

Teacher Preparation, Professional Development, and Job Satisfaction

Teachers' Formal Education

Exhibits 9.1, 9.2, 9.3, and 9.4 present teachers' reports about their highest level of formal education for fourth grade mathematics and science teachers and eighth grade mathematics and science teachers, respectively. Teachers' highest levels of formal education are reported by four categories: completed postgraduate university degree, completed a bachelor's degree or equivalent, completed post-secondary education but not a bachelor's degree, or completed upper-secondary education.

Internationally, on average, 28 percent of the fourth grade students had mathematics teachers with a postgraduate university degree, 56 percent had teachers with a bachelor's degree, 10 percent had teachers who had completed post-secondary education, and 5 percent had teachers who completed upper-secondary education (Exhibit 9.1). Similarly, on average, 29 percent of fourth grade students had science teachers with a postgraduate university degree, 56 percent had teachers with a bachelor's degree, 10 percent had teachers with some post-secondary education, and 5 percent had teachers who completed upper-secondary education (Exhibit 9.2).

Parallel results are shown for eighth grade students in Exhibit 9.3 (mathematics) and Exhibit 9.4 (science), although in both subjects, more eighth grade students than fourth grade students had teachers with bachelor's degrees and postgraduate university degrees, on average. Internationally, 35 percent of students had mathematics teachers with a postgraduate university degree, and 61 percent had mathematics teachers with a bachelor's degree. Also internationally, 38 percent of students had science teachers with a postgraduate university degree, and 58 percent had science teachers with a bachelor's degree.

In fourth and eighth grades and in both subjects, there was considerable variation across countries in teachers' education levels, reflecting countries' different education paths and requirements for teachers. The *TIMSS 2019 Encyclopedia* provides information about the main teacher preparation routes and current requirements for teachers in each country, based on information provided by National Research Coordinators in the TIMSS 2019 Curriculum Questionnaire.

Exhibit 9.1: Teachers' Formal Education*

Students' Results based on Teachers' Reports

Country	Percent of Students by Teacher Education Level				
	Completed Postgraduate University Degree**	Completed Bachelor's Degree or Equivalent but Not a Postgraduate Degree	Completed Post-Secondary Education but Not a Bachelor's Degree	No Further than Upper-Secondary Education	
Albania	r	59 (5.0)	19 (3.4)	3 (1.5)	19 (3.9)
Armenia		7 (1.9)	9 (1.9)	44 (3.7)	40 (4.0)
Australia		15 (2.4)	82 (2.5)	3 (1.1)	0 (0.0)
Austria		11 (1.8)	51 (3.4)	38 (3.2)	0 (0.0)
Azerbaijan		5 (1.8)	49 (3.5)	34 (3.6)	12 (2.5)
Bahrain		16 (3.3)	84 (3.4)	0 (0.2)	0 (0.0)
Belgium (Flemish)		3 (1.1)	97 (1.2)	0 (0.4)	0 (0.0)
Bosnia and Herzegovina		4 (1.1)	67 (3.3)	29 (3.4)	0 (0.3)
Bulgaria		73 (3.7)	21 (3.1)	6 (2.3)	0 (0.0)
Canada		19 (2.0)	80 (2.0)	0 (0.4)	0 (0.0)
Chile		12 (3.1)	86 (3.3)	2 (1.0)	0 (0.0)
Chinese Taipei		55 (4.0)	45 (3.9)	1 (0.6)	0 (0.0)
Croatia		50 (3.4)	13 (2.5)	37 (2.7)	0 (0.5)
Cyprus		63 (3.6)	35 (3.5)	2 (0.9)	0 (0.0)
Czech Republic		92 (1.9)	2 (1.1)	1 (0.9)	5 (1.4)
Denmark		8 (2.4)	82 (3.1)	2 (1.5)	7 (2.4)
England	s	6 (2.7)	94 (2.7)	0 (0.0)	0 (0.0)
Finland		93 (1.8)	6 (1.6)	1 (0.6)	0 (0.4)
France	r	49 (3.8)	37 (3.6)	10 (2.1)	4 (1.6)
Georgia		79 (3.2)	19 (3.1)	1 (0.6)	1 (0.9)
Germany		90 (2.5)	0 (0.0)	10 (2.5)	0 (0.0)
Hong Kong SAR		25 (4.4)	71 (4.6)	4 (1.8)	0 (0.0)
Hungary		9 (2.3)	90 (2.4)	1 (0.5)	0 (0.0)
Iran, Islamic Rep. of		12 (2.1)	75 (3.4)	11 (2.3)	2 (1.0)
Ireland		31 (3.5)	69 (3.5)	0 (0.4)	0 (0.2)
Italy		31 (3.6)	4 (1.6)	5 (1.8)	59 (3.6)
Japan		5 (1.3)	91 (1.6)	4 (1.4)	0 (0.0)
Kazakhstan		3 (1.4)	89 (2.5)	8 (2.1)	0 (0.2)
Korea, Rep. of		25 (3.3)	73 (3.3)	2 (1.2)	0 (0.0)
Kosovo		8 (2.1)	77 (3.5)	10 (2.5)	6 (1.8)
Kuwait		12 (3.2)	82 (3.2)	3 (1.3)	3 (1.4)
Latvia		51 (4.0)	48 (4.1)	0 (0.5)	1 (0.8)
Lithuania		29 (3.7)	67 (4.0)	4 (1.2)	0 (0.0)
Malta		18 (0.3)	70 (0.4)	6 (0.2)	7 (0.2)
Montenegro		3 (1.0)	75 (2.9)	22 (2.7)	0 (0.0)
Morocco	r	8 (2.0)	44 (4.1)	6 (1.9)	43 (3.9)
Netherlands	r	1 (0.7)	80 (3.6)	17 (3.4)	1 (1.1)
New Zealand		33 (2.9)	59 (3.2)	8 (1.5)	0 (0.0)
North Macedonia		6 (2.9)	76 (3.5)	11 (2.5)	7 (2.2)
Northern Ireland		15 (3.1)	78 (3.8)	2 (1.4)	4 (2.2)
Norway (5)	r	35 (4.3)	65 (4.3)	0 (0.0)	0 (0.0)
Oman		6 (1.1)	87 (2.2)	5 (1.6)	2 (1.0)
Pakistan		29 (7.1)	5 (2.2)	30 (6.4)	36 (7.2)
Philippines		30 (3.7)	57 (4.1)	2 (1.1)	12 (2.8)
Poland		96 (1.1)	4 (1.1)	0 (0.0)	0 (0.0)
Portugal		10 (2.2)	84 (2.7)	5 (1.5)	0 (0.0)
Qatar		19 (3.5)	80 (3.5)	0 (0.3)	0 (0.0)
Russian Federation		44 (3.8)	31 (3.6)	18 (2.7)	6 (1.6)
Saudi Arabia		0 (0.2)	1 (0.4)	93 (1.7)	6 (1.7)
Serbia		15 (2.5)	62 (3.8)	23 (3.4)	1 (0.6)
Singapore		13 (1.8)	76 (2.2)	10 (1.5)	0 (0.3)
Slovak Republic		99 (0.7)	0 (0.0)	1 (0.7)	0 (0.0)
South Africa (5)		2 (1.2)	60 (3.8)	33 (3.0)	5 (1.5)
Spain		25 (2.8)	72 (3.2)	2 (1.2)	0 (0.0)
Sweden	r	13 (3.6)	77 (4.1)	6 (2.1)	4 (1.4)
Turkey (5)		6 (1.6)	94 (1.6)	0 (0.0)	0 (0.0)
United Arab Emirates	r	27 (2.0)	70 (2.1)	3 (0.7)	1 (0.3)
United States		49 (2.3)	51 (2.3)	0 (0.0)	0 (0.0)
International Average		28 (0.4)	56 (0.4)	10 (0.3)	5 (0.2)
Benchmarking Participants					
Ontario, Canada	r	27 (3.8)	72 (3.8)	1 (0.9)	0 (0.0)
Quebec, Canada		9 (2.6)	91 (2.6)	0 (0.0)	0 (0.0)
Moscow City, Russian Fed.		56 (4.8)	39 (4.8)	3 (1.5)	2 (1.0)
Madrid, Spain		31 (3.7)	66 (3.6)	3 (0.9)	0 (0.0)
Abu Dhabi, UAE		26 (2.1)	70 (2.2)	3 (1.1)	1 (0.7)
Dubai, UAE	r	30 (3.9)	68 (3.9)	1 (0.5)	0 (0.3)

* Based on countries' categorizations according to UNESCO's International Standard Classification of Education (Operational Manual for ISCED-2011)

** For example, doctorate, master's, or other postgraduate degree.

() Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

An "r" indicates data are available for at least 70% but less than 85% of the students. An "s" indicates data are available for at least 50% but less than 70% of the students.

Exhibit 9.2: Teachers' Formal Education*

Students' Results based on Teachers' Reports

Country	Percent of Students by Teacher Education Level				
	Completed Postgraduate University Degree**	Completed Bachelor's Degree or Equivalent but Not a Postgraduate Degree	Completed Post-Secondary Education but Not a Bachelor's Degree	No Further than Upper-Secondary Education	
Albania	r	61 (4.9)	19 (3.4)	2 (1.1)	18 (3.9)
Armenia		6 (1.6)	11 (2.4)	48 (3.9)	35 (4.0)
Australia		16 (2.0)	80 (2.3)	3 (1.2)	0 (0.0)
Austria		10 (1.8)	51 (3.5)	39 (3.5)	0 (0.0)
Azerbaijan		4 (1.0)	48 (3.6)	37 (3.6)	11 (2.3)
Bahrain		14 (2.2)	86 (2.2)	0 (0.2)	0 (0.0)
Belgium (Flemish)		3 (1.1)	97 (1.1)	0 (0.0)	0 (0.0)
Bosnia and Herzegovina		4 (1.1)	67 (3.3)	29 (3.4)	0 (0.3)
Bulgaria		70 (3.8)	22 (3.2)	7 (2.4)	0 (0.0)
Canada	r	16 (2.5)	83 (2.5)	0 (0.4)	0 (0.0)
Chile		7 (2.4)	91 (2.6)	1 (0.9)	0 (0.0)
Chinese Taipei		49 (4.0)	51 (4.0)	0 (0.3)	0 (0.0)
Croatia		50 (3.4)	13 (2.5)	37 (2.7)	0 (0.5)
Cyprus		72 (4.3)	27 (4.1)	1 (0.8)	0 (0.0)
Czech Republic		92 (1.8)	3 (1.3)	0 (0.0)	5 (1.4)
Denmark		12 (2.7)	82 (3.1)	1 (0.6)	6 (2.1)
England	s	6 (2.7)	94 (2.7)	0 (0.0)	0 (0.0)
Finland		93 (1.7)	6 (1.7)	1 (0.6)	0 (0.4)
France	r	50 (3.9)	37 (3.6)	9 (2.0)	4 (1.5)
Georgia		81 (3.3)	18 (3.2)	1 (0.6)	0 (0.0)
Germany		93 (1.9)	1 (0.6)	6 (1.8)	0 (0.0)
Hong Kong SAR		25 (4.2)	70 (4.4)	5 (1.9)	0 (0.0)
Hungary		6 (1.4)	93 (1.5)	1 (0.6)	0 (0.5)
Iran, Islamic Rep. of		12 (2.1)	75 (3.4)	11 (2.3)	2 (1.0)
Ireland		31 (3.5)	69 (3.5)	0 (0.4)	0 (0.2)
Italy		31 (3.6)	4 (1.6)	5 (1.8)	59 (3.6)
Japan		4 (1.6)	93 (1.4)	2 (1.2)	0 (0.0)
Kazakhstan		3 (1.5)	89 (2.5)	8 (2.0)	0 (0.2)
Korea, Rep. of		26 (3.5)	73 (3.4)	1 (1.1)	0 (0.0)
Kosovo		8 (2.1)	77 (3.5)	10 (2.5)	6 (1.8)
Kuwait		14 (2.8)	77 (3.5)	6 (2.0)	3 (1.5)
Latvia		52 (3.8)	48 (3.8)	0 (0.0)	0 (0.0)
Lithuania		30 (3.8)	66 (4.0)	4 (1.2)	0 (0.0)
Malta		16 (0.3)	74 (0.3)	5 (0.2)	5 (0.1)
Montenegro		3 (1.0)	75 (2.9)	22 (2.7)	0 (0.0)
Morocco	r	6 (2.1)	37 (4.3)	4 (1.7)	53 (4.5)
Netherlands	r	1 (0.7)	80 (3.6)	17 (3.4)	1 (1.1)
New Zealand		34 (2.9)	58 (3.1)	8 (1.4)	0 (0.0)
North Macedonia		6 (2.9)	76 (3.5)	11 (2.5)	7 (2.2)
Northern Ireland		15 (3.1)	78 (3.8)	2 (1.4)	4 (2.2)
Norway (5)	r	30 (4.0)	69 (4.0)	0 (0.3)	0 (0.0)
Oman		12 (2.0)	81 (2.4)	5 (1.8)	1 (0.6)
Pakistan		35 (6.4)	8 (2.5)	28 (6.1)	29 (5.0)
Philippines		33 (4.1)	51 (4.3)	0 (0.0)	16 (3.0)
Poland		99 (0.7)	1 (0.7)	0 (0.0)	0 (0.0)
Portugal		10 (2.2)	84 (2.7)	5 (1.5)	0 (0.0)
Qatar		27 (3.0)	72 (3.1)	1 (1.0)	0 (0.0)
Russian Federation		44 (3.8)	31 (3.6)	18 (2.7)	6 (1.6)
Saudi Arabia		0 (0.0)	8 (2.5)	89 (2.8)	4 (1.4)
Serbia		15 (2.5)	62 (3.8)	23 (3.4)	1 (0.6)
Singapore		17 (1.9)	74 (2.2)	9 (1.4)	1 (0.4)
Slovak Republic		98 (1.1)	1 (0.8)	1 (0.7)	0 (0.2)
South Africa (5)		1 (0.6)	57 (2.9)	37 (3.2)	6 (1.7)
Spain		26 (3.1)	73 (3.3)	2 (0.8)	0 (0.0)
Sweden	r	17 (4.3)	70 (4.9)	7 (2.2)	6 (2.2)
Turkey (5)		9 (2.0)	91 (2.0)	0 (0.0)	0 (0.0)
United Arab Emirates		33 (1.6)	65 (1.6)	2 (0.5)	1 (0.4)
United States		52 (2.2)	48 (2.2)	0 (0.0)	0 (0.0)
International Average		29 (0.4)	56 (0.4)	10 (0.3)	5 (0.2)
Benchmarking Participants					
Ontario, Canada	r	22 (5.0)	77 (5.0)	1 (1.0)	0 (0.0)
Quebec, Canada		8 (2.4)	92 (2.4)	0 (0.0)	0 (0.0)
Moscow City, Russian Fed.		56 (4.8)	38 (4.8)	3 (1.5)	2 (1.0)
Madrid, Spain		31 (2.9)	66 (2.8)	3 (1.4)	0 (0.0)
Abu Dhabi, UAE		35 (2.5)	61 (2.8)	2 (1.0)	2 (1.0)
Dubai, UAE	r	40 (2.5)	59 (2.5)	0 (0.2)	0 (0.2)

* Based on countries' categorizations according to UNESCO's International Standard Classification of Education (Operational Manual for ISCED-2011)

** For example, doctorate, master's, or other postgraduate degree.

() Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

An "r" indicates data are available for at least 70% but less than 85% of the students. An "s" indicates data are available for at least 50% but less than 70% of the students.

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Exhibit 9.3: Teachers' Formal Education*

Students' Results based on Teachers' Reports

Country	Percent of Students by Teacher Education Level			
	Completed Postgraduate University Degree**	Completed Bachelor's Degree or Equivalent but Not a Postgraduate Degree	Completed Post-Secondary Education but Not a Bachelor's Degree	No Further than Upper-Secondary Education
Australia	22 (3.3)	77 (3.2)	1 (0.8)	0 (0.0)
Bahrain	18 (1.7)	81 (1.8)	1 (0.6)	1 (0.4)
Chile	10 (2.7)	88 (2.8)	1 (1.0)	0 (0.0)
Chinese Taipei	60 (3.3)	40 (3.3)	0 (0.0)	0 (0.0)
Cyprus	62 (4.0)	38 (4.0)	0 (0.0)	0 (0.0)
Egypt	6 (2.3)	76 (4.3)	15 (3.3)	3 (1.4)
England	29 (5.2)	71 (5.2)	0 (0.0)	0 (0.0)
Finland	95 (1.1)	3 (0.8)	0 (0.1)	1 (0.7)
France	66 (4.1)	33 (4.0)	1 (1.0)	0 (0.0)
Georgia	87 (3.3)	10 (2.9)	0 (0.0)	3 (1.8)
Hong Kong SAR	45 (3.9)	55 (3.9)	0 (0.2)	0 (0.0)
Hungary	29 (3.4)	71 (3.5)	0 (0.4)	0 (0.0)
Iran, Islamic Rep. of	26 (3.1)	68 (3.5)	7 (1.8)	0 (0.0)
Ireland	44 (3.1)	55 (3.0)	0 (0.1)	0 (0.4)
Israel	50 (3.6)	46 (3.6)	3 (1.0)	1 (0.5)
Italy	100 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Japan	12 (2.4)	87 (2.4)	1 (0.4)	0 (0.0)
Jordan	6 (2.0)	76 (3.2)	13 (2.0)	5 (1.8)
Kazakhstan	16 (2.7)	81 (2.9)	2 (1.1)	1 (0.6)
Korea, Rep. of	35 (3.6)	65 (3.6)	0 (0.0)	0 (0.0)
Kuwait	12 (3.2)	88 (3.3)	0 (0.0)	1 (0.5)
Lebanon	37 (4.1)	51 (3.6)	7 (2.2)	4 (1.8)
Lithuania	51 (4.3)	47 (4.2)	1 (0.6)	0 (0.0)
Malaysia	7 (1.8)	89 (2.5)	3 (1.2)	1 (0.9)
Morocco	11 (2.8)	43 (4.1)	12 (2.8)	34 (3.7)
New Zealand	53 (3.3)	44 (3.1)	3 (1.1)	0 (0.0)
Norway (9)	41 (4.1)	57 (4.1)	2 (1.3)	0 (0.0)
Oman	9 (1.9)	89 (2.2)	1 (0.6)	1 (1.1)
Portugal	18 (2.8)	80 (3.0)	2 (1.4)	0 (0.0)
Qatar	26 (3.6)	73 (3.5)	1 (0.5)	0 (0.0)
Romania	30 (3.6)	59 (3.9)	10 (2.3)	0 (0.0)
Russian Federation	74 (3.7)	24 (3.8)	1 (0.7)	0 (0.0)
Saudi Arabia	1 (0.8)	99 (0.8)	0 (0.0)	0 (0.0)
Singapore	18 (2.2)	82 (2.3)	0 (0.4)	0 (0.0)
South Africa (9)	2 (0.8)	77 (2.4)	20 (2.2)	0 (0.3)
Sweden	40 (3.5)	52 (3.4)	4 (1.6)	5 (1.6)
Turkey	7 (1.8)	93 (1.8)	0 (0.0)	0 (0.0)
United Arab Emirates	33 (2.0)	65 (2.0)	1 (0.3)	1 (0.3)
United States	57 (3.2)	43 (3.2)	0 (0.0)	0 (0.0)
International Average	35 (0.5)	61 (0.5)	3 (0.2)	2 (0.1)
Benchmarking Participants				
Ontario, Canada	19 (3.6)	81 (3.6)	0 (0.0)	0 (0.0)
Quebec, Canada	12 (2.9)	88 (2.9)	0 (0.0)	0 (0.0)
Moscow City, Russian Fed.	88 (2.6)	11 (2.6)	0 (0.0)	1 (0.5)
Gauteng, RSA (9)	2 (1.3)	75 (3.8)	22 (3.6)	1 (0.8)
Western Cape, RSA (9)	2 (1.0)	80 (3.3)	17 (3.1)	1 (0.8)
Abu Dhabi, UAE	33 (2.3)	64 (2.2)	2 (0.9)	1 (0.7)
Dubai, UAE	41 (3.4)	59 (3.5)	0 (0.0)	0 (0.0)

* Based on countries' categorizations according to UNESCO's International Standard Classification of Education (Operational Manual for ISCED-2011)

** For example, doctorate, master's, or other postgraduate degree.

() Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

An "r" indicates data are available for at least 70% but less than 85% of the students. An "s" indicates data are available for at least 50% but less than 70% of the students.

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Exhibit 9.4: Teachers' Formal Education*

Students' Results based on Teachers' Reports

Country	Percent of Students by Teacher Education Level			
	Completed Postgraduate University Degree**	Completed Bachelor's Degree or Equivalent but Not a Postgraduate Degree	Completed Post-Secondary Education but Not a Bachelor's Degree	No Further than Upper-Secondary Education
Australia	24 (2.6)	76 (2.6)	0 (0.2)	0 (0.0)
Bahrain	19 (3.0)	79 (3.1)	1 (0.7)	0 (0.0)
Chile	12 (2.5)	86 (2.7)	1 (1.0)	0 (0.1)
Chinese Taipei	67 (3.3)	33 (3.3)	0 (0.0)	0 (0.0)
Cyprus s	59 (1.8)	41 (1.8)	0 (0.0)	0 (0.0)
Egypt	3 (1.5)	87 (3.1)	9 (2.6)	1 (0.8)
England s	34 (5.1)	66 (5.1)	0 (0.0)	0 (0.0)
Finland	97 (0.7)	3 (0.7)	0 (0.1)	1 (0.4)
France r	85 (2.3)	14 (2.3)	0 (0.0)	0 (0.4)
Georgia	90 (1.4)	9 (1.3)	0 (0.2)	1 (0.5)
Hong Kong SAR	48 (4.4)	50 (4.3)	2 (1.3)	0 (0.0)
Hungary	44 (2.6)	55 (2.6)	0 (0.2)	1 (0.3)
Iran, Islamic Rep. of	29 (3.3)	67 (3.4)	3 (1.5)	1 (0.7)
Ireland	35 (3.5)	61 (3.6)	1 (1.2)	2 (0.8)
Israel	53 (3.7)	43 (3.9)	2 (0.9)	2 (1.1)
Italy	100 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Japan	15 (2.9)	85 (2.9)	0 (0.0)	0 (0.0)
Jordan	13 (2.4)	78 (3.2)	0 (0.3)	9 (2.1)
Kazakhstan	15 (1.9)	84 (1.9)	1 (0.3)	1 (0.3)
Korea, Rep. of	40 (3.4)	60 (3.4)	0 (0.0)	0 (0.0)
Kuwait	14 (3.5)	86 (3.5)	0 (0.0)	0 (0.0)
Lebanon	49 (2.7)	44 (2.8)	3 (1.3)	3 (0.8)
Lithuania	54 (2.4)	44 (2.3)	1 (0.5)	0 (0.2)
Malaysia	5 (1.6)	92 (1.9)	1 (0.7)	1 (0.6)
Morocco s	15 (1.9)	55 (2.8)	15 (2.1)	16 (2.0)
New Zealand	69 (3.2)	30 (3.3)	1 (1.1)	0 (0.0)
Norway (9) r	51 (4.5)	48 (4.6)	2 (1.3)	0 (0.0)
Oman	11 (1.8)	87 (2.1)	2 (1.1)	0 (0.0)
Portugal	24 (2.6)	74 (2.4)	2 (0.8)	0 (0.0)
Qatar	37 (3.6)	62 (3.6)	1 (0.4)	0 (0.0)
Romania	33 (2.4)	55 (2.4)	11 (1.8)	1 (0.6)
Russian Federation	76 (2.0)	21 (1.8)	1 (0.6)	2 (0.4)
Saudi Arabia r	5 (1.8)	93 (2.0)	1 (0.8)	0 (0.2)
Singapore	22 (2.4)	77 (2.4)	1 (0.6)	0 (0.0)
South Africa (9)	2 (0.7)	80 (2.3)	16 (2.4)	2 (1.3)
Sweden	43 (3.8)	49 (3.8)	1 (0.8)	6 (1.5)
Turkey	9 (2.4)	90 (2.4)	1 (0.0)	0 (0.0)
United Arab Emirates	39 (1.4)	60 (1.4)	0 (0.2)	1 (0.2)
United States	61 (2.7)	39 (2.7)	0 (0.0)	0 (0.0)
International Average	38 (0.4)	58 (0.5)	2 (0.2)	1 (0.1)
Benchmarking Participants				
Ontario, Canada s	22 (4.1)	78 (4.1)	0 (0.0)	0 (0.0)
Moscow City, Russian Fed.	86 (1.4)	13 (1.3)	0 (0.2)	0 (0.3)
Gauteng, RSA (9)	1 (0.9)	86 (3.5)	13 (3.1)	1 (0.6)
Western Cape, RSA (9)	5 (1.7)	86 (2.8)	10 (2.4)	0 (0.0)
Abu Dhabi, UAE	36 (2.1)	64 (2.1)	0 (0.5)	0 (0.3)
Dubai, UAE	53 (3.1)	46 (3.2)	0 (0.0)	1 (0.6)
Quebec, Canada y	- -	- -	- -	- -

* Based on countries' categorizations according to UNESCO's International Standard Classification of Education (Operational Manual for ISCED-2011)

** For example, doctorate, master's, or other postgraduate degree.

() Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

A dash (-) indicates comparable data not available.

An "r" indicates data are available for at least 70% but less than 85% of the students. An "s" indicates data are available for at least 50% but less than 70% of the students.

An "x" indicates data are available for at least 40% but less than 50% of the students—interpret with caution. A "y" indicates data are available for less than 40% of the students.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from <http://timss2019.org/download>

Teachers' Major

Exhibits 9.5 and 9.6 present fourth grade teachers' reports about their majors or specializations in primary education and/or mathematics and in primary education and/or science, respectively. Exhibits 9.7 and 9.8 present eighth grade teachers' reports about their majors or specializations in mathematics and/or mathematics education and in science and/or science education, respectively. For each category of teachers' major or specialization, average student achievement is also shown.

As shown in Exhibit 9.5, on average across countries, three-quarters of fourth grade students were taught by teachers with a major in primary education and a major or specialization in mathematics (32%) or by teachers with a major in primary education but no major or specialization in mathematics (43%), and just 11 percent were taught by teachers with a major in mathematics but not primary education. Another 8 percent were taught by teachers who had some other major, and 6 percent by teachers with no formal education beyond upper-secondary. The distribution of students by teachers' major was similar for science (shown in Exhibit 9.6), with 28 percent of fourth grade students taught by science teachers with a major in primary education and science, 44 percent by teachers with a major in primary education but not in science, 13 percent by teachers with a major in science but not primary education, and 9 and 5 percent by teachers with other majors or no education beyond upper-secondary, respectively. In both mathematics and science, there was considerable variation in the distribution of students by teachers' majors across countries, however, reflecting countries' different education pathways and requirements for primary school teachers.

On average across countries, mathematics achievement was highest for fourth grade students whose teachers had a major in primary education but no major in mathematics (503), followed by students with teachers with a major in both primary education and mathematics (497), and then by students with teachers who majored in mathematics but not primary education (487) and teachers who had other majors (490). Students whose teachers did not go beyond upper-secondary education had the lowest average mathematics achievement (457). Likewise, for science, students who had teachers with a major in primary education but no major in science and students who had teachers with a major in primary education and science had the highest average achievement (491 and 489, respectively), followed by students whose teachers majored in science but not primary education (480), and then by students who had teachers with other majors (478). Students whose teachers had no formal education beyond upper-secondary had the lowest average science achievement (442). However, within most countries, there was no clear relationship between teachers' major and average achievement in mathematics and science.

As shown in Exhibit 9.7, about three-quarters (78%) of eighth grade students were taught mathematics by teachers who had a major in mathematics and mathematics education (39%) or who majored in mathematics but not in mathematics education (39%). A further 11 percent were taught by teachers who majored in mathematics education only, and 10 percent by teachers with other majors. A slightly higher percentage (83%) of eighth grade students were taught science by teachers who majored in science and science education (33%) or in science but not in science education (50%), as shown

in Exhibit 9.8. A further 9 percent were taught by teachers who majored in science education but not science and 6 percent by teachers with other majors. Internationally, just 1 percent of eighth grade students were taught mathematics or science by teachers who had not completed formal education beyond upper-secondary.

In mathematics, eighth grade students with teachers who majored in mathematics and mathematics education or in mathematics education but not mathematics had higher average achievement than students with teachers who majored in mathematics and not mathematics education (averages scores of 492 and 494 compared with 488, respectively). That was not the case in all countries, however, and in many countries, there was no clear relationship between teachers' major and average mathematics achievement. In science, eighth grade students whose teachers majored in science and science education or in science but not science education had higher average scores than students whose teachers majored in science education but not science (494 and 491 compared with 482, respectively). However, within most countries, there was no clear relationship between teachers' major and average achievement science.

Exhibit 9.5: Teachers Majored in Education and Mathematics

Students' Results based on Teachers' Reports

Country	Major in Primary Education and Major (or Specialization) in Mathematics		Major in Primary Education but No Major (or Specialization) in Mathematics		Major in Mathematics but No Major in Primary Education		All Other Majors		No Formal Education Beyond Upper-Secondary*		
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	
Albania	r	15 (3.3)	512 (9.7)	65 (4.8)	491 (5.1)	1 (0.1)	~ ~	1 (1.1)	~ ~	17 (3.7)	498 (7.8)
Armenia		40 (4.0)	498 (4.5)	7 (2.2)	500 (6.7)	11 (2.7)	504 (6.2)	1 (0.7)	~ ~	42 (4.2)	495 (4.1)
Australia		16 (2.6)	522 (10.2)	80 (2.9)	518 (2.9)	0 (0.1)	~ ~	4 (1.2)	477 (13.1)	0 (0.0)	~ ~
Austria		~ ~	~ ~	~ ~	~ ~	~ ~	~ ~	~ ~	~ ~	~ ~	~ ~
Azerbaijan	r	54 (4.1)	515 (4.0)	21 (3.4)	510 (6.3)	5 (1.7)	511 (19.1)	6 (2.0)	505 (14.1)	14 (2.9)	524 (6.9)
Bahrain		44 (3.3)	477 (4.0)	5 (1.2)	503 (15.0)	45 (3.2)	479 (3.8)	5 (1.6)	491 (7.7)	0 (0.0)	~ ~
Belgium (Flemish)		~ ~	~ ~	~ ~	~ ~	~ ~	~ ~	~ ~	~ ~	~ ~	~ ~
Bosnia and Herzegovina		41 (3.4)	454 (4.1)	54 (3.4)	452 (4.0)	1 (0.8)	~ ~	2 (1.0)	~ ~	0 (0.3)	~ ~
Bulgaria	r	8 (2.2)	521 (16.1)	87 (3.5)	513 (4.3)	0 (0.3)	~ ~	5 (2.8)	476 (64.3)	0 (0.0)	~ ~
Canada	r	11 (1.4)	509 (5.5)	74 (1.9)	515 (2.4)	2 (0.9)	~ ~	13 (1.4)	504 (4.3)	0 (0.0)	~ ~
Chile		63 (3.7)	449 (3.2)	35 (3.6)	425 (5.6)	1 (0.9)	~ ~	1 (0.5)	~ ~	0 (0.0)	~ ~
Chinese Taipei		33 (3.6)	597 (3.5)	46 (4.0)	597 (2.7)	3 (1.4)	614 (4.5)	18 (3.0)	602 (4.6)	0 (0.0)	~ ~
Croatia		13 (2.6)	508 (6.8)	84 (2.7)	509 (2.4)	0 (0.0)	~ ~	2 (0.9)	~ ~	0 (0.5)	~ ~
Cyprus		24 (3.1)	543 (5.1)	73 (3.2)	530 (3.4)	1 (0.7)	~ ~	2 (1.1)	~ ~	0 (0.0)	~ ~
Czech Republic		2 (0.9)	~ ~	81 (2.3)	535 (2.9)	1 (0.5)	~ ~	11 (1.9)	528 (7.3)	5 (1.5)	523 (11.3)
Denmark	r	31 (4.4)	518 (3.9)	8 (2.4)	552 (7.6)	42 (4.5)	525 (3.3)	11 (2.5)	517 (6.4)	8 (2.5)	520 (7.6)
England	s	20 (4.6)	563 (9.9)	56 (5.1)	553 (6.6)	3 (2.1)	578 (14.5)	20 (4.2)	558 (11.8)	0 (0.0)	~ ~
Finland		9 (2.0)	541 (8.4)	84 (2.5)	532 (2.5)	0 (0.1)	~ ~	7 (1.7)	530 (7.4)	0 (0.4)	~ ~
France	r	12 (2.3)	470 (7.4)	31 (4.0)	492 (5.0)	21 (3.7)	484 (7.1)	31 (3.7)	484 (6.9)	5 (1.9)	491 (14.4)
Georgia	r	81 (3.6)	477 (4.6)	4 (2.0)	482 (9.2)	12 (3.1)	494 (12.3)	2 (0.9)	~ ~	1 (1.2)	~ ~
Germany	r	67 (3.3)	520 (3.3)	22 (3.1)	523 (6.7)	3 (1.5)	522 (12.0)	8 (2.1)	517 (10.0)	0 (0.0)	~ ~
Hong Kong SAR		53 (4.8)	602 (4.6)	20 (3.8)	605 (7.7)	20 (4.2)	596 (10.9)	8 (2.6)	621 (16.8)	0 (0.0)	~ ~
Hungary	r	4 (1.4)	528 (16.7)	95 (1.6)	522 (3.6)	0 (0.0)	~ ~	1 (0.7)	~ ~	0 (0.0)	~ ~
Iran, Islamic Rep. of		13 (2.7)	440 (9.0)	43 (3.3)	445 (7.0)	8 (2.2)	461 (14.1)	34 (3.8)	438 (7.7)	2 (1.1)	~ ~
Ireland		12 (2.5)	550 (5.0)	84 (2.8)	549 (3.0)	2 (1.0)	~ ~	3 (1.1)	535 (13.7)	0 (0.2)	~ ~
Italy		3 (1.2)	509 (12.5)	9 (2.9)	531 (6.7)	6 (1.9)	506 (7.8)	21 (3.2)	515 (4.6)	60 (3.6)	513 (2.8)
Japan		21 (3.3)	598 (3.8)	62 (3.8)	591 (2.3)	2 (0.8)	~ ~	15 (2.6)	591 (4.1)	0 (0.0)	~ ~
Kazakhstan		55 (3.9)	515 (3.3)	44 (3.8)	509 (4.4)	0 (0.0)	~ ~	1 (0.8)	~ ~	0 (0.2)	~ ~
Korea, Rep. of		19 (3.4)	600 (6.7)	78 (3.4)	599 (2.4)	0 (0.0)	~ ~	2 (1.0)	~ ~	0 (0.0)	~ ~
Kuwait		45 (4.7)	382 (7.0)	4 (1.5)	437 (25.9)	44 (4.7)	379 (9.6)	4 (1.7)	413 (24.0)	3 (1.4)	350 (27.7)
Latvia		42 (3.9)	550 (3.4)	53 (3.6)	546 (3.7)	3 (1.5)	511 (33.5)	1 (0.6)	~ ~	1 (0.9)	~ ~
Lithuania		15 (2.8)	529 (6.8)	80 (3.2)	543 (2.9)	1 (0.9)	~ ~	3 (1.3)	504 (22.0)	0 (0.0)	~ ~
Malta		24 (0.4)	503 (2.6)	48 (0.5)	511 (2.0)	4 (0.1)	505 (6.8)	18 (0.3)	514 (2.3)	7 (0.2)	506 (4.0)
Montenegro		46 (2.6)	449 (3.2)	53 (2.5)	453 (2.9)	2 (0.7)	~ ~	0 (0.2)	~ ~	0 (0.0)	~ ~
Morocco	s	3 (1.5)	317 (13.3)	6 (1.8)	359 (33.8)	14 (2.2)	434 (26.9)	29 (4.2)	377 (9.7)	48 (4.2)	377 (8.6)
New Zealand		13 (1.9)	500 (10.1)	79 (2.7)	483 (3.1)	1 (0.5)	~ ~	8 (1.8)	481 (13.7)	0 (0.0)	~ ~
North Macedonia	s	11 (3.7)	442 (29.4)	58 (5.6)	471 (7.6)	6 (2.6)	466 (20.7)	16 (4.3)	495 (14.6)	10 (3.0)	457 (15.0)
Northern Ireland	r	15 (3.1)	557 (8.2)	66 (4.7)	570 (4.6)	1 (1.2)	~ ~	13 (3.1)	553 (9.5)	5 (2.4)	552 (17.6)
Norway (5)	r	63 (4.2)	545 (2.7)	30 (3.8)	547 (5.4)	6 (2.1)	530 (12.2)	1 (0.5)	~ ~	0 (0.0)	~ ~
Oman		55 (3.2)	436 (5.6)	13 (2.2)	422 (11.7)	17 (2.4)	436 (9.7)	13 (2.6)	407 (12.9)	2 (1.1)	~ ~
Pakistan		23 (4.1)	318 (14.7)	7 (2.2)	304 (38.5)	22 (8.2)	344 (38.7)	12 (3.8)	299 (20.1)	35 (7.7)	344 (20.0)
Philippines		18 (3.5)	289 (10.8)	41 (4.0)	285 (9.5)	14 (2.5)	324 (11.9)	15 (2.9)	318 (20.2)	13 (3.0)	286 (15.2)
Poland		11 (2.4)	515 (6.3)	0 (0.0)	~ ~	89 (2.4)	521 (2.9)	0 (0.0)	~ ~	0 (0.0)	~ ~
Portugal		42 (3.3)	525 (4.2)	56 (3.4)	526 (3.5)	0 (0.3)	~ ~	1 (0.6)	~ ~	0 (0.0)	~ ~
Qatar		33 (4.0)	458 (5.7)	13 (2.4)	502 (10.7)	39 (4.1)	421 (6.1)	16 (3.0)	459 (10.4)	0 (0.0)	~ ~
Russian Federation		41 (3.2)	566 (4.8)	49 (3.3)	569 (4.7)	1 (0.6)	~ ~	2 (1.1)	~ ~	6 (1.6)	568 (12.2)
Saudi Arabia		31 (3.6)	391 (8.3)	2 (1.2)	~ ~	53 (3.5)	400 (5.4)	7 (1.8)	405 (15.7)	6 (1.6)	392 (17.8)
Serbia		43 (3.8)	506 (4.5)	55 (3.8)	511 (4.7)	0 (0.1)	~ ~	1 (0.5)	~ ~	1 (0.6)	~ ~
Singapore		66 (2.6)	624 (4.9)	11 (1.7)	643 (8.4)	14 (2.0)	618 (9.9)	9 (1.6)	629 (10.4)	0 (0.3)	~ ~
Slovak Republic		25 (3.0)	503 (7.8)	71 (3.3)	512 (4.1)	3 (1.2)	504 (21.7)	1 (0.8)	~ ~	0 (0.0)	~ ~
South Africa (5)		48 (4.3)	375 (6.3)	13 (2.4)	397 (15.2)	19 (2.9)	353 (7.9)	15 (3.1)	381 (11.8)	5 (1.5)	340 (11.7)
Spain		30 (3.4)	504 (6.1)	53 (3.6)	500 (3.8)	4 (1.3)	538 (9.4)	13 (2.7)	505 (5.3)	0 (0.0)	~ ~
Sweden		77 (3.8)	524 (3.6)	11 (3.0)	522 (5.9)	5 (1.7)	529 (8.7)	3 (1.8)	502 (13.9)	3 (1.3)	495 (10.3)
Turkey (5)		62 (3.7)	522 (5.8)	1 (0.7)	~ ~	35 (3.6)	532 (7.6)	1 (1.1)	~ ~	0 (0.0)	~ ~
United Arab Emirates	r	39 (2.2)	479 (4.5)	16 (0.8)	473 (6.0)	37 (2.0)	482 (3.8)	8 (0.8)	492 (8.7)	1 (0.3)	~ ~
United States		10 (1.5)	538 (6.9)	71 (2.5)	537 (3.0)	2 (0.8)	~ ~	17 (1.9)	525 (7.2)	0 (0.0)	~ ~
Kosovo	x	43 (6.7)	443 (7.0)	43 (7.1)	439 (9.0)	0 (0.0)	~ ~	0 (0.0)	~ ~	14 (4.1)	444 (13.1)
Netherlands	y	~ ~	~ ~	~ ~	~ ~	~ ~	~ ~	~ ~	~ ~	~ ~	~ ~
International Average		32 (0.4)	497 (1.1)	43 (0.4)	503 (1.4)	11 (0.3)	487 (2.6)	8 (0.3)	490 (2.7)	6 (0.3)	457 (3.1)
Benchmarking Participants											
Ontario, Canada	r	12 (2.7)	514 (8.9)	70 (3.3)	515 (4.8)	3 (1.8)	496 (7.7)	15 (2.6)	504 (6.0)	0 (0.0)	~ ~
Quebec, Canada		9 (1.9)	522 (6.8)	82 (2.7)	534 (2.6)	1 (0.8)	~ ~	8 (2.1)	535 (5.1)	0 (0.0)	~ ~
Moscow City, Russian Fed.		54 (4.3)	591 (3.0)	44 (4.3)	597 (3.4)	0 (0.0)	~ ~	0 (0.0)	~ ~	2 (1.0)	~ ~
Madrid, Spain		30 (3.4)	520 (3.5)	59 (3.8)	516 (3.2)	3 (1.4)	521 (10.1)	8 (2.0)	517 (8.5)	0 (0.0)	~ ~
Abu Dhabi, UAE	r	42 (2.6)	435 (5.3)	26 (2.2)	429 (6.5)	23 (2.5)	454 (8.3)	8 (1.5)	469 (15.5)	1 (0.7)	~ ~
Dubai, UAE	r	38 (3.5)	552 (4.0)	20 (2.2)	555 (5.3)	33 (3.4)	530 (4.8)	9 (1.4)	548 (9.6)	0 (0.3)	~ ~

* Countries have been increasing their certification requirements and providing professional development to teachers certified under earlier guidelines.

() Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

A dash (-) indicates comparable data not available. A tilde (~) indicates insufficient data to report achievement.

An "r" indicates data are available for at least 70% but less than 85% of the students. An "s" indicates data are available for at least 50% but less than 70% of the students.

An "x" indicates data are available for at least 40% but less than 50% of the students—interpret with caution. A "y" indicates data are available for less than 40% of the students.

Exhibit 9.6: Teachers Majored in Education and Science

Students' Results based on Teachers' Reports

Country	Major in Primary Education and Major (or Specialization) in Science		Major in Primary Education but No Major (or Specialization) in Science		Major in Science but No Major in Primary Education		All Other Majors		No Formal Education Beyond Upper-Secondary*		
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	
Albania	r	16 (3.2)	504 (11.0)	61 (4.6)	488 (5.4)	4 (1.1)	514 (14.6)	2 (1.2)	~ ~	17 (3.7)	491 (8.4)
Armenia		20 (2.7)	467 (6.2)	25 (3.4)	464 (5.6)	13 (2.9)	482 (7.2)	4 (1.5)	455 (13.6)	38 (4.2)	461 (5.4)
Australia		22 (3.5)	535 (6.6)	73 (3.5)	534 (3.0)	2 (1.0)	~ ~	3 (1.4)	506 (17.5)	0 (0.0)	~ ~
Austria		~ ~	~ ~	~ ~	~ ~	~ ~	~ ~	~ ~	~ ~	~ ~	~ ~
Azerbaijan	r	41 (4.2)	431 (5.1)	33 (3.6)	421 (6.6)	3 (1.2)	420 (25.7)	10 (2.6)	412 (14.6)	13 (2.7)	436 (9.4)
Bahrain		39 (4.4)	499 (8.7)	3 (1.3)	546 (18.0)	54 (4.3)	484 (4.5)	3 (1.5)	497 (16.9)	0 (0.0)	~ ~
Belgium (Flemish)		~ ~	~ ~	~ ~	~ ~	~ ~	~ ~	~ ~	~ ~	~ ~	~ ~
Bosnia and Herzegovina	r	39 (3.5)	459 (3.8)	57 (3.5)	460 (4.4)	1 (0.7)	~ ~	3 (1.1)	450 (13.2)	0 (0.3)	~ ~
Bulgaria	r	7 (2.3)	527 (19.8)	83 (3.5)	519 (5.4)	7 (3.1)	467 (44.2)	3 (1.4)	562 (14.3)	0 (0.0)	~ ~
Canada	r	13 (1.8)	530 (5.7)	69 (2.6)	525 (2.4)	6 (2.1)	526 (9.6)	12 (1.5)	520 (3.7)	0 (0.0)	~ ~
Chile		43 (4.3)	474 (4.5)	52 (4.4)	461 (4.2)	3 (1.7)	490 (24.8)	2 (1.0)	~ ~	0 (0.0)	~ ~
Chinese Taipei		31 (3.5)	561 (2.9)	36 (4.1)	554 (3.8)	16 (2.8)	559 (4.9)	17 (3.2)	561 (4.1)	0 (0.0)	~ ~
Croatia		22 (2.8)	525 (3.8)	76 (2.8)	523 (2.5)	1 (0.6)	~ ~	1 (0.7)	~ ~	0 (0.5)	~ ~
Cyprus		33 (4.3)	515 (4.8)	62 (4.3)	509 (3.4)	1 (0.6)	~ ~	4 (2.3)	536 (19.2)	0 (0.0)	~ ~
Czech Republic		3 (1.0)	535 (7.0)	69 (3.5)	536 (3.0)	12 (2.6)	528 (8.6)	11 (2.1)	532 (5.3)	5 (1.5)	529 (10.0)
Denmark	r	23 (3.4)	522 (5.6)	19 (3.8)	519 (6.1)	29 (4.4)	526 (4.7)	23 (3.7)	520 (5.3)	6 (2.3)	512 (8.5)
England	s	19 (4.0)	522 (4.7)	56 (5.4)	542 (5.8)	8 (2.7)	582 (15.6)	17 (3.8)	524 (7.2)	0 (0.0)	~ ~
Finland		8 (1.8)	544 (8.9)	83 (2.2)	556 (2.7)	1 (0.4)	~ ~	8 (1.8)	555 (6.8)	0 (0.4)	~ ~
France	r	14 (2.9)	475 (7.2)	25 (4.0)	497 (5.4)	32 (4.1)	489 (5.6)	25 (3.5)	488 (7.9)	4 (1.7)	500 (12.2)
Georgia	s	84 (3.8)	446 (5.1)	6 (2.7)	453 (12.8)	7 (2.4)	466 (9.3)	2 (1.3)	~ ~	0 (0.0)	~ ~
Germany		55 (3.9)	521 (3.2)	31 (3.6)	512 (5.7)	8 (2.2)	530 (8.0)	6 (1.9)	522 (9.5)	0 (0.0)	~ ~
Hong Kong SAR		27 (4.1)	526 (5.7)	52 (4.6)	532 (4.6)	4 (1.7)	531 (22.4)	17 (3.6)	541 (13.1)	0 (0.0)	~ ~
Hungary	r	8 (2.4)	514 (10.2)	90 (2.5)	531 (3.2)	0 (0.4)	~ ~	1 (0.6)	~ ~	1 (0.6)	~ ~
Iran, Islamic Rep. of		12 (2.8)	429 (15.3)	43 (3.7)	448 (5.6)	6 (1.8)	451 (18.1)	38 (3.5)	438 (7.6)	2 (1.1)	~ ~
Ireland		9 (2.0)	532 (8.4)	87 (2.5)	528 (3.7)	1 (0.5)	~ ~	3 (1.4)	511 (11.9)	0 (0.2)	~ ~
Italy		2 (0.9)	~ ~	11 (3.0)	518 (9.3)	5 (1.7)	505 (11.0)	22 (3.4)	508 (4.7)	61 (3.6)	508 (3.2)
Japan		23 (3.3)	562 (3.0)	61 (4.3)	561 (2.5)	3 (1.2)	553 (10.9)	13 (2.7)	567 (4.3)	0 (0.0)	~ ~
Kazakhstan		42 (4.2)	496 (6.9)	56 (4.2)	494 (4.8)	0 (0.2)	~ ~	2 (1.1)	~ ~	0 (0.2)	~ ~
Korea, Rep. of		16 (3.2)	589 (5.9)	80 (3.3)	588 (2.3)	2 (0.8)	~ ~	2 (0.9)	~ ~	0 (0.0)	~ ~
Kuwait		39 (4.6)	387 (10.4)	5 (1.7)	389 (22.0)	46 (4.8)	396 (8.8)	7 (2.4)	367 (30.5)	3 (1.4)	424 (46.5)
Latvia		40 (3.7)	542 (4.6)	51 (3.9)	543 (3.0)	8 (1.9)	550 (9.3)	2 (1.2)	~ ~	0 (0.0)	~ ~
Lithuania		17 (2.9)	531 (6.0)	79 (3.2)	540 (2.9)	1 (0.9)	~ ~	2 (1.1)	~ ~	0 (0.0)	~ ~
Malta		23 (0.4)	491 (2.7)	46 (0.4)	493 (2.0)	7 (0.2)	514 (4.8)	19 (0.3)	505 (2.3)	5 (0.1)	498 (5.6)
Montenegro		42 (2.4)	449 (4.0)	56 (2.3)	453 (3.5)	1 (0.7)	~ ~	1 (0.1)	~ ~	0 (0.0)	~ ~
Morocco	r	3 (1.4)	342 (16.7)	9 (2.6)	344 (19.1)	16 (2.6)	377 (13.8)	23 (4.1)	387 (18.7)	49 (4.3)	377 (8.8)
New Zealand		12 (2.0)	507 (9.0)	80 (2.9)	499 (3.2)	2 (0.9)	~ ~	7 (1.8)	497 (14.3)	0 (0.0)	~ ~
North Macedonia	s	12 (4.1)	391 (33.5)	54 (6.3)	433 (9.1)	5 (2.3)	377 (12.1)	17 (4.8)	462 (16.4)	11 (3.5)	408 (13.9)
Northern Ireland	r	13 (3.0)	516 (5.8)	67 (4.1)	522 (3.3)	2 (1.2)	~ ~	13 (3.1)	511 (7.6)	5 (2.4)	498 (12.7)
Norway (5)	r	44 (4.7)	548 (3.0)	46 (5.3)	535 (3.5)	5 (2.3)	535 (12.1)	5 (1.7)	519 (15.3)	0 (0.0)	~ ~
Oman		48 (3.5)	439 (6.8)	13 (2.5)	446 (9.0)	33 (3.4)	427 (6.6)	5 (1.7)	414 (22.1)	1 (0.7)	~ ~
Pakistan		31 (7.2)	326 (20.3)	7 (2.1)	235 (28.7)	27 (7.4)	300 (34.9)	7 (2.8)	289 (33.8)	29 (5.5)	268 (14.2)
Philippines	r	14 (3.2)	237 (24.4)	47 (4.3)	234 (8.8)	10 (2.7)	253 (20.6)	12 (2.8)	273 (27.1)	17 (3.2)	251 (15.0)
Poland		28 (3.9)	530 (4.8)	0 (0.0)	~ ~	72 (3.9)	532 (2.8)	0 (0.0)	~ ~	0 (0.0)	~ ~
Portugal		38 (3.1)	506 (4.0)	61 (3.2)	503 (3.2)	0 (0.3)	~ ~	1 (0.6)	~ ~	0 (0.0)	~ ~
Qatar		30 (4.1)	445 (7.0)	14 (2.7)	505 (11.3)	50 (4.2)	435 (6.9)	5 (1.7)	465 (20.2)	0 (0.0)	~ ~
Russian Federation		40 (3.2)	565 (4.4)	50 (3.2)	569 (4.2)	2 (1.1)	~ ~	2 (1.0)	~ ~	6 (1.6)	565 (10.9)
Saudi Arabia		30 (3.5)	383 (11.0)	1 (0.9)	~ ~	57 (4.0)	411 (5.9)	8 (2.1)	370 (16.2)	4 (1.3)	410 (18.8)
Serbia		40 (3.8)	515 (5.2)	58 (3.7)	521 (4.8)	1 (0.5)	~ ~	0 (0.2)	~ ~	1 (0.6)	~ ~
Singapore		57 (2.7)	591 (4.6)	10 (1.5)	598 (9.9)	25 (2.5)	603 (5.2)	8 (1.3)	588 (8.7)	1 (0.5)	~ ~
Slovak Republic		23 (2.9)	508 (10.2)	63 (3.4)	525 (4.7)	8 (2.2)	511 (11.9)	6 (1.9)	531 (10.1)	0 (0.2)	~ ~
South Africa (5)		34 (4.3)	316 (10.3)	22 (3.0)	344 (19.2)	19 (2.7)	321 (14.3)	19 (2.8)	311 (9.4)	6 (1.8)	288 (18.3)
Spain		28 (3.2)	508 (4.6)	55 (3.7)	512 (3.3)	5 (1.6)	517 (15.0)	11 (2.5)	517 (4.9)	0 (0.0)	~ ~
Sweden		70 (4.4)	544 (3.6)	18 (3.7)	536 (7.5)	4 (1.7)	540 (9.1)	3 (1.6)	470 (21.9)	5 (2.1)	528 (13.9)
Turkey (5)		52 (3.7)	528 (6.0)	0 (0.4)	~ ~	44 (3.8)	530 (6.9)	3 (1.4)	478 (23.9)	0 (0.0)	~ ~
United Arab Emirates	r	36 (2.1)	470 (3.7)	15 (1.0)	429 (6.7)	43 (2.3)	491 (3.9)	5 (0.8)	451 (13.2)	1 (0.4)	~ ~
United States		10 (1.4)	544 (8.0)	73 (2.4)	540 (3.1)	3 (1.3)	530 (21.4)	14 (1.8)	526 (6.9)	0 (0.0)	~ ~
Kosovo	y	~ ~	~ ~	~ ~	~ ~	~ ~	~ ~	~ ~	~ ~	~ ~	~ ~
Netherlands	y	~ ~	~ ~	~ ~	~ ~	~ ~	~ ~	~ ~	~ ~	~ ~	~ ~
International Average		28 (0.5)	489 (1.3)	44 (0.5)	491 (1.2)	13 (0.3)	480 (2.5)	9 (0.3)	478 (2.4)	5 (0.2)	442 (3.8)
Benchmarking Participants											
Ontario, Canada	r	18 (3.7)	532 (8.3)	58 (4.6)	527 (5.2)	8 (4.3)	534 (14.4)	15 (2.9)	519 (5.4)	0 (0.0)	~ ~
Quebec, Canada		6 (1.4)	522 (6.1)	84 (3.1)	523 (2.8)	3 (1.7)	519 (12.5)	7 (2.2)	528 (7.3)	0 (0.0)	~ ~
Moscow City, Russian Fed.		50 (4.4)	593 (3.1)	47 (4.5)	598 (3.4)	0 (0.3)	~ ~	0 (0.0)	~ ~	2 (1.0)	~ ~
Madrid, Spain		31 (3.6)	522 (3.3)	58 (3.8)	524 (2.9)	4 (2.1)	519 (13.2)	7 (2.3)	516 (9.9)	0 (0.0)	~ ~
Abu Dhabi, UAE		34 (2.0)	405 (6.9)	27 (1.9)	381 (7.3)	30 (2.0)	468 (6.7)	7 (1.4)	400 (16.8)	2 (1.1)	~ ~
Dubai, UAE	r	33 (2.7)	543 (5.6)	14 (1.5)	560 (5.7)	49 (2.6)	552 (2.8)	4 (0.9)	528 (16.8)	0 (0.2)	~ ~

* Countries have been increasing their certification requirements and providing professional development to teachers certified under earlier guidelines.

() Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

A dash (-) indicates comparable data not available. A tilde (~) indicates insufficient data to report achievement.

An "r" indicates data are available for at least 70% but less than 85% of the students. An "s" indicates data are available for at least 50% but less than 70% of the students.

A "y" indicates data are available for less than 40% of the students.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from <http://timss2019.org/download>

Exhibit 9.7: Teachers Majored in Education and Mathematics
Students' Results based on Teachers' Reports

Country	Major in Mathematics and Mathematics Education		Major in Mathematics but No Major in Mathematics Education		Major in Mathematics Education but No Major in Mathematics		All Other Majors		No Formal Education Beyond Upper-Secondary*	
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement
Australia	46 (3.1)	531 (8.6)	14 (2.2)	523 (9.8)	17 (2.9)	511 (10.7)	23 (2.3)	501 (6.7)	0 (0.0)	~ ~
Bahrain	47 (2.6)	479 (2.6)	42 (3.1)	481 (3.4)	10 (1.8)	494 (6.9)	1 (0.3)	~ ~	1 (0.4)	~ ~
Chile	59 (3.8)	447 (4.9)	27 (3.2)	432 (5.6)	7 (2.1)	447 (14.8)	8 (1.9)	412 (11.0)	0 (0.0)	~ ~
Chinese Taipei	39 (3.6)	618 (5.0)	44 (3.8)	617 (4.7)	3 (1.0)	597 (17.3)	15 (2.4)	589 (9.4)	0 (0.0)	~ ~
Cyprus	r 18 (3.0)	515 (9.6)	79 (2.7)	499 (2.7)	0 (0.0)	~ ~	2 (1.3)	~ ~	0 (0.0)	~ ~
Egypt	41 (3.8)	411 (8.6)	37 (3.4)	412 (9.0)	18 (3.6)	423 (12.9)	2 (0.8)	~ ~	3 (1.4)	389 (29.9)
England	s 43 (5.1)	519 (10.6)	45 (5.1)	523 (12.3)	6 (2.7)	536 (35.0)	6 (2.3)	511 (34.1)	0 (0.0)	~ ~
Finland	18 (2.4)	523 (4.5)	55 (3.2)	512 (3.4)	0 (0.0)	~ ~	25 (2.6)	493 (5.3)	1 (0.7)	~ ~
France	r 44 (4.3)	481 (4.1)	48 (4.3)	484 (4.2)	2 (1.2)	~ ~	7 (1.9)	474 (15.8)	0 (0.0)	~ ~
Georgia	s 78 (5.1)	461 (7.5)	15 (4.2)	458 (14.8)	0 (0.0)	~ ~	2 (1.9)	~ ~	5 (2.9)	437 (19.3)
Hong Kong SAR	29 (3.7)	594 (8.5)	33 (3.9)	580 (8.7)	15 (2.8)	574 (13.3)	24 (3.7)	560 (12.0)	0 (0.0)	~ ~
Hungary	14 (2.3)	516 (9.4)	9 (2.0)	503 (14.6)	77 (2.8)	517 (3.8)	1 (0.5)	~ ~	0 (0.0)	~ ~
Iran, Islamic Rep. of	27 (3.4)	449 (7.3)	46 (3.9)	448 (6.7)	12 (2.7)	446 (15.2)	14 (2.4)	433 (12.0)	0 (0.0)	~ ~
Ireland	38 (2.7)	529 (4.7)	40 (2.9)	521 (5.7)	8 (1.5)	536 (8.8)	14 (1.7)	516 (6.4)	0 (0.4)	~ ~
Israel	67 (3.2)	528 (5.3)	20 (2.8)	487 (10.5)	8 (1.9)	530 (17.4)	4 (1.0)	506 (17.1)	1 (0.5)	~ ~
Italy	45 (3.7)	495 (4.3)	17 (3.0)	501 (6.8)	8 (2.2)	485 (11.4)	30 (3.5)	504 (4.1)	0 (0.0)	~ ~
Japan	44 (3.6)	594 (3.6)	36 (3.6)	597 (6.0)	8 (2.1)	584 (5.6)	12 (2.0)	593 (5.6)	0 (0.0)	~ ~
Jordan	12 (2.5)	397 (13.9)	74 (3.1)	424 (5.1)	4 (1.4)	438 (16.0)	6 (1.3)	432 (10.1)	5 (1.7)	401 (8.5)
Kazakhstan	40 (3.9)	494 (5.6)	57 (4.0)	479 (6.0)	1 (0.7)	~ ~	1 (0.7)	~ ~	1 (0.6)	~ ~
Korea, Rep. of	20 (2.6)	608 (7.1)	24 (3.3)	597 (5.8)	54 (3.5)	611 (3.9)	2 (1.0)	~ ~	0 (0.0)	~ ~
Kuwait	16 (3.7)	398 (12.6)	62 (4.4)	403 (5.3)	19 (3.4)	402 (11.6)	3 (1.4)	445 (29.8)	1 (0.5)	~ ~
Lebanon	19 (3.2)	433 (9.8)	49 (4.3)	425 (5.3)	4 (1.9)	498 (15.7)	23 (3.7)	419 (8.1)	4 (1.8)	438 (16.4)
Lithuania	49 (4.0)	531 (4.9)	39 (4.2)	515 (4.6)	8 (1.9)	496 (9.4)	3 (1.6)	485 (11.5)	0 (0.0)	~ ~
Malaysia	41 (3.8)	459 (6.2)	30 (2.9)	464 (6.6)	10 (2.4)	469 (19.6)	18 (2.8)	459 (9.7)	1 (0.9)	~ ~
Morocco	14 (2.8)	386 (10.8)	45 (3.8)	393 (4.2)	0 (0.1)	~ ~	14 (2.6)	388 (8.1)	26 (2.9)	382 (4.4)
New Zealand	25 (3.5)	484 (10.3)	28 (2.9)	488 (6.5)	10 (2.2)	490 (11.5)	37 (3.6)	476 (5.3)	0 (0.0)	~ ~
Norway (9)	r 13 (3.1)	499 (9.6)	67 (4.2)	506 (3.2)	3 (1.2)	509 (11.5)	16 (3.1)	508 (4.8)	0 (0.0)	~ ~
Oman	35 (3.7)	410 (5.1)	48 (4.0)	406 (4.7)	13 (2.4)	413 (8.8)	1 (1.0)	~ ~	1 (1.0)	~ ~
Portugal	87 (2.6)	502 (3.5)	8 (2.2)	493 (8.1)	3 (1.4)	482 (18.5)	1 (1.2)	~ ~	0 (0.0)	~ ~
Qatar	49 (4.6)	445 (8.6)	43 (4.8)	439 (6.9)	3 (1.3)	472 (49.5)	5 (1.5)	447 (17.2)	0 (0.0)	~ ~
Romania	r 23 (3.4)	474 (9.0)	75 (3.2)	486 (5.9)	2 (1.1)	~ ~	1 (0.6)	~ ~	0 (0.0)	~ ~
Russian Federation	68 (3.5)	545 (5.1)	31 (3.5)	543 (5.7)	1 (0.7)	~ ~	0 (0.0)	~ ~	0 (0.0)	~ ~
Saudi Arabia	18 (2.9)	391 (6.3)	69 (3.3)	393 (3.4)	12 (2.6)	398 (7.5)	0 (0.1)	~ ~	0 (0.0)	~ ~
Singapore	60 (2.5)	618 (5.3)	27 (2.0)	614 (7.7)	5 (1.2)	618 (17.9)	8 (1.6)	605 (16.1)	0 (0.0)	~ ~
South Africa (9)	32 (2.7)	395 (4.9)	51 (2.8)	388 (3.0)	7 (1.5)	385 (13.1)	9 (1.7)	387 (7.1)	0 (0.3)	~ ~
Sweden	48 (3.6)	509 (4.1)	20 (3.1)	493 (5.8)	12 (1.7)	490 (8.7)	16 (2.7)	509 (5.5)	4 (1.5)	492 (8.7)
Turkey	55 (4.1)	496 (6.3)	18 (3.1)	496 (15.4)	24 (3.9)	497 (10.2)	3 (1.4)	452 (34.1)	0 (0.0)	~ ~
United Arab Emirates	48 (2.0)	481 (4.3)	41 (2.1)	472 (4.1)	5 (0.8)	441 (13.6)	5 (0.7)	466 (12.3)	1 (0.3)	~ ~
United States	36 (2.9)	539 (6.4)	11 (1.8)	521 (10.4)	24 (2.1)	512 (6.2)	29 (2.3)	490 (10.1)	0 (0.0)	~ ~
International Average	39 (0.6)	492 (1.2)	39 (0.5)	488 (1.2)	11 (0.3)	494 (2.9)	10 (0.3)	484 (2.8)	1 (0.1)	423 (6.9)
Benchmarking Participants										
Ontario, Canada	9 (3.4)	569 (27.1)	5 (2.1)	524 (15.2)	9 (2.6)	532 (7.5)	77 (4.9)	529 (3.9)	0 (0.0)	~ ~
Quebec, Canada	49 (4.9)	545 (6.4)	7 (2.6)	529 (8.4)	23 (4.1)	548 (9.2)	21 (4.2)	535 (7.5)	0 (0.0)	~ ~
Moscow City, Russian Fed.	81 (2.9)	577 (4.6)	18 (2.8)	570 (7.8)	1 (0.6)	~ ~	0 (0.0)	~ ~	1 (0.6)	~ ~
Gauteng, RSA (9)	37 (4.2)	431 (7.0)	50 (4.1)	411 (5.2)	8 (2.5)	431 (17.1)	5 (1.9)	437 (22.3)	1 (0.7)	~ ~
Western Cape, RSA (9)	41 (4.5)	444 (8.1)	35 (4.4)	445 (9.4)	14 (2.8)	447 (15.0)	10 (2.3)	404 (9.7)	1 (0.7)	~ ~
Abu Dhabi, UAE	r 44 (3.0)	425 (6.4)	40 (3.0)	453 (6.8)	5 (1.2)	405 (21.9)	9 (1.5)	425 (17.2)	1 (0.7)	~ ~
Dubai, UAE	55 (3.6)	542 (4.4)	35 (3.9)	527 (7.5)	4 (1.4)	523 (15.9)	5 (0.8)	570 (7.3)	0 (0.0)	~ ~

* Countries have been increasing their certification requirements and providing professional development to teachers certified under earlier guidelines.

() Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

A tilde (~) indicates insufficient data to report achievement.

An "r" indicates data are available for at least 70% but less than 85% of the students. An "s" indicates data are available for at least 50% but less than 70% of the students.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from <http://timss2019.org/download>

Exhibit 9.8: Teachers Majored in Education and Science

Students' Results based on Teachers' Reports

Country	Major in Science and Science Education		Major in Science but No Major in Science Education		Major in Science Education but No Major in Science		All Other Majors		No Formal Education Beyond Upper-Secondary*	
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement
Australia	65 (2.6)	534 (4.2)	19 (2.4)	540 (6.5)	7 (1.4)	522 (8.4)	9 (1.7)	512 (8.8)	0 (0.0)	~ ~
Bahrain	36 (3.3)	478 (4.9)	59 (3.4)	492 (3.5)	5 (1.0)	479 (12.5)	0 (0.0)	~ ~	0 (0.0)	~ ~
Chile	55 (3.3)	477 (4.4)	18 (3.0)	464 (5.5)	9 (1.9)	434 (8.3)	18 (3.0)	438 (7.9)	0 (0.1)	~ ~
Chinese Taipei	20 (3.0)	575 (5.5)	75 (3.4)	576 (2.1)	0 (0.3)	~ ~	5 (1.6)	548 (14.1)	0 (0.0)	~ ~
Cyprus	s 12 (2.0)	506 (10.4)	85 (2.0)	483 (2.8)	0 (0.0)	~ ~	3 (0.2)	497 (7.6)	0 (0.0)	~ ~
Egypt	34 (4.2)	387 (9.9)	46 (4.2)	396 (7.2)	18 (3.2)	385 (14.3)	2 (1.1)	~ ~	1 (0.8)	~ ~
England	s 44 (5.1)	513 (9.1)	54 (5.0)	532 (10.3)	0 (0.0)	~ ~	2 (1.4)	~ ~	0 (0.0)	~ ~
Finland	17 (1.8)	549 (6.4)	65 (2.5)	546 (3.4)	0 (0.2)	~ ~	17 (1.5)	524 (5.4)	1 (0.4)	~ ~
France	r 44 (3.2)	485 (3.9)	53 (3.3)	491 (3.4)	2 (0.8)	~ ~	1 (0.6)	~ ~	0 (0.4)	~ ~
Georgia	30 (2.2)	448 (5.4)	64 (2.2)	445 (4.1)	2 (0.6)	~ ~	3 (0.9)	462 (10.6)	1 (0.5)	~ ~
Hong Kong SAR	41 (4.2)	516 (8.7)	42 (4.2)	499 (9.8)	10 (2.5)	474 (19.0)	8 (2.1)	508 (16.7)	0 (0.0)	~ ~
Hungary	20 (1.8)	527 (6.3)	7 (1.1)	514 (8.5)	69 (2.3)	534 (3.1)	3 (0.8)	474 (13.7)	1 (0.3)	~ ~
Iran, Islamic Rep. of	9 (2.1)	472 (15.4)	36 (3.7)	453 (9.1)	48 (3.5)	447 (5.1)	7 (1.8)	418 (14.5)	1 (0.7)	~ ~
Ireland	50 (3.2)	531 (3.8)	42 (3.0)	526 (5.3)	3 (1.0)	513 (4.5)	3 (1.2)	513 (16.1)	2 (0.8)	~ ~
Israel	62 (3.8)	522 (5.5)	28 (3.6)	503 (11.4)	4 (1.5)	496 (25.4)	5 (1.5)	514 (15.7)	2 (1.1)	~ ~
Italy	51 (3.7)	496 (4.0)	44 (3.6)	504 (3.2)	1 (0.8)	~ ~	4 (1.5)	499 (16.2)	0 (0.0)	~ ~
Japan	32 (3.7)	569 (3.9)	53 (3.9)	571 (3.1)	7 (2.2)	571 (5.7)	8 (2.0)	562 (6.4)	0 (0.0)	~ ~
Jordan	11 (2.6)	440 (16.3)	63 (4.1)	447 (5.8)	16 (3.3)	475 (8.5)	2 (1.0)	~ ~	8 (1.9)	448 (13.4)
Kazakhstan	23 (2.4)	491 (5.2)	73 (2.3)	473 (3.7)	0 (0.0)	~ ~	2 (0.7)	~ ~	1 (0.3)	~ ~
Korea, Rep. of	41 (3.4)	559 (3.2)	49 (3.5)	563 (3.3)	9 (2.2)	559 (6.2)	1 (0.4)	~ ~	0 (0.0)	~ ~
Kuwait	15 (3.7)	454 (17.8)	60 (4.0)	435 (6.9)	20 (2.7)	455 (7.0)	5 (1.9)	475 (15.6)	0 (0.0)	~ ~
Lebanon	15 (2.0)	383 (11.8)	71 (2.4)	373 (5.3)	2 (0.5)	~ ~	9 (1.3)	382 (12.5)	4 (0.8)	360 (13.3)
Lithuania	23 (1.8)	537 (3.5)	74 (1.9)	532 (3.0)	1 (0.5)	~ ~	1 (0.5)	~ ~	0 (0.2)	~ ~
Malaysia	34 (3.0)	457 (8.6)	38 (3.2)	469 (6.6)	15 (2.4)	453 (7.5)	12 (2.5)	433 (13.6)	1 (0.6)	~ ~
Morocco	8 (1.1)	395 (8.2)	80 (1.8)	392 (3.0)	0 (0.1)	~ ~	1 (0.5)	~ ~	11 (1.4)	409 (6.1)
New Zealand	47 (3.8)	502 (7.0)	40 (3.8)	502 (6.1)	3 (1.5)	464 (24.2)	10 (1.8)	505 (14.4)	0 (0.0)	~ ~
Norway (9)	r 12 (2.9)	508 (7.4)	35 (4.7)	507 (5.7)	8 (2.0)	493 (9.1)	45 (4.8)	488 (4.8)	0 (0.0)	~ ~
Oman	28 (3.5)	463 (6.9)	69 (3.3)	453 (4.0)	2 (1.0)	~ ~	1 (0.5)	~ ~	0 (0.0)	~ ~
Portugal	66 (2.7)	521 (3.1)	34 (2.7)	517 (4.6)	0 (0.0)	~ ~	0 (0.2)	~ ~	0 (0.0)	~ ~
Qatar	41 (3.7)	493 (6.2)	53 (3.7)	460 (6.3)	3 (1.4)	507 (46.8)	2 (1.0)	~ ~	0 (0.0)	~ ~
Romania	r 8 (1.4)	460 (12.6)	85 (1.9)	471 (4.7)	0 (0.3)	~ ~	5 (1.1)	481 (16.0)	1 (0.7)	~ ~
Russian Federation	49 (2.3)	545 (4.3)	49 (2.4)	542 (5.0)	0 (0.0)	~ ~	1 (0.3)	~ ~	2 (0.4)	~ ~
Saudi Arabia	19 (2.9)	421 (8.3)	75 (2.9)	433 (3.3)	5 (1.6)	446 (14.2)	1 (0.4)	~ ~	0 (0.2)	~ ~
Singapore	57 (2.7)	608 (5.5)	37 (2.7)	607 (6.8)	2 (0.9)	~ ~	4 (1.0)	609 (27.0)	0 (0.0)	~ ~
South Africa (9)	20 (2.3)	390 (9.7)	59 (3.1)	366 (4.0)	6 (1.6)	358 (14.3)	12 (2.0)	375 (12.3)	2 (1.2)	~ ~
Sweden	50 (3.2)	524 (5.5)	28 (3.3)	518 (6.0)	9 (2.1)	530 (8.5)	7 (1.9)	515 (8.0)	6 (1.4)	513 (7.5)
Turkey	38 (4.0)	517 (6.5)	16 (3.0)	539 (10.3)	42 (4.1)	507 (6.2)	4 (1.5)	495 (20.5)	0 (0.0)	~ ~
United Arab Emirates	45 (1.4)	478 (5.4)	46 (1.8)	472 (4.8)	6 (1.1)	435 (17.2)	3 (0.5)	485 (14.4)	1 (0.2)	~ ~
United States	30 (2.5)	534 (6.5)	27 (2.3)	530 (9.4)	15 (2.0)	536 (9.1)	28 (2.6)	503 (11.6)	0 (0.0)	~ ~
International Average	33 (0.5)	494 (1.3)	50 (0.5)	491 (1.0)	9 (0.3)	482 (3.2)	6 (0.3)	489 (2.8)	1 (0.1)	432 (5.3)
Benchmarking Participants										
Ontario, Canada	s 27 (5.1)	523 (10.5)	10 (3.2)	501 (14.7)	6 (2.4)	532 (15.9)	57 (5.4)	524 (5.9)	0 (0.0)	~ ~
Moscow City, Russian Fed.	59 (2.0)	567 (3.4)	40 (2.0)	565 (3.3)	0 (0.1)	~ ~	0 (0.2)	~ ~	0 (0.3)	~ ~
Gauteng, RSA (9)	20 (3.6)	431 (14.6)	61 (4.3)	417 (5.9)	8 (2.3)	431 (13.7)	11 (2.8)	425 (15.2)	1 (0.6)	~ ~
Western Cape, RSA (9)	45 (4.6)	450 (10.7)	43 (4.2)	440 (8.9)	4 (1.7)	439 (46.1)	8 (1.7)	381 (13.8)	0 (0.0)	~ ~
Abu Dhabi, UAE	51 (2.6)	408 (9.3)	41 (2.8)	430 (9.8)	5 (1.0)	365 (22.0)	4 (0.7)	453 (14.2)	0 (0.3)	~ ~
Dubai, UAE	52 (3.3)	567 (4.8)	40 (3.6)	541 (8.4)	4 (0.4)	428 (16.1)	3 (1.5)	538 (18.6)	1 (0.6)	~ ~
Quebec, Canada	y - -	- -	- -	- -	- -	- -	- -	- -	- -	- -

* Countries have been increasing their certification requirements and providing professional development to teachers certified under earlier guidelines.
 () Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.
 A dash (-) indicates comparable data not available. A tilde (~) indicates insufficient data to report achievement.
 An "r" indicates data are available for at least 70% but less than 85% of the students. An "s" indicates data are available for at least 50% but less than 70% of the students.
 A "y" indicates data are available for less than 40% of the students.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
 Downloaded from <http://timss2019.org/download>

Teachers' Years of Experience

Exhibits 9.9, 9.10, 9.11, and 9.12 present teachers' reports about their years of teaching experience, including the average years of experience in each country and the percentage of students and average achievement by four categories: 20 years or more, at least 10 but less than 20 years, at least 5 but less than 10 years, and less than 5 years.

There was considerable variation in teacher experience across countries in both grades and subjects. In some countries, two-thirds or more of the students were taught by very experienced teachers with more than 20 years of experience, while in others, about a quarter of students were taught by teachers with less than 5 years of experience.

On average across countries, fourth grade students' mathematics and science teachers had been teaching for 17 years. In mathematics, experience ranged from an average of 9 years in Turkey and 10 years in England to more than 25 years in Bulgaria (26 years), Latvia and Lithuania (27 years), and the Russian Federation (26 years). In science, experience ranged from 10 years in England and Pakistan to 25 years or more in Bulgaria, Hungary, and Latvia (25 years); the Russian Federation (26 years); and Lithuania (27 years). On average across countries, just over 40 percent of fourth grade students were taught by teachers with 20 years of experience (41% for mathematics and 40% for science); 29 and 28 percent by mathematics and science teachers, respectively, with at least 10 but less than 20 years; 15 percent by mathematics teachers and 17 percent by science teachers with at least 5 but less than 10 years of experience; and 14 percent by mathematics teachers and 15 percent by science teachers with less than 5 years of experience.

On average, eighth grade teachers were slightly less experienced than their fourth grade counterparts (16 years of experience for both subjects, compared with 17 years in fourth grade). In mathematics, experience ranged from an average of 10 years in Turkey to 29 years in Lithuania. In science, teachers' average years of experience ranged from 11 years in Jordan, Lebanon, and Qatar to 26 years in Georgia and Lithuania. In both subjects, just over one-third of eighth grade students had teachers with more than 20 years of experience (35% in mathematics and 34% in science); about one-third had at least 10 but less than 20 years of experience (33% in mathematics and 32% in science); 18 percent had teachers with at least 5 but less than 10 years; and 14 percent (mathematics) and 15 percent (science) had teachers with less than 5 years of experience.

Internationally, average mathematics and average science achievement were generally higher for students whose teachers had more experience. For example, in mathematics in fourth grade, average achievement rose from 494 among students of teachers with less than 5 years of experience to 500 to 504 for the other categories. Similarly, in science in fourth grade, the average achievement was 485 for the lowest category of experience and rose to 492 for each of the other three categories. The relationship between experience and average student achievement was also more pronounced in mathematics than in science, in both grades.

Policies for teacher assignment may play a role in the relationship between teacher experience and average student achievement, as sometimes, more experienced teachers are assigned to students of higher ability and with fewer discipline problems and, conversely, less experienced teachers are assigned to students of lower ability.

Exhibit 9.9: Teachers' Years of Experience

Students' Results based on Teachers' Reports

Country	20 Years or More		At Least 10 but Less than 20 Years		At Least 5 but Less than 10 Years		Less than 5 Years		Average Years of Experience
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	
Albania	61 (3.8)	497 (4.1)	26 (3.7)	493 (9.0)	8 (2.6)	495 (6.8)	5 (1.9)	480 (13.2)	22 (0.9)
Armenia	63 (3.9)	498 (2.7)	12 (2.4)	517 (8.4)	18 (3.0)	488 (5.8)	6 (1.7)	487 (7.8)	23 (1.1)
Australia	31 (3.4)	526 (6.4)	20 (2.4)	526 (5.4)	25 (3.1)	510 (6.7)	24 (3.5)	508 (6.2)	13 (0.8)
Austria	53 (3.4)	538 (3.1)	17 (2.5)	546 (4.1)	16 (2.2)	539 (5.4)	14 (2.2)	535 (5.1)	19 (0.8)
Azerbaijan	59 (4.1)	516 (3.9)	28 (3.8)	514 (6.4)	6 (1.5)	495 (13.5)	7 (2.0)	505 (9.6)	22 (0.9)
Bahrain	13 (2.3)	478 (7.8)	43 (2.9)	480 (4.5)	24 (2.7)	479 (4.6)	20 (2.6)	486 (4.5)	11 (0.5)
Belgium (Flemish)	32 (3.5)	542 (2.6)	37 (3.7)	532 (3.7)	16 (2.7)	527 (5.9)	15 (2.3)	528 (4.8)	16 (0.8)
Bosnia and Herzegovina	50 (2.7)	452 (3.6)	34 (3.2)	455 (4.2)	9 (1.7)	451 (7.2)	7 (1.4)	437 (11.7)	18 (0.5)
Bulgaria	77 (3.2)	517 (5.1)	8 (1.9)	501 (15.5)	7 (2.1)	528 (14.9)	8 (2.1)	500 (20.6)	26 (0.8)
Canada	31 (2.8)	513 (4.1)	39 (2.7)	513 (5.4)	17 (1.9)	513 (4.6)	13 (1.7)	508 (4.2)	15 (0.4)
Chile	32 (4.0)	455 (5.6)	35 (4.0)	440 (5.3)	20 (3.4)	435 (6.5)	13 (3.0)	415 (6.0)	16 (1.0)
Chinese Taipei	53 (4.1)	597 (2.7)	38 (4.1)	604 (3.4)	6 (1.8)	589 (8.1)	4 (1.6)	598 (6.4)	19 (0.5)
Croatia	63 (3.4)	508 (2.9)	25 (2.9)	510 (4.4)	5 (1.6)	512 (7.1)	6 (1.8)	508 (11.0)	22 (0.7)
Cyprus	51 (4.0)	537 (3.0)	35 (4.1)	533 (5.5)	5 (1.5)	524 (11.9)	9 (2.0)	518 (9.9)	18 (0.6)
Czech Republic	60 (3.3)	531 (3.4)	17 (2.5)	544 (6.4)	11 (2.0)	526 (6.1)	13 (2.3)	532 (7.7)	21 (0.8)
Denmark	27 (3.7)	525 (4.9)	43 (4.4)	524 (3.4)	12 (2.7)	526 (6.8)	18 (3.1)	523 (6.1)	15 (0.8)
England	13 (4.0)	561 (16.5)	30 (5.1)	558 (11.2)	31 (4.8)	561 (6.9)	25 (4.8)	552 (4.5)	10 (0.8)
Finland	40 (3.4)	532 (3.6)	26 (2.6)	533 (4.2)	18 (2.6)	535 (4.7)	16 (2.3)	527 (5.8)	16 (0.7)
France	38 (3.6)	498 (5.4)	32 (3.3)	479 (5.4)	14 (2.3)	478 (6.1)	16 (2.8)	480 (6.7)	16 (0.8)
Georgia	68 (3.9)	478 (4.7)	23 (3.4)	490 (8.0)	5 (1.8)	486 (9.2)	4 (1.5)	492 (17.6)	24 (1.0)
Germany	43 (3.6)	526 (3.7)	29 (3.7)	519 (5.6)	17 (2.8)	514 (5.2)	11 (2.5)	512 (9.7)	18 (0.8)
Hong Kong SAR	30 (4.2)	611 (6.4)	27 (4.8)	605 (8.0)	22 (4.5)	585 (7.9)	21 (3.6)	601 (6.3)	13 (0.9)
Hungary	68 (3.7)	526 (3.6)	18 (3.0)	525 (6.9)	9 (1.9)	531 (10.3)	5 (1.7)	504 (13.0)	24 (0.9)
Iran, Islamic Rep. of	35 (3.2)	441 (7.1)	25 (3.1)	441 (9.2)	14 (2.4)	466 (11.4)	26 (2.9)	436 (6.9)	14 (0.7)
Ireland	24 (3.9)	550 (3.8)	37 (4.1)	549 (4.1)	18 (3.2)	560 (6.1)	21 (3.3)	536 (5.9)	14 (1.0)
Italy	64 (3.9)	516 (3.0)	24 (3.0)	515 (4.5)	6 (1.9)	509 (9.6)	6 (2.6)	516 (14.3)	23 (1.0)
Japan	35 (3.3)	590 (2.6)	23 (3.0)	593 (3.3)	16 (3.0)	596 (4.9)	26 (3.1)	594 (3.2)	15 (0.8)
Kazakhstan	55 (4.3)	515 (3.6)	19 (3.1)	505 (4.6)	14 (2.7)	521 (7.2)	11 (2.4)	498 (7.1)	20 (1.0)
Korea, Rep. of	25 (3.2)	605 (5.0)	37 (3.9)	604 (3.4)	23 (3.5)	593 (5.3)	15 (3.2)	590 (5.8)	14 (0.8)
Kosovo	38 (4.2)	443 (4.9)	28 (3.9)	456 (6.2)	17 (3.2)	434 (8.0)	18 (3.3)	444 (7.9)	16 (1.1)
Kuwait	9 (2.5)	387 (18.2)	50 (3.8)	381 (7.3)	27 (3.5)	389 (12.0)	13 (3.0)	378 (18.8)	12 (0.6)
Latvia	73 (3.4)	546 (2.9)	12 (2.3)	564 (6.7)	8 (1.9)	546 (7.6)	7 (1.9)	511 (16.0)	27 (1.1)
Lithuania	83 (2.7)	538 (3.1)	9 (2.2)	556 (8.2)	2 (1.2)	~ ~	5 (1.6)	557 (11.3)	27 (0.8)
Malta	24 (0.4)	504 (2.6)	21 (0.4)	521 (2.7)	24 (0.4)	512 (2.2)	31 (0.4)	503 (2.7)	12 (0.1)
Montenegro	56 (3.3)	451 (2.8)	28 (2.7)	456 (4.0)	10 (2.0)	457 (8.1)	6 (0.9)	446 (4.8)	20 (0.6)
Morocco	44 (3.3)	369 (7.6)	19 (2.8)	384 (10.5)	10 (2.2)	393 (16.2)	27 (3.1)	399 (13.8)	16 (0.7)
Netherlands	30 (4.7)	537 (4.5)	32 (4.9)	539 (3.5)	20 (4.5)	536 (5.5)	18 (4.4)	533 (5.6)	15 (1.2)
New Zealand	25 (2.5)	491 (6.2)	32 (2.7)	490 (4.6)	21 (2.5)	492 (7.3)	23 (2.4)	479 (6.1)	13 (0.6)
North Macedonia	52 (4.9)	478 (6.4)	29 (3.7)	463 (12.6)	10 (2.7)	504 (18.0)	9 (2.4)	460 (13.5)	19 (1.0)
Northern Ireland	33 (4.1)	571 (5.4)	38 (4.1)	560 (5.5)	21 (3.4)	562 (6.7)	8 (2.5)	575 (9.8)	15 (0.9)
Norway (5)	30 (4.0)	542 (4.1)	36 (3.8)	551 (4.1)	10 (2.7)	541 (9.8)	23 (4.1)	542 (5.1)	14 (0.9)
Oman	9 (2.0)	442 (23.0)	57 (3.3)	435 (4.8)	25 (2.8)	425 (7.8)	8 (2.0)	405 (8.4)	12 (0.4)
Pakistan	25 (4.0)	293 (10.3)	14 (6.5)	370 (45.4)	22 (5.2)	328 (19.0)	40 (8.1)	337 (21.8)	11 (1.2)
Philippines	30 (3.8)	310 (12.5)	32 (3.6)	284 (10.1)	24 (3.3)	298 (13.6)	14 (2.6)	295 (13.4)	14 (0.7)
Poland	51 (4.0)	517 (3.4)	31 (4.0)	522 (4.6)	10 (2.3)	520 (9.2)	8 (1.9)	534 (10.1)	20 (0.8)
Portugal	67 (2.7)	523 (3.3)	30 (2.8)	534 (4.3)	2 (0.9)	~ ~	1 (0.7)	~ ~	24 (0.6)
Qatar	13 (3.1)	445 (14.5)	35 (3.6)	441 (6.5)	33 (3.6)	457 (7.1)	19 (2.9)	455 (11.8)	11 (0.6)
Russian Federation	74 (3.2)	565 (3.1)	11 (2.4)	590 (10.0)	8 (1.8)	568 (12.0)	6 (1.8)	550 (11.9)	26 (0.9)
Saudi Arabia	31 (3.4)	407 (6.8)	43 (3.2)	401 (5.5)	15 (2.8)	399 (9.5)	11 (2.0)	372 (9.3)	15 (0.6)
Serbia	74 (3.4)	509 (3.4)	18 (3.0)	510 (9.0)	8 (2.0)	501 (9.1)	1 (0.5)	~ ~	24 (0.7)
Singapore	22 (2.2)	630 (7.7)	37 (2.2)	632 (6.2)	27 (2.0)	615 (6.5)	14 (1.9)	621 (8.7)	13 (0.5)
Slovak Republic	64 (3.0)	511 (3.7)	20 (2.7)	509 (7.3)	9 (1.7)	501 (16.8)	7 (1.7)	506 (7.5)	23 (0.7)
South Africa (5)	45 (3.4)	379 (6.0)	24 (2.9)	353 (8.5)	14 (3.0)	388 (13.7)	18 (2.4)	378 (11.0)	17 (0.7)
Spain	45 (3.4)	506 (4.7)	34 (3.5)	499 (5.5)	8 (1.7)	490 (11.3)	13 (1.7)	501 (4.8)	19 (0.7)
Sweden	20 (3.5)	537 (6.8)	35 (4.5)	526 (4.8)	21 (3.4)	516 (6.7)	25 (3.6)	510 (5.9)	12 (0.7)
Turkey (5)	9 (2.3)	544 (10.3)	34 (3.4)	552 (7.0)	22 (3.3)	535 (8.5)	35 (3.4)	480 (7.7)	9 (0.6)
United Arab Emirates	14 (1.6)	486 (7.0)	33 (1.4)	469 (3.8)	31 (1.6)	483 (5.0)	21 (1.9)	492 (5.1)	11 (0.3)
United States	26 (2.3)	537 (4.6)	36 (2.6)	542 (3.7)	21 (2.1)	539 (6.3)	18 (1.9)	514 (6.2)	13 (0.4)
International Average	41 (0.5)	503 (0.9)	29 (0.4)	504 (1.2)	15 (0.4)	500 (1.2)	14 (0.4)	494 (1.3)	17 (0.1)
Benchmarking Participants									
Ontario, Canada	26 (4.5)	508 (9.6)	42 (5.5)	512 (10.4)	20 (3.3)	519 (6.7)	11 (2.6)	508 (9.6)	15 (0.6)
Quebec, Canada	36 (4.6)	533 (2.8)	37 (4.5)	532 (3.8)	14 (3.1)	534 (5.6)	13 (3.0)	532 (6.9)	16 (0.8)
Moscow City, Russian Fed.	79 (3.3)	594 (2.3)	12 (2.3)	599 (4.8)	6 (1.8)	567 (12.6)	4 (1.6)	589 (11.9)	25 (0.8)
Madrid, Spain	36 (3.4)	522 (3.1)	38 (4.1)	510 (4.2)	8 (2.2)	533 (8.3)	18 (3.6)	519 (3.9)	16 (0.8)
Abu Dhabi, UAE	14 (1.9)	440 (9.6)	39 (2.6)	435 (5.9)	32 (2.6)	442 (5.9)	15 (1.8)	458 (9.9)	12 (0.5)
Dubai, UAE	18 (3.6)	556 (8.3)	27 (2.8)	536 (5.7)	36 (3.6)	546 (4.9)	19 (3.0)	551 (6.3)	11 (0.7)

() Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

A tilde (~) indicates insufficient data to report achievement.

An "r" indicates data are available for at least 70% but less than 85% of the students. An "s" indicates data are available for at least 50% but less than 70% of the students.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
 Downloaded from <http://timss2019.org/download>

Exhibit 9.10: Teachers' Years of Experience

Students' Results based on Teachers' Reports

Country	20 Years or More		At Least 10 but Less than 20 Years		At Least 5 but Less than 10 Years		Less than 5 Years		Average Years of Experience
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	
Albania	59 (3.9)	492 (4.5)	26 (3.7)	489 (9.5)	9 (2.7)	488 (8.3)	6 (2.0)	493 (14.7)	21 (0.9)
Armenia	58 (3.8)	469 (4.5)	15 (2.7)	470 (7.5)	20 (3.4)	459 (5.5)	7 (1.8)	454 (10.6)	22 (1.1)
Australia	31 (3.2)	539 (6.1)	19 (2.5)	537 (4.2)	24 (3.0)	531 (5.9)	26 (3.2)	526 (5.5)	13 (0.7)
Austria	54 (3.2)	522 (3.7)	15 (2.4)	527 (5.3)	16 (2.1)	525 (6.2)	15 (2.1)	512 (5.9)	19 (0.7)
Azerbaijan	r 55 (4.0)	428 (4.5)	31 (4.0)	422 (7.8)	6 (1.7)	396 (15.4)	8 (2.3)	425 (12.4)	21 (0.8)
Bahrain	15 (3.6)	483 (19.0)	35 (3.0)	508 (5.9)	28 (3.9)	481 (8.0)	22 (3.0)	491 (6.1)	11 (0.7)
Belgium (Flemish)	31 (3.5)	511 (2.6)	36 (3.7)	500 (4.2)	17 (2.8)	496 (6.3)	16 (2.5)	496 (4.9)	15 (0.8)
Bosnia and Herzegovina	50 (2.7)	461 (3.9)	34 (3.2)	460 (4.3)	9 (1.7)	456 (7.8)	7 (1.4)	437 (11.6)	18 (0.5)
Bulgaria	76 (3.4)	523 (6.0)	9 (2.2)	510 (18.7)	7 (2.1)	540 (20.8)	8 (2.1)	497 (23.8)	25 (0.8)
Canada	r 26 (2.4)	522 (2.9)	39 (2.8)	525 (3.2)	19 (2.0)	526 (3.9)	16 (2.6)	526 (8.0)	14 (0.6)
Chile	28 (4.1)	473 (5.2)	34 (3.7)	469 (5.4)	23 (3.5)	467 (6.0)	15 (3.1)	456 (7.7)	15 (1.0)
Chinese Taipei	44 (3.9)	558 (3.0)	29 (3.3)	557 (3.8)	16 (3.0)	559 (5.5)	11 (2.6)	563 (4.8)	17 (0.7)
Croatia	63 (3.4)	523 (2.6)	25 (2.9)	524 (3.8)	5 (1.6)	524 (7.0)	6 (1.8)	524 (9.5)	22 (0.7)
Cyprus	33 (4.6)	517 (4.4)	43 (5.1)	509 (4.9)	18 (4.3)	511 (8.0)	6 (2.0)	504 (8.9)	16 (0.7)
Czech Republic	56 (3.4)	530 (3.5)	21 (3.1)	540 (5.0)	12 (2.2)	533 (7.3)	11 (2.2)	540 (6.3)	20 (0.8)
Denmark	22 (3.2)	527 (4.4)	45 (4.2)	522 (3.4)	16 (2.7)	515 (6.6)	17 (3.2)	525 (6.2)	14 (0.7)
England	s 13 (4.0)	539 (13.9)	31 (5.1)	538 (9.6)	31 (5.1)	542 (6.7)	25 (4.8)	532 (4.6)	10 (0.8)
Finland	38 (3.3)	558 (3.8)	27 (2.8)	554 (4.4)	20 (2.8)	557 (4.8)	15 (2.4)	543 (6.3)	16 (0.7)
France	32 (3.4)	501 (5.6)	34 (3.6)	480 (5.2)	16 (2.4)	482 (6.1)	18 (3.0)	490 (6.5)	15 (0.7)
Georgia	62 (4.0)	447 (5.6)	27 (3.7)	466 (6.5)	8 (2.3)	457 (11.4)	4 (1.5)	460 (9.6)	24 (1.1)
Germany	39 (3.8)	521 (3.7)	26 (3.0)	513 (5.4)	18 (2.6)	520 (6.7)	17 (2.9)	518 (8.5)	17 (0.9)
Hong Kong SAR	25 (3.6)	534 (7.0)	22 (3.9)	538 (7.0)	20 (4.0)	531 (5.5)	32 (4.1)	528 (5.5)	11 (0.8)
Hungary	71 (3.3)	530 (3.3)	14 (2.5)	522 (8.5)	7 (1.6)	542 (7.3)	7 (1.8)	516 (10.0)	25 (0.8)
Iran, Islamic Rep. of	35 (3.2)	441 (7.2)	25 (3.1)	438 (9.8)	14 (2.4)	461 (11.3)	26 (2.9)	432 (7.3)	14 (0.7)
Ireland	24 (3.9)	532 (4.4)	37 (4.1)	530 (4.3)	18 (3.2)	536 (7.8)	21 (3.3)	511 (9.5)	14 (1.0)
Italy	64 (3.9)	510 (3.4)	24 (3.0)	510 (4.7)	6 (1.9)	504 (10.2)	6 (2.6)	514 (17.2)	23 (1.0)
Japan	37 (4.0)	559 (2.4)	25 (3.8)	564 (3.9)	12 (2.6)	561 (5.1)	26 (3.6)	563 (3.3)	16 (1.0)
Kazakhstan	53 (4.3)	499 (5.1)	20 (3.1)	487 (6.3)	14 (2.6)	497 (9.5)	13 (2.6)	479 (8.1)	20 (1.0)
Korea, Rep. of	26 (3.1)	591 (4.1)	40 (3.5)	588 (2.8)	21 (3.1)	586 (4.9)	13 (2.8)	581 (5.6)	15 (0.8)
Kosovo	38 (4.2)	412 (6.2)	28 (3.9)	427 (7.8)	17 (3.2)	403 (8.8)	18 (3.3)	411 (9.0)	16 (1.1)
Kuwait	6 (2.0)	363 (27.4)	53 (4.3)	406 (9.1)	28 (3.8)	395 (10.8)	13 (2.5)	354 (15.3)	11 (0.5)
Latvia	69 (3.3)	541 (3.2)	16 (2.7)	547 (5.7)	9 (2.0)	547 (6.6)	6 (1.5)	531 (13.1)	25 (0.9)
Lithuania	83 (2.6)	534 (2.8)	9 (2.2)	552 (7.8)	3 (1.2)	534 (12.4)	6 (1.7)	556 (9.2)	27 (0.8)
Malta	22 (0.3)	492 (2.8)	22 (0.4)	507 (2.8)	24 (0.4)	498 (2.8)	32 (0.4)	489 (2.2)	11 (0.1)
Montenegro	56 (3.3)	452 (3.3)	28 (2.7)	457 (4.8)	10 (2.0)	458 (10.2)	6 (0.9)	445 (6.3)	20 (0.6)
Morocco	43 (3.4)	356 (8.6)	22 (3.3)	382 (11.5)	12 (2.4)	385 (18.4)	23 (2.8)	390 (16.1)	17 (0.8)
Netherlands	r 30 (4.7)	519 (5.6)	32 (4.9)	521 (4.5)	20 (4.5)	514 (7.5)	18 (4.4)	517 (6.4)	15 (1.2)
New Zealand	27 (2.6)	505 (5.1)	33 (2.5)	507 (3.7)	20 (2.5)	506 (6.4)	20 (2.1)	493 (6.5)	14 (0.6)
North Macedonia	r 52 (4.9)	433 (8.3)	29 (3.7)	418 (13.4)	10 (2.7)	459 (17.4)	9 (2.4)	413 (16.2)	19 (1.0)
Northern Ireland	33 (4.1)	525 (4.3)	38 (4.1)	514 (3.9)	21 (3.4)	515 (5.1)	8 (2.5)	526 (7.5)	15 (0.9)
Norway (5)	r 25 (3.9)	543 (5.0)	30 (3.5)	542 (4.4)	18 (3.9)	536 (6.3)	26 (4.4)	537 (5.0)	12 (0.8)
Oman	7 (1.8)	457 (23.8)	54 (3.7)	441 (5.7)	21 (3.2)	432 (11.3)	17 (2.9)	421 (8.1)	11 (0.5)
Pakistan	23 (4.9)	275 (15.0)	7 (2.6)	239 (41.9)	26 (6.7)	330 (20.6)	43 (6.7)	288 (21.5)	10 (1.3)
Philippines	25 (3.8)	234 (13.2)	34 (4.0)	251 (12.1)	21 (3.3)	249 (14.6)	20 (3.1)	260 (15.1)	13 (0.8)
Poland	67 (3.9)	530 (3.3)	23 (3.4)	532 (4.5)	4 (1.4)	538 (10.9)	6 (2.2)	545 (10.9)	24 (0.9)
Portugal	67 (2.7)	502 (3.1)	30 (2.8)	512 (3.4)	2 (0.9)	~ ~	1 (0.7)	~ ~	24 (0.6)
Qatar	15 (3.4)	453 (15.2)	38 (4.2)	442 (5.7)	32 (4.1)	452 (8.8)	15 (2.5)	462 (10.3)	11 (0.6)
Russian Federation	73 (3.5)	565 (3.1)	12 (2.5)	587 (8.6)	8 (1.8)	567 (10.1)	7 (2.0)	563 (10.0)	26 (0.9)
Saudi Arabia	31 (3.1)	394 (7.1)	31 (3.4)	405 (8.6)	25 (3.6)	417 (6.5)	13 (2.7)	388 (18.2)	14 (0.6)
Serbia	74 (3.4)	518 (3.8)	18 (3.0)	521 (9.3)	8 (2.0)	510 (10.5)	1 (0.5)	~ ~	24 (0.7)
Singapore	16 (2.0)	597 (8.5)	41 (2.8)	598 (5.8)	29 (2.5)	598 (5.7)	14 (1.9)	577 (8.3)	12 (0.4)
Slovak Republic	61 (3.1)	523 (4.6)	20 (2.7)	517 (6.5)	14 (2.5)	506 (14.6)	6 (1.5)	528 (7.8)	23 (0.8)
South Africa (5)	42 (3.8)	331 (11.4)	21 (2.6)	304 (11.9)	14 (3.0)	336 (19.5)	23 (2.8)	329 (15.6)	16 (0.8)
Spain	39 (2.8)	514 (4.0)	38 (3.4)	508 (4.6)	11 (2.6)	500 (9.2)	13 (2.1)	516 (5.3)	17 (0.7)
Sweden	23 (4.0)	550 (6.7)	29 (4.5)	542 (4.8)	23 (4.1)	535 (6.3)	25 (4.1)	527 (7.2)	13 (0.9)
Turkey (5)	18 (2.7)	558 (6.2)	28 (3.4)	548 (7.9)	29 (3.5)	527 (5.9)	25 (2.9)	478 (10.1)	11 (0.6)
United Arab Emirates	13 (1.1)	452 (7.6)	39 (1.6)	466 (4.4)	31 (1.7)	478 (4.9)	17 (1.5)	486 (6.3)	11 (0.2)
United States	27 (2.3)	543 (4.4)	35 (2.7)	546 (4.4)	21 (2.1)	538 (6.4)	18 (2.0)	518 (6.1)	14 (0.4)
International Average	40 (0.5)	492 (1.1)	28 (0.4)	492 (1.2)	17 (0.4)	492 (1.3)	15 (0.4)	485 (1.4)	17 (0.1)
Benchmarking Participants									
Ontario, Canada	r 20 (3.3)	518 (6.7)	46 (5.8)	526 (4.8)	20 (3.4)	530 (6.9)	14 (5.1)	537 (20.6)	14 (0.9)
Quebec, Canada	33 (4.5)	524 (3.2)	32 (4.5)	521 (4.9)	19 (3.5)	530 (4.4)	17 (3.5)	517 (5.2)	14 (0.8)
Moscow City, Russian Fed.	79 (3.3)	596 (2.3)	12 (2.2)	600 (5.4)	6 (1.8)	570 (11.4)	4 (1.6)	597 (11.0)	25 (0.8)
Madrid, Spain	29 (4.2)	530 (3.8)	40 (4.3)	516 (3.8)	15 (2.7)	521 (3.5)	16 (2.6)	527 (4.8)	14 (0.8)
Abu Dhabi, UAE	13 (1.3)	368 (13.1)	40 (2.1)	418 (7.2)	31 (2.3)	426 (6.5)	15 (2.0)	440 (11.3)	11 (0.4)
Dubai, UAE	r 12 (2.2)	560 (10.2)	32 (3.5)	544 (6.6)	38 (4.6)	543 (5.5)	18 (3.6)	561 (5.9)	10 (0.5)

() Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

A tilde (~) indicates insufficient data to report achievement.

An "r" indicates data are available for at least 70% but less than 85% of the students. An "s" indicates data are available for at least 50% but less than 70% of the students.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from <http://timss2019.org/download>

Exhibit 9.11: Teachers' Years of Experience
Students' Results based on Teachers' Reports

Country	20 Years or More		At Least 10 but Less than 20 Years		At Least 5 but Less than 10 Years		Less than 5 Years		Average Years of Experience
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	
Australia	31 (3.2)	527 (7.5)	26 (3.0)	518 (7.9)	19 (2.6)	514 (9.2)	25 (2.6)	515 (8.3)	14 (0.8)
Bahrain	28 (3.1)	471 (4.6)	41 (3.4)	486 (3.7)	21 (2.6)	486 (3.3)	10 (2.3)	479 (8.4)	14 (0.5)
Chile	29 (3.5)	444 (7.0)	24 (3.3)	454 (7.8)	28 (3.4)	435 (7.4)	20 (3.4)	427 (7.3)	15 (1.0)
Chinese Taipei	40 (3.5)	618 (4.8)	42 (3.3)	608 (4.5)	16 (2.5)	609 (8.0)	3 (1.1)	622 (32.6)	17 (0.5)
Cyprus	r 16 (3.7)	517 (11.7)	47 (4.4)	507 (5.1)	19 (4.0)	495 (8.9)	19 (3.5)	497 (5.3)	12 (0.7)
Egypt	45 (3.6)	423 (7.6)	29 (4.0)	410 (9.9)	18 (3.4)	396 (14.0)	7 (2.1)	406 (16.8)	18 (0.7)
England	s 26 (4.4)	546 (12.4)	40 (4.8)	517 (11.0)	16 (3.8)	528 (12.2)	19 (4.4)	491 (22.1)	14 (0.9)
Finland	29 (2.9)	514 (4.8)	38 (2.9)	508 (3.6)	14 (2.1)	511 (5.3)	19 (2.8)	501 (4.1)	14 (0.6)
France	r 29 (3.6)	488 (5.2)	38 (4.0)	479 (4.9)	18 (3.5)	470 (6.4)	14 (2.9)	492 (11.4)	15 (0.6)
Georgia	65 (4.3)	457 (6.0)	22 (3.9)	473 (9.0)	10 (2.7)	452 (11.3)	3 (1.6)	525 (40.8)	24 (1.0)
Hong Kong SAR	35 (4.2)	571 (9.4)	29 (3.9)	585 (11.0)	15 (2.7)	589 (11.0)	20 (3.3)	569 (13.5)	15 (0.8)
Hungary	70 (3.5)	513 (4.4)	19 (2.8)	525 (8.0)	7 (2.0)	514 (8.0)	4 (1.4)	509 (25.1)	26 (0.9)
Iran, Islamic Rep. of	42 (3.2)	462 (7.2)	36 (3.4)	432 (6.8)	8 (2.1)	456 (19.1)	14 (2.5)	430 (11.8)	17 (0.7)
Ireland	28 (3.0)	524 (5.0)	30 (2.7)	526 (5.5)	26 (2.7)	524 (6.1)	16 (2.5)	521 (6.1)	14 (0.7)
Israel	40 (3.4)	547 (8.6)	26 (2.8)	510 (9.8)	19 (2.2)	493 (9.2)	15 (1.9)	499 (12.8)	16 (0.6)
Italy	42 (3.5)	499 (3.9)	43 (3.7)	495 (4.2)	11 (2.3)	500 (8.9)	5 (1.8)	506 (8.8)	19 (0.8)
Japan	35 (3.9)	588 (4.1)	27 (3.6)	604 (7.4)	21 (3.2)	593 (5.1)	18 (3.0)	592 (4.9)	16 (0.8)
Jordan	16 (2.5)	432 (8.0)	34 (3.4)	424 (6.5)	24 (3.5)	426 (6.6)	25 (3.6)	403 (9.8)	11 (0.6)
Kazakhstan	51 (3.9)	490 (5.4)	22 (3.2)	497 (9.9)	18 (3.0)	467 (9.1)	9 (2.1)	472 (15.5)	20 (0.9)
Korea, Rep. of	34 (3.7)	607 (4.1)	32 (3.9)	611 (5.9)	17 (3.3)	610 (7.3)	17 (2.6)	595 (8.6)	15 (0.8)
Kuwait	19 (3.2)	398 (9.8)	50 (4.2)	401 (6.3)	26 (3.0)	403 (7.4)	6 (2.1)	397 (30.7)	13 (0.6)
Lebanon	26 (3.7)	452 (7.7)	30 (3.8)	430 (7.9)	26 (3.1)	418 (6.4)	18 (3.7)	419 (9.1)	13 (0.8)
Lithuania	78 (3.4)	519 (3.9)	18 (3.2)	527 (9.0)	3 (1.4)	536 (28.9)	1 (0.7)	~ ~	29 (0.7)
Malaysia	28 (2.7)	442 (7.4)	43 (3.8)	469 (5.4)	18 (2.9)	466 (10.7)	11 (2.2)	466 (17.9)	14 (0.5)
Morocco	30 (3.2)	391 (4.6)	10 (1.7)	407 (11.7)	18 (2.5)	406 (5.5)	42 (3.1)	374 (3.7)	13 (0.9)
New Zealand	34 (3.8)	475 (7.9)	34 (3.4)	480 (6.2)	17 (2.8)	491 (7.8)	16 (2.9)	494 (8.6)	16 (0.9)
Norway (9)	r 25 (3.8)	504 (5.3)	31 (4.0)	506 (5.5)	18 (3.1)	499 (5.7)	27 (4.0)	508 (4.1)	13 (0.9)
Oman	12 (1.8)	439 (9.1)	67 (3.2)	406 (3.8)	17 (2.6)	403 (8.1)	4 (1.3)	429 (16.5)	14 (0.3)
Portugal	65 (3.4)	501 (4.1)	30 (3.2)	502 (5.1)	5 (1.8)	482 (19.0)	0 (0.5)	~ ~	22 (0.6)
Qatar	20 (2.8)	418 (11.6)	36 (4.3)	433 (6.9)	30 (4.1)	474 (11.2)	14 (2.8)	443 (9.6)	13 (0.6)
Romania	67 (3.6)	486 (5.5)	24 (2.8)	465 (7.7)	4 (1.5)	477 (23.0)	4 (1.6)	453 (26.8)	24 (0.8)
Russian Federation	73 (3.7)	545 (4.8)	15 (3.4)	545 (8.1)	6 (1.8)	533 (17.8)	6 (1.8)	533 (27.0)	26 (1.0)
Saudi Arabia	18 (2.7)	408 (6.2)	34 (3.6)	397 (4.1)	25 (3.4)	395 (5.6)	23 (2.8)	378 (5.2)	11 (0.5)
Singapore	14 (1.8)	645 (13.6)	34 (2.8)	608 (6.5)	37 (2.7)	617 (7.0)	16 (2.4)	604 (8.2)	11 (0.4)
South Africa (9)	29 (2.8)	395 (4.9)	28 (2.9)	385 (5.3)	21 (2.7)	383 (6.8)	22 (2.3)	397 (5.4)	14 (0.5)
Sweden	35 (3.7)	506 (5.4)	38 (3.7)	500 (3.7)	15 (2.7)	500 (8.3)	12 (2.5)	507 (8.2)	16 (0.7)
Turkey	11 (2.0)	530 (9.3)	38 (4.0)	516 (8.3)	30 (3.8)	499 (9.0)	21 (2.5)	438 (9.4)	10 (0.5)
United Arab Emirates	22 (1.3)	445 (5.2)	43 (1.7)	475 (4.4)	23 (1.6)	495 (4.9)	12 (1.1)	481 (8.0)	14 (0.3)
United States	28 (2.4)	525 (9.8)	39 (2.8)	522 (6.3)	19 (2.3)	493 (9.8)	13 (1.6)	516 (9.8)	15 (0.5)
International Average	35 (0.5)	494 (1.2)	33 (0.6)	491 (1.1)	18 (0.5)	488 (1.8)	14 (0.4)	483 (2.6)	16 (0.1)
Benchmarking Participants									
Ontario, Canada	26 (4.8)	549 (12.1)	44 (4.2)	524 (5.3)	20 (4.2)	531 (7.8)	9 (2.7)	527 (5.8)	15 (0.8)
Quebec, Canada	35 (4.5)	558 (7.4)	46 (5.2)	535 (6.2)	10 (2.8)	529 (15.3)	9 (2.9)	532 (10.7)	17 (0.9)
Moscow City, Russian Fed.	66 (3.8)	579 (4.9)	18 (2.6)	577 (9.9)	9 (2.2)	544 (7.9)	7 (2.0)	575 (14.4)	24 (1.0)
Gauteng, RSA (9)	29 (4.1)	415 (7.7)	31 (4.0)	413 (7.0)	19 (3.4)	424 (8.2)	21 (3.7)	436 (10.6)	14 (1.0)
Western Cape, RSA (9)	39 (4.1)	445 (8.7)	18 (3.4)	452 (16.2)	19 (3.2)	425 (10.0)	23 (3.7)	439 (10.0)	15 (0.9)
Abu Dhabi, UAE	r 26 (1.9)	423 (7.1)	40 (2.6)	416 (7.0)	25 (2.2)	467 (8.0)	10 (1.7)	456 (23.0)	14 (0.4)
Dubai, UAE	12 (2.1)	505 (14.8)	53 (2.8)	542 (5.2)	21 (2.2)	551 (4.2)	14 (2.3)	526 (10.3)	12 (0.5)

() Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

A tilde (~) indicates insufficient data to report achievement.

An "r" indicates data are available for at least 70% but less than 85% of the students. An "s" indicates data are available for at least 50% but less than 70% of the students.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from <http://timss2019.org/download>

Exhibit 9.12: Teachers' Years of Experience

Students' Results based on Teachers' Reports

Country	20 Years or More		At Least 10 but Less than 20 Years		At Least 5 but Less than 10 Years		Less than 5 Years		Average Years of Experience
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	
Australia	28 (3.1)	535 (6.9)	22 (2.5)	533 (8.2)	21 (2.6)	535 (7.2)	28 (3.1)	526 (4.9)	13 (0.7)
Bahrain	24 (3.0)	464 (7.9)	37 (3.7)	499 (5.3)	23 (2.4)	500 (5.9)	15 (2.5)	479 (8.1)	13 (0.4)
Chile	21 (3.0)	454 (7.0)	34 (3.3)	475 (5.4)	27 (3.5)	464 (6.6)	18 (3.5)	455 (9.4)	13 (0.8)
Chinese Taipei	35 (3.2)	573 (3.5)	42 (4.0)	576 (4.1)	12 (2.3)	563 (6.3)	11 (2.6)	580 (5.6)	16 (0.6)
Cyprus	20 (2.0)	490 (7.1)	42 (1.5)	483 (3.3)	25 (2.0)	489 (5.7)	13 (0.9)	490 (4.2)	13 (0.3)
Egypt	40 (3.8)	389 (8.5)	37 (4.2)	390 (9.6)	21 (3.1)	382 (14.7)	2 (1.1)	~ ~	17 (0.6)
England	18 (4.4)	520 (18.5)	34 (4.9)	524 (8.6)	34 (5.3)	529 (15.8)	13 (3.5)	507 (16.3)	12 (0.8)
Finland	32 (2.2)	546 (3.9)	32 (2.3)	544 (4.3)	20 (1.6)	540 (4.1)	15 (1.4)	536 (6.1)	15 (0.4)
France	29 (2.7)	497 (4.1)	36 (2.7)	490 (4.0)	13 (2.0)	489 (7.2)	22 (2.7)	475 (5.7)	14 (0.6)
Georgia	70 (2.2)	445 (4.3)	21 (1.9)	448 (5.3)	6 (1.0)	457 (5.4)	3 (0.7)	466 (18.7)	26 (0.6)
Hong Kong SAR	37 (3.6)	500 (10.5)	30 (4.0)	498 (12.3)	13 (3.0)	526 (17.1)	20 (3.2)	507 (11.1)	15 (0.8)
Hungary	66 (2.4)	527 (3.3)	20 (2.0)	538 (5.6)	7 (1.2)	528 (6.6)	6 (1.2)	514 (8.9)	24 (0.7)
Iran, Islamic Rep. of	45 (3.3)	464 (5.8)	30 (3.1)	441 (7.7)	9 (2.0)	422 (11.8)	15 (2.8)	440 (13.0)	17 (0.7)
Ireland	37 (3.8)	534 (4.3)	26 (3.2)	530 (6.0)	21 (2.8)	516 (6.4)	17 (2.2)	520 (8.7)	16 (0.8)
Israel	38 (3.5)	528 (7.1)	23 (3.0)	506 (9.9)	16 (2.9)	504 (13.1)	23 (3.5)	509 (11.5)	15 (0.9)
Italy	41 (3.8)	503 (3.9)	44 (4.0)	499 (4.7)	11 (2.4)	494 (8.4)	4 (1.5)	516 (7.6)	19 (0.8)
Japan	32 (3.7)	570 (4.4)	19 (3.3)	566 (3.3)	27 (3.8)	570 (3.7)	23 (3.7)	571 (6.0)	15 (1.0)
Jordan	13 (2.9)	449 (14.9)	33 (3.6)	459 (8.6)	33 (4.1)	451 (9.2)	21 (3.0)	441 (11.1)	11 (0.5)
Kazakhstan	45 (2.0)	484 (3.7)	27 (1.8)	469 (5.3)	16 (1.6)	468 (6.3)	12 (1.3)	484 (6.7)	18 (0.5)
Korea, Rep. of	38 (3.2)	561 (3.3)	28 (3.3)	562 (3.4)	14 (2.6)	565 (3.7)	20 (2.4)	555 (5.2)	16 (0.7)
Kuwait	19 (3.7)	454 (11.5)	42 (3.5)	442 (9.2)	25 (3.6)	439 (12.0)	13 (3.4)	446 (15.2)	12 (0.8)
Lebanon	16 (2.1)	381 (13.2)	36 (2.7)	366 (7.7)	24 (2.4)	385 (8.6)	24 (2.1)	387 (7.9)	11 (0.4)
Lithuania	76 (2.0)	531 (3.1)	18 (1.6)	539 (3.7)	4 (0.9)	552 (11.5)	2 (0.7)	~ ~	26 (0.5)
Malaysia	20 (2.9)	452 (8.7)	48 (4.0)	457 (6.1)	21 (3.0)	473 (9.9)	11 (2.6)	464 (15.2)	13 (0.5)
Morocco	27 (2.2)	405 (4.6)	19 (2.0)	403 (4.3)	20 (1.9)	396 (5.8)	33 (2.3)	378 (5.3)	13 (0.6)
New Zealand	32 (3.1)	494 (10.4)	32 (3.3)	508 (6.3)	16 (2.5)	507 (6.7)	20 (2.7)	495 (7.5)	15 (0.9)
Norway (9)	26 (4.1)	503 (5.9)	27 (4.2)	491 (6.3)	16 (2.9)	487 (7.9)	31 (4.6)	504 (5.0)	12 (1.0)
Oman	13 (2.4)	459 (9.6)	70 (2.9)	460 (3.9)	12 (2.6)	453 (9.0)	5 (1.2)	449 (11.6)	14 (0.4)
Portugal	71 (2.6)	518 (3.3)	22 (2.7)	517 (5.6)	6 (1.9)	537 (7.5)	1 (0.3)	~ ~	23 (0.5)
Qatar	12 (2.2)	464 (10.9)	38 (3.9)	469 (7.4)	35 (2.5)	473 (8.7)	15 (2.9)	495 (11.2)	11 (0.5)
Romania	68 (2.4)	468 (5.0)	23 (2.2)	474 (6.0)	4 (0.9)	485 (15.3)	6 (1.5)	475 (11.5)	24 (0.5)
Russian Federation	66 (2.0)	544 (3.8)	16 (1.5)	540 (7.1)	8 (1.2)	541 (7.3)	10 (1.1)	541 (8.4)	23 (0.5)
Saudi Arabia	23 (2.9)	433 (6.6)	37 (3.8)	435 (4.3)	27 (3.5)	430 (7.5)	13 (2.6)	423 (7.6)	13 (0.5)
Singapore	15 (1.9)	617 (11.0)	30 (2.6)	606 (7.6)	36 (2.4)	606 (7.8)	19 (2.0)	605 (10.0)	12 (0.5)
South Africa (9)	33 (2.8)	376 (6.8)	31 (3.0)	368 (6.6)	12 (1.8)	376 (10.2)	24 (3.0)	363 (8.3)	15 (0.6)
Sweden	28 (3.2)	526 (5.8)	45 (3.4)	519 (4.4)	10 (2.2)	520 (6.3)	17 (2.8)	523 (8.5)	15 (0.6)
Turkey	23 (3.2)	542 (6.8)	32 (3.5)	529 (7.5)	24 (3.2)	503 (7.8)	21 (2.4)	480 (13.6)	12 (0.6)
United Arab Emirates	19 (1.5)	448 (8.4)	39 (1.5)	473 (5.8)	30 (1.7)	485 (6.6)	12 (1.0)	486 (10.3)	13 (0.4)
United States	26 (2.3)	535 (11.3)	36 (2.5)	532 (5.4)	17 (1.8)	526 (9.5)	20 (2.3)	497 (11.7)	14 (0.5)
International Average	34 (0.5)	492 (1.3)	32 (0.5)	491 (1.0)	18 (0.4)	491 (1.5)	15 (0.4)	488 (1.7)	16 (0.1)
Benchmarking Participants									
Ontario, Canada	24 (4.9)	541 (9.8)	50 (5.7)	514 (5.5)	19 (3.9)	509 (9.1)	7 (1.6)	550 (20.0)	15 (0.7)
Moscow City, Russian Fed.	63 (2.0)	567 (2.9)	19 (2.0)	566 (3.9)	9 (1.4)	563 (7.1)	9 (1.2)	564 (4.7)	22 (0.5)
Gauteng, RSA (9)	27 (4.0)	418 (9.5)	38 (3.8)	419 (7.8)	13 (2.8)	420 (14.8)	22 (3.4)	432 (12.2)	14 (0.8)
Western Cape, RSA (9)	43 (4.5)	450 (9.2)	22 (3.6)	424 (12.6)	11 (2.3)	473 (24.5)	24 (3.9)	421 (11.8)	16 (1.1)
Abu Dhabi, UAE	19 (1.6)	390 (15.3)	39 (2.6)	425 (8.7)	31 (2.5)	416 (9.8)	11 (1.9)	445 (13.1)	13 (0.4)
Dubai, UAE	12 (1.9)	514 (11.5)	38 (3.5)	541 (8.5)	34 (3.4)	571 (8.4)	16 (2.3)	555 (6.3)	11 (0.4)
Quebec, Canada	-	-	-	-	-	-	-	-	-

() Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

A dash (-) indicates comparable data not available. A tilde (~) indicates insufficient data to report achievement.

An "r" indicates data are available for at least 70% but less than 85% of the students. An "s" indicates data are available for at least 50% but less than 70% of the students.

A "y" indicates data are available for less than 40% of the students.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from <http://timss2019.org/download>

Teachers' Participation in Professional Development

Exhibits 9.13, 9.14, 9.15, and 9.16 present, for fourth grade mathematics and science and eighth grade mathematics and science, respectively, teachers' reports about their participation in professional development during the last two years. Mathematics teachers in both grades were asked whether they had participated in professional development in the following areas: mathematics content, mathematics pedagogy/instruction, mathematics curriculum, integrating technology into mathematics instruction, improving students' critical thinking or problem solving skills, mathematics assessment, and addressing individual students' needs. Science teachers in both grades were asked about the same areas, though specific to science instead of mathematics, including asking about professional development related to students' critical thinking and inquiry skills rather than problem solving skills. Teachers of fourth grade science were also asked about professional development related to integrating science with other subjects.

Although there was variation across countries, the most common areas of mathematics professional development for mathematics teachers of fourth grade students on average were mathematics content, mathematics pedagogy/instruction, and improving students' critical thinking or problem solving skills. As shown in Exhibit 9.13, on average across countries, between 44 and 46 percent of fourth grade students' teachers participated in professional development related to mathematics content (46%), mathematics pedagogy/instruction (45%), and improving students' critical thinking or problem solving skills (44%). Integrating technology into mathematics instruction and mathematics assessment were the least common areas, with teachers of 35 percent and 37 percent of students, respectively, reporting that they participated in professional development in these areas. In science in the fourth grade, improving students' critical thinking or inquiry skills in science, science content, and science curriculum were the three most common areas of professional development. However, participation in professional development related to science was on the whole less common than for mathematics in the fourth grade. As shown in Exhibit 9.14, just over one-third of students, on average, had science teachers who reported that they participated in professional development related to critical thinking or inquiry skills in science (36%), science content (35%), and science curriculum (34%). Integrating technology into the science curriculum and science assessment were two of the least common areas for professional development (32% and 28% of students, respectively), along with integrating science with other subjects (31% of students).

Teachers of eighth grade students reported somewhat higher levels of participation in professional development than teachers of fourth grade students. Eighth grade teachers of mathematics and science reported similar levels of participation. As shown in Exhibits 9.15 and 9.16, the three most common areas of professional development for both teachers of mathematics and science were pedagogy/instruction, content, and curriculum. More than 50 percent of students, on average, had teachers who reported that they participated in professional development related to pedagogy/instruction (60% in mathematics and 59% in science), content (57% in both), and curriculum (53% in mathematics and 52% in science). From 44 percent to 50 percent of eighth grade students were taught by teachers who had some professional development in the other four areas, with addressing individual students' needs being the least common area (44% of students for both subjects).

Exhibit 9.13: Teachers' Participation in Professional Development in Mathematics in the Past Two Years
Students' Results based on Teachers' Reports

Percent of Students by Teachers' Participation in Professional Development*

Country	Mathematics Content	Mathematics Pedagogy/ Instruction	Mathematics Curriculum	Integrating Technology into Mathematics Instruction	Improving Students' Critical Thinking or Problem Solving Skills	Mathematics Assessment	Addressing Individual Students' Needs
Albania	29 (3.6)	33 (3.3)	48 (4.0)	32 (4.0)	52 (3.9)	49 (4.0)	46 (3.9)
Armenia	46 (3.4)	48 (4.0)	55 (4.1)	48 (4.1)	40 (3.7)	44 (3.7)	47 (3.8)
Australia	56 (3.7)	54 (3.4)	53 (3.4)	30 (3.3)	55 (3.6)	43 (3.2)	52 (3.8)
Austria	50 (3.1)	41 (3.0)	16 (2.4)	13 (1.9)	34 (3.4)	22 (2.7)	51 (2.9)
Azerbaijan	49 (4.0)	39 (3.7)	61 (3.7)	33 (3.7)	43 (3.7)	57 (3.6)	39 (3.6)
Bahrain	51 (3.5)	68 (2.6)	45 (3.3)	72 (3.1)	69 (2.6)	52 (3.0)	61 (3.0)
Belgium (Flemish)	17 (2.7)	19 (2.9)	35 (3.8)	8 (1.9)	15 (3.0)	5 (1.7)	34 (3.5)
Bosnia and Herzegovina	15 (2.1)	10 (1.7)	19 (2.6)	12 (2.1)	20 (2.7)	15 (2.5)	21 (2.7)
Bulgaria	30 (3.3)	25 (3.1)	29 (3.9)	26 (3.5)	19 (3.1)	26 (3.4)	25 (3.5)
Canada	62 (2.1)	r 68 (1.8)	47 (2.8)	37 (3.0)	58 (2.1)	52 (2.9)	52 (2.1)
Chile	43 (4.3)	33 (4.3)	30 (3.9)	17 (3.4)	36 (4.4)	24 (3.8)	42 (3.6)
Chinese Taipei	53 (3.8)	46 (4.0)	59 (4.1)	41 (3.8)	45 (3.7)	44 (3.6)	54 (4.0)
Croatia	49 (3.4)	35 (4.0)	36 (3.1)	43 (3.3)	44 (3.4)	36 (3.4)	43 (3.6)
Cyprus	67 (3.8)	51 (4.5)	64 (3.8)	26 (3.0)	32 (3.7)	25 (2.5)	15 (2.6)
Czech Republic	32 (3.6)	43 (3.8)	14 (2.7)	31 (3.4)	47 (3.8)	28 (3.7)	51 (3.1)
Denmark	r 26 (3.5)	r 22 (3.2)	r 13 (2.7)	r 20 (3.1)	r 15 (2.9)	r 17 (2.7)	r 15 (3.2)
Finland	7 (1.9)	17 (2.6)	12 (2.0)	15 (2.3)	8 (2.0)	9 (1.9)	17 (2.6)
France	64 (3.5)	68 (3.5)	36 (3.7)	13 (2.4)	39 (3.2)	6 (1.6)	21 (2.6)
Georgia	48 (3.8)	57 (3.8)	59 (4.1)	57 (3.6)	50 (4.3)	46 (3.4)	48 (4.3)
Germany	37 (3.3)	28 (3.5)	27 (3.3)	8 (2.0)	20 (3.2)	18 (2.9)	29 (3.3)
Hong Kong SAR	72 (3.2)	72 (3.3)	72 (3.9)	77 (3.9)	58 (4.3)	40 (4.3)	56 (4.2)
Hungary	5 (1.4)	16 (2.4)	4 (1.4)	12 (2.0)	21 (2.4)	5 (1.3)	30 (3.2)
Iran, Islamic Rep. of	59 (3.7)	64 (3.6)	35 (3.8)	24 (3.5)	32 (3.0)	35 (3.8)	57 (3.8)
Ireland	36 (3.6)	33 (3.5)	23 (3.5)	23 (3.2)	34 (3.6)	19 (2.7)	31 (3.4)
Italy	33 (3.6)	47 (3.5)	30 (3.6)	33 (3.0)	27 (3.4)	25 (3.4)	42 (3.9)
Japan	55 (3.7)	58 (2.9)	23 (2.8)	11 (2.6)	29 (3.0)	21 (3.1)	33 (3.4)
Kazakhstan	54 (3.9)	60 (3.8)	63 (3.4)	62 (3.7)	69 (3.6)	65 (3.5)	58 (3.8)
Korea, Rep. of	30 (4.3)	28 (3.7)	39 (4.1)	15 (2.9)	38 (3.8)	38 (4.1)	49 (4.0)
Kosovo	24 (3.5)	20 (3.4)	15 (3.4)	16 (3.3)	39 (3.8)	31 (4.0)	24 (3.4)
Kuwait	78 (3.6)	75 (3.6)	74 (3.5)	70 (4.0)	66 (3.9)	67 (4.4)	69 (3.5)
Latvia	42 (3.7)	37 (3.5)	34 (3.7)	48 (3.7)	67 (3.6)	37 (3.4)	42 (3.6)
Lithuania	24 (3.0)	29 (3.5)	24 (3.6)	55 (3.5)	53 (3.6)	34 (3.7)	45 (4.2)
Malta	60 (0.4)	62 (0.4)	55 (0.5)	41 (0.4)	62 (0.4)	67 (0.4)	45 (0.4)
Montenegro	30 (2.4)	23 (1.9)	21 (2.2)	14 (1.9)	38 (2.4)	35 (2.7)	30 (2.5)
Morocco	30 (3.7)	35 (3.0)	33 (3.4)	18 (3.2)	32 (3.5)	48 (3.3)	37 (3.6)
Netherlands	r 39 (4.6)	r 34 (4.6)	r 24 (5.1)	r 4 (1.5)	r 26 (4.8)	r 22 (4.3)	r 46 (5.2)
New Zealand	59 (3.7)	61 (3.3)	50 (3.6)	26 (2.9)	58 (3.3)	36 (3.4)	46 (3.1)
North Macedonia	36 (4.3)	22 (3.6)	25 (3.7)	22 (3.8)	31 (4.4)	32 (4.3)	29 (4.3)
Northern Ireland	50 (4.2)	57 (3.9)	39 (4.2)	37 (4.2)	56 (4.2)	30 (4.2)	33 (4.2)
Norway (5)	r 23 (4.0)	r 25 (4.0)	r 8 (2.5)	r 18 (3.8)	r 19 (3.4)	r 12 (3.1)	r 14 (3.3)
Oman	66 (3.2)	65 (3.4)	64 (3.3)	42 (3.3)	56 (3.7)	73 (2.8)	50 (3.4)
Pakistan	72 (5.0)	63 (6.9)	63 (7.7)	42 (7.8)	79 (4.1)	75 (4.7)	75 (4.6)
Philippines	68 (3.5)	71 (3.9)	67 (3.7)	56 (4.2)	66 (3.8)	63 (3.8)	65 (3.7)
Poland	74 (3.5)	55 (3.6)	69 (3.7)	63 (3.6)	46 (4.0)	38 (4.2)	54 (3.6)
Portugal	41 (3.3)	37 (3.6)	30 (3.0)	25 (3.1)	33 (3.2)	14 (2.2)	37 (3.4)
Qatar	64 (3.7)	68 (3.0)	60 (3.2)	70 (3.5)	72 (3.3)	54 (3.0)	71 (2.9)
Russian Federation	37 (3.8)	43 (3.8)	50 (3.8)	55 (3.4)	51 (3.6)	55 (3.7)	51 (4.2)
Saudi Arabia	55 (3.7)	59 (3.9)	43 (3.7)	53 (3.4)	52 (4.1)	35 (3.5)	50 (4.1)
Serbia	42 (3.7)	30 (3.8)	29 (3.7)	27 (4.0)	44 (3.8)	29 (3.4)	47 (3.8)
Singapore	74 (2.4)	82 (2.6)	69 (2.4)	61 (2.3)	62 (2.7)	67 (2.6)	46 (2.6)
Slovak Republic	15 (2.4)	23 (2.7)	42 (2.6)	37 (3.0)	21 (2.4)	15 (2.3)	22 (2.7)
South Africa (5)	85 (2.1)	57 (3.9)	85 (2.7)	46 (3.9)	67 (3.2)	78 (2.9)	60 (3.3)
Spain	37 (3.1)	45 (3.1)	28 (3.4)	28 (3.3)	45 (3.5)	24 (2.8)	49 (3.7)
Sweden	22 (3.1)	23 (3.2)	23 (3.8)	29 (4.1)	17 (3.0)	24 (3.9)	33 (4.6)
Turkey (5)	22 (3.3)	27 (3.1)	32 (3.1)	32 (3.5)	17 (3.4)	15 (2.9)	14 (2.6)
United Arab Emirates	r 68 (1.5)	r 70 (1.3)	r 71 (1.8)	r 70 (1.3)	r 78 (1.2)	r 67 (1.3)	r 75 (1.6)
United States	66 (2.3)	65 (2.6)	70 (2.3)	47 (2.4)	59 (2.5)	48 (2.6)	56 (2.6)
England	x 66 (5.9)	x 63 (6.9)	x 57 (6.9)	x 17 (4.4)	x 63 (5.5)	x 47 (6.9)	x 42 (6.8)
International Average	46 (0.5)	45 (0.5)	41 (0.5)	35 (0.4)	44 (0.5)	37 (0.4)	43 (0.5)
Benchmarking Participants							
Ontario, Canada	r 81 (2.6)	r 81 (2.4)	r 66 (5.1)	r 49 (5.5)	r 76 (3.3)	r 61 (5.4)	r 68 (3.7)
Quebec, Canada	38 (4.0)	50 (4.5)	20 (3.3)	22 (4.0)	34 (4.4)	44 (4.2)	27 (3.9)
Moscow City, Russian Fed.	26 (3.6)	27 (3.9)	37 (4.1)	62 (4.2)	36 (4.4)	35 (4.4)	40 (4.0)
Madrid, Spain	39 (4.0)	44 (4.0)	23 (3.4)	33 (4.6)	41 (4.0)	22 (3.8)	50 (4.2)
Abu Dhabi, UAE	r 64 (2.2)	r 65 (2.1)	r 62 (2.5)	r 58 (2.7)	r 68 (2.3)	r 57 (2.4)	r 65 (2.5)
Dubai, UAE	r 69 (2.2)	r 69 (2.5)	r 73 (1.3)	r 77 (1.8)	r 84 (2.1)	r 69 (2.4)	r 81 (2.1)

* Teachers could indicate participating in more than one area of professional development.
 () Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.
 An "r" indicates data are available for at least 70% but less than 85% of the students. An "x" indicates data are available for less than 50% of the students—interpret with caution.

Exhibit 9.14: Teachers' Participation in Professional Development in Science in the Past Two Years

Students' Results based on Teachers' Reports

Percent of Students by Teachers' Participation in Professional Development*

Country	Science Content	Science Pedagogy/ Instruction	Science Curriculum	Integrating Technology into Science Instruction	Improving Students' Critical Thinking or Inquiry Skills	Science Assessment	Addressing Individual Students' Needs	Integrating Science with Other Subjects
Albania	29 (3.9)	29 (3.9)	43 (3.7)	26 (3.9)	51 (3.9)	45 (3.8)	28 (3.6)	38 (4.3)
Armenia	35 (4.2)	39 (4.0)	r 44 (4.0)	41 (4.4)	r 43 (3.8)	r 40 (4.5)	r 43 (4.2)	r 57 (4.1)
Australia	35 (3.6)	31 (3.5)	35 (3.4)	34 (3.8)	43 (3.9)	18 (2.8)	30 (3.6)	30 (3.3)
Austria	40 (3.1)	19 (2.3)	15 (2.3)	9 (1.9)	24 (3.1)	6 (1.9)	15 (2.5)	14 (2.4)
Azerbaijan	25 (2.9)	16 (2.5)	38 (3.5)	30 (3.3)	36 (3.7)	38 (3.9)	39 (3.6)	45 (3.9)
Bahrain	42 (3.3)	69 (3.0)	47 (2.8)	80 (2.3)	78 (2.7)	61 (3.0)	57 (3.0)	70 (3.1)
Belgium (Flemish)	17 (3.0)	11 (2.5)	37 (3.4)	10 (2.3)	6 (1.8)	6 (1.9)	14 (2.7)	21 (3.4)
Bosnia and Herzegovina	13 (2.0)	12 (1.9)	16 (2.3)	10 (1.7)	17 (2.5)	12 (2.1)	16 (2.3)	12 (1.7)
Bulgaria	15 (2.4)	14 (2.8)	20 (2.8)	19 (2.8)	9 (2.2)	14 (2.7)	12 (2.7)	15 (2.7)
Canada	r 16 (1.7)	r 14 (1.8)	r 15 (1.5)	r 18 (1.7)	r 24 (2.4)	r 9 (1.7)	r 23 (2.2)	r 20 (2.0)
Chile	r 20 (3.5)	r 12 (2.8)	r 15 (3.2)	r 16 (3.2)	r 27 (4.4)	r 11 (3.0)	r 36 (4.8)	r 23 (3.9)
Chinese Taipei	61 (3.8)	41 (3.9)	61 (4.0)	53 (4.0)	44 (3.6)	29 (4.1)	50 (3.5)	45 (3.6)
Croatia	57 (3.6)	41 (3.6)	34 (3.4)	43 (4.1)	38 (3.4)	32 (3.2)	35 (3.4)	34 (3.0)
Cyprus	55 (5.1)	47 (4.7)	54 (4.9)	23 (4.2)	38 (4.1)	15 (3.5)	12 (3.3)	17 (3.6)
Czech Republic	22 (3.0)	14 (2.6)	6 (1.6)	14 (2.3)	26 (3.3)	10 (2.2)	35 (3.5)	20 (2.9)
Denmark	r 24 (3.8)	r 16 (3.3)	r 13 (3.2)	r 16 (3.9)	r 18 (3.5)	r 8 (2.3)	r 7 (2.2)	r 10 (2.8)
Finland	5 (1.6)	7 (2.0)	8 (1.6)	11 (2.1)	7 (1.9)	7 (1.7)	10 (1.8)	7 (1.8)
France	14 (2.4)	15 (2.5)	13 (2.8)	10 (2.5)	14 (2.5)	4 (1.4)	11 (2.3)	12 (2.7)
Georgia	41 (4.1)	48 (3.9)	48 (4.4)	50 (4.4)	55 (4.4)	42 (4.4)	49 (4.2)	44 (4.3)
Germany	33 (3.4)	22 (3.0)	21 (2.9)	13 (2.7)	14 (3.2)	12 (2.6)	19 (3.1)	13 (2.8)
Hong Kong SAR	53 (4.2)	47 (4.6)	54 (4.8)	66 (4.9)	61 (4.8)	34 (4.3)	48 (4.2)	58 (4.5)
Hungary	4 (1.4)	8 (1.9)	1 (0.7)	8 (2.5)	24 (2.6)	2 (1.1)	26 (3.4)	8 (1.8)
Iran, Islamic Rep. of	49 (3.6)	51 (3.2)	34 (3.1)	26 (2.9)	32 (3.5)	32 (3.7)	39 (3.7)	29 (3.0)
Ireland	25 (3.6)	22 (3.0)	21 (3.2)	22 (3.3)	29 (3.9)	12 (2.5)	19 (2.8)	28 (3.6)
Italy	13 (2.5)	18 (2.7)	18 (3.1)	19 (3.1)	22 (3.5)	18 (3.2)	28 (3.5)	20 (3.0)
Japan	40 (3.9)	37 (4.0)	18 (3.0)	11 (2.4)	12 (2.5)	13 (2.9)	14 (3.0)	4 (1.7)
Kazakhstan	51 (4.1)	56 (4.0)	54 (4.0)	57 (4.2)	66 (3.4)	61 (3.6)	63 (3.4)	56 (3.9)
Korea, Rep. of	31 (3.8)	35 (3.5)	46 (3.7)	27 (3.7)	32 (3.6)	33 (3.6)	33 (3.5)	35 (3.9)
Kosovo	16 (2.7)	16 (3.2)	10 (2.3)	9 (2.4)	28 (3.5)	24 (3.5)	18 (4.0)	19 (3.4)
Kuwait	78 (3.9)	80 (2.6)	82 (3.1)	75 (3.4)	78 (3.6)	76 (3.5)	70 (3.4)	71 (3.9)
Latvia	37 (3.9)	33 (3.7)	32 (3.8)	44 (3.9)	62 (4.0)	28 (3.5)	41 (4.3)	40 (3.7)
Lithuania	28 (3.7)	26 (3.2)	22 (3.4)	35 (3.5)	44 (3.9)	20 (2.7)	38 (3.8)	37 (3.9)
Malta	31 (0.4)	33 (0.4)	25 (0.4)	19 (0.3)	33 (0.4)	30 (0.4)	23 (0.3)	26 (0.4)
Montenegro	31 (2.2)	19 (1.8)	28 (2.4)	15 (1.9)	33 (2.3)	27 (1.8)	25 (2.2)	22 (2.5)
Morocco	24 (3.3)	33 (3.8)	30 (3.3)	23 (3.1)	28 (3.4)	39 (3.5)	38 (4.1)	25 (3.2)
Netherlands	r 8 (3.2)	r 9 (3.3)	r 8 (3.2)	r 16 (4.6)	r 24 (5.2)	r 8 (3.5)	r 17 (4.5)	r 15 (4.6)
New Zealand	29 (3.0)	30 (2.8)	28 (2.8)	20 (2.5)	34 (3.1)	13 (2.2)	21 (2.7)	25 (3.0)
North Macedonia	22 (3.5)	15 (3.0)	19 (3.5)	14 (2.8)	21 (3.2)	23 (3.7)	26 (3.6)	17 (2.9)
Northern Ireland	21 (3.3)	25 (3.5)	17 (3.6)	25 (3.7)	31 (4.3)	5 (2.1)	14 (3.2)	27 (3.8)
Norway (5)	s 11 (2.8)	s 8 (2.4)	s 5 (2.0)	s 8 (2.6)	s 7 (2.2)	s 5 (2.1)	s 9 (2.9)	s 9 (2.3)
Oman	63 (3.2)	59 (3.3)	55 (3.1)	37 (2.9)	50 (3.7)	65 (2.9)	49 (3.7)	50 (3.7)
Pakistan	r 66 (6.2)	r 72 (5.8)	r 73 (5.4)	r 56 (7.5)	r 75 (5.2)	r 70 (5.8)	r 72 (5.8)	r 54 (7.8)
Philippines	76 (3.6)	68 (3.6)	73 (3.6)	61 (4.4)	68 (3.7)	63 (4.0)	63 (4.0)	62 (3.8)
Poland	64 (4.0)	33 (4.0)	57 (4.3)	56 (3.8)	45 (3.9)	34 (3.9)	52 (4.3)	28 (3.8)
Portugal	24 (2.6)	26 (2.9)	15 (2.5)	15 (2.4)	24 (3.1)	9 (1.9)	24 (3.1)	17 (2.5)
Qatar	59 (4.1)	62 (3.2)	46 (4.0)	65 (3.4)	69 (3.3)	54 (3.2)	67 (3.2)	60 (3.7)
Russian Federation	33 (3.4)	36 (3.5)	48 (3.9)	50 (3.6)	46 (3.4)	48 (3.6)	47 (3.9)	50 (3.5)
Saudi Arabia	49 (3.6)	47 (3.6)	52 (3.8)	r 51 (3.6)	r 39 (4.5)	r 39 (4.5)	r 56 (4.0)	r 44 (4.4)
Serbia	28 (3.5)	17 (2.9)	21 (3.5)	26 (3.6)	35 (3.8)	19 (3.3)	36 (3.9)	34 (4.1)
Singapore	67 (2.7)	81 (2.1)	63 (2.6)	58 (2.5)	49 (2.6)	71 (2.6)	36 (2.7)	30 (2.6)
Slovak Republic	24 (3.1)	25 (3.2)	45 (3.7)	35 (2.7)	19 (2.6)	12 (2.4)	17 (2.7)	20 (2.8)
South Africa (5)	68 (3.8)	46 (4.5)	76 (3.2)	59 (3.5)	60 (4.3)	63 (4.1)	55 (4.2)	61 (3.8)
Spain	16 (2.5)	25 (3.2)	16 (2.5)	29 (3.3)	33 (3.1)	19 (2.7)	40 (3.1)	23 (3.5)
Sweden	17 (3.4)	13 (2.8)	10 (2.4)	19 (3.4)	10 (2.6)	15 (3.2)	19 (3.6)	17 (3.4)
Turkey (5)	28 (3.4)	28 (3.7)	36 (3.6)	31 (3.8)	20 (3.0)	25 (3.5)	19 (3.2)	20 (3.0)
United Arab Emirates	r 70 (2.1)	r 67 (2.1)	r 72 (2.3)	r 69 (2.2)	r 77 (1.8)	r 68 (2.3)	r 73 (2.1)	r 70 (2.1)
United States	40 (2.3)	34 (2.2)	43 (2.4)	29 (2.2)	37 (2.2)	21 (1.7)	29 (2.3)	26 (2.0)
England	y - -	y - -	y - -	y - -	y - -	y - -	y - -	y - -
International Average	35 (0.4)	33 (0.4)	34 (0.4)	32 (0.4)	36 (0.5)	28 (0.4)	33 (0.5)	31 (0.5)
Benchmarking Participants								
Ontario, Canada	r 10 (2.7)	r 9 (2.4)	r 19 (3.1)	r 21 (3.3)	r 35 (4.9)	r 9 (3.2)	r 34 (4.4)	r 23 (3.6)
Quebec, Canada	r 19 (3.4)	r 17 (3.6)	r 3 (1.6)	r 12 (3.0)	r 5 (1.7)	r 7 (2.4)	r 5 (1.6)	r 9 (2.8)
Moscow City, Russian Fed.	18 (3.2)	21 (3.4)	38 (4.3)	50 (4.5)	35 (4.5)	28 (3.7)	31 (4.2)	42 (4.3)
Madrid, Spain	22 (3.0)	28 (3.8)	19 (3.0)	34 (4.4)	36 (3.7)	15 (2.5)	45 (4.0)	22 (3.5)
Abu Dhabi, UAE	r 65 (2.7)	r 61 (2.6)	r 65 (2.5)	r 55 (2.7)	r 70 (2.5)	r 59 (2.4)	r 64 (2.4)	r 61 (2.3)
Dubai, UAE	r 71 (2.0)	r 67 (2.3)	r 74 (1.9)	r 78 (2.0)	r 82 (2.0)	r 75 (2.0)	r 81 (2.1)	r 75 (1.5)

* Teachers could indicate participating in more than one area of professional development.

() Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

A dash (-) indicates comparable data not available.

An "r" indicates data are available for at least 70% but less than 85% of the students. An "s" indicates data are available for at least 50% but less than 70% of the students.

A "y" indicates data are available for less than 40% of the students.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from <http://timss2019.org/download>

Exhibit 9.15: Teachers' Participation in Professional Development in Mathematics in the Past Two Years

Students' Results based on Teachers' Reports

Percent of Students by Teachers' Participation in Professional Development*

Country	Mathematics Content	Mathematics Pedagogy/ Instruction	Mathematics Curriculum	Integrating Technology into Mathematics Instruction	Improving Students' Critical Thinking or Problem Solving Skills	Mathematics Assessment	Addressing Individual Students' Needs
Australia	58 (3.0)	63 (3.2)	63 (2.9)	55 (3.0)	58 (3.7)	52 (3.0)	60 (3.2)
Bahrain	52 (3.3)	70 (2.8)	45 (3.0)	79 (2.8)	75 (3.1)	57 (3.8)	59 (3.3)
Chile	50 (4.5)	40 (4.3)	33 (4.0)	28 (3.6)	38 (3.7)	23 (3.3)	36 (3.8)
Chinese Taipei	80 (2.9)	67 (3.2)	77 (3.1)	63 (3.5)	45 (3.0)	52 (3.4)	49 (3.2)
Cyprus	s 68 (3.5)	s 56 (4.0)	s 73 (3.9)	s 38 (4.9)	s 36 (3.8)	s 48 (4.4)	s 38 (4.6)
Egypt	67 (3.9)	69 (3.7)	58 (4.0)	52 (4.1)	66 (4.3)	55 (4.0)	61 (4.3)
England	s 72 (5.6)	s 67 (5.2)	s 75 (5.0)	s 22 (5.4)	s 47 (5.6)	s 45 (5.9)	s 42 (5.9)
Finland	15 (2.3)	29 (2.9)	35 (3.2)	45 (3.4)	15 (2.1)	28 (2.7)	16 (2.4)
France	r 43 (4.3)	r 46 (4.2)	r 47 (4.4)	r 55 (4.5)	r 15 (3.3)	r 33 (4.2)	r 22 (3.3)
Georgia	69 (4.4)	83 (3.5)	69 (3.5)	71 (4.0)	76 (4.3)	68 (4.3)	67 (4.2)
Hong Kong SAR	60 (3.8)	63 (4.3)	54 (4.0)	66 (4.2)	36 (3.8)	35 (4.2)	45 (4.5)
Hungary	17 (3.0)	32 (3.3)	9 (2.4)	28 (3.3)	20 (2.9)	18 (2.9)	24 (3.1)
Iran, Islamic Rep. of	60 (3.1)	65 (3.6)	44 (3.9)	46 (3.1)	36 (3.6)	41 (3.8)	43 (3.4)
Ireland	83 (1.9)	72 (2.6)	86 (2.2)	38 (3.0)	55 (3.0)	48 (2.9)	32 (2.4)
Israel	68 (2.9)	69 (3.0)	48 (3.2)	59 (3.2)	46 (3.2)	42 (2.9)	43 (2.8)
Italy	35 (3.2)	60 (3.9)	35 (3.8)	58 (3.4)	28 (3.4)	32 (3.6)	55 (3.8)
Japan	67 (3.8)	71 (3.6)	35 (3.8)	18 (2.5)	40 (3.6)	28 (3.2)	28 (3.3)
Jordan	39 (3.7)	44 (4.0)	50 (4.2)	48 (3.6)	53 (4.2)	48 (4.6)	46 (4.1)
Kazakhstan	75 (3.3)	80 (3.1)	74 (3.7)	65 (3.9)	68 (3.6)	71 (3.5)	54 (4.2)
Korea, Rep. of	52 (3.8)	65 (3.5)	60 (3.4)	32 (3.6)	40 (3.8)	60 (3.6)	40 (3.6)
Kuwait	84 (2.8)	79 (3.8)	71 (5.1)	65 (4.3)	66 (4.1)	65 (4.6)	60 (4.2)
Lebanon	61 (4.2)	56 (3.9)	54 (4.5)	59 (4.0)	65 (4.1)	58 (3.8)	56 (3.9)
Lithuania	54 (4.1)	59 (3.7)	32 (4.0)	63 (3.6)	51 (3.8)	57 (4.5)	58 (4.1)
Malaysia	74 (2.5)	61 (3.3)	74 (2.8)	46 (3.3)	47 (3.2)	56 (3.7)	32 (3.1)
Morocco	49 (3.8)	48 (3.5)	40 (3.4)	40 (3.4)	43 (3.4)	62 (3.2)	42 (3.4)
New Zealand	61 (2.7)	66 (2.9)	54 (3.4)	58 (3.2)	54 (3.2)	40 (3.5)	51 (3.1)
Norway (9)	s 21 (3.7)	s 23 (3.6)	s 15 (2.6)	s 30 (4.1)	s 16 (3.5)	s 21 (4.0)	s 10 (2.5)
Oman	58 (3.6)	62 (3.4)	52 (3.8)	42 (3.5)	37 (3.5)	57 (3.8)	32 (3.6)
Portugal	57 (4.2)	58 (4.1)	43 (4.3)	61 (3.8)	18 (3.2)	26 (3.6)	30 (3.6)
Qatar	70 (3.5)	77 (3.2)	68 (3.9)	75 (3.9)	70 (3.4)	63 (3.7)	71 (3.6)
Romania	38 (3.2)	35 (3.8)	28 (2.8)	31 (3.8)	22 (3.3)	33 (3.1)	33 (3.1)
Russian Federation	68 (3.4)	74 (3.8)	70 (3.3)	69 (3.4)	47 (3.4)	56 (3.7)	51 (3.6)
Saudi Arabia	46 (3.8)	64 (4.0)	38 (4.1)	59 (3.6)	62 (4.1)	35 (3.8)	47 (4.0)
Singapore	60 (2.7)	82 (2.3)	62 (2.7)	57 (2.6)	57 (2.6)	60 (2.6)	43 (2.7)
South Africa (9)	84 (2.3)	58 (3.0)	74 (2.4)	46 (3.1)	56 (2.8)	70 (2.5)	50 (3.0)
Sweden	34 (3.3)	41 (4.0)	29 (3.2)	51 (3.8)	23 (3.2)	29 (3.7)	40 (3.5)
Turkey	26 (3.0)	27 (3.4)	33 (3.5)	34 (3.8)	22 (2.9)	24 (3.8)	19 (3.1)
United Arab Emirates	76 (1.7)	75 (1.6)	r 71 (2.0)	r 79 (1.3)	r 83 (1.1)	74 (1.4)	r 77 (1.4)
United States	74 (2.3)	73 (2.7)	77 (2.7)	67 (2.9)	60 (2.9)	56 (2.8)	61 (3.0)
International Average	57 (0.6)	60 (0.6)	53 (0.6)	51 (0.6)	46 (0.6)	47 (0.6)	44 (0.6)
Benchmarking Participants							
Ontario, Canada	71 (3.9)	83 (2.7)	56 (4.6)	55 (3.8)	75 (3.9)	60 (4.9)	62 (4.2)
Quebec, Canada	32 (3.9)	54 (4.6)	17 (3.3)	67 (4.1)	25 (3.6)	36 (4.0)	36 (4.5)
Moscow City, Russian Fed.	61 (3.5)	59 (3.6)	57 (3.8)	78 (3.8)	39 (3.9)	47 (4.1)	42 (3.8)
Gauteng, RSA (9)	90 (2.7)	64 (4.1)	79 (3.3)	60 (3.9)	61 (4.4)	77 (3.7)	52 (4.8)
Western Cape, RSA (9)	85 (2.8)	58 (4.4)	79 (3.2)	58 (4.5)	47 (4.1)	62 (4.3)	40 (4.2)
Abu Dhabi, UAE	r 76 (3.1)	r 74 (2.3)	r 73 (2.7)	r 77 (2.4)	r 78 (2.1)	r 71 (2.6)	r 71 (2.7)
Dubai, UAE	r 73 (2.0)	r 75 (1.9)	r 73 (3.2)	r 81 (1.6)	r 86 (1.6)	r 77 (2.1)	r 82 (1.9)

* Teachers could indicate participating in more than one area of professional development.

() Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

An "r" indicates data are available for at least 70% but less than 85% of the students. An "s" indicates data are available for at least 50% but less than 70% of the students.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from <http://timss2019.org/download>

Exhibit 9.16: Teachers' Participation in Professional Development in Science in the Past Two Years
Students' Results based on Teachers' Reports

Percent of Students by Teachers' Participation in Professional Development*

Country	Science Content	Science Pedagogy/ Instruction	Science Curriculum	Integrating Technology into Science Instruction	Improving Students' Critical Thinking or Inquiry Skills	Science Assessment	Addressing Individual Students' Needs
Australia	r 50 (3.5)	r 54 (3.5)	r 62 (2.9)	r 49 (3.1)	r 55 (3.6)	r 44 (3.2)	r 66 (2.8)
Bahrain	39 (2.6)	59 (2.8)	36 (2.8)	78 (2.0)	69 (2.8)	58 (2.2)	60 (3.0)
Chile	34 (3.9)	34 (4.0)	23 (3.4)	21 (3.1)	31 (4.1)	22 (3.4)	26 (3.5)
Chinese Taipei	76 (3.5)	69 (3.6)	74 (3.6)	71 (3.3)	43 (3.3)	49 (3.4)	39 (3.4)
Cyprus	s 62 (1.8)	s 65 (1.6)	s 67 (2.1)	s 43 (1.7)	s 52 (2.2)	s 59 (2.0)	s 36 (2.0)
Egypt	71 (3.6)	76 (3.8)	59 (4.0)	57 (4.1)	52 (4.0)	49 (4.4)	43 (4.4)
England	s 72 (5.3)	s 56 (6.3)	s 72 (5.0)	s 23 (5.2)	s 35 (5.3)	s 60 (5.7)	s 50 (5.8)
Finland	20 (1.7)	27 (2.0)	32 (2.0)	38 (2.4)	10 (1.4)	25 (1.9)	17 (1.8)
France	r 47 (3.2)	r 57 (3.5)	r 60 (3.1)	r 47 (3.2)	r 22 (2.9)	r 37 (3.2)	r 34 (3.2)
Georgia	72 (2.2)	83 (2.1)	74 (2.2)	67 (2.9)	74 (2.7)	76 (2.1)	70 (2.4)
Hong Kong SAR	72 (4.0)	69 (4.1)	64 (3.9)	65 (4.0)	37 (4.6)	46 (4.1)	48 (4.4)
Hungary	17 (1.8)	26 (2.4)	7 (1.1)	21 (2.0)	19 (2.0)	10 (1.2)	25 (2.1)
Iran, Islamic Rep. of	63 (3.6)	65 (3.3)	42 (3.9)	44 (3.7)	42 (3.8)	47 (3.4)	49 (3.3)
Ireland	87 (2.1)	76 (2.9)	95 (1.5)	39 (3.1)	51 (3.7)	74 (3.1)	34 (3.5)
Israel	75 (3.0)	79 (2.9)	53 (4.0)	56 (3.7)	49 (3.6)	41 (4.2)	43 (3.6)
Italy	28 (3.5)	39 (4.0)	25 (3.6)	44 (3.5)	22 (3.0)	17 (2.7)	44 (3.8)
Japan	76 (3.3)	72 (3.6)	39 (3.7)	27 (3.3)	26 (3.9)	26 (3.9)	26 (3.7)
Jordan	43 (3.9)	62 (4.2)	46 (4.3)	52 (3.7)	57 (3.7)	39 (3.4)	44 (4.2)
Kazakhstan	76 (1.9)	78 (2.1)	75 (2.3)	67 (2.3)	67 (2.2)	72 (2.0)	58 (2.3)
Korea, Rep. of	60 (3.1)	69 (3.5)	54 (3.1)	41 (3.7)	46 (3.8)	55 (3.3)	37 (3.4)
Kuwait	87 (2.8)	82 (3.8)	79 (3.2)	71 (3.3)	78 (3.8)	66 (4.0)	63 (3.8)
Lebanon	65 (2.5)	60 (2.9)	64 (2.6)	52 (2.5)	58 (2.8)	63 (2.6)	53 (2.8)
Lithuania	60 (2.0)	48 (2.3)	41 (1.9)	58 (2.4)	56 (2.8)	51 (2.2)	53 (2.1)
Malaysia	69 (3.5)	62 (3.8)	73 (3.0)	47 (3.8)	46 (3.6)	65 (3.1)	29 (3.5)
Morocco	49 (2.3)	52 (2.5)	38 (2.1)	44 (2.4)	40 (2.2)	58 (2.5)	33 (2.0)
New Zealand	52 (3.3)	56 (3.6)	46 (4.3)	54 (3.7)	44 (3.3)	42 (3.5)	51 (3.9)
Norway (9)	s 11 (2.8)	s 11 (2.8)	s 7 (2.3)	s 5 (1.6)	s 8 (2.6)	s 11 (2.7)	s 9 (3.1)
Oman	56 (3.7)	65 (3.3)	57 (3.5)	48 (3.3)	42 (3.9)	52 (4.1)	37 (3.6)
Portugal	57 (3.3)	52 (3.1)	30 (2.8)	58 (3.1)	24 (2.4)	22 (2.6)	32 (3.0)
Qatar	62 (4.3)	83 (2.7)	53 (3.5)	78 (3.3)	78 (4.0)	65 (3.5)	67 (4.3)
Romania	37 (3.2)	36 (3.1)	26 (2.5)	38 (2.8)	29 (2.9)	30 (2.2)	34 (2.6)
Russian Federation	78 (1.9)	75 (1.5)	69 (1.9)	69 (1.9)	51 (2.5)	56 (1.9)	53 (2.0)
Saudi Arabia	53 (3.5)	67 (3.8)	41 (3.9)	65 (3.9)	62 (4.4)	33 (3.9)	51 (3.6)
Singapore	58 (3.1)	88 (1.9)	61 (2.7)	69 (2.9)	61 (2.7)	67 (2.3)	44 (2.5)
South Africa (9)	67 (3.3)	44 (2.7)	68 (2.9)	38 (3.2)	43 (3.0)	57 (3.2)	40 (3.3)
Sweden	32 (3.6)	24 (3.2)	20 (2.9)	33 (3.3)	15 (2.6)	28 (3.4)	45 (3.4)
Turkey	29 (3.3)	37 (3.7)	46 (3.5)	42 (3.9)	21 (3.6)	22 (3.0)	19 (3.2)
United Arab Emirates	r 72 (1.7)	r 75 (1.3)	r 72 (1.2)	r 79 (1.5)	r 83 (1.1)	r 69 (1.8)	r 79 (1.1)
United States	r 72 (2.2)	r 61 (2.6)	r 74 (2.4)	r 64 (2.9)	r 66 (2.8)	r 51 (2.9)	r 64 (2.8)
International Average	57 (0.5)	59 (0.5)	52 (0.5)	50 (0.5)	45 (0.5)	46 (0.5)	44 (0.5)
Benchmarking Participants							
Ontario, Canada	s 21 (4.7)	s 26 (4.2)	s 19 (3.8)	s 34 (5.7)	s 44 (5.3)	s 19 (4.5)	s 45 (5.6)
Moscow City, Russian Fed.	66 (2.1)	57 (2.2)	49 (2.3)	76 (2.0)	42 (2.2)	40 (2.5)	42 (2.4)
Gauteng, RSA (9)	78 (3.7)	50 (4.6)	73 (3.8)	51 (4.4)	50 (3.6)	65 (3.7)	44 (4.8)
Western Cape, RSA (9)	74 (3.4)	57 (3.6)	72 (3.3)	52 (4.4)	42 (4.3)	62 (3.6)	38 (4.3)
Abu Dhabi, UAE	r 72 (2.6)	r 75 (2.2)	r 72 (1.9)	r 77 (2.1)	r 79 (1.9)	r 64 (2.5)	r 72 (2.1)
Dubai, UAE	r 63 (2.6)	r 71 (1.6)	r 68 (2.3)	r 78 (2.5)	r 82 (2.0)	r 71 (2.6)	r 84 (1.1)
Quebec, Canada	y - -	y - -	y - -	y - -	y - -	y - -	y - -

* Teachers could indicate participating in more than one area of professional development.

() Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

A dash (-) indicates comparable data not available.

An "r" indicates data are available for at least 70% but less than 85% of the students. An "s" indicates data are available for at least 50% but less than 70% of the students.

A "y" indicates data are available for less than 40% of the students.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from <http://timss2019.org/download>

Teachers' Professional Development Needs

Along with being asked about participation in professional development in the last two years (Exhibits 9.13 through 9.16), teachers were asked about their *need* for future professional development in the same areas. Teachers' reports on their professional development needs are presented in Exhibits 9.17, 9.18, 9.19, and 9.20, for fourth grade mathematics and science and eighth grade mathematics and science, respectively.

On average across countries, professional development related to integrating technology into instruction and improving students' critical thinking skills were the two areas of need most commonly reported by mathematics and science teachers in the fourth and eighth grades. In both grades and both subjects, 68 to 72 percent of students had teachers who identified integrating technology into instruction as a need (72% in fourth grade mathematics, 68% in fourth grade science, 71% in eighth grade mathematics, and 70% in eighth grade science); 65 to 69 percent of students had teachers who identified improving critical thinking or problem solving/inquiry skills as a need (69% in fourth and eighth grade mathematics, 65% in fourth grade science, and 68% in eighth grade science). Addressing individual students' needs was the third most commonly reported area of need for teachers of mathematics in both grades and teachers of science in eighth grade; 64 to 66 percent of students had teachers who identified addressing individual students' needs as a professional development need (64% for fourth grade mathematics, 65% for eighth grade mathematics, and 66% for eighth grade science). In fourth grade science, the third area of greatest need was integrating science into other subjects (62%).

It is perhaps not surprising that integrating technology into instruction was a common need given the growing role of technology in instruction and, in fourth grade, it was one of the less common areas of teachers' reported participation. Addressing individual students' needs was also one of the less commonly reported areas of professional development participation for eighth grade mathematics teachers and science teachers in both grades (see Exhibits 9.13 through 9.16).

Exhibit 9.17: Teachers' Needs for Future Professional Development in Mathematics

Students' Results based on Teachers' Reports

Country	Percent of Students by Teachers Indicating a Need for Future Professional Development*						
	Mathematics Content	Mathematics Pedagogy/ Instruction	Mathematics Curriculum	Integrating Technology into Mathematics Instruction	Improving Students' Critical Thinking or Problem Solving Skills	Mathematics Assessment	Addressing Individual Students' Needs
Albania	53 (3.7)	65 (3.2)	57 (3.9)	78 (3.3)	60 (4.2)	52 (4.2)	59 (4.3)
Armenia	r 47 (3.9)	r 48 (4.5)	r 61 (4.4)	r 80 (3.7)	r 65 (4.4)	r 50 (4.2)	r 68 (4.1)
Australia	43 (3.7)	54 (3.7)	40 (3.5)	78 (2.8)	76 (3.1)	63 (3.2)	63 (3.8)
Austria	17 (2.4)	20 (2.8)	11 (1.9)	43 (3.2)	52 (3.0)	41 (3.0)	52 (3.1)
Azerbaijan	r 56 (3.7)	r 56 (4.3)	r 59 (4.2)	r 63 (3.9)	r 61 (3.8)	r 57 (3.8)	r 54 (4.1)
Bahrain	56 (3.5)	71 (2.9)	54 (3.3)	78 (3.2)	76 (2.9)	70 (3.3)	74 (2.8)
Belgium (Flemish)	14 (2.6)	27 (3.2)	29 (2.8)	66 (3.8)	52 (4.1)	20 (2.9)	46 (3.5)
Bosnia and Herzegovina	29 (3.1)	30 (3.0)	28 (2.8)	72 (3.5)	63 (3.4)	36 (3.4)	54 (3.6)
Bulgaria	21 (3.8)	28 (4.2)	12 (3.1)	65 (4.3)	69 (3.8)	25 (3.7)	50 (4.5)
Canada	r 32 (2.4)	r 50 (3.0)	r 32 (2.3)	r 75 (2.4)	r 64 (2.4)	r 50 (3.0)	r 56 (2.5)
Chile	61 (4.3)	66 (3.8)	63 (4.0)	85 (2.8)	83 (3.2)	77 (3.9)	78 (3.4)
Chinese Taipei	79 (3.2)	80 (3.1)	77 (3.1)	86 (2.8)	91 (2.2)	79 (3.2)	83 (3.1)
Croatia	63 (3.3)	59 (3.6)	58 (3.5)	90 (2.7)	87 (2.6)	77 (3.3)	83 (2.7)
Cyprus	33 (4.0)	46 (3.9)	33 (3.5)	76 (3.3)	65 (3.6)	50 (4.1)	67 (3.9)
Czech Republic	28 (3.7)	44 (3.5)	28 (3.3)	62 (3.4)	58 (3.5)	40 (3.5)	47 (3.7)
Denmark	r 27 (3.6)	r 31 (4.0)	r 19 (3.8)	r 49 (4.7)	r 56 (4.2)	r 31 (4.3)	r 44 (4.0)
Finland	22 (2.5)	54 (3.0)	24 (2.8)	70 (3.0)	65 (2.6)	44 (2.6)	56 (3.3)
France	25 (3.2)	56 (3.2)	20 (2.5)	76 (3.0)	63 (3.6)	40 (3.7)	68 (3.3)
Georgia	r 52 (4.5)	r 68 (4.7)	r 62 (5.0)	r 75 (4.0)	r 77 (3.6)	r 72 (4.0)	r 75 (3.7)
Germany	r 24 (3.5)	r 34 (3.9)	r 16 (3.2)	r 57 (4.5)	r 60 (3.8)	r 34 (3.7)	r 46 (3.7)
Hong Kong SAR	73 (4.5)	82 (4.5)	71 (4.3)	86 (3.4)	82 (4.4)	73 (4.4)	75 (3.6)
Hungary	20 (3.5)	47 (3.7)	18 (3.0)	56 (3.3)	65 (3.3)	36 (3.7)	53 (4.1)
Iran, Islamic Rep. of	66 (3.7)	63 (3.4)	51 (3.7)	81 (2.9)	71 (3.9)	58 (3.9)	63 (3.9)
Ireland	37 (3.8)	54 (3.7)	37 (3.9)	81 (3.1)	75 (3.5)	49 (3.9)	58 (3.8)
Italy	41 (3.7)	59 (3.6)	40 (3.7)	81 (2.7)	64 (3.7)	52 (3.9)	63 (3.6)
Japan	74 (3.2)	88 (2.3)	60 (3.6)	69 (3.7)	84 (2.8)	68 (3.0)	86 (2.2)
Kazakhstan	r 46 (4.0)	55 (3.9)	55 (4.0)	r 66 (3.8)	r 61 (3.8)	55 (3.4)	r 56 (3.8)
Korea, Rep. of	58 (4.3)	78 (2.8)	60 (4.4)	76 (3.2)	83 (3.0)	67 (4.0)	78 (3.4)
Kosovo	r 74 (5.3)	r 74 (5.0)	r 84 (3.0)	s 84 (3.6)	r 83 (3.6)	r 83 (3.6)	r 80 (3.5)
Kuwait	r 60 (4.0)	r 60 (4.0)	r 50 (4.2)	r 70 (4.0)	r 65 (4.1)	r 57 (5.1)	r 67 (3.9)
Latvia	44 (4.1)	47 (3.6)	35 (3.1)	73 (3.3)	58 (3.5)	49 (3.8)	59 (3.8)
Lithuania	47 (3.7)	51 (3.5)	45 (3.4)	73 (3.4)	67 (3.3)	51 (3.5)	59 (3.8)
Malta	51 (0.4)	64 (0.4)	55 (0.4)	82 (0.3)	78 (0.4)	64 (0.4)	73 (0.4)
Montenegro	50 (2.4)	49 (2.1)	57 (2.8)	81 (2.4)	66 (2.5)	50 (2.8)	63 (2.7)
Morocco	57 (4.0)	65 (3.8)	61 (3.9)	81 (3.3)	73 (3.2)	65 (3.3)	76 (3.3)
Netherlands	r 29 (4.4)	r 38 (5.6)	r 14 (3.8)	r 52 (5.1)	r 48 (6.2)	r 33 (5.5)	r 47 (6.0)
New Zealand	48 (3.3)	57 (3.0)	37 (2.8)	74 (2.8)	75 (2.6)	52 (3.0)	59 (3.0)
North Macedonia	42 (4.4)	43 (4.4)	43 (4.8)	63 (4.2)	54 (4.4)	42 (4.4)	55 (3.8)
Northern Ireland	33 (4.1)	41 (4.1)	33 (4.1)	71 (4.0)	67 (4.3)	46 (4.4)	54 (4.7)
Norway (5)	r 41 (4.8)	r 56 (4.7)	r 38 (4.6)	r 76 (3.6)	r 61 (4.6)	r 54 (4.5)	r 60 (4.8)
Oman	63 (3.2)	56 (3.4)	58 (3.6)	75 (3.2)	66 (3.4)	60 (3.7)	67 (4.2)
Pakistan	r 74 (7.2)	r 66 (7.2)	r 57 (7.7)	r 73 (5.6)	r 78 (5.2)	r 70 (7.9)	r 75 (7.2)
Philippines	93 (1.6)	92 (1.9)	89 (2.5)	96 (1.5)	96 (1.5)	92 (1.7)	93 (2.0)
Poland	32 (3.6)	40 (4.1)	20 (3.2)	53 (3.4)	63 (3.4)	32 (3.8)	49 (4.2)
Portugal	34 (3.0)	57 (3.5)	37 (3.0)	79 (2.8)	68 (3.2)	46 (3.4)	55 (3.3)
Qatar	44 (3.9)	53 (4.1)	48 (4.1)	63 (3.3)	63 (3.0)	50 (3.6)	58 (3.9)
Russian Federation	68 (3.3)	69 (3.5)	72 (2.9)	82 (3.3)	82 (3.0)	73 (3.5)	83 (2.6)
Saudi Arabia	r 31 (3.8)	r 37 (3.7)	r 27 (3.3)	r 61 (3.5)	r 47 (4.2)	r 38 (3.7)	r 53 (4.1)
Serbia	24 (3.3)	30 (3.5)	27 (3.5)	64 (4.0)	56 (4.2)	36 (4.0)	49 (3.6)
Singapore	44 (2.9)	64 (2.5)	45 (2.7)	75 (2.2)	79 (2.1)	63 (2.4)	75 (2.1)
Slovak Republic	30 (2.5)	45 (3.2)	31 (3.1)	62 (3.3)	68 (3.0)	40 (3.2)	56 (2.8)
South Africa (5)	70 (3.7)	78 (3.3)	68 (4.1)	83 (3.3)	84 (3.0)	73 (3.8)	83 (3.8)
Spain	39 (3.4)	65 (4.1)	31 (3.3)	79 (3.3)	70 (3.6)	56 (3.5)	69 (3.6)
Sweden	r 35 (4.0)	r 49 (4.3)	r 26 (3.4)	r 68 (4.1)	r 61 (4.5)	r 58 (4.5)	r 60 (4.6)
Turkey (5)	48 (4.0)	62 (3.7)	64 (3.5)	86 (2.8)	87 (2.8)	64 (3.7)	74 (3.4)
United Arab Emirates	r 50 (1.8)	r 56 (1.5)	r 52 (1.9)	r 66 (1.5)	r 66 (1.5)	r 55 (1.8)	r 59 (1.6)
United States	38 (2.5)	45 (2.3)	41 (2.6)	66 (2.5)	64 (2.6)	45 (3.0)	58 (2.6)
England	x 31 (6.7)	y - -	x 31 (6.4)	y - -	y - -	y - -	y - -
International Average	45 (0.5)	55 (0.5)	44 (0.5)	72 (0.5)	69 (0.5)	54 (0.5)	64 (0.5)
Benchmarking Participants							
Ontario, Canada	r 38 (4.2)	r 49 (5.9)	r 38 (4.0)	r 79 (3.7)	r 61 (4.4)	r 55 (5.6)	r 56 (4.6)
Quebec, Canada	15 (2.7)	45 (4.1)	12 (2.8)	72 (4.0)	56 (4.6)	34 (3.9)	48 (4.2)
Moscow City, Russian Fed.	59 (4.2)	66 (4.2)	73 (4.0)	85 (3.2)	90 (2.4)	75 (3.9)	85 (3.3)
Madrid, Spain	52 (4.8)	79 (3.6)	44 (4.6)	89 (2.6)	86 (3.0)	62 (3.9)	81 (3.7)
Abu Dhabi, UAE	r 44 (2.8)	r 52 (2.8)	r 47 (2.6)	r 64 (2.5)	r 66 (2.8)	r 53 (3.0)	r 60 (3.0)
Dubai, UAE	r 58 (2.2)	r 65 (2.4)	r 58 (2.3)	r 73 (2.4)	r 74 (2.2)	r 63 (2.5)	r 65 (2.4)

* Teachers could indicate needing professional development in more than one area.
 () Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.
 A dash (-) indicates comparable data not available.
 An "r" indicates data are available for at least 70% but less than 85% of the students. An "s" indicates data are available for at least 50% but less than 70% of the students.
 An "x" indicates data are available for at least 40% but less than 50% of the students—interpret with caution. A "y" indicates data are available for less than 40% of the students.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
 Downloaded from <http://timss2019.org/download>

Exhibit 9.18: Teachers' Needs for Future Professional Development in Science

Students' Results based on Teachers' Reports

Percent of Students by Teachers Indicating a Need for Future Professional Development*

Country	Science Content	Science Pedagogy/ Instruction	Science Curriculum	Integrating Technology into Science Instruction	Improving Students' Critical Thinking or Inquiry Skills	Science Assessment	Addressing Individual Students' Needs	Integrating Science with Other Subjects
Albania	55 (4.1)	60 (4.1)	59 (4.2)	75 (3.8)	66 (4.4)	53 (4.7)	63 (4.3)	67 (4.1)
Armenia	r 66 (3.9)	r 65 (3.7)	r 67 (4.1)	r 76 (3.9)	r 63 (4.4)	r 52 (4.3)	r 64 (4.8)	r 68 (4.5)
Australia	54 (3.9)	59 (3.7)	54 (3.7)	74 (3.3)	68 (4.0)	66 (4.3)	61 (4.4)	67 (3.7)
Austria	39 (2.8)	32 (2.8)	21 (2.1)	37 (3.7)	45 (3.4)	29 (3.0)	30 (2.8)	43 (3.6)
Azerbaijan	r 59 (4.0)	r 59 (3.8)	r 58 (3.7)	r 51 (3.8)	r 57 (4.5)	r 55 (3.7)	r 53 (3.9)	r 53 (4.1)
Bahrain	52 (3.4)	r 53 (3.3)	r 53 (3.5)	r 63 (3.3)	r 56 (3.6)	r 54 (3.2)	r 59 (3.1)	r 53 (3.7)
Belgium (Flemish)	25 (3.9)	28 (3.3)	25 (3.0)	55 (3.4)	36 (3.4)	32 (3.2)	36 (3.8)	50 (4.2)
Bosnia and Herzegovina	34 (3.3)	34 (3.0)	31 (3.0)	73 (3.6)	60 (3.5)	31 (3.1)	50 (3.5)	61 (3.9)
Bulgaria	24 (4.0)	26 (3.6)	12 (3.2)	65 (3.9)	65 (3.9)	32 (4.2)	44 (4.8)	47 (3.7)
Canada	r 50 (2.5)	r 56 (2.9)	r 41 (2.4)	r 70 (2.0)	r 62 (2.8)	r 50 (2.4)	r 48 (3.2)	r 62 (2.2)
Chile	r 70 (4.1)	r 70 (4.5)	r 62 (4.4)	r 81 (3.6)	r 82 (3.5)	r 72 (3.7)	r 70 (4.1)	r 77 (4.1)
Chinese Taipei	82 (3.2)	76 (3.6)	82 (3.1)	88 (2.6)	85 (2.9)	77 (3.2)	78 (3.2)	85 (2.9)
Croatia	71 (2.6)	61 (3.5)	58 (3.4)	88 (2.6)	85 (2.8)	79 (2.8)	80 (2.7)	79 (3.1)
Cyprus	45 (4.8)	50 (5.3)	40 (4.6)	77 (4.3)	60 (5.0)	64 (4.3)	67 (5.1)	62 (4.9)
Czech Republic	27 (3.6)	33 (3.8)	20 (3.3)	51 (3.7)	46 (3.2)	26 (3.3)	25 (2.9)	37 (3.5)
Denmark	r 44 (4.0)	r 37 (4.0)	r 22 (3.5)	r 37 (3.7)	r 46 (4.7)	r 30 (4.2)	r 31 (3.7)	r 36 (4.3)
Finland	32 (2.9)	46 (2.9)	29 (2.9)	61 (3.0)	53 (3.0)	40 (3.0)	45 (3.4)	51 (2.8)
France	46 (3.9)	65 (3.7)	35 (3.5)	74 (3.0)	56 (3.0)	40 (4.0)	50 (3.5)	63 (3.6)
Georgia	r 63 (4.7)	r 68 (4.9)	r 60 (5.1)	r 80 (3.8)	r 72 (4.0)	r 65 (4.4)	r 69 (4.0)	r 74 (3.9)
Germany	r 43 (3.9)	r 43 (3.5)	r 18 (3.0)	r 54 (4.1)	r 45 (4.2)	r 27 (3.7)	r 33 (4.2)	r 41 (3.5)
Hong Kong SAR	r 69 (4.0)	75 (4.5)	68 (3.9)	75 (4.0)	79 (4.1)	r 66 (4.0)	70 (4.1)	80 (3.8)
Hungary	28 (3.0)	39 (3.4)	17 (3.0)	42 (4.0)	54 (3.7)	25 (3.4)	47 (4.0)	37 (3.7)
Iran, Islamic Rep. of	58 (3.7)	60 (3.6)	50 (3.4)	74 (3.2)	68 (3.7)	54 (3.6)	60 (3.7)	69 (3.5)
Ireland	47 (3.7)	58 (3.9)	42 (3.7)	78 (3.1)	73 (3.6)	62 (4.1)	54 (3.6)	67 (3.3)
Italy	48 (4.2)	66 (3.7)	39 (3.9)	77 (3.1)	66 (3.8)	47 (4.1)	64 (4.1)	72 (3.8)
Japan	72 (3.7)	89 (2.8)	63 (3.9)	69 (4.1)	80 (3.4)	71 (3.7)	80 (3.0)	53 (4.1)
Kazakhstan	r 57 (3.9)	r 55 (4.1)	r 56 (4.3)	r 65 (4.2)	r 66 (4.2)	r 60 (4.2)	r 57 (4.4)	r 57 (4.1)
Korea, Rep. of	62 (3.8)	66 (3.9)	59 (4.1)	75 (3.7)	79 (3.2)	58 (4.4)	66 (3.7)	74 (3.4)
Kosovo	r 80 (3.7)	r 77 (4.2)	r 84 (4.0)	r 88 (3.0)	r 84 (3.5)	r 82 (3.7)	r 87 (2.9)	r 86 (3.3)
Kuwait	60 (4.5)	57 (4.6)	56 (4.6)	66 (3.8)	67 (3.9)	59 (4.5)	68 (4.3)	60 (4.4)
Latvia	46 (3.9)	45 (3.6)	38 (3.8)	65 (3.3)	54 (3.9)	54 (3.6)	45 (3.9)	66 (3.8)
Lithuania	49 (3.6)	51 (3.5)	44 (3.9)	73 (3.1)	57 (3.1)	56 (3.5)	54 (3.6)	55 (3.6)
Malta	69 (0.4)	72 (0.4)	74 (0.4)	86 (0.3)	81 (0.3)	79 (0.3)	73 (0.3)	74 (0.3)
Montenegro	59 (2.8)	56 (2.8)	59 (2.4)	81 (2.3)	66 (2.3)	50 (2.6)	65 (2.6)	63 (3.1)
Morocco	66 (3.7)	77 (3.4)	72 (3.8)	85 (2.4)	79 (3.3)	71 (3.9)	76 (3.3)	77 (3.6)
Netherlands	r 29 (4.1)	r 27 (4.3)	r 26 (3.4)	r 43 (3.7)	r 43 (3.9)	r 18 (2.6)	r 26 (4.6)	r 50 (4.8)
New Zealand	69 (2.8)	70 (2.9)	60 (3.3)	76 (2.7)	71 (2.5)	64 (2.9)	62 (2.8)	72 (2.6)
North Macedonia	45 (4.2)	47 (4.3)	43 (4.7)	60 (4.2)	64 (4.3)	48 (4.7)	52 (4.5)	53 (4.7)
Northern Ireland	62 (4.4)	63 (4.8)	61 (4.5)	r 74 (4.1)	r 66 (4.3)	59 (4.3)	r 55 (4.4)	64 (4.2)
Norway (5)	s 65 (4.3)	s 68 (4.5)	s 53 (4.9)	s 73 (4.5)	s 62 (5.1)	s 53 (4.7)	s 52 (5.5)	s 61 (4.6)
Oman	62 (3.0)	58 (3.7)	59 (3.3)	67 (3.3)	70 (3.3)	63 (3.3)	59 (3.5)	66 (4.0)
Pakistan	s 70 (8.7)	s 79 (5.2)	s 67 (8.8)	s 58 (8.3)	s 78 (5.5)	s 70 (9.0)	s 70 (8.7)	s 68 (9.0)
Philippines	s 81 (3.9)	s 77 (4.2)	s 78 (4.2)	s 76 (3.8)	s 78 (4.2)	s 77 (4.1)	s 78 (3.9)	s 75 (4.2)
Poland	25 (4.2)	23 (3.5)	17 (3.4)	47 (4.6)	46 (4.0)	r 29 (4.3)	r 35 (4.0)	33 (4.1)
Portugal	38 (3.4)	59 (3.2)	37 (3.5)	77 (2.9)	58 (3.2)	43 (3.6)	48 (3.1)	72 (2.7)
Qatar	50 (3.4)	54 (4.0)	48 (3.2)	64 (2.8)	64 (2.9)	54 (3.6)	60 (4.1)	58 (3.9)
Russian Federation	67 (4.2)	68 (3.8)	68 (3.8)	78 (3.2)	79 (3.3)	68 (3.6)	72 (3.4)	72 (3.9)
Saudi Arabia	63 (3.6)	55 (3.4)	42 (3.7)	42 (3.7)	r 40 (4.0)	r 56 (4.2)	r 38 (4.2)	r 44 (3.9)
Serbia	30 (3.5)	38 (4.0)	32 (2.8)	61 (3.9)	54 (4.4)	36 (3.3)	44 (3.5)	54 (4.3)
Singapore	53 (2.3)	71 (2.1)	56 (2.6)	78 (2.2)	81 (2.4)	68 (2.4)	70 (2.5)	66 (2.6)
Slovak Republic	46 (3.7)	46 (3.0)	31 (2.9)	55 (3.5)	61 (2.6)	35 (2.8)	46 (3.3)	43 (3.3)
South Africa (5)	78 (3.5)	75 (3.6)	74 (3.7)	78 (3.5)	81 (3.4)	74 (3.8)	79 (3.4)	79 (3.4)
Spain	48 (3.7)	72 (3.0)	42 (3.9)	82 (2.8)	68 (3.4)	55 (3.5)	63 (3.0)	73 (2.7)
Sweden	r 55 (4.7)	r 46 (4.7)	r 33 (4.3)	r 68 (4.5)	r 65 (4.5)	r 55 (4.9)	r 52 (4.6)	r 57 (4.5)
Turkey (5)	61 (3.8)	74 (3.3)	69 (3.8)	84 (2.6)	84 (2.9)	76 (3.3)	78 (3.6)	83 (3.0)
United Arab Emirates	r 48 (1.9)	r 54 (1.7)	r 49 (2.0)	r 64 (1.7)	r 62 (1.8)	r 51 (1.6)	r 55 (1.9)	r 57 (1.9)
United States	61 (2.5)	58 (2.2)	60 (2.6)	70 (2.5)	67 (2.6)	57 (2.7)	56 (2.4)	65 (2.5)
England	y - -	y - -	y - -	y - -	y - -	y - -	y - -	y - -
International Average	54 (0.5)	57 (0.5)	49 (0.5)	68 (0.5)	65 (0.5)	54 (0.5)	57 (0.5)	62 (0.5)
Benchmarking Participants								
Ontario, Canada	r 49 (4.7)	r 58 (5.9)	r 38 (4.3)	r 76 (2.9)	r 63 (5.4)	r 50 (4.6)	r 50 (6.3)	r 63 (4.3)
Quebec, Canada	r 52 (4.8)	r 59 (4.4)	r 39 (4.5)	r 66 (4.3)	r 57 (4.5)	r 53 (5.0)	r 45 (4.9)	r 61 (4.6)
Moscow City, Russian Fed.	61 (4.2)	61 (4.3)	65 (3.9)	84 (2.9)	82 (3.4)	72 (3.5)	79 (3.5)	85 (3.2)
Madrid, Spain	54 (4.9)	71 (4.0)	40 (4.8)	77 (3.4)	70 (3.9)	53 (4.1)	66 (4.5)	72 (3.5)
Abu Dhabi, UAE	r 49 (3.0)	r 53 (2.4)	r 49 (2.7)	r 67 (2.5)	r 60 (2.8)	r 51 (2.8)	r 55 (3.0)	r 55 (2.6)
Dubai, UAE	r 50 (3.4)	r 62 (3.4)	r 54 (2.9)	r 65 (3.3)	s 68 (3.4)	r 58 (3.4)	r 61 (3.5)	r 63 (3.7)

* Teachers could indicate needing professional development in more than one area.

() Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

A dash (-) indicates comparable data not available.

An "r" indicates data are available for at least 70% but less than 85% of the students. An "s" indicates data are available for at least 50% but less than 70% of the students.

A "y" indicates data are available for less than 40% of the students.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Exhibit 9.19: Teachers' Needs for Future Professional Development in Mathematics

Students' Results based on Teachers' Reports

Percent of Students by Teacher Indicating a Need for Future Professional Development*

Country	Mathematics Content	Mathematics Pedagogy/ Instruction	Mathematics Curriculum	Integrating Technology into Mathematics Instruction	Improving Students' Critical Thinking or Problem Solving Skills	Mathematics Assessment	Addressing Individual Students' Needs
Australia	58 (3.3)	70 (2.9)	61 (3.7)	81 (2.7)	84 (2.2)	71 (3.1)	77 (3.2)
Bahrain	48 (3.8)	r 59 (4.0)	45 (4.1)	r 79 (3.4)	74 (3.7)	r 56 (3.4)	64 (3.5)
Chile	40 (3.8)	48 (3.7)	44 (3.8)	75 (3.5)	70 (3.7)	65 (3.5)	68 (3.7)
Chinese Taipei	76 (2.8)	80 (3.1)	76 (3.2)	87 (2.4)	82 (2.5)	73 (2.8)	79 (2.9)
Cyprus	s 24 (3.2)	s 41 (4.6)	s 21 (2.9)	s 67 (4.4)	s 68 (4.9)	s 44 (5.0)	s 61 (4.7)
Egypt	r 46 (4.4)	r 51 (4.5)	r 49 (4.9)	r 69 (4.1)	r 59 (4.3)	r 53 (4.7)	r 53 (4.7)
England	s 28 (5.2)	s 44 (6.2)	s 36 (5.4)	s 57 (6.0)	s 61 (6.4)	s 38 (5.3)	s 38 (5.4)
Finland	25 (2.9)	48 (3.4)	31 (2.5)	70 (3.2)	50 (3.0)	46 (2.8)	57 (3.1)
France	r 28 (3.6)	r 61 (4.3)	r 39 (4.0)	r 61 (4.3)	r 60 (4.3)	r 49 (4.2)	r 71 (3.7)
Georgia	r 44 (4.3)	r 68 (4.8)	r 48 (4.7)	r 82 (3.1)	r 72 (3.9)	r 60 (4.7)	r 65 (4.6)
Hong Kong SAR	r 60 (4.7)	r 76 (3.9)	r 60 (4.6)	r 73 (4.3)	r 80 (3.4)	r 54 (4.3)	r 77 (3.5)
Hungary	21 (2.4)	44 (3.7)	14 (2.0)	53 (3.8)	58 (3.8)	34 (3.6)	57 (3.6)
Iran, Islamic Rep. of	67 (3.6)	59 (3.8)	64 (3.7)	81 (3.5)	76 (3.4)	68 (3.5)	72 (3.6)
Ireland	54 (3.2)	61 (2.8)	67 (2.9)	79 (2.9)	84 (1.8)	66 (2.9)	71 (3.0)
Israel	47 (3.2)	51 (3.2)	43 (3.1)	74 (3.0)	68 (2.9)	52 (3.0)	56 (3.4)
Italy	24 (2.8)	60 (4.0)	37 (3.6)	65 (3.7)	60 (3.7)	38 (4.1)	60 (3.6)
Japan	80 (2.8)	86 (2.3)	64 (3.5)	75 (3.1)	86 (2.7)	72 (3.0)	79 (3.1)
Jordan	50 (4.5)	44 (3.8)	38 (3.9)	48 (4.1)	44 (3.7)	47 (4.4)	52 (4.0)
Kazakhstan	47 (4.2)	50 (4.2)	46 (3.6)	63 (4.2)	61 (4.2)	56 (4.4)	57 (3.8)
Korea, Rep. of	66 (4.1)	82 (3.3)	65 (3.7)	84 (2.7)	83 (2.6)	86 (2.5)	76 (3.3)
Kuwait	65 (3.9)	71 (3.7)	60 (3.8)	78 (3.6)	73 (4.1)	66 (3.6)	71 (3.1)
Lebanon	r 51 (4.1)	r 58 (3.8)	r 59 (3.9)	r 61 (4.0)	r 61 (4.0)	r 53 (4.1)	r 62 (4.9)
Lithuania	48 (4.2)	61 (3.9)	47 (4.0)	77 (3.0)	83 (2.8)	67 (4.1)	69 (4.2)
Malaysia	60 (3.4)	70 (3.3)	60 (3.4)	77 (3.1)	77 (3.3)	67 (3.2)	72 (3.1)
Morocco	50 (3.8)	70 (3.4)	55 (3.1)	82 (2.6)	73 (3.5)	63 (3.4)	73 (3.6)
New Zealand	r 53 (3.0)	r 63 (3.5)	r 54 (3.6)	72 (2.9)	80 (2.8)	60 (3.2)	71 (3.2)
Norway (9)	s 25 (4.1)	s 52 (4.7)	s 36 (4.1)	s 60 (4.1)	s 56 (4.5)	s 42 (4.4)	s 59 (4.5)
Oman	57 (3.8)	55 (4.0)	60 (3.6)	74 (3.5)	63 (3.9)	56 (4.5)	57 (4.2)
Portugal	25 (3.3)	50 (4.2)	39 (3.7)	60 (4.2)	65 (4.0)	50 (4.5)	67 (3.4)
Qatar	38 (4.8)	57 (5.0)	44 (4.1)	63 (4.2)	62 (4.6)	45 (4.8)	57 (5.1)
Romania	29 (3.0)	39 (3.6)	37 (3.4)	59 (3.6)	59 (4.0)	37 (3.8)	54 (3.8)
Russian Federation	68 (3.8)	73 (3.3)	75 (2.9)	77 (3.7)	79 (2.9)	73 (3.3)	79 (2.8)
Saudi Arabia	r 40 (4.1)	r 46 (3.8)	r 37 (4.0)	r 62 (4.0)	r 52 (4.5)	r 51 (4.4)	r 51 (4.2)
Singapore	49 (2.9)	69 (2.3)	58 (2.9)	78 (2.1)	82 (2.2)	69 (2.6)	68 (2.9)
South Africa (9)	77 (2.4)	81 (2.3)	71 (2.6)	88 (2.0)	89 (1.7)	77 (2.0)	86 (2.0)
Sweden	38 (3.7)	59 (4.3)	27 (3.3)	79 (2.9)	64 (3.3)	51 (3.8)	67 (3.5)
Turkey	42 (4.0)	61 (4.2)	61 (4.1)	81 (2.9)	81 (3.1)	61 (3.9)	67 (3.8)
United Arab Emirates	r 44 (2.0)	r 55 (1.9)	r 47 (1.9)	r 64 (2.2)	r 62 (1.6)	r 47 (1.8)	r 54 (1.7)
United States	36 (2.9)	49 (2.6)	43 (2.8)	72 (2.1)	71 (2.2)	50 (3.0)	63 (2.6)
International Average	47 (0.6)	60 (0.6)	49 (0.6)	71 (0.6)	69 (0.6)	57 (0.6)	65 (0.6)
Benchmarking Participants							
Ontario, Canada	39 (3.9)	55 (4.2)	35 (4.8)	70 (4.5)	70 (4.2)	60 (4.1)	55 (4.9)
Quebec, Canada	25 (4.4)	52 (4.8)	23 (4.1)	78 (4.0)	58 (5.1)	47 (5.0)	59 (4.9)
Moscow City, Russian Fed.	72 (3.2)	76 (3.3)	72 (3.4)	76 (3.3)	81 (2.9)	73 (3.2)	84 (2.5)
Gauteng, RSA (9)	r 60 (4.7)	r 72 (4.1)	r 63 (4.3)	r 83 (3.8)	r 88 (3.2)	r 68 (4.5)	r 82 (3.5)
Western Cape, RSA (9)	53 (3.9)	62 (3.8)	r 46 (4.2)	80 (3.5)	80 (3.5)	r 50 (4.4)	75 (3.9)
Abu Dhabi, UAE	r 49 (3.3)	r 57 (2.9)	r 53 (3.3)	r 71 (2.5)	r 66 (2.9)	r 51 (3.1)	r 60 (2.6)
Dubai, UAE	r 49 (3.1)	r 63 (2.8)	r 54 (3.0)	r 72 (2.5)	r 71 (2.3)	r 57 (3.0)	r 58 (3.0)

* Teachers could indicate needing professional development in more than one area.

() Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

An "r" indicates data are available for at least 70% but less than 85% of the students. An "s" indicates data are available for at least 50% but less than 70% of the students.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Exhibit 9.20: Teachers' Needs for Future Professional Development in Science

Students' Results based on Teachers' Reports

Percent of Students by Teachers Indicating a Need for Future Professional Development*								
Country	Science Content	Science Pedagogy/ Instruction	Science Curriculum	Integrating Technology into Science Instruction	Improving Students' Critical Thinking or Inquiry Skills	Science Assessment	Addressing Individual Students' Needs	
Australia	r 52 (3.1)	r 65 (3.0)	r 51 (3.1)	r 77 (2.6)	r 81 (2.3)	r 59 (2.9)	r 71 (3.0)	r 71 (3.0)
Bahrain	52 (3.5)	53 (3.1)	48 (3.1)	61 (3.1)	62 (3.0)	58 (3.3)	56 (3.1)	56 (3.1)
Chile	44 (4.1)	54 (3.9)	53 (4.0)	83 (2.8)	68 (3.3)	67 (3.5)	80 (3.0)	80 (3.0)
Chinese Taipei	75 (3.1)	75 (3.0)	75 (3.0)	84 (2.6)	82 (3.0)	69 (3.7)	71 (3.6)	71 (3.6)
Cyprus	s 33 (1.6)	s 45 (2.2)	s 26 (2.1)	s 65 (2.5)	s 57 (1.6)	s 44 (2.8)	s 60 (2.6)	s 60 (2.6)
Egypt	r 47 (4.7)	r 49 (5.0)	r 49 (4.4)	r 64 (4.7)	r 60 (4.6)	r 54 (4.6)	r 64 (5.0)	r 64 (5.0)
England	s 34 (5.6)	s 44 (5.5)	s 35 (6.1)	s 55 (6.4)	s 56 (5.4)	s 44 (6.1)	s 41 (5.3)	s 41 (5.3)
Finland	32 (1.8)	51 (1.9)	34 (1.9)	69 (1.8)	56 (2.2)	54 (2.2)	63 (1.9)	63 (1.9)
France	r 58 (3.4)	r 65 (2.8)	r 53 (2.9)	r 67 (3.0)	r 62 (3.1)	r 56 (2.9)	r 70 (2.8)	r 70 (2.8)
Georgia	s 48 (3.1)	s 55 (3.2)	s 54 (3.1)	r 80 (2.4)	r 68 (2.8)	s 54 (2.9)	s 63 (3.2)	s 63 (3.2)
Hong Kong SAR	r 65 (4.2)	r 77 (3.4)	r 65 (4.3)	r 80 (4.0)	r 74 (3.8)	r 66 (4.6)	r 76 (3.9)	r 76 (3.9)
Hungary	29 (2.0)	47 (2.2)	26 (1.8)	54 (1.9)	59 (2.2)	40 (2.4)	51 (2.5)	51 (2.5)
Iran, Islamic Rep. of	69 (3.4)	63 (3.6)	60 (3.9)	80 (3.2)	77 (3.6)	62 (3.5)	68 (3.6)	68 (3.6)
Ireland	56 (3.6)	58 (3.1)	63 (3.8)	76 (2.9)	79 (2.6)	59 (3.1)	71 (3.6)	71 (3.6)
Israel	48 (4.0)	49 (4.4)	41 (3.9)	63 (3.6)	60 (4.1)	45 (3.6)	57 (3.8)	57 (3.8)
Italy	26 (3.3)	54 (3.5)	32 (3.5)	59 (3.6)	58 (3.8)	33 (3.4)	54 (3.6)	54 (3.6)
Japan	89 (2.6)	90 (2.5)	67 (3.7)	83 (2.9)	84 (3.0)	75 (3.7)	76 (3.5)	76 (3.5)
Jordan	47 (4.2)	48 (4.3)	42 (4.1)	62 (4.0)	50 (3.8)	52 (3.5)	49 (4.0)	49 (4.0)
Kazakhstan	46 (2.6)	54 (2.6)	48 (2.7)	62 (2.8)	62 (2.4)	57 (2.4)	63 (2.1)	63 (2.1)
Korea, Rep. of	68 (3.3)	86 (2.6)	70 (3.1)	83 (2.4)	85 (2.6)	77 (2.5)	78 (2.7)	78 (2.7)
Kuwait	62 (4.5)	58 (4.7)	55 (4.2)	79 (3.8)	68 (3.7)	63 (4.4)	70 (4.2)	70 (4.2)
Lebanon	56 (2.8)	r 65 (3.1)	r 57 (2.4)	r 74 (2.3)	r 69 (2.6)	r 58 (2.7)	r 65 (3.1)	r 65 (3.1)
Lithuania	58 (2.0)	64 (2.3)	59 (2.2)	74 (2.2)	73 (1.9)	68 (1.8)	69 (2.2)	69 (2.2)
Malaysia	56 (4.1)	67 (3.7)	58 (3.6)	80 (2.7)	79 (2.9)	68 (3.3)	71 (3.4)	71 (3.4)
Morocco	58 (2.5)	68 (2.2)	63 (2.4)	73 (2.5)	78 (2.4)	65 (2.5)	78 (2.4)	78 (2.4)
New Zealand	46 (4.1)	62 (3.6)	54 (3.9)	75 (3.2)	77 (3.6)	59 (3.3)	71 (3.7)	71 (3.7)
Norway (9)	s 46 (4.5)	s 53 (4.9)	s 35 (4.8)	s 51 (5.1)	s 55 (5.0)	s 45 (5.2)	s 52 (4.8)	s 52 (4.8)
Oman	70 (3.6)	64 (3.5)	62 (3.8)	80 (3.1)	66 (3.7)	55 (4.1)	65 (4.0)	65 (4.0)
Portugal	36 (2.9)	49 (2.8)	35 (2.8)	68 (2.6)	69 (3.2)	54 (2.6)	64 (3.1)	64 (3.1)
Qatar	38 (4.2)	41 (4.4)	37 (4.2)	48 (3.7)	51 (4.7)	45 (5.0)	49 (4.5)	49 (4.5)
Romania	36 (2.5)	48 (3.1)	45 (2.7)	54 (2.9)	56 (3.2)	46 (2.9)	59 (2.9)	59 (2.9)
Russian Federation	79 (1.6)	79 (1.9)	79 (1.4)	82 (1.7)	83 (1.3)	81 (1.4)	84 (1.4)	84 (1.4)
Saudi Arabia	r 48 (4.5)	r 50 (4.3)	r 48 (4.7)	r 64 (3.7)	r 57 (4.2)	r 54 (4.4)	r 55 (4.5)	r 55 (4.5)
Singapore	48 (2.7)	75 (2.7)	56 (2.7)	80 (2.0)	83 (2.2)	70 (2.3)	78 (2.4)	78 (2.4)
South Africa (9)	72 (2.7)	76 (2.4)	69 (2.5)	81 (2.2)	85 (2.0)	76 (2.6)	81 (2.5)	81 (2.5)
Sweden	51 (3.7)	58 (3.9)	33 (3.3)	69 (3.4)	66 (3.4)	51 (3.5)	61 (3.0)	61 (3.0)
Turkey	55 (3.6)	67 (3.8)	65 (3.3)	83 (3.0)	84 (3.0)	72 (3.0)	79 (2.8)	79 (2.8)
United Arab Emirates	r 43 (1.8)	r 49 (1.7)	r 49 (1.8)	r 62 (2.0)	r 62 (1.7)	r 50 (1.8)	r 59 (1.5)	r 59 (1.5)
United States	r 48 (3.0)	r 51 (3.3)	r 56 (3.0)	r 64 (3.1)	r 65 (2.9)	r 57 (3.1)	r 62 (2.9)	r 62 (2.9)
International Average	52 (0.5)	60 (0.5)	51 (0.5)	70 (0.5)	68 (0.5)	58 (0.5)	66 (0.5)	66 (0.5)
Benchmarking Participants								
Ontario, Canada	s 45 (6.3)	s 49 (5.8)	s 43 (6.0)	s 63 (5.9)	s 60 (6.0)	s 54 (5.8)	s 52 (5.7)	s 52 (5.7)
Moscow City, Russian Fed.	72 (2.3)	74 (2.0)	72 (2.0)	76 (2.0)	78 (1.8)	69 (2.4)	79 (1.9)	79 (1.9)
Gauteng, RSA (9)	59 (4.9)	r 64 (4.9)	r 58 (4.7)	79 (4.1)	80 (3.9)	67 (4.5)	74 (4.0)	74 (4.0)
Western Cape, RSA (9)	47 (4.5)	59 (4.2)	46 (4.8)	72 (3.9)	78 (3.5)	r 62 (4.1)	73 (4.1)	73 (4.1)
Abu Dhabi, UAE	r 44 (2.6)	r 51 (2.7)	r 49 (3.1)	r 62 (2.9)	r 67 (2.8)	r 53 (2.8)	r 65 (2.4)	r 65 (2.4)
Dubai, UAE	r 46 (3.1)	r 55 (1.6)	r 52 (2.6)	r 70 (2.8)	r 67 (2.0)	r 56 (2.7)	r 59 (3.0)	r 59 (3.0)
Quebec, Canada	y - -	y - -	y - -	y - -	y - -	y - -	y - -	y - -

* Teachers could indicate needing professional development in more than one area.

() Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

A dash (-) indicates comparable data not available.

An "r" indicates data are available for at least 70% but less than 85% of the students. An "s" indicates data are available for at least 50% but less than 70% of the students.

A "y" indicates data are available for less than 40% of the students.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Teachers' Job Satisfaction

Teachers who are satisfied with their profession are more motivated, may be more likely to continue teaching into the future, and may experience greater overall well-being. The TIMSS 2019 *Teachers' Job Satisfaction* scale, based on teachers' responses to five statements about how they feel about being a teacher, is described in Exhibit 9.21 (see About the Scale). Exhibits 9.22, 9.23, 9.24, and 9.25 present teachers' reports of their job satisfaction, including the percentage and average achievement of students with teachers who reported they were "very satisfied," "somewhat satisfied," and "less than satisfied," and the average scale score on the *Teachers' Job Satisfaction* scale, for each country. Countries are ordered by the percent "very satisfied."

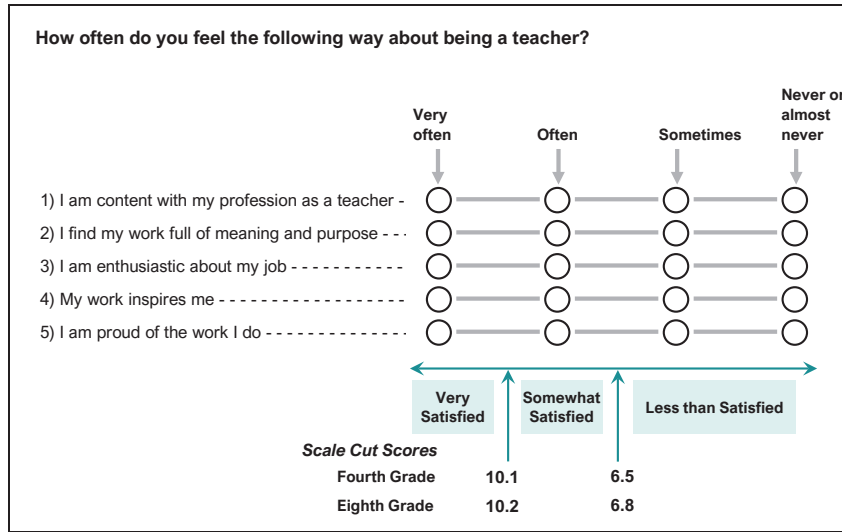
Across the TIMSS 2019 countries, almost all students in fourth and eighth grades were taught mathematics and science by teachers who were "very satisfied" or "somewhat satisfied" with being a teacher, with job satisfaction somewhat higher among fourth grade teachers than eighth grade teachers. In fourth grade, 61 percent of students were taught mathematics and science by teachers who reported they were "very satisfied," and 34 percent were taught by teachers who reported they were "somewhat satisfied." Only 5 percent of students had mathematics or science teachers who reported they were "less than satisfied." In eighth grade, 54 percent of students had mathematics teachers and 53 percent of students had science teachers who said they were "very satisfied," 39 percent of students had mathematics and science teachers who said they were "somewhat satisfied," and 7 and 8 percent of students had mathematics and science teachers, respectively, who reported they were "less than satisfied."

In fourth grade, average achievement was somewhat higher for students of "very satisfied" teachers compared with "somewhat satisfied" teachers (503 vs. 499 in mathematics and 493 vs. 490 in science). Counterintuitively, in both subjects, average achievement was highest for students with "less than satisfied" teachers (515 for mathematics and 508 for science), though there were few students in this category, and in some countries, there were so few that average achievement could not be estimated. In the eighth grade, average achievement was also higher for students with "very satisfied" compared with "somewhat satisfied" teachers (493 vs. 486 for mathematics and 494 vs. 486 for science). In both subjects, for the few students with "less than satisfied" teachers, average achievement was close to that of students with "somewhat satisfied" teachers (490 in mathematics and 488 in science).

Exhibit 9.21: Teachers' Job Satisfaction
Students' Results based on Teachers' Reports

About the Scale

Students were scored according to their teachers' responses to five statements on the *Teachers' Job Satisfaction* scale. Cut scores divide the scale into three categories. Students with **Very Satisfied** teachers had a score at or above the cut score corresponding to their teachers responding "very often" to three of the five statements and "often" to the other two, on average. Students with **Less than Satisfied** teachers had a score at or below the cut score corresponding to their teachers responding "sometimes" to three of the five statements and "often" to the other two, on average. All other students had **Somewhat Satisfied** teachers.



SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Exhibit 9.22: Teachers' Job Satisfaction
Students' Results based on Teachers' Reports

Country	Very Satisfied		Somewhat Satisfied		Less than Satisfied		Average Scale Score
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	
Kosovo	94 (1.9)	446 (3.0)	6 (1.9)	425 (12.0)	0 (0.0)	~ ~	11.2 (0.06)
Albania	91 (2.5)	494 (3.6)	9 (2.5)	496 (13.0)	0 (0.0)	~ ~	11.2 (0.07)
Iran, Islamic Rep. of	87 (2.4)	444 (4.0)	11 (2.3)	441 (9.6)	2 (0.9)	~ ~	11.0 (0.09)
Oman	87 (2.3)	431 (4.5)	13 (2.3)	431 (10.7)	0 (0.3)	~ ~	11.0 (0.08)
Philippines	87 (2.7)	294 (6.8)	12 (2.6)	304 (15.3)	1 (0.8)	~ ~	11.1 (0.10)
Armenia	83 (3.1)	498 (2.9)	16 (3.1)	499 (5.3)	1 (0.5)	~ ~	10.9 (0.08)
Kuwait	83 (3.1)	384 (5.5)	17 (3.0)	377 (14.0)	1 (0.6)	~ ~	11.0 (0.10)
North Macedonia	80 (3.7)	470 (6.1)	20 (3.7)	478 (9.3)	0 (0.0)	~ ~	10.8 (0.11)
Pakistan	79 (5.4)	333 (14.8)	21 (5.3)	318 (20.2)	1 (0.7)	~ ~	10.7 (0.14)
Qatar	78 (2.7)	447 (4.6)	19 (2.2)	460 (9.7)	3 (1.1)	442 (19.5)	10.9 (0.10)
Bahrain	78 (2.9)	481 (2.9)	21 (3.0)	479 (5.7)	1 (0.8)	~ ~	10.8 (0.10)
Saudi Arabia	78 (2.9)	405 (4.6)	21 (2.9)	375 (7.5)	1 (0.7)	~ ~	10.9 (0.08)
Bosnia and Herzegovina	78 (2.7)	453 (2.6)	20 (2.5)	449 (6.2)	2 (0.9)	~ ~	10.7 (0.09)
United Arab Emirates	r 78 (1.1)	486 (2.5)	19 (1.1)	473 (5.4)	3 (0.3)	398 (10.5)	10.7 (0.04)
Georgia	77 (3.3)	480 (4.7)	23 (3.3)	488 (6.2)	0 (0.0)	~ ~	10.8 (0.09)
Chile	77 (3.7)	442 (3.6)	23 (3.7)	436 (5.7)	0 (0.4)	~ ~	10.8 (0.12)
Azerbaijan	77 (2.7)	517 (3.2)	22 (2.6)	512 (5.9)	1 (0.5)	~ ~	10.8 (0.08)
Spain	73 (3.5)	503 (2.6)	25 (3.5)	499 (4.8)	2 (0.8)	~ ~	10.6 (0.11)
Italy	71 (3.5)	515 (2.8)	28 (3.5)	515 (4.7)	1 (0.7)	~ ~	10.5 (0.11)
Serbia	70 (3.2)	507 (4.2)	27 (3.0)	507 (4.4)	3 (1.3)	530 (6.5)	10.5 (0.11)
Montenegro	70 (2.6)	450 (2.7)	30 (2.5)	459 (3.4)	0 (0.4)	~ ~	10.4 (0.07)
Kazakhstan	68 (2.8)	512 (3.1)	32 (2.8)	513 (4.3)	0 (0.4)	~ ~	10.4 (0.09)
Austria	68 (3.2)	541 (2.4)	31 (3.2)	535 (4.2)	2 (0.8)	~ ~	10.4 (0.11)
Morocco	67 (3.3)	395 (6.0)	28 (3.3)	360 (6.5)	5 (1.3)	348 (10.8)	10.2 (0.13)
Australia	65 (3.4)	519 (3.9)	29 (2.9)	516 (7.0)	6 (1.6)	517 (14.3)	10.3 (0.14)
South Africa (5)	64 (3.4)	367 (5.0)	31 (3.4)	385 (9.1)	5 (1.5)	390 (36.6)	10.4 (0.11)
Turkey (5)	64 (3.6)	526 (5.3)	31 (3.3)	522 (10.4)	5 (1.8)	489 (18.1)	10.3 (0.15)
Netherlands	r 64 (5.0)	535 (3.1)	33 (4.9)	541 (3.7)	3 (1.6)	530 (15.4)	10.3 (0.15)
Croatia	62 (3.8)	510 (2.7)	36 (3.9)	509 (3.8)	2 (0.7)	~ ~	10.3 (0.10)
Canada	59 (2.5)	509 (2.8)	36 (2.2)	516 (2.3)	5 (1.2)	518 (9.4)	10.0 (0.10)
Lithuania	58 (3.7)	548 (4.1)	38 (3.6)	531 (4.5)	5 (1.6)	539 (3.9)	10.0 (0.13)
United States	56 (2.3)	538 (3.4)	33 (2.3)	531 (4.4)	11 (1.6)	535 (6.0)	9.8 (0.11)
Russian Federation	55 (3.8)	564 (4.6)	43 (3.7)	571 (4.2)	2 (1.1)	~ ~	10.0 (0.13)
Bulgaria	53 (4.0)	526 (5.1)	43 (3.9)	505 (9.0)	4 (1.4)	478 (20.2)	9.7 (0.14)
Ireland	52 (3.9)	549 (3.8)	40 (3.6)	551 (3.2)	8 (2.3)	533 (6.5)	9.7 (0.15)
Malta	52 (0.4)	516 (1.7)	34 (0.4)	502 (2.2)	14 (0.3)	500 (3.4)	9.5 (0.02)
Portugal	52 (3.3)	528 (3.2)	41 (3.4)	525 (3.9)	7 (1.6)	511 (7.1)	9.8 (0.12)
Northern Ireland	50 (4.3)	566 (4.1)	39 (4.1)	568 (6.1)	11 (3.0)	561 (8.3)	9.6 (0.19)
Hong Kong SAR	50 (4.4)	609 (5.6)	40 (4.3)	599 (4.5)	10 (2.5)	576 (7.8)	9.6 (0.17)
Cyprus	49 (3.7)	536 (4.1)	45 (3.8)	531 (3.7)	6 (2.0)	529 (4.6)	9.7 (0.14)
Norway (5)	r 48 (3.9)	547 (3.3)	48 (4.0)	542 (3.4)	4 (1.7)	549 (14.2)	9.7 (0.13)
Latvia	48 (3.6)	547 (3.5)	50 (3.6)	545 (4.2)	2 (0.5)	~ ~	9.9 (0.12)
Singapore	47 (2.3)	631 (5.6)	44 (2.5)	618 (5.1)	9 (1.4)	637 (10.7)	9.6 (0.09)
Slovak Republic	46 (3.6)	516 (4.6)	43 (3.4)	507 (5.9)	11 (2.2)	494 (10.8)	9.4 (0.14)
New Zealand	46 (3.2)	493 (4.7)	44 (3.1)	485 (4.8)	10 (1.8)	467 (10.1)	9.5 (0.13)
Hungary	44 (4.2)	523 (5.4)	50 (4.0)	527 (4.7)	6 (1.6)	510 (15.8)	9.5 (0.15)
Sweden	43 (4.3)	525 (5.3)	50 (4.2)	519 (3.8)	6 (1.9)	516 (6.6)	9.7 (0.15)
Chinese Taipei	42 (3.8)	600 (2.5)	48 (4.2)	598 (2.8)	10 (2.4)	602 (6.3)	9.4 (0.15)
England	s 41 (6.1)	566 (7.4)	57 (5.9)	553 (6.6)	1 (1.2)	~ ~	9.8 (0.19)
Denmark	41 (4.2)	524 (3.5)	47 (3.9)	525 (3.6)	12 (2.6)	523 (5.7)	9.2 (0.17)
Belgium (Flemish)	40 (3.4)	535 (2.8)	51 (3.4)	532 (2.9)	9 (2.2)	538 (7.3)	9.3 (0.13)
Finland	39 (3.0)	534 (3.7)	52 (3.3)	531 (3.0)	9 (1.6)	531 (5.1)	9.3 (0.09)
Korea, Rep. of	38 (3.6)	601 (4.2)	49 (3.7)	602 (3.4)	13 (2.5)	587 (5.0)	9.1 (0.16)
Germany	38 (3.7)	519 (4.7)	57 (3.9)	523 (3.9)	5 (1.7)	513 (11.1)	9.5 (0.13)
Czech Republic	36 (3.9)	536 (5.0)	54 (4.2)	533 (3.6)	10 (1.9)	522 (6.9)	9.1 (0.14)
France	35 (3.2)	484 (5.5)	55 (3.1)	487 (3.5)	10 (2.6)	483 (10.2)	9.0 (0.13)
Poland	32 (3.4)	523 (4.4)	49 (3.2)	518 (3.4)	18 (2.8)	520 (6.3)	8.6 (0.15)
Japan	31 (3.3)	591 (2.8)	58 (3.5)	592 (2.3)	11 (2.3)	602 (6.0)	8.9 (0.14)
International Average	61 (0.5)	503 (0.6)	34 (0.4)	499 (0.9)	5 (0.2)	515 (2.1)	
Benchmarking Participants							
Dubai, UAE	r 79 (1.7)	546 (2.4)	18 (1.7)	545 (7.0)	2 (0.3)	~ ~	10.9 (0.05)
Madrid, Spain	78 (3.4)	519 (2.1)	19 (3.4)	519 (5.6)	3 (1.3)	473 (26.3)	10.6 (0.12)
Abu Dhabi, UAE	r 67 (2.3)	453 (4.1)	27 (2.3)	430 (7.4)	7 (0.8)	366 (10.1)	10.3 (0.08)
Ontario, Canada	r 65 (4.2)	512 (5.0)	30 (3.8)	510 (4.3)	5 (1.7)	518 (18.2)	10.2 (0.17)
Moscow City, Russian Fed.	59 (4.1)	596 (2.6)	38 (4.1)	587 (3.9)	3 (1.3)	604 (23.9)	10.1 (0.14)
Quebec, Canada	40 (4.6)	530 (4.0)	52 (4.4)	534 (2.5)	8 (2.7)	530 (10.2)	9.3 (0.19)

This TIMSS context questionnaire scale was established in 2015 based on the combined response distribution of all countries that participated in TIMSS 2015. To provide a point of reference for country comparisons, the scale centerpoint of 10 was located at the mean of the combined distribution. The units of the scale were chosen so that 2 scale score points corresponded to the standard deviation of the distribution.

() Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

A tilde (~) indicates insufficient data to report achievement.

An "r" indicates data are available for at least 70% but less than 85% of the students. An "s" indicates data are available for at least 50% but less than 70% of the students.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Exhibit 9.23: Teachers' Job Satisfaction

Students' Results based on Teachers' Reports

Country	Very Satisfied		Somewhat Satisfied		Less than Satisfied		Average Scale Score	
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement		
Kosovo	94 (1.9)	414 (3.8)	6 (1.9)	392 (13.6)	0 (0.0)	~ ~	11.2 (0.06)	
Albania	90 (2.4)	488 (3.8)	10 (2.4)	499 (13.6)	0 (0.0)	~ ~	11.2 (0.07)	
Iran, Islamic Rep. of	87 (2.4)	442 (4.2)	11 (2.3)	436 (10.0)	2 (0.9)	~ ~	11.0 (0.09)	
Philippines	87 (2.9)	246 (7.8)	11 (2.9)	265 (19.2)	2 (1.2)	~ ~	11.1 (0.10)	
Kuwait	82 (3.3)	394 (7.1)	17 (3.4)	390 (15.3)	1 (0.6)	~ ~	11.0 (0.10)	
Oman	81 (2.6)	434 (4.8)	17 (2.6)	450 (10.9)	2 (0.8)	~ ~	10.8 (0.08)	
Qatar	81 (2.6)	449 (5.0)	16 (2.4)	456 (12.8)	3 (1.1)	437 (16.7)	10.9 (0.10)	
Armenia	81 (3.2)	468 (3.9)	19 (3.2)	460 (5.9)	0 (0.2)	~ ~	10.9 (0.09)	
North Macedonia	80 (3.7)	424 (7.0)	20 (3.7)	436 (11.3)	0 (0.0)	~ ~	10.8 (0.11)	
Pakistan	80 (4.6)	294 (16.1)	19 (4.5)	287 (18.3)	1 (0.8)	~ ~	10.6 (0.17)	
Saudi Arabia	79 (3.2)	406 (4.4)	20 (3.2)	379 (12.2)	1 (0.8)	~ ~	10.9 (0.09)	
Georgia	78 (3.4)	455 (4.9)	22 (3.4)	454 (6.2)	0 (0.0)	~ ~	10.8 (0.09)	
Bosnia and Herzegovina	78 (2.7)	461 (2.9)	20 (2.5)	453 (7.1)	2 (0.9)	~ ~	10.7 (0.09)	
Chile	77 (3.6)	466 (3.3)	22 (3.6)	474 (5.5)	0 (0.4)	~ ~	10.8 (0.11)	
Bahrain	77 (2.7)	493 (3.7)	18 (2.7)	496 (10.4)	5 (1.1)	473 (7.7)	10.5 (0.09)	
Azerbaijan	76 (2.9)	428 (3.7)	23 (2.9)	425 (6.8)	1 (0.5)	~ ~	10.7 (0.08)	
United Arab Emirates	r	75 (1.3)	481 (2.5)	21 (1.3)	456 (5.8)	4 (0.5)	389 (12.2)	10.6 (0.05)
Italy	71 (3.5)	509 (3.3)	28 (3.5)	511 (4.8)	1 (0.7)	~ ~	10.5 (0.11)	
Spain	71 (3.6)	512 (2.4)	27 (3.5)	507 (4.4)	2 (1.1)	~ ~	10.5 (0.11)	
Turkey (5)	70 (3.4)	531 (4.5)	27 (3.4)	514 (9.7)	3 (1.2)	537 (21.5)	10.6 (0.12)	
Serbia	70 (3.2)	517 (4.5)	27 (3.0)	514 (4.9)	3 (1.3)	543 (6.5)	10.5 (0.11)	
Montenegro	70 (2.6)	450 (3.2)	30 (2.5)	462 (4.2)	0 (0.4)	~ ~	10.4 (0.07)	
Kazakhstan	68 (2.8)	494 (4.0)	31 (2.8)	495 (5.3)	0 (0.4)	~ ~	10.4 (0.09)	
South Africa (5)	68 (3.5)	318 (6.6)	27 (3.1)	339 (12.0)	5 (1.4)	321 (35.2)	10.3 (0.15)	
Austria	68 (3.1)	524 (2.9)	30 (3.1)	518 (5.5)	2 (0.8)	~ ~	10.3 (0.10)	
Morocco	64 (3.4)	393 (7.9)	32 (3.4)	343 (8.0)	4 (1.3)	331 (17.4)	10.3 (0.13)	
Netherlands	r	64 (5.0)	517 (4.0)	33 (4.9)	521 (4.4)	3 (1.6)	507 (21.8)	10.3 (0.15)
Croatia	62 (3.8)	525 (2.7)	36 (3.9)	522 (3.0)	2 (0.7)	~ ~	10.3 (0.10)	
Australia	61 (3.7)	533 (3.3)	34 (3.3)	533 (4.8)	6 (1.4)	542 (11.1)	10.2 (0.14)	
Canada	r	58 (2.6)	526 (2.7)	36 (2.4)	523 (2.3)	6 (1.3)	521 (6.4)	10.0 (0.10)
Lithuania	58 (3.7)	544 (3.7)	38 (3.6)	526 (5.4)	5 (1.6)	537 (3.8)	10.0 (0.13)	
Chinese Taipei	57 (3.3)	558 (2.5)	39 (3.2)	559 (2.6)	4 (1.5)	552 (7.4)	10.0 (0.13)	
United States	56 (2.4)	541 (3.6)	33 (2.3)	534 (4.4)	11 (1.5)	541 (6.0)	9.8 (0.11)	
Russian Federation	54 (3.8)	565 (3.8)	42 (3.7)	570 (3.9)	3 (1.2)	579 (8.8)	10.0 (0.13)	
Malta	53 (0.5)	504 (1.9)	32 (0.4)	487 (2.1)	15 (0.3)	485 (3.4)	9.5 (0.02)	
Cyprus	53 (4.4)	517 (4.7)	40 (4.5)	507 (3.6)	7 (2.2)	508 (9.0)	9.7 (0.18)	
Ireland	52 (3.9)	528 (5.0)	40 (3.6)	532 (3.4)	8 (2.3)	511 (8.1)	9.7 (0.15)	
Bulgaria	52 (4.0)	537 (6.8)	42 (4.0)	509 (9.7)	6 (1.7)	475 (26.0)	9.7 (0.16)	
Portugal	52 (3.3)	507 (3.1)	41 (3.4)	504 (3.5)	7 (1.6)	490 (6.8)	9.8 (0.12)	
Northern Ireland	50 (4.3)	518 (3.3)	39 (4.1)	520 (4.6)	11 (3.0)	515 (6.5)	9.6 (0.19)	
Norway (5)	s	49 (4.3)	540 (4.0)	48 (4.4)	540 (3.1)	3 (1.7)	532 (19.5)	9.6 (0.15)
Latvia	48 (3.7)	543 (3.2)	48 (3.7)	542 (3.2)	4 (1.7)	532 (27.8)	9.8 (0.13)	
Sweden	48 (4.3)	540 (4.7)	46 (4.4)	538 (4.6)	5 (1.8)	548 (7.4)	9.8 (0.15)	
Hong Kong SAR	47 (4.3)	535 (5.1)	44 (4.1)	533 (4.7)	8 (2.1)	511 (8.6)	9.6 (0.16)	
Hungary	47 (3.8)	528 (4.2)	46 (3.7)	532 (4.1)	6 (1.9)	519 (15.3)	9.6 (0.15)	
Slovak Republic	46 (3.4)	517 (5.8)	45 (3.5)	526 (5.8)	9 (2.0)	505 (16.7)	9.4 (0.12)	
New Zealand	45 (3.4)	507 (4.2)	46 (3.2)	501 (3.8)	10 (1.7)	486 (10.1)	9.4 (0.14)	
Singapore	43 (2.6)	593 (4.8)	47 (2.7)	593 (4.9)	9 (1.5)	611 (10.4)	9.4 (0.11)	
Germany	42 (4.3)	518 (3.8)	50 (4.4)	519 (4.1)	8 (2.3)	516 (8.5)	9.5 (0.15)	
Belgium (Flemish)	42 (3.4)	503 (2.9)	50 (3.4)	499 (3.4)	9 (2.2)	506 (7.1)	9.4 (0.13)	
England	s	41 (6.1)	544 (6.3)	56 (5.9)	536 (5.9)	2 (1.7)	~ ~	9.7 (0.20)
Korea, Rep. of	41 (3.4)	589 (3.3)	45 (3.5)	588 (3.1)	14 (2.4)	581 (6.1)	9.1 (0.15)	
Finland	39 (3.1)	557 (3.6)	51 (3.3)	554 (3.3)	10 (1.6)	550 (5.9)	9.3 (0.10)	
Denmark	39 (3.8)	524 (3.7)	52 (4.1)	524 (3.9)	9 (2.1)	508 (5.3)	9.3 (0.13)	
France	35 (3.4)	489 (5.0)	53 (3.2)	490 (3.7)	12 (3.0)	481 (10.2)	9.0 (0.14)	
Czech Republic	35 (3.6)	538 (4.3)	53 (3.9)	532 (3.6)	12 (2.3)	529 (5.7)	9.0 (0.15)	
Poland	32 (4.0)	531 (4.9)	46 (4.6)	531 (4.0)	22 (3.7)	533 (4.2)	8.6 (0.18)	
Japan	30 (3.8)	559 (3.0)	59 (4.2)	563 (2.5)	11 (2.3)	562 (4.5)	8.9 (0.14)	
International Average	61 (0.5)	493 (0.6)	34 (0.5)	490 (1.0)	5 (0.2)	508 (2.2)		
Benchmarking Participants								
Dubai, UAE	r	79 (2.0)	552 (2.7)	18 (1.9)	539 (6.6)	3 (0.7)	510 (12.6)	10.8 (0.06)
Madrid, Spain		71 (3.6)	527 (2.0)	27 (3.3)	515 (3.8)	2 (1.4)	~ ~	10.5 (0.12)
Abu Dhabi, UAE		66 (2.3)	432 (4.1)	28 (2.3)	406 (8.3)	7 (1.0)	342 (10.0)	10.2 (0.09)
Ontario, Canada	r	65 (4.6)	527 (5.0)	29 (4.2)	526 (4.3)	6 (1.8)	529 (11.3)	10.2 (0.18)
Moscow City, Russian Fed.		59 (4.1)	598 (2.6)	39 (4.1)	589 (3.9)	3 (1.3)	610 (25.0)	10.1 (0.14)
Quebec, Canada		40 (4.6)	523 (3.4)	51 (4.4)	523 (3.1)	9 (2.9)	518 (8.9)	9.3 (0.19)

This TIMSS context questionnaire scale was established in 2015 based on the combined response distribution of all countries that participated in TIMSS 2015. To provide a point of reference for country comparisons, the scale centerpoint of 10 was located at the mean of the combined distribution. The units of the scale were chosen so that 2 scale score points corresponded to the standard deviation of the distribution.

() Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

A tilde (~) indicates insufficient data to report achievement.

An "r" indicates data are available for at least 70% but less than 85% of the students. An "s" indicates data are available for at least 50% but less than 70% of the students.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from <http://timss2019.org/download>

Exhibit 9.24: Teachers' Job Satisfaction
Students' Results based on Teachers' Reports

Country	Very Satisfied		Somewhat Satisfied		Less than Satisfied		Average Scale Score
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	
Saudi Arabia	86 (2.3)	391 (2.7)	12 (2.4)	398 (9.0)	2 (1.2)	~ ~	11.0 (0.09)
Kuwait	86 (2.2)	400 (5.2)	14 (2.2)	415 (13.1)	0 (0.0)	~ ~	11.1 (0.07)
Bahrain	78 (3.0)	483 (2.2)	21 (3.0)	474 (4.8)	1 (0.7)	~ ~	10.8 (0.08)
United Arab Emirates	77 (1.2)	483 (2.8)	20 (1.1)	448 (6.4)	3 (0.4)	419 (13.7)	10.8 (0.04)
Qatar	74 (4.0)	448 (5.8)	24 (3.7)	426 (8.4)	2 (0.9)	~ ~	10.8 (0.12)
Egypt	72 (3.9)	422 (6.4)	25 (3.6)	398 (7.9)	3 (1.4)	341 (21.2)	10.4 (0.13)
Chile	72 (3.8)	439 (3.9)	27 (3.9)	445 (5.8)	1 (0.8)	~ ~	10.6 (0.12)
Lebanon	70 (3.6)	432 (4.2)	29 (3.6)	425 (8.0)	1 (0.7)	~ ~	10.5 (0.11)
Israel	68 (2.8)	524 (6.5)	26 (2.8)	506 (10.5)	6 (1.7)	524 (18.1)	10.4 (0.10)
South Africa (9)	64 (2.9)	388 (3.3)	31 (2.7)	395 (5.0)	5 (1.4)	379 (8.3)	10.3 (0.10)
Morocco	63 (3.5)	393 (3.5)	31 (3.5)	382 (4.2)	6 (1.6)	378 (9.2)	10.1 (0.12)
Oman	63 (3.3)	415 (4.0)	28 (3.2)	405 (6.3)	10 (2.3)	394 (8.2)	10.1 (0.13)
Iran, Islamic Rep. of	63 (3.4)	448 (4.9)	29 (3.3)	445 (8.9)	8 (1.8)	436 (13.5)	10.2 (0.12)
Kazakhstan	62 (3.7)	480 (4.5)	36 (3.8)	495 (5.7)	2 (1.2)	~ ~	10.3 (0.13)
Georgia	62 (4.3)	461 (5.2)	37 (4.4)	462 (8.4)	1 (0.8)	~ ~	10.3 (0.11)
Jordan	58 (4.1)	422 (5.8)	31 (3.9)	422 (7.5)	11 (2.5)	406 (8.1)	10.0 (0.15)
Romania	57 (3.6)	486 (6.2)	37 (3.3)	469 (6.9)	5 (1.7)	482 (15.5)	10.1 (0.13)
Ireland	57 (2.9)	531 (3.6)	35 (2.5)	519 (5.4)	8 (1.7)	504 (12.2)	9.9 (0.12)
Turkey	55 (4.4)	501 (8.3)	38 (4.0)	487 (8.3)	7 (2.1)	512 (20.7)	10.1 (0.16)
Cyprus ^r	51 (3.7)	511 (3.6)	35 (4.0)	496 (5.1)	14 (3.4)	503 (7.2)	9.7 (0.17)
Malaysia	49 (3.4)	456 (5.9)	48 (3.4)	463 (6.3)	3 (1.4)	487 (24.4)	10.0 (0.12)
United States	49 (2.9)	521 (7.0)	40 (2.8)	512 (6.1)	11 (1.9)	513 (11.9)	9.7 (0.12)
New Zealand	48 (3.8)	481 (6.9)	39 (3.5)	481 (5.3)	14 (2.8)	488 (8.8)	9.5 (0.16)
Chinese Taipei	47 (3.5)	618 (4.3)	43 (3.3)	608 (4.2)	10 (2.0)	608 (12.4)	9.7 (0.12)
Norway (9) ^r	45 (4.2)	510 (4.0)	53 (4.3)	501 (3.6)	2 (1.0)	~ ~	9.9 (0.13)
Australia	45 (3.4)	529 (5.6)	46 (3.5)	515 (6.0)	9 (1.9)	492 (12.1)	9.6 (0.12)
Italy	43 (4.1)	495 (4.4)	50 (3.8)	501 (3.8)	7 (2.1)	492 (10.7)	9.7 (0.15)
Sweden	41 (3.6)	508 (4.1)	53 (3.8)	501 (3.7)	6 (1.5)	488 (12.8)	9.6 (0.12)
Singapore	40 (2.6)	627 (7.2)	49 (2.5)	609 (5.4)	11 (1.5)	604 (11.0)	9.4 (0.11)
Russian Federation	39 (3.1)	542 (6.7)	53 (3.2)	545 (5.6)	8 (1.7)	539 (13.5)	9.5 (0.11)
Hong Kong SAR	39 (4.1)	579 (9.4)	49 (4.1)	580 (6.2)	13 (2.5)	562 (13.3)	9.3 (0.15)
Portugal	37 (4.1)	505 (5.5)	49 (4.3)	498 (5.0)	14 (2.9)	496 (7.2)	9.2 (0.15)
Hungary	37 (3.3)	532 (6.0)	54 (3.5)	507 (5.1)	9 (1.9)	490 (14.6)	9.3 (0.12)
Korea, Rep. of	37 (3.3)	608 (4.8)	52 (3.6)	603 (3.8)	11 (2.3)	622 (8.6)	9.1 (0.14)
England ^s	37 (4.9)	533 (11.3)	58 (4.6)	522 (10.6)	6 (2.5)	440 (23.7)	9.4 (0.18)
Lithuania	36 (3.8)	526 (6.0)	52 (3.8)	517 (4.9)	11 (3.0)	522 (9.4)	9.3 (0.14)
France ^r	32 (4.1)	485 (6.4)	53 (4.5)	482 (3.9)	15 (3.3)	479 (7.1)	9.1 (0.15)
Finland	30 (2.3)	512 (4.1)	56 (2.7)	508 (3.1)	14 (2.1)	508 (6.3)	9.0 (0.10)
Japan	27 (3.1)	603 (5.2)	58 (3.3)	591 (3.6)	15 (2.3)	592 (6.9)	8.9 (0.12)
International Average	54 (0.6)	493 (0.9)	39 (0.6)	486 (1.1)	7 (0.3)	490 (2.4)	
Benchmarking Participants							
Dubai, UAE	77 (1.5)	542 (3.3)	21 (1.7)	523 (7.9)	2 (0.6)	~ ~	10.8 (0.05)
Abu Dhabi, UAE ^r	72 (2.4)	448 (5.0)	25 (2.4)	405 (9.6)	3 (0.9)	370 (17.6)	10.6 (0.08)
Ontario, Canada	67 (4.3)	531 (4.3)	29 (4.3)	535 (10.9)	3 (1.4)	525 (15.9)	10.4 (0.14)
Gauteng, RSA (9)	65 (4.2)	420 (5.1)	31 (4.0)	423 (7.3)	4 (1.3)	408 (20.0)	10.3 (0.14)
Moscow City, Russian Fed.	50 (3.8)	586 (6.2)	46 (3.7)	565 (5.4)	3 (1.4)	554 (18.2)	9.8 (0.13)
Quebec, Canada	49 (5.2)	547 (5.7)	45 (5.2)	540 (6.3)	6 (2.3)	523 (16.4)	9.8 (0.17)
Western Cape, RSA (9)	47 (4.1)	439 (8.6)	46 (3.8)	444 (7.8)	7 (2.2)	449 (15.5)	9.6 (0.14)

This TIMSS context questionnaire scale was established in 2015 based on the combined response distribution of all countries that participated in TIMSS 2015. To provide a point of reference for country comparisons, the scale centerpoint of 10 was located at the mean of the combined distribution. The units of the scale were chosen so that 2 scale score points corresponded to the standard deviation of the distribution.

() Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

A tilde (~) indicates insufficient data to report achievement.

An "r" indicates data are available for at least 70% but less than 85% of the students. An "s" indicates data are available for at least 50% but less than 70% of the students.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Exhibit 9.25: Teachers' Job Satisfaction

Students' Results based on Teachers' Reports

Country	Very Satisfied		Somewhat Satisfied		Less than Satisfied		Average Scale Score
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	
Kuwait	85 (3.0)	450 (6.0)	15 (3.0)	419 (16.0)	0 (0.0)	~ ~	11.1 (0.10)
Saudi Arabia	81 (3.1)	437 (3.0)	15 (2.7)	403 (9.1)	3 (1.6)	421 (15.4)	11.0 (0.11)
United Arab Emirates	r 76 (1.4)	481 (3.2)	20 (1.4)	449 (8.1)	4 (0.5)	438 (15.6)	10.7 (0.05)
Qatar	75 (3.5)	475 (5.4)	22 (3.1)	474 (7.9)	3 (1.5)	478 (17.4)	10.8 (0.11)
Egypt	73 (3.2)	395 (6.0)	~ ~	376 (9.9)	2 (1.3)	~ ~	10.5 (0.11)
Bahrain	72 (2.9)	492 (2.4)	24 (3.0)	475 (6.0)	4 (1.3)	456 (13.3)	10.6 (0.11)
Oman	70 (3.1)	463 (3.6)	22 (2.9)	445 (9.1)	8 (2.2)	438 (9.0)	10.3 (0.13)
Chile	69 (3.4)	468 (3.2)	29 (3.4)	452 (6.9)	2 (1.1)	~ ~	10.6 (0.11)
Turkey	68 (3.3)	522 (4.5)	28 (3.1)	504 (5.8)	4 (1.6)	485 (17.0)	10.5 (0.11)
Morocco	65 (2.4)	393 (3.5)	30 (2.4)	398 (3.3)	5 (1.2)	392 (7.7)	10.3 (0.08)
Iran, Islamic Rep. of	63 (3.3)	449 (4.5)	32 (3.3)	455 (8.0)	5 (1.5)	421 (10.9)	10.2 (0.13)
Lebanon	63 (3.2)	385 (6.0)	35 (3.1)	362 (8.1)	2 (0.6)	~ ~	10.3 (0.09)
Georgia	62 (2.7)	520 (4.1)	~ ~	441 (4.6)	1 (0.5)	~ ~	10.3 (0.07)
Israel	60 (3.4)	516 (6.4)	34 (3.7)	513 (7.2)	7 (1.9)	499 (18.7)	10.1 (0.12)
Kazakhstan	59 (1.9)	473 (3.7)	39 (1.9)	485 (4.7)	2 (0.5)	~ ~	10.2 (0.06)
South Africa (9)	57 (2.9)	366 (4.3)	35 (2.7)	374 (6.0)	8 (1.7)	379 (10.9)	10.0 (0.11)
Ireland	55 (3.6)	532 (3.5)	38 (3.4)	527 (4.4)	7 (2.1)	501 (14.2)	9.8 (0.13)
Jordan	55 (3.9)	467 (4.9)	37 (3.9)	440 (8.6)	8 (1.7)	405 (17.3)	9.9 (0.13)
Australia	r 55 (3.0)	535 (4.2)	34 (3.0)	531 (6.3)	11 (2.0)	520 (8.9)	9.9 (0.11)
Romania	54 (2.4)	477 (5.5)	41 (2.3)	466 (5.2)	5 (1.2)	447 (10.2)	10.0 (0.09)
Cyprus	s 53 (2.5)	487 (3.2)	37 (2.3)	489 (4.7)	9 (1.3)	476 (7.5)	9.8 (0.09)
Chinese Taipei	49 (3.6)	576 (3.0)	34 (3.0)	571 (3.8)	17 (2.4)	575 (6.4)	9.5 (0.15)
United States	49 (2.6)	532 (5.5)	39 (2.6)	515 (8.8)	12 (1.9)	522 (11.3)	9.7 (0.10)
Malaysia	48 (3.7)	470 (5.5)	49 (3.9)	448 (6.8)	3 (1.0)	487 (20.3)	9.9 (0.12)
Singapore	48 (2.8)	612 (6.2)	41 (2.8)	604 (6.6)	11 (1.7)	598 (12.4)	9.7 (0.11)
Sweden	44 (3.6)	524 (4.9)	47 (3.7)	522 (4.7)	9 (2.3)	505 (10.2)	9.6 (0.13)
Italy	43 (3.8)	497 (4.7)	49 (3.5)	504 (3.4)	8 (2.3)	500 (9.3)	9.6 (0.15)
Norway (9)	r 41 (4.2)	496 (4.3)	~ ~	499 (4.8)	2 (1.4)	~ ~	9.6 (0.13)
Korea, Rep. of	40 (3.6)	566 (3.1)	46 (3.4)	560 (3.4)	14 (2.7)	549 (5.5)	9.3 (0.16)
England	s 39 (5.0)	526 (10.4)	46 (5.5)	528 (8.4)	15 (3.9)	496 (23.5)	9.3 (0.22)
Hong Kong SAR	39 (3.8)	504 (9.8)	48 (4.2)	511 (8.4)	14 (3.2)	482 (18.5)	9.3 (0.15)
Russian Federation	38 (1.8)	545 (4.3)	55 (2.0)	543 (4.6)	7 (1.1)	529 (7.7)	9.4 (0.07)
New Zealand	37 (3.4)	504 (5.3)	51 (4.1)	501 (6.9)	12 (2.4)	494 (12.5)	9.4 (0.12)
Lithuania	34 (2.2)	538 (4.0)	53 (2.0)	533 (3.3)	13 (1.6)	520 (4.4)	9.2 (0.09)
Finland	32 (2.0)	546 (4.5)	55 (2.1)	542 (3.3)	13 (1.6)	539 (5.5)	9.0 (0.09)
Portugal	31 (2.8)	524 (5.3)	46 (2.6)	519 (3.7)	22 (2.4)	513 (4.5)	8.7 (0.13)
Hungary	31 (2.2)	533 (4.7)	58 (2.4)	531 (3.4)	11 (1.5)	504 (7.4)	9.1 (0.09)
France	r 26 (2.6)	493 (4.5)	54 (3.3)	489 (3.6)	20 (2.9)	480 (5.6)	8.7 (0.12)
Japan	22 (3.5)	568 (3.5)	63 (3.9)	571 (3.0)	16 (2.7)	565 (4.2)	8.6 (0.14)
International Average	53 (0.5)	494 (0.8)	39 (0.5)	486 (1.1)	8 (0.3)	488 (2.2)	
Benchmarking Participants							
Dubai, UAE	r 77 (2.4)	554 (3.8)	19 (2.4)	533 (9.5)	5 (1.0)	565 (15.1)	10.8 (0.07)
Abu Dhabi, UAE	69 (2.4)	433 (6.2)	24 (2.3)	384 (10.3)	6 (1.2)	364 (15.3)	10.5 (0.09)
Ontario, Canada	s 68 (5.2)	524 (5.8)	26 (4.6)	514 (7.7)	6 (2.6)	521 (9.9)	10.4 (0.20)
Gauteng, RSA (9)	53 (4.2)	416 (6.9)	38 (4.1)	424 (8.8)	9 (2.6)	441 (18.5)	9.9 (0.16)
Moscow City, Russian Fed.	46 (2.3)	567 (3.4)	49 (2.1)	567 (3.3)	5 (0.9)	557 (6.9)	9.8 (0.08)
Western Cape, RSA (9)	45 (4.5)	458 (11.1)	45 (4.3)	434 (8.5)	11 (2.4)	392 (10.7)	9.6 (0.15)
Quebec, Canada	y - -	- -	- -	- -	- -	- -	- -

This TIMSS context questionnaire scale was established in 2015 based on the combined response distribution of all countries that participated in TIMSS 2015. To provide a point of reference for country comparisons, the scale centerpoint of 10 was located at the mean of the combined distribution. The units of the scale were chosen so that 2 scale score points corresponded to the standard deviation of the distribution.

() Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

A dash (-) indicates comparable data not available. A tilde (~) indicates insufficient data to report achievement.

An "r" indicates data are available for at least 70% but less than 85% of the students. An "s" indicates data are available for at least 50% but less than 70% of the students.

A "y" indicates data are available for less than 40% of the students.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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