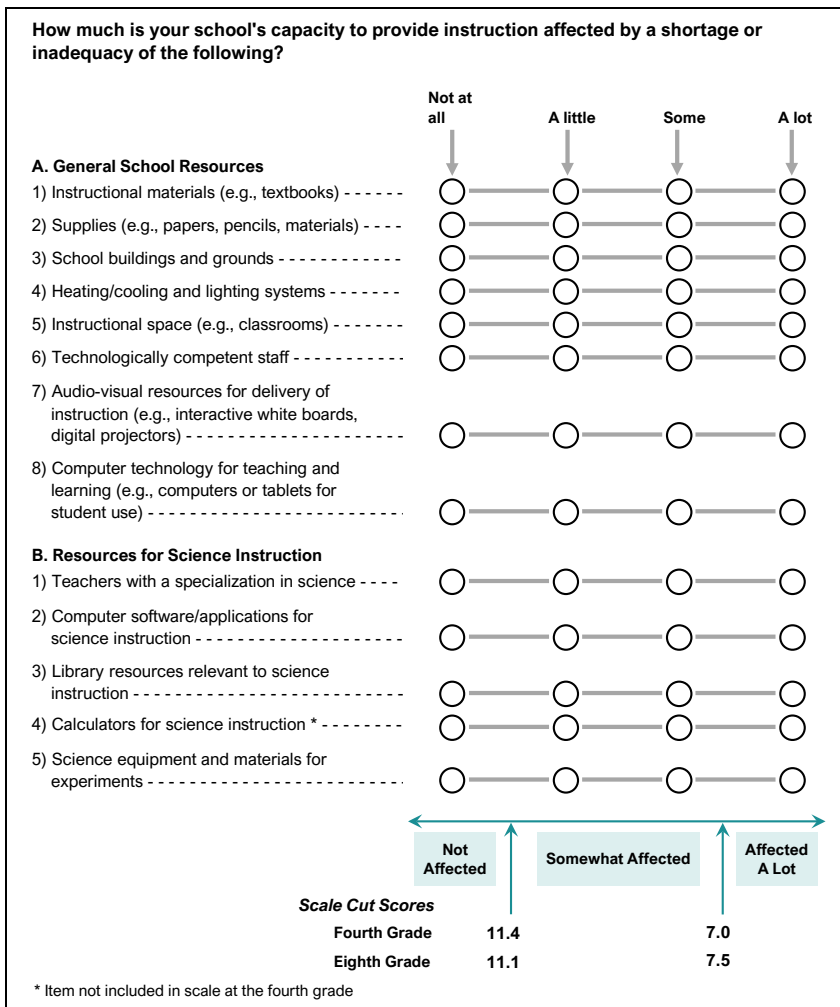


Exhibit 6.16: Instruction Affected by Science Resource Shortages – Principals’ Reports

Students’ Results based on Principals’ Reports

About the Scale

Students were scored according to their principals’ responses regarding thirteen school and classroom resources on the *Instruction Affected by Science Resource Shortages* scale. Cut scores divide the scale into three categories. Students in schools where instruction was **Not Affected** by resource shortages had a score at or above the cut score corresponding to their principals reporting that shortages affected instruction “not at all” for seven of the thirteen resources and “a little” for the other six, on average. Students in schools where instruction was **Affected A Lot** had a score at or below the cut score corresponding to their principals reporting that shortages affected instruction “a lot” for seven of the thirteen resources and “some” for the other six, on average. All other students attended schools where instruction was **Somewhat Affected** by resource shortages.



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

Exhibit 6.17: Instruction Affected by Science Resource Shortages – Principals' Reports

Students' Results based on Principals' Reports

Country	Not Affected		Somewhat Affected		Affected A Lot		Average Scale Score
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	
Korea, Rep. of	70 (4.0)	590 (2.7)	27 (3.9)	581 (3.8)	4 (1.2)	599 (12.5)	12.6 (0.24)
Singapore	63 (0.0)	595 (4.5)	25 (0.0)	601 (5.8)	12 (0.0)	582 (8.8)	11.6 (0.00)
Bulgaria	48 (4.1)	533 (5.4)	52 (4.1)	510 (8.0)	0 (0.0)	~ ~	11.4 (0.16)
Poland	48 (4.2)	532 (3.6)	51 (4.2)	529 (3.5)	1 (0.8)	~ ~	11.3 (0.16)
United States	45 (2.9)	544 (5.1)	54 (2.9)	535 (4.3)	2 (0.8)	~ ~	11.2 (0.14)
Qatar	43 (3.8)	473 (7.6)	24 (3.4)	444 (7.7)	33 (3.3)	423 (6.4)	9.6 (0.36)
Kazakhstan	43 (4.3)	493 (5.9)	49 (4.1)	497 (5.3)	8 (2.1)	485 (18.0)	11.3 (0.26)
United Arab Emirates	40 (1.8)	502 (2.5)	42 (1.7)	444 (3.0)	18 (1.8)	464 (4.0)	10.2 (0.19)
Norway (5) r	39 (5.3)	542 (3.6)	61 (5.3)	539 (3.5)	0 (0.0)	~ ~	10.9 (0.13)
Georgia	38 (4.1)	455 (6.9)	61 (4.2)	455 (5.0)	1 (0.8)	~ ~	10.9 (0.18)
Australia	37 (3.7)	538 (5.6)	61 (3.8)	530 (3.7)	2 (1.4)	~ ~	10.9 (0.16)
Belgium (Flemish)	35 (4.4)	502 (3.7)	64 (4.4)	500 (3.0)	1 (0.8)	~ ~	10.9 (0.17)
Sweden	35 (4.4)	536 (5.5)	64 (4.5)	538 (4.0)	1 (0.8)	~ ~	10.8 (0.16)
Cyprus	34 (4.8)	517 (4.7)	60 (4.6)	506 (3.6)	6 (2.6)	526 (15.1)	10.7 (0.25)
Canada	33 (2.1)	530 (3.3)	66 (2.1)	520 (2.1)	2 (0.7)	~ ~	10.8 (0.09)
Latvia	32 (3.3)	533 (6.2)	66 (3.5)	545 (2.6)	1 (0.9)	~ ~	10.8 (0.14)
Spain	31 (3.0)	523 (3.3)	68 (3.1)	506 (2.9)	1 (0.8)	~ ~	10.7 (0.10)
Armenia	30 (4.1)	474 (5.7)	69 (4.1)	464 (3.9)	1 (0.6)	~ ~	10.7 (0.16)
Denmark r	30 (3.6)	523 (4.0)	67 (3.4)	522 (3.0)	3 (1.1)	522 (8.4)	10.7 (0.16)
Finland	30 (3.7)	552 (3.9)	70 (3.7)	556 (3.3)	0 (0.0)	~ ~	10.7 (0.13)
Chinese Taipei	30 (3.4)	560 (3.4)	67 (3.3)	557 (2.2)	3 (1.3)	555 (10.2)	10.6 (0.17)
Czech Republic	29 (4.2)	531 (4.3)	70 (4.3)	535 (3.3)	1 (0.8)	~ ~	10.9 (0.13)
Chile	28 (3.8)	489 (6.8)	66 (4.1)	462 (3.4)	6 (2.1)	462 (12.2)	10.3 (0.18)
Russian Federation	27 (3.0)	574 (6.3)	69 (3.0)	564 (3.2)	4 (1.2)	575 (11.9)	10.3 (0.15)
New Zealand	27 (3.5)	516 (6.3)	71 (3.6)	498 (3.3)	3 (1.3)	485 (21.8)	10.5 (0.16)
Bahrain	24 (2.3)	521 (5.5)	43 (2.3)	488 (4.9)	33 (2.0)	478 (7.2)	9.0 (0.19)
Hungary	24 (3.6)	526 (7.0)	74 (4.0)	530 (3.5)	3 (1.8)	512 (40.0)	10.1 (0.17)
Japan	23 (3.6)	564 (3.9)	74 (3.6)	561 (2.0)	3 (1.0)	572 (6.4)	10.5 (0.13)
Lithuania	23 (3.7)	535 (6.3)	76 (3.8)	539 (3.5)	1 (0.8)	~ ~	10.4 (0.17)
Kuwait	22 (3.0)	408 (10.8)	51 (4.9)	382 (8.4)	27 (4.1)	401 (15.1)	8.6 (0.26)
England s	21 (3.9)	557 (7.9)	79 (3.9)	532 (4.8)	0 (0.0)	~ ~	10.5 (0.14)
Malta	21 (0.4)	513 (2.5)	76 (0.4)	491 (1.5)	3 (0.1)	501 (5.9)	10.3 (0.02)
Serbia	20 (3.5)	533 (7.0)	77 (3.6)	513 (4.0)	3 (1.2)	507 (15.5)	9.9 (0.12)
Croatia	18 (2.9)	527 (5.5)	82 (2.9)	524 (2.2)	0 (0.0)	~ ~	10.2 (0.14)
Germany	17 (2.6)	520 (7.1)	82 (2.6)	518 (2.5)	0 (0.3)	~ ~	10.2 (0.10)
Hong Kong SAR	17 (2.7)	540 (6.3)	74 (3.8)	528 (4.5)	8 (2.6)	541 (24.6)	9.7 (0.20)
Austria	16 (2.8)	545 (6.5)	83 (2.8)	518 (2.7)	1 (0.6)	~ ~	10.2 (0.09)
Bosnia and Herzegovina	16 (3.0)	464 (6.7)	80 (3.4)	458 (3.2)	5 (1.9)	452 (13.3)	9.6 (0.14)
Oman	15 (2.1)	452 (8.0)	62 (3.5)	431 (5.1)	23 (2.9)	432 (12.2)	8.9 (0.16)
Slovak Republic	15 (3.0)	537 (6.4)	78 (3.2)	519 (4.7)	7 (1.8)	514 (11.2)	9.5 (0.13)
Portugal	15 (2.9)	510 (5.6)	84 (3.0)	503 (2.8)	1 (0.7)	~ ~	9.9 (0.13)
Ireland	13 (2.9)	545 (8.0)	86 (3.1)	526 (3.5)	1 (0.7)	~ ~	10.0 (0.11)
Netherlands s	13 (3.8)	518 (9.1)	87 (3.8)	519 (3.5)	0 (0.0)	~ ~	10.1 (0.16)
Northern Ireland r	12 (3.1)	526 (6.8)	85 (3.4)	518 (2.9)	2 (1.5)	~ ~	9.5 (0.13)
Montenegro	11 (0.2)	435 (9.3)	82 (0.3)	457 (2.5)	7 (0.2)	437 (5.1)	9.4 (0.01)
France	10 (2.6)	507 (7.8)	89 (2.7)	487 (3.3)	1 (0.8)	~ ~	9.7 (0.12)
Pakistan	10 (2.7)	280 (35.8)	79 (6.2)	282 (14.7)	12 (6.1)	354 (30.1)	9.2 (0.21)
Saudi Arabia	9 (1.8)	424 (11.2)	69 (3.0)	394 (5.7)	21 (2.7)	422 (8.7)	8.6 (0.15)
Iran, Islamic Rep. of	9 (2.1)	476 (11.5)	77 (3.1)	439 (4.3)	14 (2.4)	425 (9.3)	8.7 (0.15)
North Macedonia	8 (2.3)	434 (19.7)	71 (4.2)	431 (6.7)	21 (3.7)	409 (13.5)	8.7 (0.17)
Albania	8 (2.1)	550 (10.5)	69 (3.3)	483 (4.6)	23 (3.0)	490 (5.8)	8.6 (0.16)
South Africa (5)	8 (1.9)	423 (32.2)	84 (3.0)	318 (5.4)	8 (2.2)	323 (25.8)	9.2 (0.11)
Morocco	7 (1.8)	340 (21.9)	89 (2.5)	371 (6.4)	4 (1.8)	492 (45.1)	9.6 (0.11)
Italy	7 (1.9)	518 (13.5)	92 (2.2)	510 (3.1)	2 (1.3)	~ ~	9.8 (0.11)
Turkey (5)	5 (1.7)	568 (10.7)	62 (3.3)	527 (5.1)	33 (3.5)	519 (9.0)	8.0 (0.18)
Azerbaijan	2 (1.0)	~ ~	87 (2.4)	428 (3.6)	11 (2.2)	420 (10.3)	8.6 (0.09)
Philippines	1 (0.5)	~ ~	95 (1.6)	245 (7.6)	5 (1.5)	291 (22.0)	8.8 (0.09)
Kosovo	0 (0.3)	~ ~	72 (4.2)	413 (4.6)	28 (4.2)	413 (5.6)	7.6 (0.20)
International Average	24 (0.4)	508 (1.4)	69 (0.5)	488 (0.6)	7 (0.3)	472 (3.0)	
Benchmarking Participants							
Moscow City, Russian Fed.	63 (4.3)	592 (3.1)	35 (4.3)	600 (3.2)	2 (1.1)	~ ~	12.5 (0.26)
Dubai, UAE r	54 (0.3)	552 (2.7)	30 (0.3)	526 (2.7)	16 (0.2)	566 (4.7)	10.9 (0.02)
Madrid, Spain	51 (3.8)	526 (2.2)	49 (3.8)	519 (3.5)	0 (0.4)	~ ~	11.6 (0.16)
Abu Dhabi, UAE r	36 (1.5)	454 (3.4)	48 (1.7)	384 (4.7)	16 (1.3)	405 (12.9)	10.3 (0.10)
Ontario, Canada	29 (3.9)	533 (6.6)	70 (3.9)	520 (3.3)	1 (1.0)	~ ~	10.7 (0.17)
Quebec, Canada	29 (3.7)	526 (3.4)	68 (4.0)	521 (3.3)	4 (1.8)	525 (12.1)	10.6 (0.16)

This TIMSS context questionnaire scale was established in 2011 based on the combined response distribution of all countries that participated in TIMSS 2011. 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.

Exhibit 6.18: Instruction Affected by Science Resource Shortages – Principals' Reports

Students' Results based on Principals' Reports

Country	Not Affected		Somewhat Affected		Affected A Lot		Average Scale Score
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	
Singapore	75 (0.0)	607 (4.5)	18 (0.0)	607 (8.6)	7 (0.0)	612 (20.3)	12.3 (0.00)
Australia	63 (3.4)	542 (4.6)	35 (3.4)	510 (4.6)	2 (1.2)	~ ~	11.7 (0.13)
France	56 (4.5)	501 (4.4)	43 (4.4)	478 (4.6)	1 (0.8)	~ ~	11.5 (0.15)
Norway (9)	55 (5.1)	499 (4.9)	45 (5.1)	495 (4.9)	0 (0.0)	~ ~	11.4 (0.11)
New Zealand	55 (4.9)	516 (5.6)	41 (5.0)	492 (5.8)	5 (4.0)	464 (66.9)	11.3 (0.33)
Korea, Rep. of	55 (3.9)	564 (3.2)	41 (4.2)	557 (3.4)	4 (1.8)	557 (7.4)	11.5 (0.17)
United States	48 (3.0)	540 (4.5)	50 (3.0)	514 (7.7)	1 (0.7)	~ ~	11.2 (0.12)
Hong Kong SAR	47 (4.6)	517 (7.3)	47 (4.0)	487 (9.1)	7 (2.7)	530 (34.8)	10.7 (0.27)
Qatar	46 (3.5)	499 (7.4)	25 (3.3)	462 (6.8)	28 (3.7)	445 (9.2)	9.9 (0.27)
Cyprus	44 (0.5)	489 (3.5)	51 (0.5)	478 (2.9)	5 (0.2)	497 (7.6)	10.9 (0.02)
Sweden	44 (3.7)	528 (5.5)	55 (3.8)	517 (4.6)	1 (0.8)	~ ~	11.0 (0.09)
United Arab Emirates	41 (1.8)	502 (3.2)	45 (1.8)	449 (3.3)	14 (0.7)	448 (6.2)	10.4 (0.07)
Kazakhstan	40 (4.1)	485 (6.2)	52 (4.2)	476 (5.1)	9 (1.8)	458 (18.5)	10.9 (0.17)
Finland	37 (4.1)	543 (5.8)	62 (4.1)	542 (3.8)	1 (0.9)	~ ~	10.9 (0.12)
England	37 (4.9)	533 (11.7)	62 (4.7)	516 (6.8)	1 (1.4)	~ ~	10.8 (0.19)
Chinese Taipei	36 (3.4)	578 (4.0)	64 (3.5)	573 (2.6)	0 (0.4)	~ ~	10.9 (0.11)
Japan	36 (3.4)	578 (4.6)	64 (3.5)	565 (2.1)	1 (0.7)	~ ~	10.8 (0.09)
Ireland	34 (3.2)	537 (5.2)	65 (3.3)	518 (3.7)	1 (0.6)	~ ~	10.8 (0.12)
Georgia	34 (3.3)	453 (7.5)	65 (3.4)	444 (4.9)	1 (1.0)	~ ~	10.7 (0.12)
Chile	33 (3.1)	491 (5.9)	63 (3.4)	449 (4.3)	4 (1.7)	453 (15.6)	10.4 (0.14)
Hungary	25 (3.9)	527 (7.1)	73 (3.9)	531 (4.3)	2 (1.1)	~ ~	10.3 (0.12)
Russian Federation	25 (3.5)	551 (7.4)	74 (3.6)	542 (4.0)	2 (0.9)	~ ~	10.1 (0.11)
Lebanon	21 (2.9)	439 (10.5)	64 (3.7)	357 (6.3)	15 (2.7)	370 (16.0)	9.5 (0.16)
Egypt	21 (3.4)	410 (10.0)	72 (3.6)	383 (6.9)	7 (2.3)	405 (12.5)	9.9 (0.16)
Bahrain	20 (0.2)	506 (3.0)	52 (0.2)	468 (2.1)	27 (0.2)	505 (4.3)	9.2 (0.01)
Oman	19 (2.9)	475 (8.7)	65 (3.9)	452 (4.1)	17 (2.9)	459 (6.2)	9.5 (0.14)
Kuwait	17 (3.6)	456 (12.1)	58 (4.2)	432 (6.6)	25 (3.6)	459 (9.4)	9.0 (0.18)
Portugal	15 (2.7)	536 (8.0)	82 (3.0)	515 (3.2)	2 (1.3)	~ ~	10.1 (0.11)
Lithuania	15 (3.1)	532 (8.0)	82 (3.6)	532 (3.6)	3 (1.8)	545 (17.8)	10.1 (0.10)
Israel	14 (3.2)	535 (13.5)	82 (3.6)	509 (4.7)	4 (1.7)	539 (23.5)	10.0 (0.12)
Italy	13 (2.7)	500 (9.3)	87 (2.7)	502 (2.6)	0 (0.0)	~ ~	10.0 (0.09)
Saudi Arabia	12 (2.4)	439 (9.7)	64 (3.7)	424 (3.9)	24 (3.2)	448 (6.0)	8.8 (0.14)
Jordan	9 (2.5)	447 (25.1)	77 (3.2)	449 (4.6)	15 (2.4)	471 (15.4)	8.9 (0.12)
Romania	9 (2.2)	507 (13.7)	85 (2.9)	468 (4.4)	6 (1.9)	456 (14.0)	9.5 (0.12)
Turkey	8 (2.4)	550 (18.4)	68 (3.6)	519 (4.7)	23 (3.2)	493 (9.7)	8.5 (0.14)
South Africa (9)	7 (1.1)	488 (22.0)	86 (2.1)	362 (3.4)	7 (1.8)	358 (10.7)	9.3 (0.08)
Iran, Islamic Rep. of	5 (1.4)	528 (18.3)	83 (2.8)	445 (3.5)	11 (2.4)	447 (14.5)	9.0 (0.11)
Morocco	4 (1.4)	457 (16.0)	93 (1.5)	390 (2.8)	3 (1.1)	438 (21.3)	9.6 (0.08)
Malaysia	2 (0.7)	~ ~	77 (3.3)	454 (3.9)	20 (3.3)	479 (8.7)	8.3 (0.10)
International Average	30 (0.5)	510 (1.7)	62 (0.6)	484 (0.8)	8 (0.3)	472 (4.1)	
Benchmarking Participants							
Quebec, Canada	71 (4.3)	538 (3.6)	28 (4.3)	545 (7.9)	2 (1.2)	~ ~	11.9 (0.16)
Moscow City, Russian Fed.	65 (4.1)	566 (4.0)	34 (4.1)	568 (4.4)	1 (0.5)	~ ~	11.9 (0.17)
Dubai, UAE	56 (0.6)	567 (3.4)	35 (0.6)	520 (3.4)	9 (0.3)	531 (6.8)	11.3 (0.02)
Abu Dhabi, UAE	38 (1.9)	450 (5.9)	40 (2.0)	388 (8.1)	22 (1.3)	413 (10.5)	10.1 (0.10)
Ontario, Canada	31 (5.6)	533 (7.2)	68 (5.6)	514 (4.0)	1 (1.1)	~ ~	10.7 (0.18)
Western Cape, RSA (9)	14 (2.4)	575 (11.4)	84 (2.7)	418 (5.7)	3 (1.4)	435 (37.4)	9.8 (0.11)
Gauteng, RSA (9)	11 (2.5)	528 (11.1)	85 (2.7)	406 (4.5)	4 (1.4)	458 (32.0)	9.5 (0.12)

This TIMSS context questionnaire scale was established in 2011 based on the combined response distribution of all countries that participated in TIMSS 2011. 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.

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