisdictions. The frequencies range from 0 (competency not mentioned at all for any of the 22 jurisdictions) to 110 (competency mentioned consistently across all five categories and in all 22 jurisdictions).

Figure 2. Frequencies of the 12 competencies across the 22 jurisdictions



The results indicate that certain competencies, such as creativity (CRE) and critical thinking (CRI), are identified most frequently across the five categories, while other competencies, such as courage (COU) and leadership (LEA), are less frequent. Competencies under the skills dimension of the CCR framework (in blue) are most frequently identified in the five categories by the jurisdictions compared to the competencies under the character (in yellow) and meta-learning (in gray) dimensions.

The variation in the distribution of the competencies across each of the five categories was examined. As shown in Table 2, there were no competencies represented in the pedagogies category. In other words, none of the 22 jurisdictions had publicly available documents that explicitly included teaching practices to target the competencies, notwithstanding that these may currently be under development. In the assessment category, only one jurisdiction—Victoria, Australia—utilized a standardized assessment of competencies, with its "Critical and Creative Thinking Assessment," launched in 2019 and available only to randomly selected students from volunteering schools.

In the remaining three categories (inclusion, identification, and progression), there was variability in how consistently specific competencies were identified by the jurisdictions. For example, although four jurisdictions identified leadership consistently across each of the three categories, for other competencies like critical thinking, this was not the case. In fact, even though 21 jurisdictions included critical thinking somewhere in their curricula, only six provided evidence of progressions in their curricula. These six jurisdictions—Australia, British Columbia, Finland, Hong Kong, Singapore, and Victoria—were also the only jurisdictions to include progressions of any of the twelve competencies in their curricula. Figure 3 depicts

how the 12 competencies were represented across inclusion, identification, progression, and assessment.

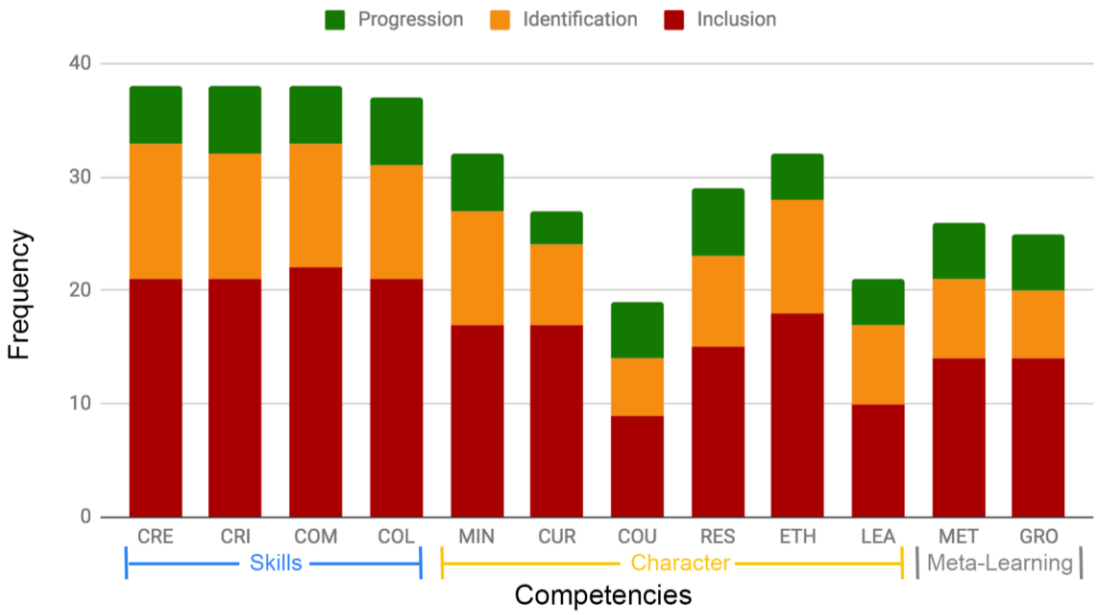
Table 2. Competency distribution by category

	Competency	Inclusion	Identification	Progression	Pedagogy	Assessment
Skills	Creativity	21	12	5	0	0
	Critical thinking	21	11	6	0	0
	Communication	22	11	5	0	0
	Collaboration	21	10	6	0	0
Character	Mindfulness	17	10	5	0	0
	Curiosity	17	7	3	0	0
	Courage	9	5	5	0	0
	Resilience	15	8	6	0	0
	Ethics	18	10	4	0	0
	Leadership	10	7	4	0	0
Meta-learning	Metacognition	14	7	5	0	0
	Growth mindset	14	6	5	0	0

How are competencies represented within the categories?

Figure 3 suggests that the 12 competencies are distributed similarly across the categories, with the exception of a few competencies (e.g., curiosity, courage, leadership, and growth mindset). Notably, the competencies are found more frequently in the inclusion compared to identification and progression, meaning that jurisdictions are more likely to include competencies only within specific subject areas and less likely to identify competencies cross-disciplinarily or provide evidence of progressions. This suggests that there may not be alignment across curriculum, pedagogy, and assessment when it comes to integrating competencies into the education system. This is especially true given that none of the 22 jurisdictions had publicly available documents that included pedagogies targeting the 12 competencies.

Figure 3. Representation of the 12 competencies across inclusion, identification, and progression categories



Although assessments take place in these jurisdictions, including school-level assessments, diploma requirements, and national exams, according to currently available public information, only one jurisdiction, Victoria, explicitly designed an assessment to measure a student's proficiency in these competencies. While some of the jurisdictions' assessments may measure competencies within disciplines, such as critical thinking within mathematics assessments or communication within literacy assessments, to date, these do not appear intentional and explicit in terms of reflecting the actual competencies. This finding is in line with a previous UNESCO study[6] with eight countries in Asia that found very few assessment tools designed to capture transversal competencies directly. The one assessment being piloted in Victoria shows promise in explicitly assessing proficiency in two competencies. However, the assessment is not yet comprehensive system-wide: At the time of research, schools opt in for one year and provide a random sample of 25 students to take the test. The assessment shows potential, especially should it develop the reach of more common national exams that have traditionally focused on literacy and numeracy.

Table 3 summarizes how the competencies are distributed across the different categories for each jurisdiction. The number and corresponding color indicate the categories in which the competencies are identified, with the table organized from top to bottom by jurisdiction according to frequency. A "4" (dark green) indicates that the jurisdiction has identified that particular competency in four categories, a "3" (green) indicates that the jurisdiction has identified that competency in three categories, a "2" (pale green) indicates that the

[6] Care, E., Vista, A., & Kim, H. (2019). Assessment of Transversal Competencies: Current Tools in the Asian Region. UNESCO Bangkok. https://unesdoc.unesco.org/ark:/48223/pf0000368479.

competency was identified in two categories, a "1" (pale orange) indicates that the competency was identified in one category, and a "blank" (white) indicates that the competency was not mentioned. This table can be used to explore the patterns of jurisdictions' uptake of the competencies. As shown, the jurisdictions that endorse three or four categories tend to do this most often across the competencies in the skills dimension. The next group of jurisdictions (New Zealand, Portugal, and Chinese Taipei [Taiwan]) similarly include skills, to a lesser extent the character competencies, and to an even lesser extent, the meta-learning competencies. The final group of jurisdictions have similar patterns but at lower level of frequency. Skills are primarily endorsed of the three dimensions of competencies.

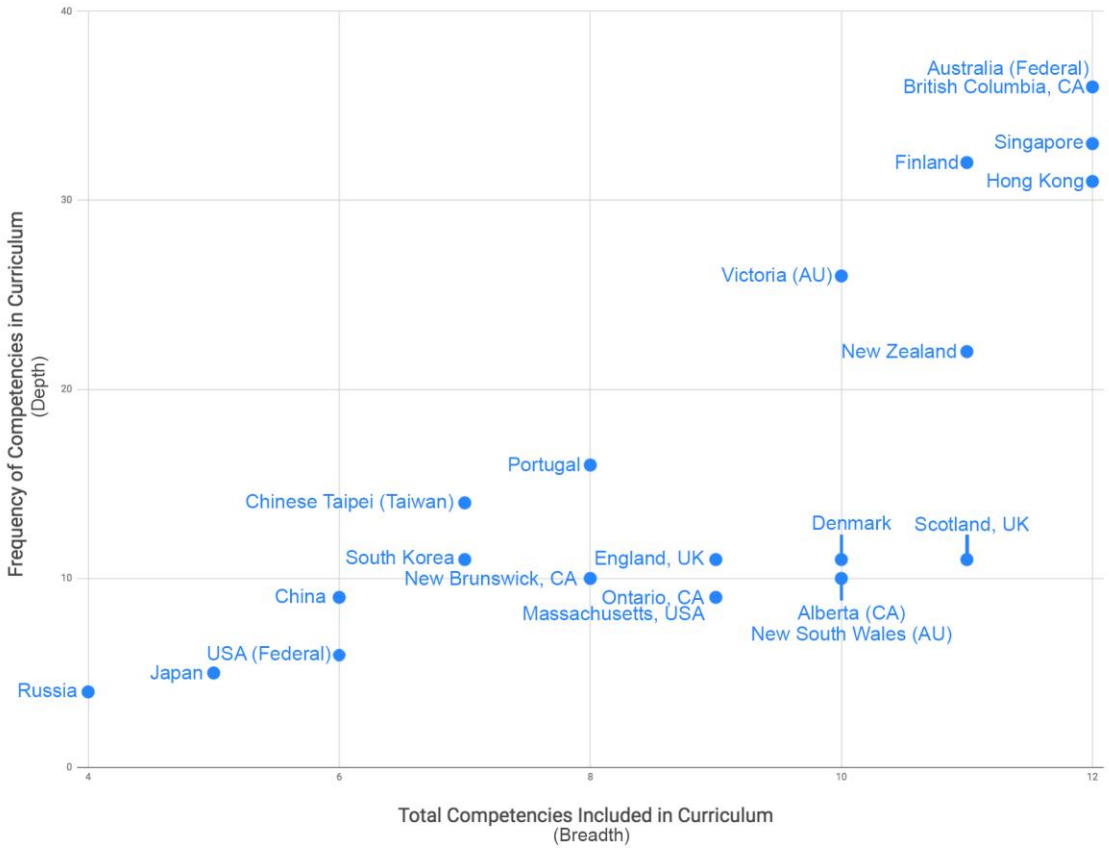
Table 3. Frequency count of the competencies across the 5 categories for the jurisdictions

Jurisdiction	CRE	CRI	COM	COL	MIN	CUR	COU	RES	ETH	LEA	MET	GRO	Total
Australia (Federal)	3	3	3	3	3	3	3	3	3	3	3	3	36
British Columbia (Canada)	3	3	3	3	3	3	3	3	3	3	3	3	36
Singapore	3	3	3	3	2	3	3	3	3	2	2	3	33
Finland	3	3	3	3	3		3	3	2	3	3	3	32
Hong Kong (China SAR)	2	3	3	3	3	1	3	3	2	2	3	3	31
Victoria (Australia)	3	3	1	3	3	1		3	3	3	3		26
New Zealand	2	2	2	2	2	2		2	2	2	2	2	22
Portugal	2	2	2	2	2	2		2	2				16
Chinese Taipei (aka Taiwan)	2	2	2	2	2	2			2				14
Denmark	2	1	1	1	1	1	1		1	1	1		11
England (UK)	2	1	1	1		2	1		1		1	1	11
Scotland (UK)	1	1	1	1	1	1	1	1	1		1	1	11
South Korea	2	2	2	1	2	1			1				11
Alberta (Canada)	1	1	1	1	1	1		1		1	1	1	10
New Brunswick (Canada)	1	2	2	1		1		1	1			1	10
New South Wales (Australia)	1	1	1	1	1	1	1	1			1	1	10
Massachusetts (USA)	1	1	1	1	1			1	1	1	1		9
Ontario (Canada)	1	1	1	1	1	1		1			1	1	9
China	1		2	2	1				2			1	9
USA (Federal)		1	1	1				1	1			1	6
Japan	1	1	1	1		1							5
Russia	1	1	1						1				4
Total	38	38	38	37	32	27	19	29	32	21	26	25	

Figure 4 plots the breadth and depth of each jurisdiction's coverage of competencies in the curriculum. "Breadth" indicates how many of the 12 competencies a jurisdiction references in its curriculum documents; "depth" utilizes the competency scoring of Table 3—one point for inclusion, a second point for identification, a third for progression, and a fourth for assessment (no points were given for pedagogies). There is no judgment associated with

breadth and depth—different jurisdictions will naturally value different characteristics according to their visions for education.

Figure 4. Breadth and depth in each jurisdiction's coverage of competencies



Conclusion

This study confirms previous findings that education systems are broadening their learning goals to develop competencies in their students. There were four key findings of note:

1. The 12 competencies are distributed reasonably similarly across the three dimensions, primarily for the skills dimension in the CCR framework, and less so for the character and meta-learning dimensions.

2. There is one pilot of a small-scale jurisdictional competency assessment, Victoria's "Critical and Creative Thinking Assessment. While some jurisdiction diploma requirements referenced competencies, they did not reveal a systematic approach to measuring a student's proficiency.

3. There was a scarcity of pedagogies designed to develop student proficiencies in the competencies. Different jurisdictions varied in their methods of communicating

pedagogies, and in holding teachers accountable. When documentation on pedagogies were found, they rarely addressed the 12 competencies.

4. There is clear lack of alignment across curriculum, pedagogy, and assessment, which is necessary for implementation of the competencies.

As with all studies, there are limitations that should be considered when interpreting the results. First, this study included data only from publicly available sources; there may be existing documents that identify competencies in different categories. However, they might be unpublished, or could have been missed in the literature search. In cases where information was not available, secondary sources were examined, such as for South Korea, Chinese Taipei (Taiwan), and China (for sources, please see the interactive at https://www.brookings.edu/4DCompetencies/). Second, it is possible that there were errors in coding documents that were translated to English, such as for China, Russia, and Portugal. Third, although competencies were coded as present if they were identified anywhere in the K-12 sector, this does not necessarily indicate that competencies are consistently documented across all of the grade levels. Finally, the lack of pedagogical information and assessments that explicitly target competencies limits the ability to evaluate the degree to which jurisdictions have translated their high-level educational goals to classroom practice. Although jurisdictions may currently be developing or piloting pedagogies or assessments, such information was not available for this study.

This study provides evidence that jurisdictions are broadening their educational goals beyond just the academic. Over the past two decades, we have seen significant shifts in education systems in recognizing the importance of competencies. Resetting goals is a first step in implementing new teaching and learning paradigms in classrooms. This study documents that some jurisdictions including British Columbia (Canada), Finland, Hong Kong, Singapore, and Victoria (Australia)—have begun the process of creating a road map for implementation, and some are in the process of developing assessments. In general, however, there is little evidence available that attention is being *focused* on pedagogies and assessments, an important factor in education change. Given the impact of COVID-19, the situation may only stagnate further.