

Chapter 5

School Resources for Teaching Mathematics

The most successful schools tend to have students that are relatively economically affluent, speak the language of instruction, and begin school with early numeracy skills. Successful schools also are likely to have better working conditions and facilities as well as more instructional materials, such as books, computers, technological support, and supplies.

The learning environment of the school can be a positive influence, encouraging a positive attitude toward academic excellence and facilitating classroom instruction. Considerable research has shown that higher levels of school resources are associated with higher achievement. However, the relationship between resources and achievement is complicated. First, a school can have a more socioeconomically advantaged student population, for example, because of its location or because it competes for students. Second, the school system can invest more money into schools for such things as facilities, teachers' salaries, equipment, and materials. It follows that the most successful schools are likely to have more socioeconomically advantaged students and better resources.

Schools with Students from Advantaged Home Backgrounds

The home backgrounds of students attending a school can be closely related to the learning environment, with the two reinforcing each other and being strongly linked to academic achievement. Students from home backgrounds supportive of learning are likely to have more positive attitudes toward learning and, perhaps, even better discipline. Beyond that, parents that have high educational expectations for their children are more likely to take an active interest in the quality of teachers and school facilities.

School Location

Depending on each country's characteristics, a school's location can have a substantial impact on whether the students attending that school typically are from economically and educationally advantaged home backgrounds. Also, depending on the country, the location of the school can provide access to important additional resources (e.g., libraries, media centers, or museums) or mean that the school is relatively isolated.

To provide some information about the urbanicity of each school's location, TIMSS 2011 asked principals to describe the population size of the city, town, or area in which their schools were located. For the fourth grade mathematics assessment, Exhibit 5.1 shows the percentages of students together with their average achievement for schools located in cities, towns, or areas of three different population sizes: cities of more than 100,000; cities or towns of 15,001 to 100,000; and small towns, villages, or rural areas of 15,000 or fewer people. Countries are presented in alphabetical order with the fourth grade on

the first page of the exhibit, followed by the sixth grade and the benchmarking participants on the second page.

On average, across the fourth grade countries, 31 percent of the students attended schools in cities with more than 100,000 people, 27 percent attended schools in cities or towns of 15,001 to 100,000, and 42 percent in small towns, villages, or rural areas. In general, the fourth grade students attending schools in the largest cities had the highest average mathematics achievement (501), followed by students in medium sized cities (489), and then those in smaller towns and rural areas (477). While this pattern held for the majority of the countries in the fourth grade assessment, there were also other patterns. In some countries, students attending schools in medium sized cities of 15,001 to 100,000 had higher average achievement than students in schools in larger cities, or there was not much difference in average achievement between the two. There were also a number of countries where average mathematics achievement was highest among students attending schools in small towns or rural areas. The countries that assessed TIMSS 2011 in the sixth grade had relatively large percentages of students (64–77%) attending schools in small towns or rural areas, and these students had lower average mathematics achievement than students in schools in large or medium sized cities.

Exhibit 5.2 shows principals' reports about school location for the TIMSS 2011 eighth grade assessment, with percentages of students and average achievement for the eighth grade students on the first page and results for countries assessing the ninth grade and benchmarking participants on the second page. Compared to the fourth grade assessment, the results indicated a slight shift away from small towns and rural areas into large cities. For the eighth grade assessment, 37 percent of students were attending schools in cities with a population more than 100,000, 28 percent were attending schools in medium sized cities or towns of 15,001 to 100,000, and 35 percent in small towns or rural areas of 15,000 or fewer people. Average achievement differences among students attending the three types of schools were more pronounced than at the fourth grade, and more strongly related to degree of urbanicity, with average achievement highest in the big-city schools (484), next highest in schools in medium sized cities (463), and lowest in schools in small towns or rural areas (450). As with the fourth grade, this pattern did not hold in all countries and there was considerable variation.

Exhibit 5.1: School Location
Reported by Principals

Country	Population Size of City, Town, or Area Where School Is Located					
	More than 100,000		15,001 to 100,000		15,000 or Fewer	
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement
Armenia	27 (3.0)	464 (5.2)	26 (3.4)	455 (6.1)	46 (3.2)	443 (6.5)
Australia	42 (3.3)	532 (4.6)	30 (3.9)	502 (5.7)	28 (4.1)	511 (5.3)
Austria	24 (1.5)	502 (5.2)	9 (1.9)	502 (5.0)	66 (2.3)	511 (3.2)
Azerbaijan	16 (2.9)	464 (8.7)	21 (2.9)	481 (14.9)	63 (3.5)	456 (7.2)
Bahrain	11 (3.3)	443 (10.8)	28 (5.1)	431 (8.4)	61 (5.5)	437 (5.0)
Belgium (Flemish)	6 (1.9)	539 (12.3)	55 (4.1)	545 (2.4)	39 (3.8)	559 (2.8)
Chile	56 (3.5)	476 (3.9)	28 (3.3)	453 (5.9)	16 (2.5)	437 (6.4)
Chinese Taipei	56 (3.5)	603 (2.4)	39 (3.3)	576 (3.2)	6 (2.0)	572 (10.6)
Croatia	16 (2.2)	509 (3.9)	23 (3.3)	493 (3.5)	61 (3.7)	484 (2.8)
Czech Republic	15 (2.5)	518 (9.0)	33 (3.1)	513 (3.5)	52 (3.2)	507 (3.3)
Denmark	r 15 (2.6)	524 (8.3)	37 (3.6)	550 (4.3)	48 (3.2)	536 (3.1)
England	40 (5.2)	533 (6.9)	38 (5.0)	533 (7.2)	23 (3.9)	569 (6.3)
Finland	31 (3.9)	545 (4.2)	39 (4.2)	549 (2.7)	30 (3.3)	540 (5.4)
Georgia	37 (2.9)	472 (5.7)	17 (2.3)	449 (6.9)	46 (2.4)	432 (6.0)
Germany	25 (3.2)	518 (4.6)	33 (3.7)	527 (3.9)	42 (3.5)	537 (2.4)
Hong Kong SAR	r 84 (3.4)	603 (5.0)	15 (3.2)	611 (7.5)	1 (1.2)	~ ~
Hungary	25 (2.6)	537 (6.9)	29 (3.2)	536 (4.8)	46 (2.2)	492 (6.4)
Iran, Islamic Rep. of	45 (3.5)	455 (6.0)	18 (2.9)	433 (9.1)	36 (3.4)	399 (4.8)
Ireland	16 (3.0)	515 (7.7)	27 (3.2)	519 (5.7)	57 (3.0)	536 (3.9)
Italy	16 (2.3)	510 (5.4)	34 (3.2)	505 (5.0)	50 (3.3)	509 (3.8)
Japan	64 (2.9)	591 (2.4)	33 (3.0)	578 (2.4)	3 (1.4)	561 (9.1)
Kazakhstan	26 (3.0)	511 (8.7)	21 (2.8)	486 (8.4)	54 (3.0)	500 (6.8)
Korea, Rep. of	86 (2.8)	609 (2.1)	9 (2.1)	586 (3.0)	5 (2.2)	579 (5.8)
Kuwait	12 (2.7)	339 (13.1)	38 (4.2)	347 (6.3)	50 (4.2)	343 (5.3)
Lithuania	35 (1.7)	556 (3.8)	19 (2.8)	532 (3.9)	46 (2.9)	518 (4.1)
Malta	0 (0.0)	~ ~	13 (0.1)	482 (3.7)	87 (0.1)	498 (1.4)
Morocco	r 30 (3.4)	368 (7.0)	27 (3.6)	324 (6.7)	43 (3.9)	319 (6.9)
Netherlands	r 25 (4.9)	535 (4.3)	59 (5.5)	543 (2.6)	16 (3.7)	545 (4.0)
New Zealand	40 (3.6)	501 (4.3)	23 (3.2)	467 (6.3)	37 (3.1)	484 (4.0)
Northern Ireland	r 23 (3.6)	565 (8.9)	29 (4.9)	561 (7.6)	48 (4.4)	569 (4.9)
Norway	20 (2.8)	495 (6.9)	45 (3.8)	497 (3.8)	34 (3.5)	488 (5.1)
Oman	r 4 (1.4)	359 (12.7)	17 (2.5)	395 (6.6)	79 (2.5)	377 (3.9)
Poland	24 (0.9)	500 (5.4)	24 (2.1)	485 (3.7)	52 (2.3)	472 (3.0)
Portugal	14 (2.6)	551 (7.8)	28 (4.6)	524 (4.5)	58 (4.6)	530 (5.4)
Qatar	34 (3.0)	453 (8.6)	24 (2.7)	400 (9.5)	42 (3.1)	386 (6.1)
Romania	21 (2.7)	538 (6.2)	15 (2.4)	516 (7.6)	65 (2.5)	457 (8.2)
Russian Federation	48 (1.6)	557 (4.5)	22 (2.3)	537 (5.5)	30 (2.0)	523 (7.2)
Saudi Arabia	57 (3.7)	410 (8.2)	15 (2.9)	420 (10.0)	28 (3.9)	404 (8.7)
Serbia	28 (3.2)	535 (5.2)	34 (3.7)	517 (5.4)	38 (3.2)	499 (5.5)
Singapore	100 (0.0)	606 (3.2)	0 (0.0)	~ ~	0 (0.0)	~ ~
Slovak Republic	11 (2.1)	545 (7.4)	35 (3.3)	519 (3.6)	54 (2.9)	491 (5.8)
Slovenia	14 (2.8)	523 (5.6)	21 (3.4)	515 (4.2)	65 (3.6)	510 (2.6)
Spain	37 (3.6)	491 (4.8)	34 (3.6)	483 (5.0)	30 (3.6)	476 (4.7)
Sweden	16 (3.5)	510 (6.6)	38 (4.5)	505 (4.0)	46 (5.0)	500 (2.9)
Thailand	8 (2.2)	516 (14.4)	22 (2.7)	470 (11.1)	70 (3.1)	447 (5.2)
Tunisia	12 (2.7)	380 (10.5)	28 (3.5)	370 (7.5)	60 (3.3)	349 (5.1)
Turkey	52 (2.4)	489 (5.7)	21 (2.3)	480 (8.1)	28 (2.4)	424 (10.8)
United Arab Emirates	50 (1.8)	449 (3.5)	22 (1.7)	425 (5.5)	28 (1.8)	408 (5.4)
United States	33 (2.1)	539 (4.8)	36 (2.6)	547 (3.3)	31 (2.4)	542 (3.4)
Yemen	15 (3.1)	269 (15.0)	10 (2.2)	271 (17.9)	75 (3.5)	241 (7.4)
International Avg.	31 (0.4)	501 (1.1)	27 (0.5)	489 (1.0)	42 (0.5)	477 (0.8)

() 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.

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2011

Exhibit 5.1: School Location (Continued)

Country	Population Size of City, Town, or Area Where School Is Located					
	More than 100,000		15,001 to 100,000		15,000 or Fewer	
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement
Sixth Grade Participants						
Botswana	3 (1.6)	469 (35.5)	20 (3.2)	454 (12.3)	77 (3.3)	407 (3.5)
Honduras	21 (4.0)	439 (13.1)	15 (2.6)	428 (4.7)	64 (3.8)	375 (6.5)
Yemen	18 (3.6)	369 (10.4)	13 (2.8)	359 (14.4)	69 (3.9)	336 (7.1)
Benchmarking Participants						
Alberta, Canada	46 (4.4)	514 (4.1)	21 (3.7)	506 (2.8)	33 (3.6)	499 (4.4)
Ontario, Canada	62 (3.7)	522 (4.4)	21 (3.8)	513 (4.9)	16 (3.1)	513 (4.3)
Quebec, Canada	37 (4.0)	534 (4.3)	35 (4.4)	536 (3.6)	28 (4.5)	527 (4.1)
Abu Dhabi, UAE	46 (3.9)	438 (7.9)	21 (3.5)	392 (11.9)	33 (3.6)	394 (6.6)
Dubai, UAE	65 (0.3)	474 (2.4)	19 (0.2)	475 (2.3)	16 (0.2)	434 (3.7)
Florida, US	r 52 (6.6)	543 (6.1)	36 (6.0)	548 (6.5)	13 (4.2)	541 (15.7)
North Carolina, US	r 23 (5.5)	565 (12.3)	33 (7.1)	551 (10.7)	45 (6.7)	554 (5.7)

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2011

Exhibit 5.2: School Location
Reported by Principals

Country	Population Size of City, Town, or Area Where School Is Located					
	More than 100,000		15,001 to 100,000		15,000 or Fewer	
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement
Armenia	24 (2.8)	492 (5.4)	24 (3.5)	475 (7.5)	52 (3.5)	451 (4.5)
Australia	55 (3.2)	523 (7.2)	28 (3.5)	504 (9.0)	16 (2.9)	464 (6.1)
Bahrain	17 (0.3)	412 (4.9)	42 (0.3)	404 (3.3)	41 (0.3)	418 (3.2)
Chile	55 (3.5)	431 (4.6)	29 (3.8)	401 (6.8)	16 (2.9)	403 (7.3)
Chinese Taipei	63 (3.5)	624 (3.8)	34 (3.6)	586 (7.9)	3 (1.3)	570 (33.9)
England	49 (5.0)	507 (8.0)	36 (4.6)	502 (10.3)	15 (3.2)	536 (15.9)
Finland	24 (3.3)	514 (6.1)	42 (4.1)	514 (3.2)	34 (3.4)	512 (3.6)
Georgia	31 (2.4)	455 (5.9)	17 (2.4)	442 (14.4)	52 (2.5)	412 (5.2)
Ghana	19 (3.0)	370 (7.8)	13 (2.5)	343 (12.5)	68 (3.2)	317 (5.4)
Hong Kong SAR	88 (3.1)	588 (4.6)	9 (2.9)	564 (22.2)	3 (1.8)	630 (13.5)
Hungary	27 (2.4)	526 (7.4)	27 (3.1)	523 (5.2)	46 (2.4)	483 (4.3)
Indonesia	68 (4.1)	394 (6.2)	20 (4.1)	373 (7.6)	12 (3.0)	361 (11.5)
Iran, Islamic Rep. of	48 (3.4)	445 (7.2)	20 (2.7)	404 (7.0)	32 (3.4)	377 (6.0)
Israel	26 (3.0)	547 (6.5)	45 (4.0)	508 (8.8)	29 (3.2)	507 (8.3)
Italy	17 (2.7)	507 (6.2)	39 (3.4)	493 (5.1)	43 (3.7)	499 (3.4)
Japan	67 (3.2)	573 (3.3)	27 (3.4)	567 (3.8)	5 (1.8)	551 (18.4)
Jordan	26 (3.0)	419 (6.6)	31 (3.4)	411 (6.3)	42 (3.4)	397 (6.6)
Kazakhstan	26 (3.3)	504 (6.8)	21 (3.2)	488 (9.4)	53 (3.2)	478 (6.1)
Korea, Rep. of	87 (2.6)	616 (3.0)	10 (2.0)	594 (6.7)	3 (1.7)	567 (5.7)
Lebanon	21 (3.2)	469 (8.9)	37 (4.3)	445 (7.5)	42 (4.0)	440 (5.2)
Lithuania	31 (2.3)	533 (4.4)	19 (3.1)	501 (5.2)	50 (3.1)	484 (4.0)
Macedonia, Rep. of	21 (3.1)	454 (14.4)	36 (3.2)	431 (8.4)	43 (3.0)	409 (8.1)
Malaysia	18 (3.1)	465 (11.1)	49 (4.4)	448 (7.4)	33 (3.4)	413 (10.3)
Morocco	47 (2.7)	380 (2.9)	32 (2.9)	370 (4.3)	21 (2.5)	353 (4.4)
New Zealand	48 (5.0)	497 (9.4)	32 (4.7)	494 (6.9)	20 (3.1)	456 (7.7)
Norway	25 (2.0)	484 (4.0)	43 (3.2)	474 (3.9)	32 (2.8)	467 (4.0)
Oman	8 (1.2)	422 (10.0)	21 (2.8)	377 (7.4)	70 (3.0)	355 (3.0)
Palestinian Nat'l Auth.	22 (3.2)	408 (8.4)	35 (4.1)	397 (6.3)	43 (3.5)	407 (5.9)
Qatar	29 (0.7)	441 (8.1)	32 (0.5)	413 (4.5)	39 (0.3)	395 (3.9)
Romania	24 (2.8)	509 (9.9)	16 (2.9)	477 (7.3)	60 (2.8)	433 (6.1)
Russian Federation	48 (2.1)	550 (5.2)	20 (2.4)	544 (7.2)	31 (2.2)	518 (7.0)
Saudi Arabia	57 (3.2)	403 (5.9)	18 (2.8)	395 (11.0)	24 (3.0)	369 (9.9)
Singapore	100 (0.0)	611 (3.8)	0 (0.0)	~ ~	0 (0.0)	~ ~
Slovenia	13 (2.1)	516 (7.1)	21 (3.5)	503 (5.5)	66 (3.7)	504 (2.5)
Sweden	22 (3.6)	491 (5.6)	42 (4.4)	487 (3.2)	36 (4.5)	480 (3.6)
Syrian Arab Republic	26 (3.2)	385 (8.1)	26 (3.9)	374 (7.6)	47 (3.5)	380 (7.3)
Thailand	11 (2.6)	470 (16.1)	36 (3.5)	428 (6.9)	53 (3.5)	415 (5.7)
Tunisia	16 (2.8)	444 (10.0)	44 (3.4)	430 (3.2)	39 (3.5)	410 (4.0)
Turkey	54 (2.3)	465 (6.3)	21 (2.4)	458 (8.5)	25 (2.0)	420 (6.9)
Ukraine	31 (3.0)	511 (6.2)	18 (2.7)	479 (6.2)	52 (2.9)	461 (6.2)
United Arab Emirates	48 (2.4)	474 (4.1)	23 (2.0)	444 (4.5)	30 (2.3)	435 (3.9)
United States	30 (2.4)	499 (6.9)	43 (2.7)	516 (3.8)	27 (1.8)	515 (5.7)
International Avg.	37 (0.5)	484 (1.1)	28 (0.5)	463 (1.2)	35 (0.4)	450 (1.4)

() 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.

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2011

Exhibit 5.2: School Location (Continued)

Country	Population Size of City, Town, or Area Where School Is Located					
	More than 100,000		15,001 to 100,000		15,000 or Fewer	
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement
Ninth Grade Participants						
Botswana	15 (2.6)	425 (8.0)	60 (3.9)	395 (3.3)	25 (3.5)	381 (4.3)
Honduras	24 (3.6)	360 (10.5)	27 (4.1)	337 (6.9)	49 (4.2)	326 (4.7)
South Africa	19 (2.5)	398 (10.9)	32 (3.1)	358 (4.8)	50 (3.3)	329 (4.4)
Benchmarking Participants						
Alberta, Canada	53 (3.7)	508 (4.3)	18 (3.3)	507 (4.3)	29 (3.2)	500 (3.8)
Ontario, Canada	63 (3.5)	515 (3.7)	20 (3.7)	511 (4.9)	17 (3.0)	500 (4.6)
Quebec, Canada	45 (3.5)	532 (4.4)	39 (4.0)	530 (3.1)	16 (2.4)	535 (8.2)
Abu Dhabi, UAE	43 (4.2)	472 (8.6)	26 (4.1)	427 (6.8)	31 (4.1)	436 (6.5)
Dubai, UAE	66 (0.4)	488 (3.0)	16 (0.4)	497 (6.8)	18 (0.2)	432 (2.9)
Alabama, US	r 10 (5.1)	476 (23.6)	42 (9.2)	467 (13.1)	48 (6.7)	463 (7.4)
California, US	r 41 (6.3)	479 (10.5)	53 (6.8)	501 (7.8)	7 (2.4)	503 (12.3)
Colorado, US	40 (6.4)	511 (9.0)	45 (7.3)	519 (7.8)	15 (3.0)	525 (15.1)
Connecticut, US	12 (2.9)	452 (7.5)	64 (5.6)	525 (8.4)	24 (5.0)	532 (14.4)
Florida, US	r 58 (5.1)	516 (12.2)	36 (4.8)	517 (9.8)	6 (3.4)	497 (26.0)
Indiana, US	r 17 (5.1)	501 (18.8)	51 (6.0)	527 (8.1)	32 (5.1)	524 (9.5)
Massachusetts, US	9 (2.9)	507 (13.6)	67 (6.5)	568 (6.8)	24 (5.7)	568 (10.3)
Minnesota, US	13 (4.5)	519 (21.1)	43 (5.6)	551 (7.5)	44 (5.6)	549 (6.6)
North Carolina, US	30 (4.6)	535 (18.0)	36 (7.9)	530 (9.7)	35 (6.9)	543 (11.9)

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2011

School Composition by Student Background

Ever since the Coleman report (Coleman, et al., 1966), researchers have recognized that the compositional characteristics of a school's student body can affect student achievement. Essentially, students from disadvantaged backgrounds typically have higher achievement if they attend schools where the majority of students are from advantaged backgrounds. To provide information on this topic, TIMSS routinely asks school principals to report on two demographic characteristics of their schools:

- ◆ Economic home background; and
- ◆ Language home background.

Previous assessments have found both to be strongly related to average mathematics achievement. For example, in TIMSS 2007 the mathematics achievement of students attending schools with a higher proportion of economically advantaged students was higher than for those attending schools with large proportions of disadvantaged students. Also, mathematics achievement was highest for students in schools where most students spoke the language of the TIMSS assessment as their first language, and was progressively lower as percentages of students not having the TIMSS language as their first language increased.

Exhibit 5.3 presents, for participants in the TIMSS 2011 fourth grade assessment, principals' economic categorizations of their schools according to three categories that are fully described on the second page of the exhibit. To summarize, the **More Affluent** schools had more than one-fourth of their students from affluent home backgrounds and not more than one-fourth from disadvantaged home backgrounds, and the **More Disadvantaged** schools had the reverse situation. The other schools were "in between." Internationally, the students were distributed relatively equally across the three types of schools. On average, across countries at the fourth grade, 36 percent of the students attended schools with relatively more affluent students than disadvantaged students, and students in these schools had the highest average achievement (508). At the other end of the range, 30 percent of the students attended schools with relatively more disadvantaged students than affluent students, and students in these schools had the lowest average achievement (470). Although this overall achievement pattern was observed in most countries and benchmarking participants, there was a wide variation among participants in the percentages of students attending the three different economic categories of schools.

Exhibit 5.4 presents principals' economic categorizations of their schools for participants in the TIMSS 2011 eighth grade assessment. Similar to the fourth grade assessment, internationally the students were distributed relatively equally across the three types of schools, with 32 percent of the eighth grade students attending schools with relatively more affluent than disadvantaged students and 36 percent attending schools with relatively more disadvantaged than affluent students. Again, the percentages in each school category varied considerably across countries. Also similar to the fourth grade assessment, average mathematics achievement was highest among the eighth grade students attending schools with relatively more affluent students (494) and lowest among students attending schools with relatively more disadvantaged students (448).

Exhibit 5.5 presents, for participants in the fourth grade assessment, principals' categorizations of their schools according to the percentage of students who had the language of the TIMSS 2011 assessment as their native language. Approximately three-fourths of the fourth grade students (73%) were in schools where almost all students (more than 90%) spoke the language of the TIMSS test as their native language, 15 percent were in schools where the majority of students (51–90%) were native speakers of the TIMSS assessment language, and 13 percent were in schools where half the students (or less) spoke the language of the test as their native language. On average across the fourth grade countries, mathematics achievement was highest among students in schools where almost all students were native speakers of the TIMSS assessment language (491), next highest in schools where 51–90% of students were native speakers (482), and lowest in schools where half the students or less were native speakers (471). Among countries participating at the sixth grade, Botswana was notable for having almost all students (92%) in schools with half or less native speakers.

Exhibit 5.6 presents principals' categorizations of their schools in terms of their students being native speakers of the TIMSS assessment language for participants in the eighth grade assessment. Similar to the fourth grade assessment, most eighth grade students (69%) were in schools where almost all students (more than 90%) spoke the language of the TIMSS assessment as their native language, 13 percent were in schools where the majority of students (51–90%) were native speakers of the TIMSS assessment language, and 17 percent were in schools where half the students (or less) spoke the language of the assessment as their native language. Similar to the fourth grade, the eighth grade students in schools with the most native speakers had higher average achievement (471) than those in schools with fewest native speakers (461), but the achievement gap between the two was smaller than at the fourth grade.

Exhibit 5.3: School Composition by Student Economic Background

Reported by Principals

Country	More Affluent - Schools Where More than 25% of Students Come from Economically Affluent Homes and Not More than 25% from Economically Disadvantaged Homes		Neither More Affluent nor More Disadvantaged		More Disadvantaged - Schools Where More than 25% of Students Come from Economically Disadvantaged Homes and Not More than 25% from Economically Affluent homes	
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement
Armenia	38 (3.9)	458 (5.8)	20 (3.3)	458 (9.3)	42 (4.0)	445 (5.5)
Australia	32 (3.9)	544 (4.8)	41 (4.0)	517 (4.8)	27 (3.4)	486 (6.0)
Austria	31 (4.0)	516 (3.9)	48 (3.8)	514 (2.9)	21 (3.9)	483 (6.1)
Azerbaijan	r 11 (2.5)	479 (15.2)	32 (4.7)	481 (14.5)	57 (4.9)	454 (8.5)
Bahrain	r 46 (6.1)	453 (5.7)	35 (5.7)	430 (7.4)	19 (3.7)	409 (11.3)
Belgium (Flemish)	r 64 (4.6)	556 (2.2)	26 (4.2)	542 (4.1)	10 (2.6)	532 (8.2)
Chile	r 11 (2.2)	514 (8.0)	33 (4.6)	487 (5.1)	57 (4.2)	445 (3.9)
Chinese Taipei	22 (3.3)	600 (5.0)	67 (3.5)	593 (2.6)	11 (2.0)	559 (6.5)
Croatia	38 (4.0)	498 (3.2)	38 (4.2)	488 (3.0)	24 (3.2)	485 (5.5)
Czech Republic	37 (3.7)	515 (3.9)	46 (4.4)	514 (3.0)	17 (3.1)	489 (7.0)
Denmark	r 60 (3.9)	546 (3.1)	31 (3.9)	536 (3.7)	9 (2.5)	512 (11.1)
England	r 34 (4.8)	573 (7.6)	29 (4.5)	541 (7.2)	36 (4.2)	521 (6.7)
Finland	43 (4.2)	552 (3.3)	47 (4.3)	544 (4.0)	10 (2.6)	521 (5.6)
Georgia	16 (3.0)	465 (11.8)	41 (4.3)	457 (7.2)	43 (4.0)	443 (6.6)
Germany	21 (2.8)	538 (3.4)	53 (3.7)	537 (2.8)	26 (3.3)	501 (4.8)
Hong Kong SAR	r 21 (3.5)	608 (11.5)	29 (4.5)	607 (6.2)	50 (4.7)	599 (4.7)
Hungary	21 (3.6)	555 (5.8)	31 (4.3)	536 (5.3)	48 (4.0)	488 (6.4)
Iran, Islamic Rep. of	27 (3.6)	464 (8.6)	27 (4.1)	433 (8.0)	46 (4.2)	410 (4.7)
Ireland	r 39 (4.5)	546 (3.6)	30 (3.8)	531 (7.0)	31 (3.7)	498 (4.5)
Italy	37 (3.8)	507 (5.3)	43 (3.7)	510 (3.5)	20 (2.9)	499 (6.5)
Japan	46 (4.3)	589 (3.3)	45 (4.4)	583 (2.3)	9 (2.6)	573 (6.8)
Kazakhstan	73 (3.6)	502 (4.9)	19 (3.4)	493 (11.2)	8 (2.3)	504 (26.6)
Korea, Rep. of	17 (3.7)	627 (5.7)	62 (4.7)	605 (2.5)	21 (3.2)	590 (2.8)
Kuwait	r 57 (3.7)	352 (5.3)	28 (3.8)	326 (8.5)	15 (3.2)	323 (8.9)
Lithuania	19 (3.3)	560 (6.1)	43 (4.6)	538 (4.5)	38 (3.5)	519 (3.2)
Malta	47 (0.1)	500 (2.1)	43 (0.1)	496 (2.1)	10 (0.1)	461 (3.5)
Morocco	s 12 (2.1)	377 (17.7)	13 (2.9)	333 (14.9)	75 (2.9)	326 (6.7)
Netherlands	r 70 (5.2)	547 (2.2)	21 (5.0)	538 (4.4)	9 (2.5)	509 (11.0)
New Zealand	33 (3.0)	520 (4.5)	41 (3.3)	486 (3.2)	26 (2.8)	448 (5.3)
Northern Ireland	r 36 (4.7)	589 (4.4)	38 (4.3)	562 (4.4)	26 (3.8)	527 (6.7)
Norway	53 (5.2)	501 (4.1)	44 (5.2)	491 (4.1)	3 (1.3)	475 (15.5)
Oman	r 44 (3.4)	391 (4.1)	25 (2.9)	372 (5.6)	31 (2.9)	373 (6.5)
Poland	8 (2.1)	488 (12.0)	61 (3.8)	487 (2.9)	31 (3.7)	468 (3.8)
Portugal	31 (4.6)	540 (4.7)	39 (5.1)	540 (4.7)	31 (4.9)	511 (6.2)
Qatar	r 68 (3.0)	411 (4.9)	21 (2.3)	429 (6.6)	11 (1.9)	351 (7.8)
Romania	19 (3.1)	523 (10.7)	24 (4.0)	487 (9.8)	57 (4.8)	472 (7.7)
Russian Federation	58 (3.2)	553 (4.3)	29 (3.3)	529 (6.9)	13 (2.1)	528 (10.3)
Saudi Arabia	r 42 (4.7)	423 (11.2)	30 (4.3)	420 (6.1)	29 (4.0)	389 (11.6)
Serbia	18 (3.6)	521 (7.6)	37 (4.3)	516 (5.4)	45 (4.4)	516 (4.9)
Singapore	40 (0.0)	629 (5.0)	50 (0.0)	593 (4.6)	10 (0.0)	584 (13.7)
Slovak Republic	24 (3.3)	525 (4.7)	56 (3.4)	512 (3.6)	20 (3.2)	462 (11.7)
Slovenia	42 (4.0)	515 (3.9)	40 (4.0)	514 (2.6)	18 (3.0)	504 (7.4)
Spain	51 (4.1)	491 (4.1)	31 (3.7)	488 (4.1)	18 (3.2)	455 (7.8)
Sweden	r 77 (4.1)	509 (2.7)	17 (4.1)	490 (5.8)	7 (1.5)	466 (6.2)
Thailand	r 18 (3.8)	505 (11.8)	17 (3.3)	476 (9.8)	65 (4.2)	443 (6.1)
Tunisia	30 (3.4)	380 (6.5)	27 (3.9)	370 (7.7)	43 (4.3)	334 (5.9)
Turkey	14 (2.3)	535 (8.5)	24 (3.0)	484 (12.7)	63 (3.4)	449 (5.7)
United Arab Emirates	r 68 (2.2)	436 (3.5)	20 (1.6)	443 (4.9)	12 (1.7)	409 (7.1)
United States	r 19 (2.2)	574 (6.2)	31 (2.5)	555 (3.4)	50 (2.6)	523 (2.4)
Yemen	r 8 (2.9)	309 (16.0)	12 (3.5)	280 (18.5)	81 (4.3)	234 (7.5)
International Avg.	36 (0.5)	508 (1.0)	35 (0.6)	494 (1.0)	30 (0.5)	470 (1.2)

() 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 2011

Exhibit 5.3: School Composition by Student Economic Background (Continued)

Country	More Affluent - Schools Where More than 25% of Students Come from Economically Affluent Homes and Not More than 25% from Economically Disadvantaged Homes		Neither More Affluent nor More Disadvantaged		More Disadvantaged - Schools Where More than 25% of Students Come from Economically Disadvantaged Homes and Not More than 25% from Economically Affluent homes	
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement
Sixth Grade Participants						
Botswana	32 (3.6)	449 (7.5)	25 (4.0)	408 (8.5)	43 (4.3)	395 (4.4)
Honduras	r 16 (4.0)	469 (16.4)	13 (3.8)	382 (15.5)	71 (4.9)	388 (5.8)
Yemen	r 7 (2.9)	390 (8.6)	13 (3.2)	361 (18.0)	80 (3.6)	345 (7.5)
Benchmarking Participants						
Alberta, Canada	37 (4.3)	514 (3.8)	51 (4.5)	507 (3.2)	12 (2.8)	484 (10.5)
Ontario, Canada	36 (4.4)	534 (4.6)	36 (4.3)	520 (3.7)	28 (4.4)	496 (5.8)
Quebec, Canada	60 (4.1)	538 (2.8)	25 (4.0)	525 (6.3)	15 (2.7)	522 (6.0)
Abu Dhabi, UAE	s 75 (4.5)	417 (7.7)	12 (3.2)	430 (17.9)	13 (3.5)	389 (9.3)
Dubai, UAE	r 67 (0.4)	465 (2.2)	22 (0.3)	487 (4.6)	11 (0.2)	411 (5.5)
Florida, US	r 11 (4.4)	590 (11.4)	20 (4.7)	566 (11.3)	69 (4.6)	531 (3.0)
North Carolina, US	r 21 (6.0)	584 (9.5)	16 (5.3)	552 (6.1)	64 (7.5)	547 (6.4)

SOURCE: IEA's Trends in International Mathematics and Science Study - TIMSS 2011

Approximately what percentage of students in your school have the following backgrounds?

0 to 10% 11 to 25% 26 to 50% More than 50%

1) Come from economically disadvantaged homes ----- ○ ——— ○ ——— ○ ——— ○

2) Come from economically affluent homes ----- ○ ——— ○ ——— ○ ——— ○

More Affluent - Schools where more than 25% of students come from economically affluent homes and not more than 25% from economically disadvantaged homes

More Disadvantaged - Schools where more than 25% of students come from economically disadvantaged homes and not more than 25% from economically affluent homes

Neither More Affluent nor More Disadvantaged - All other possible response combinations

Exhibit 5.4: School Composition by Student Economic Background

Reported by Principals

Country	More Affluent - Schools Where More than 25% of Students Come from Economically Affluent Homes and Not More than 25% from Economically Disadvantaged Homes		Neither More Affluent nor More Disadvantaged		More Disadvantaged - Schools Where More than 25% of Students Come from Economically Disadvantaged Homes and Not More than 25% from Economically Affluent homes	
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement
Armenia	35 (3.7)	484 (5.9)	24 (3.6)	461 (7.5)	41 (3.7)	455 (5.0)
Australia	32 (3.4)	543 (11.2)	39 (3.7)	507 (6.1)	29 (3.1)	476 (7.5)
Bahrain	45 (0.3)	420 (3.2)	28 (0.2)	408 (2.7)	27 (0.3)	395 (3.7)
Chile	r 12 (2.3)	474 (13.0)	32 (4.1)	439 (6.0)	56 (3.9)	399 (4.8)
Chinese Taipei	17 (2.7)	649 (7.9)	69 (3.8)	604 (4.2)	14 (2.9)	577 (13.5)
England	28 (4.1)	553 (11.0)	50 (4.5)	498 (8.9)	22 (4.3)	487 (10.9)
Finland	r 30 (3.4)	519 (4.0)	67 (3.8)	513 (3.0)	3 (1.5)	486 (3.5)
Georgia	11 (2.0)	436 (13.7)	44 (4.4)	438 (6.8)	45 (4.2)	417 (6.8)
Ghana	7 (2.0)	392 (13.9)	18 (3.4)	331 (10.6)	75 (3.6)	321 (5.2)
Hong Kong SAR	11 (3.0)	628 (11.8)	37 (5.1)	609 (10.2)	53 (4.8)	561 (7.8)
Hungary	16 (2.7)	535 (7.4)	33 (4.1)	531 (4.9)	50 (4.3)	478 (5.6)
Indonesia	16 (3.3)	426 (9.9)	28 (4.6)	400 (8.1)	56 (4.6)	369 (6.0)
Iran, Islamic Rep. of	20 (2.7)	472 (11.2)	25 (3.5)	429 (9.1)	54 (3.8)	390 (5.2)
Israel	28 (3.5)	556 (7.8)	30 (4.5)	526 (8.8)	42 (3.9)	481 (8.8)
Italy	40 (3.7)	515 (3.7)	47 (3.9)	495 (3.8)	13 (2.6)	465 (8.9)
Japan	46 (4.4)	582 (4.5)	44 (4.5)	564 (4.1)	10 (2.9)	548 (9.0)
Jordan	r 32 (3.5)	431 (7.0)	25 (2.9)	402 (9.7)	43 (3.9)	388 (6.3)
Kazakhstan	r 75 (3.5)	487 (4.4)	20 (3.4)	493 (11.0)	5 (1.8)	462 (22.5)
Korea, Rep. of	18 (3.3)	653 (5.8)	51 (4.3)	612 (2.6)	32 (3.9)	591 (4.6)
Lebanon	r 21 (4.1)	491 (8.8)	34 (4.2)	455 (8.7)	45 (5.0)	435 (5.3)
Lithuania	23 (3.6)	537 (6.5)	39 (4.4)	499 (4.3)	38 (4.0)	487 (4.5)
Macedonia, Rep. of	r 38 (3.6)	458 (7.9)	30 (4.1)	428 (10.0)	32 (3.9)	401 (9.7)
Malaysia	26 (3.2)	467 (10.5)	23 (3.3)	452 (12.4)	52 (4.1)	424 (8.8)
Morocco	r 6 (1.4)	422 (15.0)	13 (2.5)	393 (9.8)	81 (2.9)	361 (2.6)
New Zealand	30 (5.6)	522 (6.9)	47 (5.8)	485 (7.4)	24 (4.0)	450 (10.6)
Norway	--	--	--	--	--	--
Oman	43 (3.1)	386 (4.6)	26 (2.6)	360 (5.6)	31 (3.1)	339 (5.8)
Palestinian Nat'l Auth.	44 (4.2)	411 (6.5)	23 (3.9)	402 (8.7)	33 (3.7)	393 (6.1)
Qatar	r 81 (0.2)	403 (4.3)	16 (0.2)	448 (6.6)	3 (0.1)	435 (18.2)
Romania	r 18 (2.9)	479 (12.7)	29 (4.2)	471 (8.1)	52 (4.3)	447 (6.2)
Russian Federation	58 (3.5)	553 (5.1)	25 (2.8)	527 (4.4)	16 (3.1)	513 (10.3)
Saudi Arabia	r 40 (4.4)	405 (7.5)	30 (4.4)	394 (10.5)	29 (4.1)	382 (8.2)
Singapore	27 (0.0)	643 (5.9)	61 (0.0)	604 (4.9)	11 (0.0)	569 (11.6)
Slovenia	40 (3.8)	510 (4.4)	45 (4.3)	506 (2.7)	15 (2.7)	489 (6.8)
Sweden	r 74 (4.4)	490 (2.6)	21 (4.1)	472 (5.5)	5 (1.8)	466 (11.9)
Syrian Arab Republic	r 37 (4.2)	388 (8.0)	27 (4.3)	392 (9.5)	36 (4.4)	371 (8.2)
Thailand	20 (3.0)	466 (13.9)	24 (3.6)	437 (9.5)	57 (4.4)	410 (5.7)
Tunisia	23 (3.3)	439 (9.6)	29 (3.3)	432 (3.9)	48 (3.5)	411 (3.0)
Turkey	17 (2.6)	533 (11.6)	25 (3.3)	455 (6.0)	59 (3.8)	428 (5.1)
Ukraine	13 (2.7)	486 (14.1)	29 (3.9)	486 (7.4)	59 (4.5)	472 (5.1)
United Arab Emirates	r 70 (2.0)	459 (3.4)	17 (1.9)	442 (7.3)	13 (1.4)	441 (5.6)
United States	22 (1.9)	543 (5.8)	23 (1.9)	526 (6.1)	55 (1.9)	490 (3.4)
International Avg.	32 (0.5)	494 (1.4)	33 (0.6)	471 (1.2)	36 (0.5)	448 (1.3)

() 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.

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2011

Exhibit 5.4: School Composition by Student Economic Background (Continued)

Country	More Affluent - Schools Where More than 25% of Students Come from Economically Affluent Homes and Not More than 25% from Economically Disadvantaged Homes		Neither More Affluent nor More Disadvantaged		More Disadvantaged - Schools Where More than 25% of Students Come from Economically Disadvantaged Homes and Not More than 25% from Economically Affluent homes	
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement
Ninth Grade Participants						
Botswana	13 (3.0)	432 (10.9)	24 (4.0)	401 (4.4)	63 (4.6)	384 (2.7)
Honduras	5 (1.6)	383 (12.5)	14 (3.4)	358 (12.3)	82 (3.6)	333 (4.4)
South Africa	8 (1.3)	487 (14.4)	12 (2.6)	356 (15.0)	80 (2.7)	339 (3.2)
Benchmarking Participants						
Alberta, Canada	39 (4.1)	517 (3.6)	43 (4.8)	505 (3.3)	18 (3.8)	482 (5.9)
Ontario, Canada	37 (4.1)	523 (5.1)	36 (4.7)	510 (3.8)	27 (4.5)	498 (5.2)
Quebec, Canada	51 (4.1)	542 (4.3)	32 (3.8)	523 (5.2)	17 (3.5)	514 (6.3)
Abu Dhabi, UAE	76 (4.1)	453 (6.1)	17 (3.6)	429 (10.3)	7 (2.4)	446 (14.9)
Dubai, UAE	71 (0.3)	484 (3.2)	12 (0.2)	449 (2.9)	16 (0.2)	434 (3.8)
Alabama, US	17 (4.4)	492 (19.0)	5 (3.4)	481 (41.0)	78 (5.6)	455 (6.1)
California, US	16 (4.2)	541 (12.3)	20 (5.2)	532 (16.7)	64 (5.4)	467 (5.8)
Colorado, US	21 (5.7)	525 (9.1)	34 (6.6)	526 (10.9)	46 (7.4)	500 (12.5)
Connecticut, US	43 (6.1)	565 (7.8)	27 (6.1)	528 (10.3)	30 (5.9)	455 (8.6)
Florida, US	6 (3.4)	500 (18.4)	37 (5.6)	535 (11.1)	58 (6.0)	499 (8.8)
Indiana, US	13 (4.5)	573 (7.5)	29 (5.3)	524 (10.1)	58 (5.9)	509 (6.6)
Massachusetts, US	29 (6.8)	589 (9.1)	45 (6.6)	562 (8.0)	26 (4.2)	521 (13.4)
Minnesota, US	18 (3.2)	583 (16.6)	45 (7.1)	546 (5.4)	37 (7.6)	530 (8.4)
North Carolina, US	14 (5.6)	560 (16.1)	23 (6.4)	551 (10.9)	63 (6.7)	519 (10.5)

SOURCE: IEA's Trends in International Mathematics and Science Study - TIMSS 2011

Approximately what percentage of students in your school have the following backgrounds?

0 to 10%
11 to 25%
26 to 50%
More than 50%

1) Come from economically disadvantaged homes ----- ○ ——— ○ ——— ○ ——— ○

2) Come from economically affluent homes ----- ○ ——— ○ ——— ○ ——— ○

More Affluent - Schools where more than 25% of students come from economically affluent homes and not more than 25% from economically disadvantaged homes

More Disadvantaged - Schools where more than 25% of students come from economically disadvantaged homes and not more than 25% from economically affluent homes

Neither More Affluent nor More Disadvantaged - All other possible response combinations

Exhibit 5.5: Schools with Students Having the Language of the Test as Their Native Language

Reported by Principals

Country	More than 90% of Students		51–90% of Students		50% of Students or Less	
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement
Armenia	95 (1.6)	452 (3.4)	5 (1.6)	471 (22.2)	0 (0.0)	~ ~
Australia	63 (3.8)	522 (3.5)	21 (2.8)	510 (7.2)	16 (3.1)	505 (10.2)
Austria	33 (4.1)	521 (3.5)	52 (4.7)	507 (3.5)	16 (1.9)	485 (7.2)
Azerbaijan	90 (2.6)	463 (5.5)	5 (1.9)	455 (28.2)	4 (1.8)	469 (43.6)
Bahrain	65 (3.8)	426 (3.8)	13 (2.3)	425 (12.4)	22 (3.0)	460 (10.8)
Belgium (Flemish)	52 (3.7)	561 (2.2)	36 (4.1)	542 (3.0)	12 (2.3)	528 (7.5)
Chile	99 (0.9)	464 (2.5)	1 (0.8)	~ ~	0 (0.0)	~ ~
Chinese Taipei	49 (3.8)	597 (2.7)	36 (3.8)	587 (3.7)	15 (2.6)	582 (6.9)
Croatia	95 (1.7)	492 (1.8)	3 (1.2)	466 (12.9)	1 (1.1)	~ ~
Czech Republic	96 (1.5)	512 (2.2)	2 (1.1)	~ ~	1 (1.0)	~ ~
Denmark	r 95 (1.6)	540 (2.6)	4 (1.5)	535 (16.5)	1 (0.6)	~ ~
England	56 (4.7)	542 (5.1)	22 (4.4)	545 (12.2)	22 (4.6)	538 (8.2)
Finland	85 (3.2)	547 (2.4)	15 (3.1)	535 (6.3)	1 (0.8)	~ ~
Georgia	92 (2.3)	450 (3.6)	7 (2.0)	461 (12.8)	1 (1.1)	~ ~
Germany	49 (2.9)	536 (2.3)	37 (2.8)	528 (3.4)	13 (2.4)	503 (6.8)
Hong Kong SAR	94 (1.2)	606 (2.8)	3 (1.6)	519 (66.4)	3 (1.1)	529 (73.5)
Hungary	96 (1.5)	517 (3.8)	3 (1.4)	511 (34.0)	1 (0.0)	~ ~
Iran, Islamic Rep. of	48 (3.4)	462 (4.7)	15 (3.5)	422 (9.1)	37 (2.9)	395 (5.4)
Ireland	64 (3.6)	535 (3.6)	33 (3.9)	519 (5.1)	3 (1.7)	485 (16.7)
Italy	64 (3.7)	509 (3.3)	30 (3.3)	506 (4.5)	6 (1.9)	497 (8.0)
Japan	99 (0.8)	585 (1.7)	1 (0.0)	~ ~	0 (0.0)	~ ~
Kazakhstan	56 (3.7)	491 (6.7)	30 (3.6)	516 (8.0)	14 (2.8)	509 (12.5)
Korea, Rep. of	100 (0.0)	605 (1.9)	0 (0.0)	~ ~	0 (0.0)	~ ~
Kuwait	93 (2.1)	342 (3.6)	6 (1.9)	345 (14.8)	2 (0.8)	~ ~
Lithuania	88 (2.5)	535 (2.8)	8 (1.5)	540 (5.5)	4 (2.0)	503 (24.9)
Malta	6 (0.1)	520 (4.9)	12 (0.1)	517 (3.5)	82 (0.1)	493 (1.6)
Morocco	60 (4.1)	344 (6.2)	13 (2.3)	329 (11.4)	27 (4.1)	318 (8.8)
Netherlands	r 75 (4.3)	545 (2.2)	15 (3.7)	538 (7.4)	10 (2.8)	516 (9.5)
New Zealand	58 (3.5)	493 (3.7)	25 (3.1)	490 (6.1)	17 (2.5)	464 (8.7)
Northern Ireland	88 (3.1)	564 (3.8)	7 (2.4)	559 (9.8)	4 (1.9)	555 (11.1)
Norway	64 (4.5)	497 (3.3)	29 (4.6)	490 (6.5)	8 (2.9)	493 (12.2)
Oman	85 (1.9)	381 (3.5)	10 (1.8)	372 (7.9)	5 (1.2)	355 (12.0)
Poland	100 (0.0)	482 (2.2)	0 (0.0)	~ ~	0 (0.0)	~ ~
Portugal	92 (1.9)	534 (3.8)	6 (1.5)	500 (11.4)	2 (1.0)	~ ~
Qatar	r 40 (3.2)	378 (6.4)	9 (2.6)	458 (27.9)	51 (3.2)	452 (4.8)
Romania	88 (2.5)	481 (6.6)	8 (2.3)	483 (12.3)	4 (1.7)	496 (17.7)
Russian Federation	73 (3.7)	543 (3.7)	17 (2.8)	539 (6.8)	9 (2.3)	546 (13.9)
Saudi Arabia	88 (2.3)	410 (6.1)	8 (2.2)	390 (13.5)	5 (1.4)	425 (13.6)
Serbia	89 (3.1)	517 (3.5)	10 (2.9)	511 (10.2)	2 (1.0)	~ ~
Singapore	2 (0.0)	~ ~	32 (0.0)	620 (5.0)	65 (0.0)	597 (4.4)
Slovak Republic	89 (2.4)	510 (3.6)	7 (2.2)	496 (22.8)	4 (1.3)	462 (16.5)
Slovenia	70 (2.8)	517 (2.6)	28 (2.9)	506 (4.4)	2 (0.9)	~ ~
Spain	60 (2.8)	487 (4.0)	24 (3.0)	484 (4.6)	16 (2.5)	471 (6.8)
Sweden	56 (3.6)	512 (3.1)	29 (3.2)	504 (4.0)	15 (2.9)	471 (7.0)
Thailand	84 (3.3)	467 (4.3)	4 (1.9)	411 (9.8)	13 (3.3)	413 (16.4)
Tunisia	75 (3.3)	364 (5.2)	5 (2.0)	352 (11.3)	20 (2.6)	348 (9.0)
Turkey	78 (2.5)	479 (5.1)	7 (1.8)	480 (11.7)	15 (2.2)	413 (14.4)
United Arab Emirates	47 (1.4)	405 (3.1)	8 (0.8)	455 (9.2)	45 (1.4)	457 (3.6)
United States	55 (2.5)	550 (2.8)	30 (2.1)	538 (3.8)	15 (2.1)	521 (4.4)
Yemen	92 (2.2)	247 (6.8)	3 (1.2)	244 (10.8)	5 (2.0)	240 (32.2)
International Avg.	73 (0.4)	491 (0.6)	15 (0.4)	482 (2.4)	13 (0.3)	471 (3.2)

() 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.

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2011

Exhibit 5.5: Schools with Students Having the Language of the Test as Their Native Language (Continued)

Country	More than 90% of Students		51–90% of Students		50% of Students or Less	
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement
Sixth Grade Participants						
Botswana	5 (1.9)	393 (12.5)	4 (1.7)	466 (35.1)	92 (2.5)	418 (4.1)
Honduras	95 (2.2)	399 (5.8)	3 (1.3)	355 (18.5)	2 (1.7)	~ ~
Yemen	92 (2.4)	349 (6.3)	4 (1.7)	321 (27.8)	4 (2.0)	348 (40.4)
Benchmarking Participants						
Alberta, Canada	56 (4.2)	507 (3.4)	33 (4.2)	509 (3.5)	11 (2.6)	502 (9.0)
Ontario, Canada	50 (3.9)	518 (3.6)	28 (3.9)	525 (6.7)	22 (3.2)	510 (6.6)
Quebec, Canada	69 (3.8)	534 (2.7)	20 (3.2)	535 (5.7)	11 (2.4)	525 (5.5)
Abu Dhabi, UAE	59 (2.5)	389 (5.5)	3 (1.5)	454 (44.1)	38 (2.6)	448 (8.6)
Dubai, UAE	15 (0.2)	430 (4.7)	15 (0.4)	475 (4.7)	69 (0.4)	475 (2.0)
Florida, US	43 (6.2)	551 (5.5)	33 (5.9)	544 (6.8)	24 (5.6)	531 (6.0)
North Carolina, US	61 (7.9)	560 (6.0)	34 (8.1)	549 (9.5)	5 (3.6)	552 (6.2)

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2011

Exhibit 5.6: Schools with Students Having the Language of the Test as Their Native Language

Reported by Principals

Country	More than 90% of Students		51–90% of Students		50% of Students or Less	
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement
Armenia	95 (1.6)	465 (2.9)	5 (1.6)	485 (9.3)	0 (0.0)	~ ~
Australia	65 (3.6)	502 (6.3)	25 (3.2)	519 (10.0)	10 (2.2)	525 (11.3)
Bahrain	76 (0.2)	394 (2.5)	9 (0.1)	414 (3.9)	14 (0.2)	490 (3.2)
Chile	99 (0.5)	418 (2.9)	1 (0.0)	~ ~	0 (0.2)	~ ~
Chinese Taipei	62 (4.0)	613 (4.3)	23 (3.1)	605 (8.3)	15 (2.9)	599 (12.5)
England	66 (3.9)	513 (7.3)	21 (3.2)	505 (14.3)	13 (2.9)	482 (14.5)
Finland	87 (3.1)	514 (2.6)	13 (3.1)	508 (5.1)	0 (0.0)	~ ~
Georgia	94 (1.7)	432 (4.1)	6 (1.6)	427 (14.1)	0 (0.0)	~ ~
Ghana	0 (0.0)	~ ~	2 (1.6)	~ ~	98 (1.6)	326 (4.4)
Hong Kong SAR	49 (4.4)	567 (6.4)	3 (1.7)	502 (27.9)	48 (4.3)	607 (8.3)
Hungary	98 (1.1)	505 (3.6)	2 (1.1)	~ ~	0 (0.1)	~ ~
Indonesia	23 (3.8)	398 (12.5)	33 (4.4)	370 (8.0)	43 (3.9)	391 (5.6)
Iran, Islamic Rep. of	50 (2.7)	446 (5.3)	10 (2.0)	380 (8.6)	40 (2.8)	386 (4.6)
Israel	64 (4.0)	515 (5.3)	25 (3.6)	516 (9.6)	11 (2.5)	537 (16.9)
Italy	64 (3.5)	500 (3.3)	31 (3.2)	502 (3.4)	5 (1.5)	470 (14.7)
Japan	98 (1.3)	570 (2.6)	0 (0.0)	~ ~	2 (1.3)	~ ~
Jordan	93 (1.9)	408 (3.6)	4 (1.3)	418 (11.6)	3 (1.3)	338 (47.3)
Kazakhstan	53 (3.6)	475 (5.6)	33 (3.6)	496 (7.3)	14 (3.1)	509 (12.0)
Korea, Rep. of	100 (0.0)	612 (2.9)	0 (0.0)	~ ~	0 (0.0)	~ ~
Lebanon	6 (2.1)	461 (18.8)	8 (2.5)	464 (12.5)	87 (3.1)	447 (4.0)
Lithuania	91 (2.0)	503 (2.7)	6 (1.3)	517 (8.0)	4 (1.6)	468 (40.2)
Macedonia, Rep. of	71 (3.4)	433 (6.8)	19 (3.2)	415 (9.4)	10 (1.9)	408 (16.3)
Malaysia	40 (3.3)	429 (8.8)	24 (3.2)	424 (11.5)	36 (3.6)	462 (9.0)
Morocco	75 (2.9)	374 (2.5)	12 (2.2)	372 (7.1)	13 (2.0)	360 (5.0)
New Zealand	64 (5.2)	490 (5.1)	28 (4.3)	486 (11.6)	9 (3.4)	482 (22.7)
Norway	73 (3.7)	475 (2.8)	21 (3.7)	480 (4.3)	6 (2.1)	454 (11.5)
Oman	84 (1.9)	359 (3.1)	5 (0.9)	366 (12.0)	11 (1.7)	420 (12.0)
Palestinian Nat'l Auth.	96 (1.7)	405 (3.6)	3 (1.6)	386 (16.6)	1 (0.6)	~ ~
Qatar	46 (0.6)	362 (5.0)	5 (1.1)	499 (23.5)	49 (1.0)	438 (3.5)
Romania	90 (2.5)	458 (4.4)	6 (1.8)	452 (17.3)	4 (1.7)	478 (15.0)
Russian Federation	74 (3.9)	538 (4.0)	17 (2.9)	541 (9.6)	9 (2.4)	542 (11.3)
Saudi Arabia	89 (2.4)	395 (5.1)	7 (2.0)	385 (11.6)	3 (1.4)	392 (21.3)
Singapore	7 (0.0)	671 (7.5)	15 (0.0)	626 (9.1)	77 (0.0)	602 (4.3)
Slovenia	72 (3.9)	507 (2.2)	26 (3.8)	503 (5.8)	2 (1.0)	~ ~
Sweden	53 (4.5)	491 (2.7)	36 (4.6)	479 (4.1)	11 (2.8)	479 (7.9)
Syrian Arab Republic	90 (2.8)	382 (4.8)	9 (2.7)	362 (14.5)	1 (0.6)	~ ~
Thailand	89 (2.3)	430 (4.4)	2 (0.9)	~ ~	9 (2.4)	400 (12.8)
Tunisia	91 (2.0)	423 (3.0)	7 (1.7)	438 (13.2)	3 (1.3)	444 (9.7)
Turkey	80 (2.1)	461 (4.8)	7 (1.9)	450 (11.6)	13 (2.0)	401 (9.9)
Ukraine	76 (3.7)	481 (4.7)	18 (3.4)	475 (6.8)	6 (2.0)	471 (16.2)
United Arab Emirates	56 (1.7)	434 (2.6)	8 (1.1)	479 (10.9)	36 (1.6)	483 (3.7)
United States	65 (1.8)	519 (3.7)	23 (1.9)	505 (6.0)	12 (1.4)	476 (7.5)
International Avg.	69 (0.4)	471 (0.9)	13 (0.4)	465 (1.9)	17 (0.3)	461 (2.8)

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2011

() 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.

Exhibit 5.6: Schools with Students Having the Language of the Test as Their Native Language (Continued)

Country	More than 90% of Students		51–90% of Students		50% of Students or Less	
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement
Ninth Grade Participants						
Botswana	4 (1.8)	371 (6.7)	1 (0.7)	~ ~	95 (2.0)	397 (2.3)
Honduras	97 (1.8)	339 (4.0)	2 (1.7)	~ ~	1 (0.4)	~ ~
South Africa	7 (1.3)	441 (12.5)	7 (1.4)	435 (15.3)	85 (1.7)	339 (3.0)
Benchmarking Participants						
Alberta, Canada	51 (4.2)	507 (3.3)	36 (4.2)	507 (4.4)	13 (3.3)	497 (6.8)
Ontario, Canada	51 (3.6)	508 (3.0)	27 (3.1)	515 (5.0)	22 (3.0)	514 (6.9)
Quebec, Canada	66 (3.8)	533 (3.0)	24 (3.2)	535 (7.1)	11 (2.4)	516 (7.8)
Abu Dhabi, UAE	67 (2.6)	430 (4.0)	4 (1.6)	468 (26.0)	30 (2.5)	489 (8.5)
Dubai, UAE	24 (0.3)	437 (3.0)	12 (0.3)	519 (11.9)	64 (0.4)	485 (2.3)
Alabama, US	r 84 (6.0)	470 (8.4)	10 (4.9)	467 (9.3)	6 (3.7)	441 (24.7)
California, US	r 14 (5.8)	529 (17.9)	47 (6.0)	504 (7.3)	38 (5.7)	463 (9.1)
Colorado, US	45 (5.1)	546 (7.3)	39 (5.5)	502 (9.9)	16 (5.3)	479 (20.6)
Connecticut, US	r 73 (4.5)	539 (7.5)	21 (4.3)	473 (13.9)	6 (3.7)	453 (43.1)
Florida, US	43 (6.5)	511 (8.5)	47 (6.6)	522 (11.4)	9 (4.2)	476 (20.7)
Indiana, US	r 85 (5.2)	525 (6.6)	15 (5.2)	507 (19.1)	0 (0.0)	~ ~
Massachusetts, US	76 (3.8)	574 (6.1)	10 (3.9)	542 (23.8)	14 (4.5)	497 (12.7)
Minnesota, US	67 (6.5)	549 (5.8)	28 (6.2)	543 (6.1)	5 (3.6)	520 (91.8)
North Carolina, US	69 (6.1)	548 (10.3)	27 (5.6)	512 (8.9)	3 (2.4)	525 (48.0)

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2011

Exhibit 5.7: Schools Where Students Enter the Primary Grades with Early Numeracy Skills
Reported by Principals

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2011

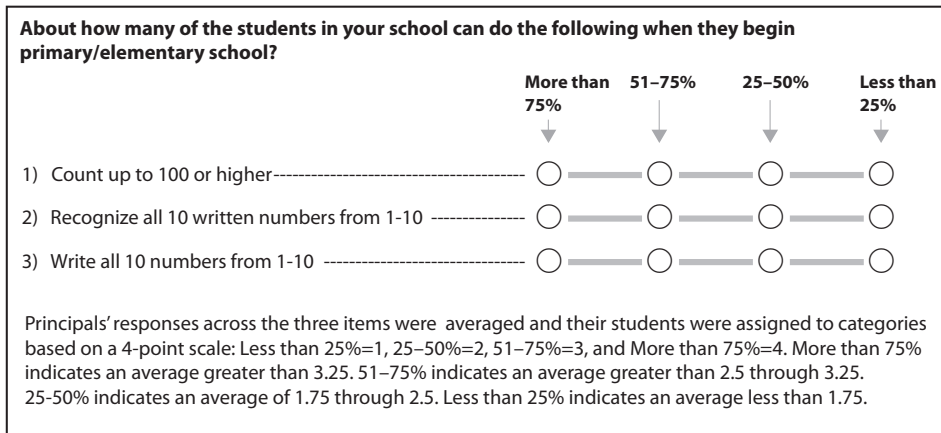
Country	Schools Where More than 75% Enter with Skills		Schools Where 51–75% Enter with Skills		Schools Where 25–50% Enter with Skills		Schools Where Less than 25% Enter with Skills	
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement
Hong Kong SAR	87 (3.4)	605 (3.6)	10 (3.0)	593 (10.4)	2 (1.1)	~ ~	1 (1.0)	~ ~
Korea, Rep. of	85 (2.8)	604 (2.1)	9 (2.1)	609 (7.6)	4 (2.0)	614 (12.5)	1 (1.0)	~ ~
Singapore	82 (0.0)	608 (3.9)	12 (0.0)	606 (11.4)	5 (0.0)	574 (17.2)	2 (0.0)	~ ~
Thailand	81 (3.4)	460 (5.7)	8 (2.3)	461 (8.5)	7 (2.4)	435 (9.5)	3 (1.5)	449 (16.1)
Chinese Taipei	67 (3.8)	593 (2.5)	18 (3.3)	592 (5.8)	10 (2.6)	576 (7.7)	5 (1.8)	599 (7.9)
Denmark	r 67 (3.2)	543 (3.2)	18 (2.6)	531 (7.2)	9 (2.0)	533 (6.1)	6 (1.9)	532 (9.0)
Spain	62 (3.7)	490 (3.5)	26 (3.3)	484 (5.7)	9 (2.2)	458 (8.4)	3 (1.0)	441 (22.1)
Qatar	59 (3.4)	418 (4.5)	11 (2.6)	430 (19.6)	7 (1.8)	402 (21.1)	23 (3.1)	396 (11.8)
Kazakhstan	54 (3.7)	501 (6.2)	21 (3.3)	515 (10.3)	13 (2.5)	485 (13.3)	12 (2.7)	497 (15.1)
United Arab Emirates	53 (2.4)	441 (3.0)	16 (2.0)	428 (7.0)	12 (1.5)	412 (7.9)	19 (1.5)	420 (6.0)
Sweden	r 51 (4.9)	509 (3.3)	22 (3.9)	508 (4.9)	12 (2.5)	491 (6.7)	15 (3.0)	488 (5.7)
Bahrain	49 (3.9)	447 (5.5)	19 (3.5)	426 (4.6)	17 (3.5)	424 (6.2)	15 (2.1)	435 (6.9)
Finland	48 (4.9)	555 (2.3)	26 (4.0)	543 (4.2)	10 (2.6)	533 (8.3)	16 (3.8)	531 (8.8)
Romania	48 (4.2)	490 (8.4)	22 (4.1)	476 (14.9)	15 (2.8)	459 (11.8)	15 (3.1)	488 (14.5)
Japan	46 (4.3)	587 (2.7)	31 (3.7)	587 (3.5)	17 (3.3)	581 (5.1)	6 (2.0)	576 (5.9)
Kuwait	43 (4.5)	341 (5.5)	13 (2.6)	339 (11.9)	20 (3.4)	346 (7.9)	24 (3.5)	344 (8.2)
Yemen	42 (4.1)	242 (10.0)	15 (3.3)	260 (14.9)	11 (2.7)	239 (8.7)	32 (4.1)	252 (12.9)
England	r 36 (4.9)	545 (9.8)	21 (4.4)	545 (9.2)	10 (3.4)	541 (13.3)	33 (4.6)	533 (6.6)
Chile	36 (3.6)	492 (4.3)	14 (3.3)	467 (8.7)	20 (3.2)	447 (9.0)	30 (3.5)	441 (5.7)
Morocco	33 (3.1)	351 (6.7)	11 (2.1)	323 (9.5)	10 (1.7)	332 (10.8)	46 (3.7)	331 (8.5)
Lithuania	30 (3.6)	545 (5.4)	18 (3.6)	537 (5.9)	24 (3.4)	529 (4.2)	27 (3.7)	527 (7.3)
Russian Federation	30 (3.5)	554 (5.5)	24 (2.4)	546 (9.5)	25 (3.6)	529 (5.1)	21 (2.5)	536 (8.4)
Serbia	30 (4.1)	534 (5.6)	29 (3.6)	510 (5.9)	21 (3.6)	503 (8.1)	20 (3.0)	514 (7.4)
Oman	29 (2.4)	381 (5.6)	21 (2.9)	382 (5.5)	17 (2.6)	380 (6.6)	33 (3.1)	376 (6.2)
Saudi Arabia	27 (3.6)	418 (7.0)	22 (3.4)	419 (8.2)	25 (3.7)	408 (14.1)	26 (3.3)	397 (12.0)
Armenia	27 (3.4)	460 (6.9)	10 (2.7)	456 (8.4)	19 (3.7)	449 (7.9)	44 (4.1)	447 (6.1)
Tunisia	25 (3.9)	372 (9.0)	9 (2.4)	376 (13.0)	11 (2.6)	366 (9.9)	55 (4.1)	349 (5.4)
Malta	25 (0.1)	505 (2.7)	24 (0.1)	508 (2.2)	21 (0.1)	481 (2.9)	30 (0.1)	494 (2.4)
Poland	21 (3.6)	488 (5.3)	27 (4.0)	484 (4.6)	20 (3.6)	476 (6.2)	32 (3.9)	478 (3.0)
Croatia	r 21 (3.4)	496 (5.1)	28 (3.9)	493 (3.6)	24 (3.5)	484 (4.6)	27 (3.4)	488 (3.9)
Georgia	21 (3.4)	446 (7.7)	15 (3.2)	463 (13.2)	20 (3.1)	449 (9.3)	45 (3.7)	449 (6.4)
Azerbaijan	21 (2.9)	466 (10.9)	17 (3.2)	483 (18.5)	22 (3.3)	442 (11.4)	40 (4.0)	465 (7.4)
Netherlands	r 12 (3.2)	533 (7.0)	56 (5.5)	544 (3.2)	18 (3.2)	532 (5.0)	13 (4.5)	550 (3.5)
Norway	r 12 (3.3)	495 (7.6)	19 (3.6)	494 (5.8)	24 (4.4)	494 (5.4)	44 (4.5)	493 (4.4)
United States	r 12 (2.0)	553 (8.7)	12 (1.9)	565 (5.5)	22 (2.3)	547 (4.5)	55 (2.8)	534 (2.7)
Iran, Islamic Rep. of	10 (2.2)	445 (11.1)	8 (2.0)	438 (10.8)	17 (2.7)	439 (8.6)	65 (3.9)	426 (4.9)
Italy	10 (2.1)	510 (10.3)	14 (2.0)	487 (8.1)	20 (3.1)	503 (8.0)	56 (3.3)	515 (2.9)
Australia	9 (2.3)	526 (8.6)	13 (2.6)	527 (8.3)	13 (2.7)	541 (9.4)	65 (3.6)	510 (3.9)
Portugal	9 (2.5)	537 (12.4)	15 (3.2)	540 (7.0)	16 (3.5)	524 (7.8)	59 (4.4)	532 (5.1)
Germany	8 (2.0)	541 (4.3)	17 (3.0)	542 (4.0)	17 (2.7)	532 (3.9)	58 (3.4)	522 (3.1)
Turkey	8 (1.6)	512 (12.0)	8 (1.9)	506 (10.9)	15 (2.5)	473 (8.7)	69 (2.8)	459 (6.4)
Slovenia	8 (2.2)	515 (5.4)	23 (3.5)	512 (4.0)	22 (3.2)	512 (5.0)	47 (4.0)	513 (3.2)
Belgium (Flemish)	5 (2.0)	557 (5.4)	24 (3.7)	552 (3.6)	30 (3.9)	549 (3.6)	40 (4.1)	548 (3.0)
Czech Republic	5 (1.7)	523 (5.6)	11 (2.8)	502 (4.9)	30 (4.1)	511 (4.5)	54 (4.0)	510 (3.7)
Hungary	4 (1.9)	539 (6.9)	7 (2.3)	538 (10.6)	18 (3.7)	532 (8.2)	72 (4.3)	509 (5.0)
New Zealand	3 (1.4)	518 (20.9)	8 (2.5)	515 (9.9)	15 (3.1)	502 (5.7)	73 (4.0)	479 (3.2)
Austria	3 (1.5)	528 (9.5)	5 (2.3)	509 (3.3)	15 (2.7)	515 (5.4)	78 (4.1)	506 (3.1)
Slovak Republic	2 (1.1)	~ ~	16 (2.9)	524 (9.4)	16 (3.0)	505 (4.7)	66 (3.6)	503 (5.2)
Northern Ireland	r 0 (0.0)	~ ~	3 (1.8)	539 (18.3)	9 (2.3)	567 (11.4)	88 (2.9)	563 (3.7)
Ireland	--	--	--	--	--	--	--	--
International Avg.	32 (0.5)	496 (1.1)	17 (0.4)	494 (1.3)	16 (0.4)	482 (1.3)	35 (0.5)	477 (1.2)

() 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.

Exhibit 5.7: Schools Where Students Enter the Primary Grades with Early Numeracy Skills (Continued)

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2011

Country	Schools Where More than 75% Enter with Skills		Schools Where 51–75% Enter with Skills		Schools Where 25–50% Enter with Skills		Schools Where Less than 25% Enter with Skills	
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement
Sixth Grade Participants								
Honduras	51 (4.8)	406 (8.2)	8 (2.2)	394 (17.4)	9 (2.8)	403 (9.2)	32 (4.4)	379 (10.6)
Yemen	39 (4.2)	340 (9.8)	10 (2.6)	343 (16.2)	17 (3.4)	348 (11.8)	35 (4.2)	353 (10.1)
Botswana	12 (2.4)	469 (16.9)	9 (2.4)	441 (12.2)	6 (2.1)	444 (15.2)	73 (3.5)	406 (4.1)
Benchmarking Participants								
Dubai, UAE	65 (0.4)	465 (2.2)	12 (0.2)	463 (5.5)	4 (0.1)	487 (6.3)	19 (0.4)	469 (3.4)
Abu Dhabi, UAE	52 (3.9)	432 (6.3)	18 (3.4)	390 (10.5)	10 (2.2)	398 (15.0)	21 (2.9)	393 (10.6)
Quebec, Canada	21 (3.8)	542 (5.0)	29 (4.2)	536 (4.0)	17 (3.4)	528 (4.8)	33 (4.4)	526 (4.2)
Alberta, Canada	20 (3.3)	520 (5.2)	15 (3.3)	511 (5.6)	12 (2.3)	501 (5.5)	53 (4.1)	504 (3.2)
Florida, US	19 (5.2)	567 (10.8)	23 (5.8)	559 (9.8)	9 (3.8)	536 (11.4)	48 (5.3)	530 (4.5)
Ontario, Canada	12 (3.2)	534 (5.3)	6 (2.0)	516 (12.9)	7 (2.1)	522 (9.6)	75 (4.0)	515 (3.6)
North Carolina, US	8 (4.7)	539 (19.6)	17 (6.2)	572 (10.6)	16 (6.1)	560 (7.9)	59 (7.2)	552 (6.8)



Schools Where Students Are Ready to Learn

An important element of school readiness is having students with the prerequisite skills for the curriculum for their grade—that is, students academically ready to learn. Furthermore, students who begin school with higher numeracy skills tend to maintain that advantage. For example, the Early Childhood Longitudinal Study conducted in the United States found that of students in the highest one-third in mathematics achievement in kindergarten, 67 percent also were in the highest one-third in fifth grade, and that the majority of students in the lowest one-third as kindergartners also were in the lowest one-third in fifth grade (Princiotta, Flanagan, & Hausken, 2006).

TIMSS collected information about this important issue in the fourth grade assessment by asking school principals to estimate the percentages of students entering their schools able to perform each of three early numeracy skills: count up to 100 or higher, recognize all 10 written numbers from 1 to 10, and write all 10 numbers from 1 to 10. Of course, in countries where students start school at a young age (e.g., age 4 or 5 in England, Ireland, the Netherlands, New Zealand, and Northern Ireland), students have had fewer years to develop numeracy skills prior to starting school.

Exhibit 5.7 presents the TIMSS results for the percentages of students entering school with early numeracy skills and their average mathematics achievement. The first page of the exhibit shows that 32 percent of the fourth grade students, on average, were in schools where most children (more than 75%) entered school with early numeracy skills, and a further 17 percent in schools where 51–75% have such skills. Students in these schools had higher average mathematics achievement than those in schools where fewer students entered with numeracy skills. In particular, the 35 percent in schools where few students began school with numeracy skills had the lowest average mathematics achievement.

Schools with Sufficient Facilities, Books, and Technology

Studies have shown that resources are crucial for improving schooling, perhaps even more so in developing countries than in economically developed countries, where adequate school structures and material resources can be taken for granted (Lee & Zuze, 2011). The extent and quality of school resources can have an important impact on the quality of classroom instruction.

School Resources

To provide information on the extent to which school resources are available to support mathematics instruction, TIMSS routinely asks school principals about the degree of shortages or inadequacies in general school resources (materials, supplies, heating/cooling/lighting, buildings, space, staff, and computers) as well as about resources specifically targeted to support mathematics instruction (specialized teachers, computer software, library materials, audio-visual resources, and calculators). Although “adequacy” can be relative, in each TIMSS assessment there has been a strong positive relationship between principals’ perceptions of the absence of school resource shortages and average mathematics achievement.

Exhibit 5.8 presents the TIMSS 2011 results for the Mathematics Resource Shortages scale for participants in the fourth grade assessment. Students were scored according to their principals’ responses concerning twelve school and classroom resources (see the second page of the exhibit for details). Countries are ordered according to the percentage of students (from most to least) in schools **Not Affected** by resource shortages. Schools in this category had principals who reported that shortages affected instruction “not at all” for six of the twelve resources and only “a little” for the other six, on average. There was substantial variation across the fourth grade countries—from 0 to 64 percent, with an average of 25 percent of students attending well-resourced schools.

Students in schools where instruction was **Affected A Lot** had principals who reported that shortages affected instruction “a lot” for six of the twelve resources and “some” for the other six, on average. Many countries were fortunate to have very few, if any, students in such poorly resourced schools. However, this was a crucial problem in some countries. At 462 points, on average, mathematics achievement for students in schools **Affected A Lot** by resource shortages was substantially lower (35 points) than for students in schools **Not Affected** by resources shortages.

Exhibit 5.9 presents the results for the Mathematics Resource Shortages scale for participants in the TIMSS 2011 eighth grade assessment. As shown on the second page of the exhibit, the eighth grade scale consisted of essentially the same twelve resources as the fourth grade. The results also were similar to the fourth grade, with wide variation across countries in the percentage of eighth grade students attending schools **Not Affected** by resource shortages (1–71%), with an international average of 25 percent. Furthermore, the average achievement gap between students attending schools where instruction was

Exhibit 5.8: Instruction Affected by Mathematics Resource Shortages

Reported by Principals

Students were scored according to their principals' responses concerning twelve school and classroom resources on the *Mathematics Resource Shortages* scale. Students in schools where instruction was **Not Affected** by resource shortages had a score on the scale of at least 11.1, which corresponds to their principals reporting that shortages affected instruction "not at all" for six of the twelve resources and "a little" for the other six, on average. Students in schools where instruction was **Affected A Lot** had a score no higher than 6.8, which corresponds to their principals reporting that shortages affected instruction "a lot" for six of the twelve resources and "some" for the other six, on average. All other students attended schools where instruction was **Somewhat Affected** by resource shortages.

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	64 (4.2)	606 (2.4)	35 (4.1)	601 (3.7)	1 (0.0)	~ ~	11.9 (0.17)
Slovenia	61 (3.7)	514 (3.1)	39 (3.7)	511 (3.1)	0 (0.0)	~ ~	11.8 (0.12)
Netherlands	46 (4.8)	544 (3.0)	54 (4.8)	538 (2.5)	0 (0.0)	~ ~	11.1 (0.15)
Australia	44 (3.3)	529 (5.1)	54 (3.3)	507 (3.4)	1 (0.8)	~ ~	11.1 (0.14)
Spain	44 (4.8)	487 (4.5)	55 (4.8)	480 (4.3)	1 (0.8)	~ ~	10.9 (0.16)
United States	42 (2.9)	549 (3.3)	57 (2.9)	538 (3.0)	1 (0.4)	~ ~	11.0 (0.13)
England	42 (4.8)	545 (6.5)	58 (4.8)	540 (5.5)	0 (0.0)	~ ~	11.1 (0.18)
New Zealand	39 (3.9)	493 (4.5)	61 (3.9)	483 (4.0)	0 (0.0)	~ ~	10.9 (0.12)
Czech Republic	38 (4.1)	505 (4.5)	60 (4.3)	514 (3.0)	2 (1.1)	~ ~	10.8 (0.12)
Singapore	37 (0.0)	603 (4.7)	56 (0.0)	608 (4.4)	7 (0.0)	598 (13.1)	10.5 (0.00)
Poland	36 (3.8)	486 (4.2)	64 (3.8)	479 (2.8)	0 (0.0)	~ ~	10.9 (0.15)
Belgium (Flemish)	34 (4.3)	552 (3.7)	66 (4.3)	549 (2.0)	0 (0.0)	~ ~	10.8 (0.14)
Croatia	34 (4.6)	487 (4.9)	64 (4.5)	491 (2.5)	2 (1.2)	~ ~	10.5 (0.16)
Austria	34 (4.5)	511 (4.1)	66 (4.5)	507 (3.3)	0 (0.0)	~ ~	10.5 (0.15)
Kazakhstan	33 (3.9)	499 (7.9)	60 (4.0)	499 (6.1)	7 (2.1)	533 (23.0)	10.1 (0.22)
Qatar	31 (2.8)	447 (8.9)	43 (3.3)	409 (6.2)	27 (3.0)	387 (7.7)	9.2 (0.24)
Armenia	30 (4.2)	464 (6.9)	70 (4.2)	447 (3.3)	0 (0.0)	~ ~	10.5 (0.12)
Georgia	30 (4.0)	453 (8.6)	70 (4.0)	449 (4.8)	0 (0.0)	~ ~	10.5 (0.13)
United Arab Emirates	30 (2.0)	460 (5.0)	61 (2.4)	422 (3.1)	9 (1.3)	428 (9.2)	9.7 (0.09)
Hungary	29 (3.6)	528 (6.6)	69 (3.8)	511 (4.6)	2 (1.2)	~ ~	10.5 (0.17)
Northern Ireland	29 (4.5)	568 (6.4)	70 (4.6)	561 (4.3)	1 (1.0)	~ ~	10.6 (0.17)
Sweden	28 (3.9)	512 (5.0)	72 (3.9)	500 (2.5)	0 (0.0)	~ ~	10.5 (0.14)
Germany	28 (2.9)	534 (4.1)	71 (3.0)	526 (2.7)	1 (0.0)	~ ~	10.5 (0.09)
Norway	28 (4.4)	486 (4.9)	72 (4.4)	498 (3.7)	0 (0.0)	~ ~	10.5 (0.11)
Japan	28 (3.7)	584 (2.9)	71 (3.9)	587 (2.3)	2 (1.1)	~ ~	10.4 (0.13)
Russian Federation	25 (3.4)	554 (5.3)	70 (3.5)	535 (4.8)	4 (1.5)	540 (13.7)	10.0 (0.15)
Malta	25 (0.1)	503 (2.0)	71 (0.1)	493 (1.7)	4 (0.0)	511 (8.4)	10.2 (0.00)
Finland	24 (3.3)	553 (3.0)	74 (3.3)	543 (3.0)	2 (1.2)	~ ~	10.2 (0.14)
Ireland	24 (3.9)	534 (5.9)	74 (4.0)	526 (3.5)	1 (1.0)	~ ~	10.4 (0.15)
Lithuania	23 (3.7)	534 (6.2)	77 (3.7)	534 (2.9)	0 (0.0)	~ ~	10.2 (0.12)
Serbia	21 (3.5)	528 (7.9)	73 (4.1)	516 (3.5)	7 (2.5)	481 (17.6)	9.6 (0.15)
Chile	18 (2.5)	506 (8.7)	77 (3.2)	455 (3.3)	5 (1.8)	443 (12.2)	9.6 (0.15)
Romania	16 (3.6)	492 (23.1)	81 (3.8)	479 (5.7)	2 (1.3)	~ ~	9.6 (0.14)
Bahrain	16 (4.6)	469 (7.2)	71 (4.9)	425 (4.6)	13 (3.2)	451 (12.0)	9.2 (0.35)
Slovak Republic	15 (2.3)	510 (6.2)	85 (2.3)	505 (4.1)	0 (0.0)	~ ~	9.9 (0.09)
Denmark	14 (2.6)	538 (5.8)	85 (2.8)	539 (2.9)	2 (1.1)	~ ~	9.8 (0.09)
Yemen	14 (3.1)	238 (12.7)	83 (3.4)	247 (6.8)	3 (1.5)	336 (23.0)	10.0 (0.12)
Morocco	12 (2.5)	339 (10.6)	83 (2.8)	332 (5.3)	5 (1.2)	392 (12.7)	9.9 (0.09)
Tunisia	12 (2.4)	367 (10.0)	86 (2.5)	358 (4.1)	2 (1.1)	~ ~	9.9 (0.09)
Portugal	12 (2.3)	540 (9.3)	87 (2.5)	531 (4.0)	1 (0.7)	~ ~	9.5 (0.14)
Italy	12 (2.2)	517 (7.8)	88 (2.2)	507 (2.6)	0 (0.4)	~ ~	9.7 (0.09)
Kuwait	9 (2.6)	323 (10.9)	65 (4.1)	346 (3.7)	26 (3.7)	340 (8.5)	8.2 (0.19)
Chinese Taipei	9 (2.3)	603 (6.2)	81 (3.2)	590 (2.3)	10 (2.6)	596 (6.5)	8.7 (0.14)
Saudi Arabia	8 (2.6)	417 (11.5)	84 (2.6)	410 (6.1)	7 (2.0)	414 (20.0)	9.1 (0.14)
Oman	7 (1.6)	384 (11.2)	82 (2.0)	376 (3.2)	11 (1.6)	391 (10.0)	8.5 (0.09)
Thailand	5 (1.9)	511 (15.8)	75 (4.2)	457 (4.6)	20 (3.8)	448 (14.4)	8.3 (0.14)
Iran, Islamic Rep. of	4 (1.8)	446 (25.1)	82 (3.9)	429 (4.2)	14 (3.5)	429 (10.3)	8.4 (0.12)
Turkey	2 (1.0)	~ ~	83 (2.1)	465 (5.2)	15 (1.9)	472 (8.2)	8.0 (0.07)
Azerbaijan	1 (0.9)	~ ~	88 (3.0)	460 (6.6)	10 (3.0)	491 (14.4)	8.5 (0.13)
Hong Kong SAR	0 (0.0)	~ ~	94 (2.1)	604 (3.7)	6 (2.1)	567 (36.6)	8.2 (0.07)
International Avg.	25 (0.5)	497 (1.2)	70 (0.5)	488 (0.6)	5 (0.2)	462 (3.5)	

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2011

Centerpoint of scale set at 10.

() 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.

Exhibit 5.8: Instruction Affected by Mathematics Resource Shortages (Continued)

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	
Sixth Grade Participants							
Honduras	20 (4.1)	413 (16.8)	66 (4.5)	396 (5.7)	14 (3.3)	371 (11.6)	9.3 (0.23)
Yemen	12 (2.5)	323 (15.2)	85 (2.8)	349 (6.0)	3 (1.5)	386 (12.2)	9.8 (0.12)
Botswana	2 (1.0)	~ ~	90 (2.5)	416 (3.8)	8 (2.3)	431 (27.5)	8.7 (0.12)
Benchmarking Participants							
Dubai, UAE	48 (0.4)	491 (3.1)	43 (0.4)	454 (2.2)	9 (0.1)	437 (6.6)	10.6 (0.02)
Alberta, Canada	41 (4.2)	505 (3.7)	59 (4.2)	509 (3.2)	0 (0.0)	~ ~	11.1 (0.16)
Quebec, Canada	40 (4.6)	537 (3.2)	59 (4.6)	530 (3.2)	1 (0.7)	~ ~	10.8 (0.16)
Florida, US	38 (6.3)	544 (3.8)	62 (6.3)	544 (4.9)	0 (0.0)	~ ~	11.0 (0.24)
North Carolina, US	37 (7.3)	555 (8.2)	57 (8.1)	553 (6.3)	6 (4.1)	555 (16.8)	10.8 (0.38)
Ontario, Canada	26 (4.1)	515 (5.6)	72 (4.1)	519 (3.7)	1 (0.9)	~ ~	10.4 (0.14)
Abu Dhabi, UAE	25 (3.9)	442 (11.5)	63 (4.7)	402 (6.0)	12 (2.9)	419 (11.7)	9.3 (0.20)

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2011

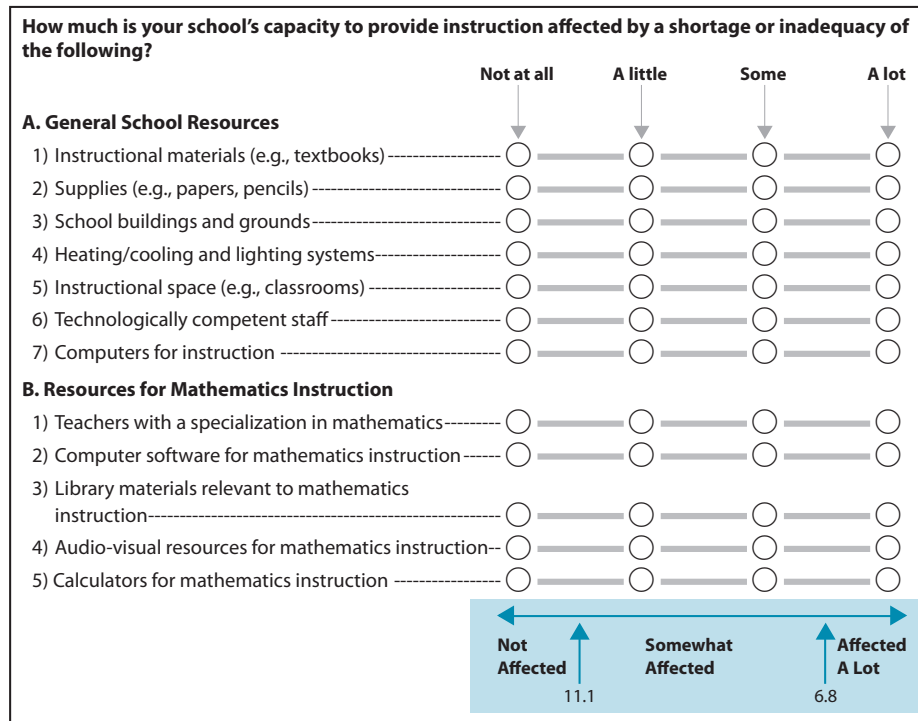


Exhibit 5.9: Instruction Affected by Mathematics Resource Shortages

Reported by Principals

Students were scored according to their principals' responses concerning twelve school and classroom resources on the *Mathematics Resource Shortages* scale. Students in schools where instruction was **Not Affected** by resource shortages had a score on the scale of at least 11.1, which corresponds to their principals reporting that shortages affected instruction "not at all" for six of the twelve resources and "a little" for the other six, on average. Students in schools where instruction was **Affected A Lot** had a score no higher than 7.3, which corresponds to their principals reporting that shortages affected instruction "a lot" for six of the twelve resources and "some" for the other six, on average. All other students attended schools where instruction was **Somewhat Affected** by resource shortages.

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	
Slovenia	71 (3.9)	505 (2.8)	29 (3.9)	506 (3.2)	0 (0.0)	~ ~	11.9 (0.13)
Singapore	67 (0.0)	614 (4.5)	22 (0.0)	594 (7.4)	11 (0.0)	625 (11.4)	11.7 (0.00)
Korea, Rep. of	58 (4.2)	615 (3.2)	40 (4.3)	608 (4.9)	2 (1.1)	~ ~	11.6 (0.17)
Australia	51 (3.5)	525 (8.6)	46 (3.2)	489 (5.7)	3 (1.5)	516 (15.5)	11.1 (0.16)
Norway	48 (4.5)	474 (3.6)	52 (4.5)	475 (3.1)	0 (0.0)	~ ~	11.1 (0.10)
England	48 (4.2)	498 (8.1)	52 (4.2)	516 (8.2)	0 (0.0)	~ ~	11.3 (0.16)
New Zealand	44 (4.3)	498 (8.8)	53 (4.4)	481 (7.2)	3 (1.9)	470 (13.3)	11.3 (0.17)
Sweden	43 (4.9)	490 (2.9)	57 (4.9)	482 (3.4)	0 (0.2)	~ ~	10.9 (0.12)
United States	43 (2.6)	520 (4.7)	55 (2.7)	502 (3.9)	2 (0.7)	~ ~	11.0 (0.10)
Hong Kong SAR	41 (4.4)	605 (7.8)	54 (4.8)	573 (7.3)	6 (2.3)	553 (32.6)	10.9 (0.19)
Japan	38 (4.4)	581 (5.1)	62 (4.4)	563 (3.0)	0 (0.0)	~ ~	10.9 (0.14)
Finland	36 (4.5)	519 (3.4)	63 (4.6)	510 (3.0)	1 (0.6)	~ ~	10.8 (0.10)
Qatar	35 (0.9)	422 (7.4)	28 (0.2)	444 (3.7)	37 (0.8)	367 (4.2)	9.1 (0.06)
Chinese Taipei	33 (4.1)	610 (8.0)	65 (4.0)	609 (4.2)	3 (1.3)	608 (15.0)	10.5 (0.16)
Hungary	32 (3.8)	510 (6.5)	66 (3.8)	502 (5.2)	2 (1.1)	~ ~	10.5 (0.14)
Armenia	30 (3.6)	474 (7.3)	70 (3.6)	464 (3.9)	0 (0.0)	~ ~	10.6 (0.11)
United Arab Emirates	29 (2.1)	481 (4.1)	57 (2.4)	445 (3.7)	14 (1.6)	442 (6.2)	9.7 (0.09)
Kazakhstan	27 (3.3)	499 (7.1)	63 (3.9)	484 (5.4)	9 (2.6)	470 (17.5)	10.1 (0.20)
Israel	25 (3.8)	548 (8.8)	64 (4.3)	518 (5.6)	11 (2.4)	447 (13.8)	9.8 (0.18)
Russian Federation	25 (3.5)	548 (8.2)	71 (3.6)	537 (3.8)	4 (1.4)	524 (10.9)	10.1 (0.13)
Lithuania	22 (3.7)	509 (7.0)	78 (3.7)	500 (3.4)	0 (0.0)	~ ~	10.3 (0.10)
Georgia	21 (2.9)	450 (10.5)	76 (3.1)	426 (3.9)	3 (1.4)	438 (17.9)	10.2 (0.11)
Lebanon	20 (3.1)	494 (9.3)	71 (3.6)	435 (4.0)	9 (2.5)	466 (11.0)	9.7 (0.17)
Chile	18 (2.7)	464 (7.1)	79 (3.0)	406 (3.6)	2 (1.2)	~ ~	9.8 (0.11)
Malaysia	16 (3.0)	469 (13.3)	69 (3.7)	436 (5.6)	15 (2.6)	427 (16.3)	9.4 (0.15)
Romania	15 (3.1)	483 (15.7)	83 (3.4)	454 (4.7)	2 (1.4)	~ ~	9.9 (0.13)
Italy	13 (2.1)	513 (5.6)	86 (2.2)	496 (2.9)	1 (0.0)	~ ~	10.0 (0.07)
Bahrain	12 (0.1)	493 (7.5)	80 (0.2)	398 (2.0)	7 (0.2)	390 (6.0)	9.5 (0.01)
Oman	11 (1.5)	398 (9.7)	77 (2.6)	361 (3.6)	12 (2.2)	367 (8.6)	9.0 (0.09)
Jordan	10 (2.1)	423 (12.9)	78 (3.1)	402 (4.3)	12 (2.4)	419 (13.5)	9.1 (0.11)
Ghana	10 (2.4)	313 (12.2)	88 (2.6)	332 (4.7)	2 (1.4)	~ ~	9.9 (0.09)
Saudi Arabia	8 (2.2)	383 (16.0)	87 (2.6)	394 (5.0)	4 (1.7)	406 (13.4)	9.3 (0.12)
Macedonia, Rep. of	7 (2.3)	476 (16.9)	86 (2.2)	423 (6.0)	7 (1.8)	431 (23.3)	9.4 (0.11)
Thailand	6 (2.0)	440 (17.9)	74 (3.8)	429 (5.3)	20 (3.3)	416 (9.4)	8.5 (0.12)
Palestinian Nat'l Auth.	5 (1.6)	408 (6.1)	90 (2.4)	403 (3.9)	5 (1.8)	425 (15.3)	9.0 (0.09)
Tunisia	4 (1.7)	409 (7.0)	94 (1.9)	425 (2.9)	1 (0.8)	~ ~	9.6 (0.07)
Morocco	4 (1.0)	435 (17.4)	94 (1.2)	366 (2.1)	2 (0.6)	~ ~	9.6 (0.06)
Indonesia	3 (2.7)	306 (23.2)	87 (3.1)	385 (3.9)	10 (2.6)	418 (14.1)	8.9 (0.12)
Turkey	3 (1.0)	609 (50.3)	82 (2.6)	448 (4.1)	16 (2.4)	447 (8.9)	8.4 (0.09)
Iran, Islamic Rep. of	3 (1.0)	505 (40.5)	88 (2.3)	415 (4.5)	9 (2.0)	393 (11.9)	8.8 (0.09)
Syrian Arab Republic	2 (1.1)	~ ~	93 (2.1)	379 (4.7)	5 (2.0)	376 (14.0)	9.2 (0.08)
Ukraine	1 (1.1)	~ ~	77 (3.6)	477 (4.4)	21 (3.5)	486 (9.4)	8.3 (0.11)
International Avg.	25 (0.5)	488 (2.2)	69 (0.5)	464 (0.7)	6 (0.3)	453 (2.9)	

Centerpoint of scale set at 10.

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

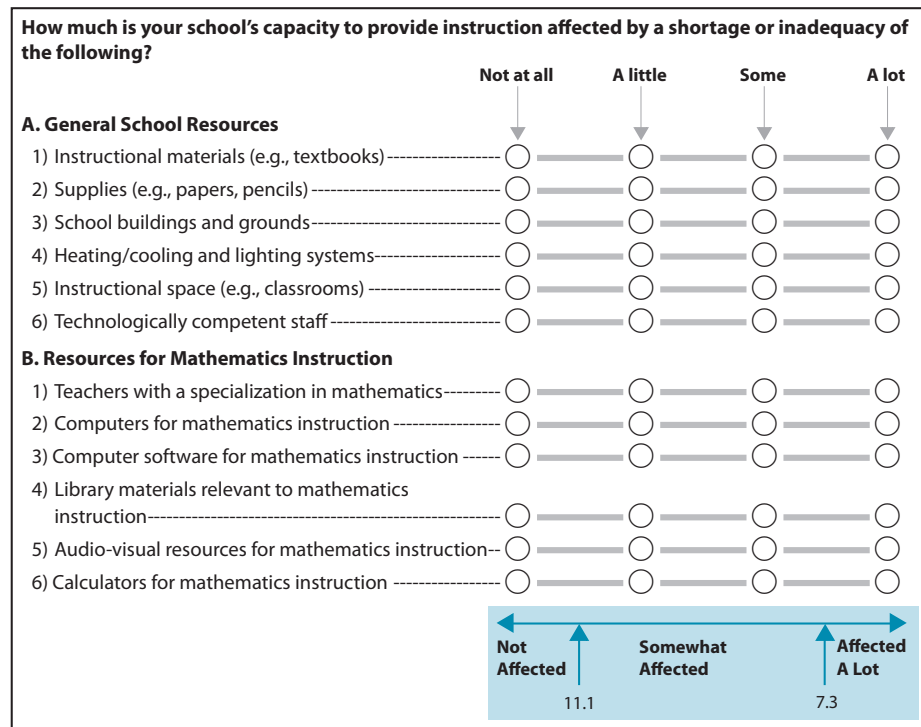
A tilde (~) indicates insufficient data to report achievement.

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

Exhibit 5.9: Instruction Affected by Mathematics Resource Shortages (Continued)

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	
Ninth Grade Participants							
Honduras	13 (2.4)	376 (16.8)	78 (3.2)	333 (3.6)	9 (2.3)	315 (8.2)	9.2 (0.13)
South Africa	5 (0.9)	510 (15.2)	85 (2.2)	342 (3.0)	10 (2.1)	350 (7.7)	9.3 (0.09)
Botswana	1 (0.7)	~ ~	96 (1.7)	395 (2.7)	3 (1.6)	417 (22.0)	8.9 (0.08)
Benchmarking Participants							
Quebec, Canada	66 (3.6)	534 (3.2)	34 (3.6)	527 (4.4)	0 (0.0)	~ ~	11.8 (0.14)
Connecticut, US	59 (7.4)	530 (8.7)	39 (7.1)	504 (12.9)	2 (1.8)	~ ~	11.5 (0.27)
Indiana, US	58 (7.8)	518 (8.9)	42 (7.8)	531 (7.8)	0 (0.0)	~ ~	11.6 (0.26)
Florida, US	51 (8.3)	509 (10.9)	46 (8.2)	520 (11.3)	3 (2.4)	462 (23.5)	11.4 (0.35)
Massachusetts, US	49 (7.2)	571 (8.8)	50 (7.0)	551 (9.4)	1 (0.1)	~ ~	11.1 (0.27)
Dubai, UAE	44 (0.5)	499 (3.9)	41 (0.4)	461 (2.2)	15 (0.3)	460 (6.2)	10.4 (0.03)
Minnesota, US	44 (7.3)	551 (7.4)	56 (7.3)	541 (7.6)	0 (0.0)	~ ~	11.2 (0.28)
Alberta, Canada	43 (4.1)	513 (4.1)	54 (3.9)	500 (3.2)	3 (1.7)	499 (20.2)	10.9 (0.14)
California, US	38 (6.4)	493 (9.9)	61 (6.6)	488 (7.3)	2 (0.1)	~ ~	10.8 (0.23)
Ontario, Canada	34 (4.4)	520 (4.2)	64 (4.5)	507 (3.3)	1 (0.0)	~ ~	10.8 (0.15)
Alabama, US	33 (6.6)	487 (15.9)	65 (7.1)	459 (7.4)	2 (2.3)	~ ~	11.0 (0.25)
Colorado, US	22 (5.7)	535 (13.2)	76 (6.0)	513 (6.6)	2 (0.1)	~ ~	10.3 (0.25)
Abu Dhabi, UAE	22 (3.6)	485 (10.9)	61 (4.3)	439 (6.1)	17 (2.9)	438 (7.5)	9.2 (0.17)
North Carolina, US	22 (6.6)	517 (17.0)	76 (6.8)	541 (8.6)	2 (1.8)	~ ~	10.4 (0.30)

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2011



Not Affected by resource shortages and those attending schools where it was **Affected A Lot** was 35 points for eighth grade, the same as for the fourth grade.

Teacher Working Conditions

There is evidence that, in some countries, teacher shortages may exist partly as a result of poor working conditions. For example, a review of research from the United States suggests that teachers who leave the profession after just a few years are more likely to leave because of poor working conditions than because of low pay (Johnson, 2006). Although teachers' reports across countries are related to their expectations and need to be considered in the context of variations in economic situations, TIMSS 2011 asked the students' teachers to provide their views on the adequacy of their working conditions. More specifically, teachers were asked about five potential problem areas:

- ◆ The school building needing significant repair;
- ◆ Classrooms being overcrowded;
- ◆ Teachers having too many teaching hours;
- ◆ Teachers not having adequate workspace; and
- ◆ Teachers not having adequate instructional materials and supplies.

Exhibit 5.10 presents the results for the TIMSS 2011 fourth grade assessment for the Teacher Working Conditions scale. Countries are ordered by the percentage of students whose teachers reported few problems with their working conditions. Teachers with **Hardly Any Problems** with their working conditions reported “not a problem” for three of the five areas and only “minor problems” for the other two, on average. There was a range of results across the fourth grade countries—from 4 to 49 percent, with an average of 26 percent of students in schools where teachers had **Hardly Any Problems**.

For this scale, the remaining two categories were **Minor Problems** and **Moderate Problems**. Teachers with **Moderate Problems** reported “moderate problem” for three of five conditions and “minor problem” for the other two, on average. About half of the students, on average, across the fourth grade countries were in schools where teachers had **Minor Problems** and about one-fourth were in schools with **Moderate Problems**. Students whose teachers reported **Moderate Problems** had somewhat lower mathematics achievement, on average, than those whose teachers reported **Minor Problems**, and those

students in turn had lower achievement than students whose teachers reported **Hardly Any Problems** (487, 491, and 498, respectively). In general, the results for the sixth grade and benchmarking participants followed the same pattern, with agreement between teacher reports and higher achievement for students in better school conditions. However, substantial percentages of students (45–59%) in the sixth grade countries had teachers reporting **Moderate Problems** with school conditions. Exhibit 5.11 presents the results for the Teacher Working Conditions scale for the TIMSS 2011 eighth grade assessment. The eighth grade scale was based on responses by the students' mathematics teachers to statements about the same five problem areas as the fourth grade. Eighth grade mathematics teachers expressed about the same level of satisfaction with working conditions as fourth grade teachers, with 21 percent of students in schools whose teachers reported **Hardly Any Problems** and 31 percent in schools with **Moderate Problems**. The average mathematics achievement difference between these two groups of students was 15 points (479 vs. 464).

Difficulties Filling Vacancies for Mathematics Teachers

Recent research suggests that mathematics teachers are in relatively short supply in some countries, and that the impending retirement of aging teachers will further contribute to this shortage (Ingersoll & Perda, 2010). TIMSS Advanced 2008 noted that, in several countries, not only were teachers of advanced mathematics nearing retirement age, but relatively few students were considering mathematics as a career option (Mullis, Martin, Robitaille, & Foy, 2009).

Exhibit 5.12 summarizes school principals' reports from the TIMSS 2011 eighth grade assessment about difficulties in filling vacancies for mathematics teachers. In most countries, on average, eighth grade students were in schools where principals reported that there were no vacancies (58%) or that vacancies were easy to fill (23%). Average mathematics achievement was the same for these two groups of students (468). However, average achievement was somewhat lower among the 15 percent of students in schools where vacancies were somewhat difficult to fill (458), and especially among the 4 percent in schools where vacancies were very difficult to fill (433).

Exhibit 5.10: Teacher Working Conditions

Reported by Teachers

Students were scored according to their teachers' responses concerning five potential problem areas on the *Teacher Working Conditions* scale. Students whose teachers had **Hardly Any Problems** with their working conditions had a score on the scale of at least 11.3, which corresponds to their teachers reporting "not a problem" for three of five areas and "minor problem" for the other two, on average. Students whose teachers had **Moderate Problems** had a score no higher than 8.7, which corresponds to their teachers reporting "moderate problem" for three of five conditions and "minor problem" for the other two, on average. All other students had teachers that reported **Minor Problems** with their working conditions.

Country	Hardly Any Problems		Minor Problems		Moderate Problems		Average Scale Score
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	
Poland	49 (3.6)	474 (2.8)	44 (3.5)	488 (3.1)	7 (1.5)	483 (7.7)	11.2 (0.13)
United States ^r	49 (2.5)	547 (2.8)	41 (2.3)	544 (2.8)	10 (1.6)	517 (6.8)	11.1 (0.10)
United Arab Emirates	46 (2.6)	441 (4.5)	38 (2.4)	436 (4.2)	15 (1.6)	412 (6.0)	10.9 (0.11)
Qatar	46 (3.9)	414 (7.3)	41 (3.6)	404 (6.7)	13 (2.1)	426 (11.1)	10.8 (0.17)
Czech Republic	45 (4.2)	510 (4.2)	46 (4.1)	511 (3.2)	9 (2.3)	513 (4.7)	11.0 (0.15)
Australia ^r	44 (4.2)	531 (6.2)	37 (4.1)	513 (5.2)	19 (2.7)	505 (8.4)	10.9 (0.19)
England	40 (4.3)	541 (5.7)	51 (4.6)	548 (5.7)	9 (2.4)	540 (11.6)	10.9 (0.14)
New Zealand	40 (3.1)	488 (4.8)	45 (3.0)	488 (3.7)	15 (2.3)	477 (6.7)	10.7 (0.13)
Ireland	38 (4.0)	533 (4.8)	47 (3.8)	522 (3.9)	15 (2.5)	531 (7.5)	10.8 (0.17)
Belgium (Flemish)	37 (3.6)	551 (2.4)	47 (3.9)	551 (2.6)	16 (2.8)	540 (7.3)	10.6 (0.14)
Kuwait	37 (4.1)	340 (6.0)	47 (3.9)	343 (5.1)	16 (3.0)	341 (10.5)	10.6 (0.16)
Slovak Republic	36 (3.4)	505 (6.4)	52 (3.2)	503 (5.2)	12 (2.2)	528 (6.5)	10.6 (0.12)
Northern Ireland ^r	35 (4.8)	567 (5.4)	49 (4.3)	564 (5.0)	16 (3.5)	553 (8.4)	10.7 (0.19)
Chile	35 (4.2)	484 (5.8)	38 (3.9)	453 (5.8)	27 (3.5)	447 (6.5)	10.2 (0.17)
Spain	32 (3.8)	485 (5.3)	46 (4.1)	484 (4.3)	22 (3.1)	477 (4.3)	10.3 (0.13)
Bahrain	32 (3.4)	460 (6.9)	42 (3.6)	424 (5.8)	26 (3.4)	426 (5.5)	10.1 (0.14)
Hungary	32 (3.2)	501 (7.9)	49 (3.1)	519 (5.2)	19 (2.9)	525 (6.9)	10.4 (0.15)
Lithuania	30 (3.2)	529 (4.8)	59 (3.3)	535 (3.3)	11 (2.0)	535 (4.1)	10.4 (0.11)
Austria	30 (3.5)	514 (3.5)	46 (3.8)	511 (3.4)	25 (3.7)	498 (5.4)	10.3 (0.18)
Singapore	29 (2.4)	611 (5.9)	53 (2.5)	602 (4.7)	18 (2.0)	607 (8.1)	10.4 (0.10)
Netherlands ^r	29 (4.3)	539 (4.4)	53 (5.0)	540 (3.1)	18 (3.7)	534 (5.3)	10.3 (0.17)
Kazakhstan	29 (3.8)	508 (9.5)	44 (3.9)	506 (7.8)	27 (3.7)	489 (8.4)	10.0 (0.19)
Slovenia	28 (3.6)	515 (3.9)	45 (4.0)	515 (3.2)	27 (3.2)	507 (3.9)	10.0 (0.14)
Croatia	27 (3.0)	485 (4.3)	51 (3.5)	493 (2.7)	21 (3.0)	491 (4.0)	10.2 (0.14)
Thailand	27 (4.0)	465 (6.5)	50 (4.3)	459 (6.0)	23 (3.8)	454 (14.4)	10.2 (0.16)
Georgia	26 (3.3)	457 (8.0)	52 (4.1)	442 (5.1)	22 (3.1)	464 (9.2)	10.0 (0.14)
Romania	26 (3.4)	484 (10.2)	44 (4.2)	481 (7.3)	30 (3.6)	478 (11.1)	9.9 (0.15)
Russian Federation	24 (3.0)	543 (7.0)	54 (4.0)	542 (4.6)	22 (2.9)	539 (6.3)	10.0 (0.12)
Saudi Arabia	23 (3.4)	423 (7.5)	42 (4.3)	407 (8.0)	34 (4.2)	406 (10.7)	9.7 (0.18)
Malta	21 (0.1)	501 (2.3)	56 (0.1)	498 (1.9)	24 (0.1)	487 (2.7)	9.9 (0.00)
Italy	20 (2.7)	520 (4.5)	46 (3.5)	508 (4.1)	34 (3.7)	504 (4.8)	9.7 (0.11)
Finland	20 (3.0)	548 (4.3)	63 (4.3)	545 (2.8)	17 (3.5)	548 (5.1)	10.1 (0.13)
Azerbaijan	19 (3.0)	477 (13.8)	51 (3.7)	467 (7.7)	30 (3.3)	449 (8.3)	9.8 (0.14)
Chinese Taipei	19 (3.1)	588 (4.1)	59 (4.1)	595 (2.9)	23 (3.4)	585 (4.9)	10.1 (0.15)
Turkey	18 (2.3)	499 (8.3)	43 (3.0)	478 (7.2)	39 (3.1)	446 (8.6)	9.4 (0.13)
Iran, Islamic Rep. of	18 (2.4)	449 (9.0)	51 (4.2)	429 (5.4)	31 (4.3)	424 (7.8)	9.7 (0.15)
Hong Kong SAR	17 (3.6)	597 (13.1)	50 (4.5)	601 (4.4)	33 (4.3)	607 (5.4)	9.5 (0.15)
Oman	17 (1.7)	412 (4.5)	44 (3.2)	387 (4.2)	40 (3.1)	371 (5.0)	9.4 (0.08)
Japan	16 (3.2)	591 (4.5)	44 (3.7)	584 (2.9)	40 (3.4)	586 (3.0)	9.3 (0.14)
Serbia	16 (3.1)	513 (6.0)	48 (3.9)	515 (4.7)	36 (3.8)	518 (4.4)	9.5 (0.13)
Portugal	16 (4.7)	526 (14.9)	46 (4.9)	537 (5.3)	38 (4.8)	530 (4.6)	9.3 (0.26)
Armenia	16 (2.5)	445 (10.7)	49 (3.6)	454 (5.4)	35 (3.7)	455 (5.2)	9.5 (0.11)
Denmark	16 (2.5)	543 (5.3)	57 (3.8)	544 (3.6)	27 (3.8)	532 (4.5)	9.6 (0.10)
Norway	15 (3.2)	501 (5.8)	51 (4.8)	491 (3.9)	34 (5.0)	497 (5.6)	9.5 (0.17)
Korea, Rep. of	14 (3.1)	603 (4.6)	49 (4.1)	605 (3.0)	36 (4.3)	606 (3.6)	9.4 (0.14)
Germany	14 (2.2)	527 (6.9)	50 (3.5)	531 (2.6)	36 (3.3)	525 (3.8)	9.4 (0.12)
Yemen	10 (2.9)	280 (19.3)	47 (4.1)	232 (7.7)	43 (4.4)	255 (10.3)	9.0 (0.14)
Sweden ^r	9 (2.6)	503 (6.3)	49 (4.1)	508 (3.1)	42 (4.3)	501 (4.1)	9.1 (0.15)
Morocco	6 (1.2)	421 (13.5)	16 (2.3)	363 (12.3)	78 (2.5)	327 (5.3)	7.6 (0.19)
Tunisia	4 (1.0)	397 (13.3)	30 (3.3)	361 (6.7)	67 (3.4)	356 (5.0)	7.9 (0.15)
International Avg.	26 (0.5)	498 (1.1)	47 (0.5)	491 (0.7)	27 (0.5)	487 (1.0)	

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2011

Centerpoint of scale set at 10.

() 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.

Exhibit 5.10: Teacher Working Conditions (Continued)

Country	Hardly Any Problems		Minor Problems		Moderate Problems		Average Scale Score
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	
Sixth Grade Participants							
Honduras	15 (3.1)	442 (16.9)	40 (4.5)	399 (6.9)	45 (4.4)	377 (8.0)	9.3 (0.17)
Botswana	7 (1.7)	478 (28.4)	34 (4.1)	422 (8.8)	59 (4.1)	413 (4.3)	8.5 (0.15)
Yemen	6 (2.2)	340 (27.1)	48 (4.3)	350 (7.6)	46 (4.2)	347 (7.8)	8.8 (0.13)
Benchmarking Participants							
Florida, US	r 64 (5.5)	544 (4.6)	31 (5.5)	546 (7.9)	6 (2.5)	528 (9.6)	11.8 (0.20)
Abu Dhabi, UAE	50 (4.5)	423 (8.3)	32 (3.9)	415 (10.0)	18 (3.3)	409 (9.6)	10.9 (0.21)
Dubai, UAE	r 49 (2.8)	483 (5.0)	42 (3.1)	467 (5.0)	9 (2.0)	414 (14.9)	11.1 (0.14)
Alberta, Canada	r 42 (4.5)	507 (5.4)	47 (4.3)	509 (3.0)	12 (2.8)	500 (5.9)	10.7 (0.16)
Ontario, Canada	39 (4.0)	516 (4.1)	54 (4.2)	522 (4.2)	8 (2.2)	520 (7.4)	10.8 (0.13)
North Carolina, US	35 (6.5)	549 (7.8)	57 (6.7)	552 (4.9)	8 (1.9)	577 (13.4)	10.6 (0.23)
Quebec, Canada	33 (4.5)	540 (4.6)	49 (4.6)	529 (2.4)	17 (3.8)	530 (6.6)	10.5 (0.16)

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2011

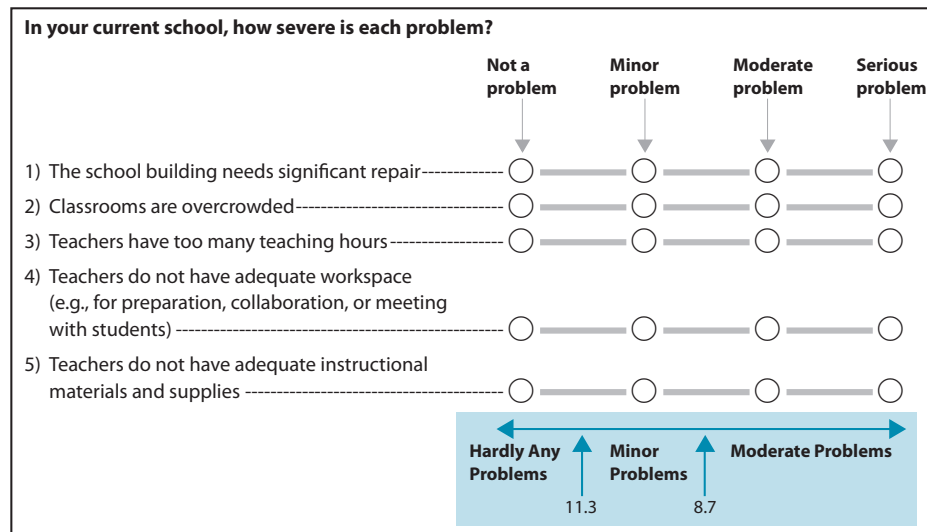


Exhibit 5.11: Teacher Working Conditions

Reported by Teachers

Students were scored according to their teachers' responses concerning five potential problem areas on the *Teacher Working Conditions* scale. Students whose teachers had **Hardly Any Problems** with their working conditions had a score on the scale of at least 11.7, which corresponds to their teachers reporting "not a problem" for three of five areas and "minor problem" for the other two, on average. Students whose teachers had **Moderate Problems** had a score no higher than 8.9, which corresponds to their teachers reporting "moderate problem" for three of five conditions and "minor problem" for the other two, on average. All other students had teachers that reported **Minor Problems** with their working conditions.

Country	Hardly Any Problems		Minor Problems		Moderate Problems		Average Scale Score
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	
United States	48 (2.6)	515 (5.0)	41 (2.4)	511 (4.4)	10 (1.6)	497 (8.3)	11.6 (0.11)
Qatar	47 (4.3)	410 (8.8)	41 (4.5)	408 (8.0)	11 (2.2)	409 (5.8)	11.3 (0.18)
United Arab Emirates	36 (2.2)	470 (4.3)	44 (2.3)	445 (3.4)	20 (2.0)	450 (6.0)	10.8 (0.11)
New Zealand	34 (4.0)	490 (8.6)	49 (3.9)	487 (8.5)	17 (2.6)	476 (11.4)	10.9 (0.18)
Lebanon	33 (4.2)	470 (6.4)	53 (4.2)	440 (5.2)	14 (3.0)	439 (9.2)	10.8 (0.20)
Australia	32 (4.0)	510 (7.7)	51 (3.7)	511 (8.2)	16 (3.1)	489 (12.7)	10.9 (0.20)
Lithuania	32 (3.2)	493 (5.2)	56 (3.5)	506 (4.2)	12 (2.4)	510 (6.0)	10.8 (0.13)
Slovenia	31 (3.1)	504 (3.4)	43 (2.9)	502 (3.2)	26 (2.5)	510 (3.7)	10.5 (0.14)
England	30 (4.4)	500 (8.2)	55 (4.4)	516 (8.5)	14 (2.9)	479 (13.7)	10.9 (0.18)
Hungary	30 (3.4)	496 (6.3)	50 (3.4)	498 (5.8)	20 (2.8)	532 (6.4)	10.5 (0.13)
Singapore	28 (2.0)	630 (7.3)	54 (3.0)	606 (5.6)	18 (2.0)	598 (8.9)	10.7 (0.08)
Italy	26 (3.2)	501 (4.7)	54 (4.0)	499 (4.0)	19 (3.0)	497 (6.9)	10.4 (0.12)
Bahrain	25 (1.6)	460 (5.0)	44 (2.5)	392 (2.8)	31 (1.9)	396 (3.9)	10.1 (0.09)
Russian Federation	24 (2.4)	544 (8.5)	54 (3.5)	535 (4.7)	22 (3.2)	540 (8.3)	10.4 (0.10)
Romania	24 (3.0)	467 (9.8)	54 (3.6)	452 (5.8)	22 (2.9)	462 (7.4)	10.4 (0.13)
Georgia	22 (3.2)	420 (11.7)	57 (3.6)	428 (5.0)	21 (3.2)	455 (7.7)	10.3 (0.14)
Japan	22 (3.5)	571 (8.0)	40 (4.3)	575 (5.3)	38 (4.2)	563 (4.3)	9.8 (0.18)
Chinese Taipei	21 (3.4)	609 (10.9)	53 (3.7)	602 (4.4)	26 (3.5)	625 (7.7)	10.3 (0.15)
Kazakhstan	21 (3.3)	501 (9.2)	44 (4.0)	485 (6.6)	35 (3.9)	480 (7.4)	10.0 (0.18)
Ukraine	21 (3.6)	470 (9.6)	60 (4.2)	483 (5.0)	19 (3.5)	479 (10.3)	10.4 (0.14)
Chile	19 (2.7)	427 (8.8)	51 (3.6)	422 (4.8)	30 (3.5)	402 (6.0)	10.1 (0.16)
Macedonia, Rep. of	19 (3.2)	434 (16.5)	47 (4.0)	425 (8.4)	33 (4.1)	416 (11.0)	10.0 (0.14)
Iran, Islamic Rep. of	17 (2.5)	434 (11.3)	50 (3.9)	412 (6.4)	32 (3.5)	410 (7.3)	10.0 (0.13)
Israel	17 (2.8)	498 (12.3)	44 (3.0)	512 (6.5)	38 (2.9)	537 (6.6)	9.7 (0.15)
Finland	17 (2.8)	518 (5.3)	63 (3.5)	514 (3.1)	20 (2.8)	512 (4.3)	10.2 (0.10)
Thailand	16 (2.9)	430 (11.5)	60 (3.7)	428 (6.6)	24 (3.2)	421 (6.5)	10.2 (0.13)
Hong Kong SAR	15 (3.5)	591 (14.6)	62 (4.5)	585 (5.8)	23 (4.1)	573 (14.1)	9.9 (0.17)
Jordan	14 (2.5)	419 (8.7)	41 (3.9)	412 (6.7)	45 (4.0)	396 (6.1)	9.4 (0.18)
Turkey	14 (2.8)	475 (15.9)	50 (3.5)	454 (5.2)	35 (3.1)	441 (7.1)	9.7 (0.14)
Tunisia	13 (2.7)	416 (6.3)	49 (4.1)	425 (4.6)	38 (4.0)	427 (5.2)	9.6 (0.12)
Saudi Arabia	13 (2.6)	430 (11.7)	51 (4.7)	391 (5.9)	36 (4.4)	388 (7.3)	9.8 (0.17)
Syrian Arab Republic	13 (3.2)	366 (15.8)	41 (4.1)	389 (7.9)	47 (4.6)	374 (6.9)	9.4 (0.18)
Malaysia	12 (2.8)	471 (16.8)	59 (3.9)	427 (6.9)	29 (3.6)	455 (9.7)	10.0 (0.12)
Norway	11 (2.4)	475 (5.5)	65 (4.1)	474 (2.9)	24 (3.4)	478 (4.0)	9.8 (0.12)
Armenia	10 (1.9)	514 (8.7)	49 (3.7)	465 (4.4)	42 (3.6)	457 (4.8)	9.5 (0.11)
Palestinian Nat'l Auth.	10 (2.1)	399 (8.4)	51 (4.0)	413 (6.0)	39 (3.6)	394 (5.7)	9.4 (0.11)
Oman	9 (1.2)	396 (11.0)	38 (3.4)	372 (4.9)	53 (3.5)	356 (3.9)	8.9 (0.11)
Indonesia	9 (2.4)	425 (15.8)	32 (3.8)	397 (6.7)	60 (3.9)	374 (6.2)	8.9 (0.18)
Sweden	8 (2.0)	501 (8.8)	51 (3.4)	488 (3.0)	41 (3.4)	480 (3.2)	9.4 (0.14)
Korea, Rep. of	8 (1.7)	610 (10.0)	36 (2.9)	600 (4.7)	56 (2.9)	621 (4.1)	9.0 (0.11)
Ghana	7 (2.0)	356 (16.7)	32 (4.1)	340 (7.1)	61 (3.9)	323 (5.9)	8.7 (0.13)
Morocco	4 (0.7)	490 (13.7)	34 (3.3)	372 (3.9)	62 (3.3)	362 (2.9)	8.8 (0.10)
International Avg.	21 (0.5)	479 (1.6)	49 (0.6)	467 (0.9)	31 (0.5)	464 (1.2)	

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2011

Centerpoint of scale set at 10.

() 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.

Exhibit 5.11: Teacher Working Conditions (Continued)

Country	Hardly Any Problems		Minor Problems		Moderate Problems		Average Scale Score
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	
Ninth Grade Participants							
Honduras	11 (3.1)	387 (18.3)	43 (4.6)	332 (7.0)	46 (4.3)	330 (4.8)	9.5 (0.17)
South Africa	9 (1.7)	468 (19.5)	26 (2.9)	365 (7.0)	64 (3.3)	331 (3.1)	8.6 (0.13)
Botswana	3 (1.4)	440 (31.1)	18 (3.1)	387 (6.6)	80 (3.4)	398 (2.8)	7.7 (0.19)
Benchmarking Participants							
Indiana, US	r 65 (6.9)	523 (7.7)	29 (6.8)	513 (10.2)	5 (2.9)	491 (3.7)	12.1 (0.22)
Florida, US	r 61 (5.9)	539 (8.9)	37 (6.1)	488 (8.0)	2 (1.6)	~ ~	12.5 (0.25)
Colorado, US	r 53 (5.8)	515 (7.8)	44 (5.8)	520 (11.5)	4 (2.0)	550 (24.6)	11.6 (0.19)
Massachusetts, US	53 (6.8)	563 (7.5)	44 (6.5)	563 (8.9)	4 (2.6)	476 (13.1)	11.8 (0.23)
California, US	r 48 (7.0)	500 (7.7)	42 (6.8)	487 (10.7)	11 (4.1)	480 (23.9)	11.6 (0.30)
Dubai, UAE	46 (3.7)	495 (5.0)	43 (3.7)	466 (5.7)	11 (2.0)	438 (9.8)	11.4 (0.12)
Minnesota, US	44 (5.8)	553 (7.2)	47 (6.4)	533 (9.4)	9 (4.4)	569 (19.7)	11.4 (0.23)
North Carolina, US	r 43 (6.8)	536 (11.7)	45 (6.9)	541 (10.7)	12 (4.5)	561 (16.5)	11.4 (0.32)
Ontario, Canada	43 (4.2)	512 (3.9)	43 (4.2)	512 (4.1)	14 (3.1)	516 (8.8)	11.2 (0.18)
Connecticut, US	40 (6.8)	533 (9.6)	44 (6.6)	515 (13.5)	15 (4.6)	504 (16.3)	11.3 (0.29)
Alberta, Canada	37 (3.7)	506 (4.8)	49 (3.7)	506 (3.6)	14 (2.9)	497 (3.5)	11.0 (0.16)
Abu Dhabi, UAE	36 (3.9)	459 (9.1)	43 (4.0)	441 (5.8)	21 (3.3)	452 (7.9)	10.8 (0.19)
Quebec, Canada	34 (4.0)	545 (5.3)	52 (4.0)	525 (3.4)	14 (3.1)	529 (6.4)	11.0 (0.17)
Alabama, US	r 34 (5.9)	466 (16.3)	46 (6.9)	474 (8.3)	21 (6.2)	455 (12.0)	10.9 (0.26)

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2011

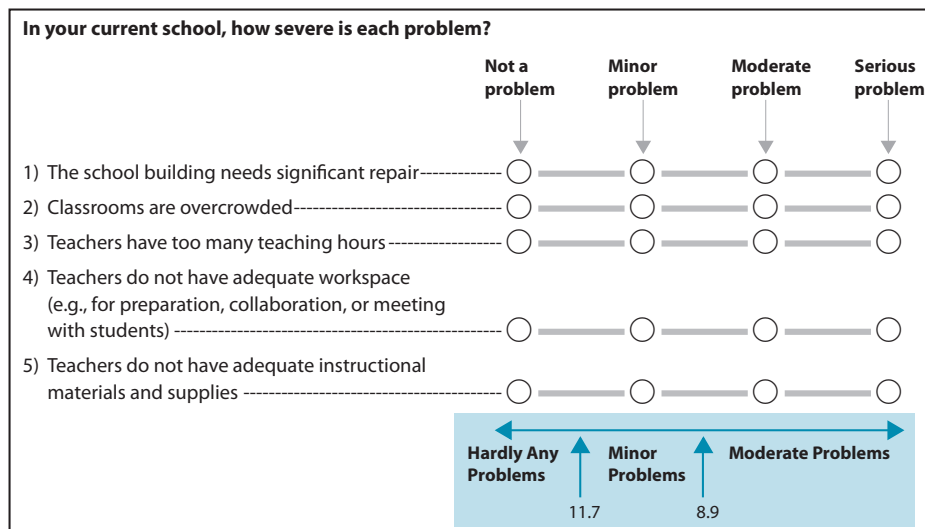


Exhibit 5.12: Schools with Difficulties Filling Vacancies for Mathematics Teachers

Reported by Principals

Country	No Vacancies		Vacancies Are Easy to Fill		Vacancies Are Somewhat Difficult to Fill		Vacancies Are Very Difficult to Fill	
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement
Armenia	97 (1.3)	467 (2.9)	1 (0.9)	~ ~	1 (0.9)	~ ~	0 (0.0)	~ ~
Australia	25 (2.7)	509 (10.2)	34 (4.0)	517 (10.1)	31 (3.5)	500 (9.1)	10 (2.5)	498 (16.8)
Bahrain	43 (0.3)	408 (3.3)	24 (0.2)	436 (2.7)	30 (0.3)	387 (3.5)	3 (0.1)	427 (8.8)
Chile	65 (4.0)	425 (4.3)	15 (3.5)	393 (10.1)	14 (3.1)	412 (12.7)	6 (2.1)	410 (9.5)
Chinese Taipei	46 (3.9)	607 (5.1)	44 (4.1)	615 (6.0)	10 (2.4)	600 (14.2)	1 (0.8)	~ ~
England	28 (4.3)	504 (11.7)	35 (4.8)	515 (10.6)	27 (4.2)	495 (13.1)	10 (2.9)	524 (19.2)
Finland	42 (3.6)	516 (3.2)	46 (3.8)	512 (3.8)	10 (2.4)	513 (6.5)	1 (0.8)	~ ~
Georgia	91 (1.9)	431 (4.0)	3 (1.2)	427 (25.1)	5 (1.4)	464 (14.0)	1 (1.0)	~ ~
Ghana	45 (3.6)	334 (6.2)	25 (3.6)	344 (10.9)	26 (3.9)	306 (7.0)	4 (1.5)	326 (16.5)
Hong Kong SAR	48 (5.3)	587 (7.6)	44 (5.3)	583 (8.9)	8 (2.7)	600 (26.3)	0 (0.0)	~ ~
Hungary	86 (3.2)	507 (3.5)	6 (2.1)	492 (11.8)	4 (1.7)	531 (21.6)	4 (1.7)	455 (41.3)
Indonesia	52 (4.1)	401 (5.5)	22 (3.8)	381 (7.8)	23 (3.6)	356 (11.5)	3 (1.2)	386 (29.9)
Iran, Islamic Rep. of	35 (3.2)	431 (8.0)	40 (2.7)	404 (5.5)	21 (2.8)	409 (11.1)	3 (1.3)	432 (25.0)
Israel	55 (4.3)	512 (7.1)	17 (3.3)	523 (12.4)	20 (3.6)	517 (10.9)	9 (2.4)	529 (19.7)
Italy	70 (3.5)	500 (3.4)	22 (3.2)	496 (5.9)	8 (1.4)	498 (7.1)	0 (0.4)	~ ~
Japan	82 (3.1)	572 (3.0)	6 (1.9)	553 (10.9)	8 (2.5)	567 (4.2)	3 (1.3)	560 (22.6)
Jordan	44 (3.7)	408 (6.5)	27 (3.2)	414 (6.5)	24 (3.3)	403 (6.9)	6 (1.9)	361 (22.0)
Kazakhstan	71 (3.6)	487 (4.5)	12 (2.7)	502 (13.5)	15 (3.1)	475 (11.1)	1 (1.1)	~ ~
Korea, Rep. of	67 (4.0)	611 (3.1)	16 (2.9)	625 (7.9)	15 (3.4)	603 (7.7)	2 (1.1)	~ ~
Lebanon	42 (4.6)	453 (6.3)	39 (4.6)	454 (6.3)	17 (3.5)	427 (9.7)	2 (1.1)	~ ~
Lithuania	93 (1.9)	503 (2.8)	6 (1.8)	506 (11.4)	0 (0.0)	~ ~	1 (0.7)	~ ~
Macedonia, Rep. of	64 (3.6)	425 (6.9)	28 (3.4)	444 (8.5)	7 (2.2)	407 (22.6)	1 (0.9)	~ ~
Malaysia	39 (3.2)	439 (7.4)	51 (3.2)	446 (8.0)	8 (1.6)	417 (27.9)	2 (1.1)	~ ~
Morocco	65 (3.4)	372 (2.8)	13 (2.2)	370 (8.2)	16 (2.4)	370 (5.3)	7 (1.8)	362 (12.0)
New Zealand	30 (4.1)	483 (8.8)	27 (4.2)	504 (7.5)	38 (4.5)	484 (9.9)	6 (2.0)	461 (13.7)
Norway	38 (4.6)	475 (4.8)	40 (4.8)	476 (3.3)	20 (3.4)	472 (4.8)	2 (1.2)	~ ~
Oman	55 (3.2)	357 (4.5)	19 (2.4)	379 (6.2)	19 (2.5)	376 (8.6)	7 (1.5)	364 (11.1)
Palestinian Nat'l Auth.	66 (3.7)	406 (4.8)	25 (3.2)	407 (8.6)	6 (2.0)	394 (12.3)	2 (1.2)	~ ~
Qatar	47 (0.8)	409 (5.8)	25 (0.2)	421 (4.0)	25 (0.7)	392 (5.2)	3 (0.0)	411 (10.6)
Romania	78 (3.6)	463 (4.8)	19 (3.2)	445 (10.6)	2 (0.9)	~ ~	2 (1.4)	~ ~
Russian Federation	81 (2.8)	542 (3.8)	11 (1.8)	525 (9.9)	6 (1.9)	543 (10.6)	2 (1.1)	~ ~
Saudi Arabia	52 (4.3)	393 (5.6)	29 (3.7)	397 (9.5)	16 (2.8)	394 (12.3)	4 (1.8)	378 (22.5)
Singapore	59 (0.0)	609 (4.8)	38 (0.0)	613 (5.8)	2 (0.0)	~ ~	0 (0.0)	~ ~
Slovenia	72 (3.6)	505 (2.6)	22 (3.2)	505 (4.3)	5 (1.9)	499 (11.6)	1 (0.0)	~ ~
Sweden	51 (4.4)	484 (3.1)	26 (3.4)	481 (4.2)	14 (3.0)	491 (7.3)	9 (3.2)	487 (4.7)
Syrian Arab Republic	46 (4.5)	387 (6.9)	25 (3.5)	378 (8.4)	21 (3.9)	368 (11.2)	8 (2.8)	380 (17.6)
Thailand	32 (4.2)	421 (6.8)	10 (2.7)	425 (21.4)	36 (3.6)	440 (8.7)	22 (3.7)	417 (10.0)
Tunisia	63 (3.6)	426 (4.1)	27 (3.2)	421 (4.5)	8 (2.3)	416 (10.5)	1 (0.0)	~ ~
Turkey	66 (2.6)	465 (5.3)	12 (2.0)	430 (10.4)	13 (2.1)	444 (11.2)	9 (1.6)	408 (6.4)
Ukraine	96 (1.7)	479 (3.9)	1 (0.6)	~ ~	2 (1.2)	~ ~	1 (1.0)	~ ~
United Arab Emirates	48 (2.3)	442 (3.3)	26 (2.2)	466 (5.3)	23 (1.7)	468 (4.9)	3 (0.6)	459 (11.6)
United States	63 (2.5)	512 (3.6)	25 (2.0)	512 (4.8)	9 (1.5)	498 (10.3)	3 (0.8)	501 (19.6)
International Avg.	58 (0.5)	468 (0.9)	23 (0.5)	468 (1.5)	15 (0.4)	458 (2.0)	4 (0.2)	433 (4.0)

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2011

() 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.

**Exhibit 5.12: Schools with Difficulties Filling Vacancies for Mathematics Teachers
(Continued)**

Country	No Vacancies		Vacancies Are Easy to Fill		Vacancies Are Somewhat Difficult to Fill		Vacancies Are Very Difficult to Fill	
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement
Ninth Grade Participants								
Botswana	46 (4.1)	393 (4.1)	21 (3.6)	402 (6.1)	24 (3.5)	399 (6.9)	9 (2.1)	388 (5.5)
Honduras	61 (4.7)	335 (4.4)	14 (3.1)	344 (8.5)	17 (3.7)	349 (16.8)	8 (2.9)	318 (11.9)
South Africa	44 (3.9)	355 (5.2)	9 (2.0)	373 (12.1)	31 (3.7)	356 (7.0)	16 (3.0)	327 (6.4)
Benchmarking Participants								
Alberta, Canada	59 (4.1)	505 (3.3)	31 (4.0)	508 (5.0)	8 (2.3)	500 (7.6)	1 (1.0)	~ ~
Ontario, Canada	74 (4.0)	511 (3.3)	18 (3.4)	513 (7.2)	8 (2.7)	518 (8.8)	0 (0.0)	~ ~
Quebec, Canada	34 (3.7)	543 (4.7)	41 (4.0)	528 (4.3)	19 (3.8)	518 (5.5)	5 (2.0)	539 (9.2)
Abu Dhabi, UAE	52 (4.3)	436 (5.7)	30 (4.3)	458 (11.6)	15 (2.9)	472 (11.1)	3 (1.4)	469 (24.4)
Dubai, UAE	30 (0.3)	465 (3.4)	27 (0.4)	496 (5.5)	40 (0.5)	474 (3.7)	3 (0.0)	471 (8.9)
Alabama, US	67 (6.8)	462 (7.4)	25 (6.2)	494 (11.7)	7 (3.5)	421 (13.4)	0 (0.0)	~ ~
California, US	60 (6.4)	498 (6.7)	20 (5.8)	487 (16.0)	13 (3.4)	490 (17.6)	6 (3.0)	471 (25.4)
Colorado, US	47 (7.1)	529 (8.7)	32 (7.0)	520 (12.7)	7 (3.6)	498 (13.4)	13 (4.3)	477 (17.6)
Connecticut, US	78 (5.6)	526 (8.4)	20 (5.2)	499 (15.1)	2 (0.1)	~ ~	0 (0.0)	~ ~
Florida, US	46 (7.8)	527 (10.3)	40 (7.2)	506 (9.2)	3 (3.1)	432 (12.0)	10 (4.4)	500 (30.3)
Indiana, US	56 (7.0)	525 (5.7)	38 (6.8)	529 (9.8)	6 (3.5)	491 (32.1)	0 (0.0)	~ ~
Massachusetts, US	53 (7.1)	551 (7.8)	25 (5.8)	566 (15.3)	18 (6.0)	583 (16.4)	4 (2.8)	516 (1.9)
Minnesota, US	66 (7.0)	539 (6.3)	24 (6.0)	564 (13.2)	7 (4.4)	552 (9.1)	3 (2.7)	546 (4.9)
North Carolina, US	60 (7.0)	526 (10.6)	27 (5.8)	542 (9.3)	13 (4.8)	568 (29.1)	0 (0.0)	~ ~

SOURCE: IEA's Trends in International Mathematics and Science Study - TIMSS 2011

Size of School Library

Libraries, both within the school and in the local community, provide a range of reading materials and other resources from which teachers can draw to expand their instructional approaches, and from which students can choose books for their own learning and enjoyment. Also, with the growing use of technology, libraries increasingly are becoming media centers offering Internet access to a wide range of materials, with the potential to improve achievement in all areas, including mathematics.

Exhibit 5.13 presents principals' reports about the existence and size of school libraries for participants in the TIMSS 2011 fourth grade assessment. In considering the results in this exhibit, it is important to realize that, because of variation in policies across countries regarding school libraries and classroom libraries, some countries have well-resourced classroom libraries rather than a larger central library, so the lack of a school library does not necessarily mean that children do not have access to a variety of books. Also, primary schools tend to be smaller than middle and secondary schools, and may have small libraries as a result of their small enrollments.

On average, across the fourth grade countries, 32 percent of the students attended schools (for the most part primary schools) having well-resourced school libraries with more than 5,000 book titles. Another 38 percent of the students attended schools having libraries with between 501 and 5,000 book titles, and 17 percent attended schools having smaller library collections of 500 book titles or fewer. On average internationally, 13 percent of fourth grade students attended schools with no school library.

Average mathematics achievement was positively related to school library size, with the fourth grade students attending schools with well-resourced school libraries having the highest achievement and students with no school library the lowest achievement (506 vs. 474). For countries at the sixth grade, there were few students in schools with libraries having more than 5,000 book titles, and high percentages of students with no school library.

Schools with Computers Available for Instruction

Recent research reviews suggest that computer use continues to grow in mathematics and science instruction. For example, a meta-analysis of the impact of computer technology on mathematics education in US classrooms found significant positive effects, and in particular that computer technology had a stronger effect in promoting mathematics achievement among elementary compared to secondary school students (Li & Ma, 2010).

Exhibit 5.14 shows principals' reports about the availability of computers for instruction for participants in the TIMSS fourth grade assessment. Internationally, 38 percent of the fourth grade students, on average, were in schools that had 1 computer for every 1–2 fourth grade students, 30 percent were in schools with 1 computer for every 3–5 fourth grade students, and 24 percent were in schools with 1 computer for 6 or more students. There was considerable variation from country to country, with the highest computer-to-student ratio in England (90% of students in schools with 1 computer for every 1–2 fourth grade students) and the lowest in Iran, Tunisia, and Yemen (7% or fewer students in such schools). On average, however, only 8 percent of the fourth grade students were in schools that did not have any computers available for instruction. The percentages of students in schools with no computers for instruction were higher for the sixth grade participants.

The relationship between computer availability and average mathematics achievement is difficult to interpret because it is highly interrelated with socio-economic levels and instructional practices. In the primary grades, computer instruction can be used for remedial purposes as frequently (if not more frequently) because it can provide an increased variety of stimulating and challenging activities. However, the fourth grade students with access to computers for instruction had higher average mathematics achievement than those students with no access to computers for instruction.

Exhibit 5.15 provides principals' reports about the availability of computers for instruction for participants in the TIMSS eighth grade assessment. Levels of computer availability are similar to the fourth grade (although a little more favorable), with 40 percent of the eighth grade students, on average, in schools having 1 computer for every 1–2 eighth grade students, 28 percent in schools with 1 computer for every 3–5 eighth grade students, and 28 percent in schools with 1 computer for 6 or more students. Only 4 percent of the eighth grade students were in schools with no provision for computers for instruction. Eighth grade participants with 70 percent or more of students in schools with the highest computer-to-student ratio (1 computer for every 1–2 eighth grade students) included Australia, England, Georgia, Hungary, Macedonia, New Zealand, Norway, Slovenia, and, among benchmarking participants, Alberta, Colorado, and Indiana. Similar to the fourth grade, there was no relationship between computer-to-student ratio and mathematic achievement, but the 4 percent of students in schools with no computers available for instruction had lower average mathematics achievement than students in schools with some access to computers.

Exhibit 5.13: Size of School Library

Reported by Principals (Does not include classroom libraries)

Country	More than 5,000 Book Titles		501–5,000 Book Titles		500 Book Titles or Fewer		No School Library	
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement
Armenia	42 (4.0)	448 (5.7)	50 (3.9)	454 (4.7)	8 (2.3)	459 (12.7)	0 (0.5)	~ ~
Australia	56 (3.6)	519 (4.0)	42 (3.7)	513 (5.4)	1 (0.5)	~ ~	1 (0.0)	~ ~
Austria	1 (0.1)	~ ~	45 (4.5)	509 (2.8)	27 (4.2)	498 (6.1)	27 (3.6)	516 (4.0)
Azerbaijan	29 (3.6)	472 (11.0)	44 (4.1)	469 (10.0)	28 (3.7)	445 (10.5)	0 (0.0)	~ ~
Bahrain	27 (4.8)	464 (8.2)	48 (5.5)	431 (5.7)	25 (4.1)	420 (8.8)	0 (0.0)	~ ~
Belgium (Flemish)	1 (0.0)	~ ~	13 (3.3)	547 (4.8)	26 (3.8)	553 (4.2)	60 (4.6)	548 (2.4)
Chile	16 (2.8)	504 (7.2)	58 (4.2)	459 (4.5)	22 (3.1)	452 (7.5)	4 (1.3)	444 (9.6)
Chinese Taipei	90 (2.8)	593 (2.2)	9 (2.7)	580 (5.4)	0 (0.0)	~ ~	1 (0.8)	~ ~
Croatia	39 (4.2)	493 (3.3)	53 (4.3)	489 (2.8)	8 (1.8)	474 (12.2)	0 (0.0)	~ ~
Czech Republic	6 (1.6)	510 (6.1)	55 (4.1)	511 (3.7)	23 (3.6)	512 (4.5)	17 (3.5)	508 (5.8)
Denmark	r 68 (3.6)	542 (3.1)	26 (3.7)	536 (5.9)	2 (1.5)	~ ~	4 (1.3)	541 (12.2)
England	13 (2.9)	536 (10.6)	63 (4.6)	550 (5.0)	15 (3.6)	525 (10.4)	8 (2.3)	520 (20.0)
Finland	4 (1.7)	557 (10.0)	47 (4.3)	545 (2.7)	27 (3.8)	546 (6.6)	21 (3.4)	540 (6.5)
Georgia	35 (3.2)	452 (5.4)	49 (3.6)	449 (7.4)	13 (2.4)	446 (9.8)	2 (1.3)	~ ~
Germany	2 (1.0)	~ ~	39 (3.4)	531 (3.8)	33 (3.6)	523 (4.5)	26 (3.3)	533 (3.7)
Hong Kong SAR	82 (3.2)	608 (4.1)	18 (3.2)	594 (6.0)	0 (0.0)	~ ~	0 (0.0)	~ ~
Hungary	52 (4.0)	525 (4.8)	41 (4.3)	508 (6.7)	3 (1.3)	497 (20.4)	4 (1.6)	506 (32.1)
Iran, Islamic Rep. of	3 (1.2)	484 (24.8)	40 (4.0)	452 (6.4)	37 (3.6)	426 (5.3)	20 (3.1)	397 (9.1)
Ireland	7 (2.1)	513 (7.1)	30 (4.0)	526 (6.5)	14 (2.8)	535 (8.3)	49 (4.2)	530 (3.7)
Italy	5 (1.4)	499 (13.4)	41 (3.9)	512 (4.4)	42 (3.8)	503 (4.4)	12 (2.6)	505 (7.6)
Japan	81 (3.1)	586 (1.9)	18 (3.2)	579 (5.1)	0 (0.0)	~ ~	1 (0.7)	~ ~
Kazakhstan	65 (3.9)	501 (5.7)	30 (3.9)	499 (8.7)	5 (1.9)	462 (24.5)	0 (0.0)	~ ~
Korea, Rep. of	92 (2.5)	605 (2.1)	8 (2.4)	599 (3.5)	0 (0.0)	~ ~	1 (0.0)	~ ~
Kuwait	3 (1.5)	335 (11.8)	37 (4.4)	348 (6.0)	59 (4.1)	342 (4.9)	1 (0.7)	~ ~
Lithuania	46 (3.9)	533 (3.7)	45 (4.0)	533 (4.4)	6 (1.7)	562 (11.0)	3 (0.8)	522 (13.4)
Malta	11 (0.1)	515 (3.6)	58 (0.1)	500 (1.7)	17 (0.1)	483 (3.4)	14 (0.1)	479 (3.4)
Morocco	0 (0.3)	~ ~	6 (2.2)	370 (11.5)	24 (3.0)	365 (10.2)	70 (3.3)	321 (5.2)
Netherlands	--	--	--	--	--	--	--	--
New Zealand	46 (3.8)	490 (4.9)	53 (3.7)	484 (4.3)	0 (0.0)	~ ~	1 (1.0)	~ ~
Northern Ireland	r 3 (1.5)	540 (11.9)	51 (4.6)	561 (5.4)	15 (3.9)	540 (14.1)	31 (4.0)	578 (6.5)
Norway	18 (4.0)	498 (5.8)	73 (4.8)	494 (3.7)	4 (2.3)	500 (9.4)	4 (2.0)	481 (18.0)
Oman	r 11 (2.2)	374 (7.8)	58 (3.7)	380 (3.8)	10 (2.1)	401 (10.8)	21 (2.6)	369 (6.7)
Poland	65 (3.6)	484 (2.8)	32 (3.6)	475 (4.9)	2 (1.0)	~ ~	1 (0.9)	~ ~
Portugal	5 (2.0)	524 (11.0)	47 (5.4)	527 (5.4)	24 (4.0)	543 (8.5)	25 (4.1)	532 (5.4)
Qatar	52 (3.4)	429 (6.5)	34 (3.3)	391 (6.0)	13 (2.2)	390 (7.2)	1 (1.0)	~ ~
Romania	45 (3.9)	494 (7.4)	45 (4.2)	468 (10.0)	6 (1.7)	493 (16.8)	4 (1.7)	474 (24.6)
Russian Federation	65 (3.4)	544 (4.4)	31 (3.4)	541 (6.2)	3 (1.8)	533 (24.9)	1 (0.0)	~ ~
Saudi Arabia	3 (1.5)	435 (18.2)	17 (3.0)	418 (14.1)	55 (4.2)	414 (8.1)	25 (3.6)	399 (8.8)
Serbia	66 (4.0)	524 (4.0)	22 (3.5)	505 (6.8)	8 (2.5)	478 (15.4)	4 (1.6)	498 (9.0)
Singapore	77 (0.0)	606 (3.6)	22 (0.0)	606 (7.2)	1 (0.0)	~ ~	0 (0.0)	~ ~
Slovak Republic	11 (2.0)	504 (9.9)	58 (3.9)	508 (5.0)	20 (3.2)	494 (7.7)	12 (2.6)	514 (6.4)
Slovenia	66 (2.9)	511 (2.1)	27 (3.6)	513 (3.7)	6 (2.7)	533 (14.2)	1 (0.6)	~ ~
Spain	19 (3.2)	495 (6.1)	69 (4.0)	481 (3.6)	8 (1.8)	478 (12.8)	3 (1.6)	486 (18.5)
Sweden	r 18 (3.7)	507 (4.7)	52 (5.0)	503 (4.0)	12 (3.4)	508 (6.1)	18 (3.8)	502 (6.6)
Thailand	18 (3.1)	494 (7.0)	37 (4.6)	456 (7.1)	42 (3.7)	438 (7.3)	3 (1.6)	514 (26.8)
Tunisia	0 (0.1)	~ ~	5 (2.2)	363 (10.1)	61 (3.8)	364 (5.4)	34 (3.3)	349 (7.7)
Turkey	1 (0.7)	~ ~	38 (3.2)	487 (5.4)	36 (3.3)	478 (5.3)	24 (2.7)	420 (13.1)
United Arab Emirates	r 27 (1.4)	473 (5.3)	47 (2.3)	424 (3.6)	23 (2.1)	409 (6.1)	3 (0.8)	443 (20.0)
United States	62 (3.1)	546 (2.3)	34 (2.9)	536 (3.8)	3 (1.2)	534 (13.5)	1 (0.8)	~ ~
Yemen	r 1 (0.7)	~ ~	3 (1.0)	306 (5.5)	19 (3.3)	264 (15.5)	77 (3.4)	247 (7.0)
International Avg.	32 (0.4)	506 (1.3)	38 (0.5)	490 (0.9)	17 (0.4)	471 (1.8)	13 (0.3)	474 (2.4)

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2011

() 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.

Exhibit 5.13: Size of School Library (Continued)

Country	More than 5,000 Book Titles		501–5,000 Book Titles		500 Book Titles or Fewer		No School Library	
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement
Sixth Grade Participants								
Botswana	3 (1.2)	458 (35.2)	12 (2.7)	454 (21.5)	33 (4.1)	420 (6.3)	52 (4.5)	409 (4.5)
Honduras	0 (0.0)	~ ~	15 (3.5)	449 (17.2)	30 (4.2)	395 (10.8)	55 (4.2)	384 (6.3)
Yemen	1 (0.0)	~ ~	4 (1.4)	394 (8.7)	21 (3.3)	354 (9.4)	73 (3.5)	344 (7.4)
Benchmarking Participants								
Alberta, Canada	70 (4.0)	510 (2.7)	30 (4.0)	502 (6.1)	0 (0.0)	~ ~	0 (0.0)	~ ~
Ontario, Canada	51 (4.3)	520 (4.4)	45 (4.3)	515 (4.4)	2 (1.5)	~ ~	1 (1.0)	~ ~
Quebec, Canada	42 (4.2)	534 (4.2)	52 (4.0)	533 (3.0)	5 (1.9)	538 (6.2)	2 (1.1)	~ ~
Abu Dhabi, UAE	r 22 (3.6)	443 (13.6)	46 (4.8)	412 (7.5)	27 (3.8)	403 (8.9)	5 (1.7)	448 (21.3)
Dubai, UAE	r 51 (0.2)	501 (2.7)	39 (0.2)	448 (2.5)	10 (0.2)	409 (4.1)	0 (0.0)	~ ~
Florida, US	r 65 (6.9)	545 (4.8)	30 (6.1)	547 (9.0)	3 (2.3)	510 (7.5)	2 (0.1)	~ ~
North Carolina, US	76 (6.2)	555 (5.7)	24 (6.2)	559 (9.4)	0 (0.0)	~ ~	0 (0.0)	~ ~

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2011

Does your school have a school library?

1) Yes
2) No

If Yes,

A. Approximately how many books with different titles does your school library have (exclude magazines and periodicals)?

1) 250 or fewer
2) 251–500
3) 501–2,000
4) 2,001–5,000
5) 5,001–10,000
6) More than 10,000

Exhibit 5.14: Schools with Computers Available for Instruction

Reported by Principals

Country	1 Computer for 1–2 Students		1 Computer for 3–5 Students		1 Computer for 6 or More Students		No Computers Available	
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement
Armenia	26 (3.7)	455 (9.3)	46 (4.3)	451 (5.5)	24 (3.7)	445 (6.2)	4 (1.8)	474 (13.1)
Australia	65 (3.7)	520 (3.8)	26 (3.2)	512 (6.3)	9 (2.4)	518 (6.6)	0 (0.1)	~ ~
Austria	11 (2.4)	525 (7.0)	19 (2.7)	511 (4.3)	66 (3.7)	507 (2.8)	4 (3.0)	472 (27.8)
Azerbaijan	19 (3.2)	466 (18.9)	37 (4.1)	451 (8.1)	29 (3.7)	483 (9.6)	15 (3.2)	447 (16.5)
Bahrain	r 42 (3.9)	444 (5.4)	43 (4.4)	432 (6.4)	15 (2.8)	427 (14.2)	0 (0.0)	~ ~
Belgium (Flemish)	41 (4.3)	552 (3.2)	34 (3.7)	552 (2.9)	25 (4.0)	545 (3.1)	0 (0.0)	~ ~
Chile	r 58 (3.7)	458 (4.2)	32 (3.6)	469 (6.2)	7 (2.2)	481 (12.2)	2 (1.1)	~ ~
Chinese Taipei	23 (2.7)	575 (4.6)	41 (3.7)	594 (3.5)	36 (3.6)	601 (2.8)	0 (0.0)	~ ~
Croatia	12 (2.4)	486 (5.5)	21 (3.3)	496 (4.1)	50 (4.3)	490 (3.1)	17 (3.1)	488 (4.8)
Czech Republic	66 (3.5)	507 (3.3)	26 (3.1)	516 (3.4)	5 (1.9)	523 (5.6)	3 (1.5)	526 (10.8)
Denmark	s 44 (4.7)	539 (3.7)	42 (4.4)	543 (4.1)	14 (3.3)	552 (7.9)	0 (0.0)	~ ~
England	r 90 (2.8)	543 (4.2)	10 (2.8)	549 (16.6)	0 (0.0)	~ ~	0 (0.0)	~ ~
Finland	55 (4.3)	546 (3.5)	28 (4.1)	541 (4.6)	15 (3.2)	550 (4.4)	2 (1.2)	~ ~
Georgia	64 (3.7)	441 (5.1)	25 (3.6)	460 (10.2)	9 (2.7)	486 (11.0)	2 (1.1)	~ ~
Germany	21 (2.5)	523 (6.6)	49 (3.6)	533 (3.3)	28 (3.4)	530 (3.4)	1 (0.9)	~ ~
Hong Kong SAR	56 (4.3)	593 (6.7)	43 (4.2)	614 (4.4)	1 (0.7)	~ ~	0 (0.0)	~ ~
Hungary	53 (3.9)	509 (5.2)	26 (3.4)	523 (8.1)	11 (2.8)	548 (7.5)	10 (2.7)	504 (15.3)
Iran, Islamic Rep. of	1 (0.5)	~ ~	2 (0.8)	~ ~	23 (3.3)	446 (7.4)	74 (3.4)	422 (4.5)
Ireland	35 (4.0)	526 (6.6)	27 (3.2)	532 (5.9)	38 (4.2)	527 (4.4)	0 (0.0)	~ ~
Italy	20 (3.0)	509 (6.4)	34 (3.4)	505 (5.1)	45 (3.6)	509 (4.5)	1 (0.0)	~ ~
Japan	48 (3.3)	579 (3.0)	44 (4.0)	590 (2.6)	8 (2.1)	596 (5.8)	0 (0.0)	~ ~
Kazakhstan	35 (3.9)	502 (8.2)	24 (3.6)	507 (10.2)	27 (4.0)	488 (8.4)	14 (2.7)	514 (13.8)
Korea, Rep. of	22 (3.5)	595 (3.9)	46 (4.0)	604 (2.5)	30 (3.7)	611 (3.6)	2 (1.1)	~ ~
Kuwait	40 (4.3)	349 (6.3)	50 (4.5)	338 (5.3)	9 (2.6)	337 (11.6)	1 (0.9)	~ ~
Lithuania	29 (3.2)	521 (5.7)	24 (3.9)	533 (5.8)	42 (3.9)	544 (4.7)	5 (1.8)	530 (5.9)
Malta	15 (0.1)	506 (3.4)	67 (0.1)	493 (1.7)	18 (0.1)	495 (3.1)	0 (0.0)	~ ~
Morocco	11 (2.3)	361 (21.0)	9 (2.2)	345 (10.1)	49 (4.0)	333 (5.1)	31 (3.4)	323 (9.3)
Netherlands	r 34 (4.4)	538 (3.6)	38 (5.4)	545 (3.6)	28 (4.9)	541 (5.0)	0 (0.0)	~ ~
New Zealand	70 (3.3)	483 (4.1)	22 (3.1)	501 (8.1)	7 (2.0)	485 (14.8)	1 (0.7)	~ ~
Northern Ireland	r 77 (4.3)	558 (4.4)	17 (3.8)	574 (6.6)	5 (2.3)	569 (11.1)	0 (0.0)	~ ~
Norway	58 (5.1)	493 (4.1)	26 (4.2)	494 (5.8)	16 (3.6)	502 (4.8)	1 (0.0)	~ ~
Oman	r 22 (2.3)	372 (5.4)	13 (1.9)	377 (10.3)	61 (2.8)	384 (3.8)	3 (0.8)	310 (14.9)
Poland	31 (3.0)	470 (4.5)	29 (3.7)	486 (3.8)	25 (3.4)	490 (4.5)	15 (2.6)	479 (6.9)
Portugal	14 (3.2)	553 (8.2)	21 (5.2)	523 (10.8)	58 (5.3)	534 (4.3)	7 (2.4)	517 (14.0)
Qatar	42 (3.5)	413 (6.7)	32 (3.7)	398 (9.4)	26 (1.3)	442 (6.9)	1 (0.6)	~ ~
Romania	42 (3.7)	471 (9.5)	34 (3.9)	483 (10.2)	19 (3.4)	495 (14.8)	5 (1.7)	501 (17.5)
Russian Federation	28 (3.0)	538 (7.1)	33 (4.0)	538 (5.1)	34 (3.4)	543 (5.8)	6 (2.1)	575 (13.5)
Saudi Arabia	16 (2.9)	430 (18.3)	20 (4.1)	415 (12.2)	28 (3.7)	402 (7.4)	36 (4.0)	404 (7.4)
Serbia	16 (2.6)	511 (8.1)	36 (3.6)	517 (5.8)	35 (4.4)	516 (6.0)	12 (2.6)	516 (8.5)
Singapore	51 (0.0)	607 (4.4)	47 (0.0)	605 (5.4)	3 (0.0)	612 (29.8)	0 (0.0)	~ ~
Slovak Republic	81 (2.5)	504 (4.5)	14 (2.1)	512 (9.2)	4 (1.4)	516 (11.8)	0 (0.0)	~ ~
Slovenia	65 (3.3)	513 (2.9)	30 (3.7)	514 (3.4)	5 (1.6)	506 (6.7)	0 (0.0)	~ ~
Spain	50 (3.9)	474 (4.7)	35 (4.1)	491 (4.5)	10 (2.5)	504 (8.3)	6 (2.0)	468 (9.5)
Sweden	r 29 (3.6)	509 (5.4)	37 (4.6)	498 (3.9)	35 (4.4)	502 (4.0)	0 (0.0)	~ ~
Thailand	37 (3.8)	467 (6.4)	32 (4.2)	445 (8.5)	23 (3.6)	471 (11.7)	8 (2.6)	431 (15.2)
Tunisia	7 (1.7)	376 (8.4)	23 (2.9)	338 (8.9)	51 (3.9)	366 (5.8)	18 (3.2)	354 (9.0)
Turkey	18 (2.6)	467 (6.8)	27 (3.0)	470 (11.2)	43 (3.2)	476 (6.7)	11 (2.2)	438 (25.9)
United Arab Emirates	r 32 (2.0)	422 (4.2)	40 (2.3)	417 (3.5)	27 (2.0)	457 (6.0)	1 (0.5)	~ ~
United States	r 65 (2.8)	547 (2.7)	26 (2.4)	536 (3.9)	8 (1.5)	537 (7.8)	1 (0.0)	~ ~
Yemen	r 6 (2.0)	225 (20.0)	7 (2.6)	271 (33.0)	15 (3.5)	264 (12.2)	72 (4.2)	252 (7.2)
International Avg.	38 (0.5)	491 (1.1)	30 (0.5)	493 (1.2)	24 (0.5)	493 (1.3)	8 (0.3)	452 (2.9)

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2011

() 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 5.14: Schools with Computers Available for Instruction (Continued)

Country	1 Computer for 1–2 Students		1 Computer for 3–5 Students		1 Computer for 6 or More Students		No Computers Available	
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement
Sixth Grade Participants								
Botswana	13 (3.1)	428 (18.3)	15 (3.2)	460 (15.0)	41 (4.5)	410 (5.5)	31 (4.1)	412 (6.3)
Honduras	24 (3.9)	425 (13.4)	24 (4.0)	404 (6.9)	15 (2.7)	420 (7.0)	37 (4.0)	370 (10.5)
Yemen	r 9 (2.7)	342 (11.0)	6 (2.5)	380 (15.8)	12 (3.5)	356 (18.3)	73 (4.6)	345 (8.0)
Benchmarking Participants								
Alberta, Canada	91 (3.3)	506 (2.6)	8 (3.2)	516 (4.0)	1 (0.0)	~	0 (0.0)	~
Ontario, Canada	74 (3.7)	514 (3.6)	19 (3.6)	530 (7.0)	7 (1.6)	526 (11.6)	0 (0.0)	~
Quebec, Canada	64 (3.6)	536 (3.7)	29 (3.6)	531 (2.6)	7 (2.5)	533 (9.1)	0 (0.0)	~
Abu Dhabi, UAE	r 30 (3.7)	398 (9.2)	43 (3.9)	414 (7.0)	25 (3.9)	423 (12.4)	2 (1.2)	~
Dubai, UAE	r 35 (0.4)	475 (3.1)	35 (0.5)	435 (3.3)	29 (0.3)	477 (2.8)	0 (0.0)	~
Florida, US	r 55 (6.2)	548 (4.5)	36 (6.2)	546 (7.4)	8 (3.4)	513 (8.3)	0 (0.0)	~
North Carolina, US	62 (7.1)	554 (5.7)	31 (7.0)	553 (7.3)	7 (4.1)	580 (19.2)	0 (0.0)	~

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2011

The number of students per computer was calculated by dividing the number of students by the number of computers.

- 1) What is the total enrollment of fourth grade students in your school as of the first day of the month TIMSS 2011 testing begins?**

- 2) What is the total number of computers that can be used for instructional purposes by fourth grade students?**

Exhibit 5.15: Schools with Computers Available for Instruction

Reported by Principals

Country	1 Computer for 1–2 Students		1 Computer for 3–5 Students		1 Computer for 6 or More Students		No Computers Available	
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement
Armenia	24 (3.4)	457 (6.7)	50 (4.2)	470 (4.9)	26 (3.2)	475 (5.7)	0 (0.0)	~ ~
Australia	89 (2.4)	508 (5.6)	9 (2.4)	509 (11.5)	2 (1.2)	~ ~	0 (0.0)	~ ~
Bahrain	32 (0.3)	414 (3.2)	35 (0.3)	414 (3.0)	26 (0.3)	397 (3.6)	7 (0.1)	368 (11.5)
Chile	49 (4.1)	420 (4.4)	38 (4.0)	414 (5.7)	11 (2.6)	422 (12.8)	2 (1.1)	~ ~
Chinese Taipei	6 (1.8)	619 (25.3)	18 (2.9)	591 (12.6)	76 (3.3)	614 (3.8)	1 (0.7)	~ ~
England	99 (0.9)	510 (5.8)	1 (0.9)	~ ~	0 (0.0)	~ ~	0 (0.0)	~ ~
Finland	47 (3.8)	518 (3.5)	44 (4.0)	510 (3.6)	7 (2.1)	506 (7.8)	2 (1.2)	~ ~
Georgia	70 (3.2)	421 (5.3)	25 (3.5)	455 (9.9)	4 (1.7)	445 (15.1)	1 (0.0)	~ ~
Ghana	42 (4.0)	326 (6.7)	13 (2.5)	359 (17.5)	31 (3.6)	342 (6.9)	15 (3.4)	302 (10.6)
Hong Kong SAR	54 (4.9)	576 (8.0)	37 (4.6)	595 (9.5)	9 (3.0)	584 (18.0)	0 (0.0)	~ ~
Hungary	71 (3.9)	499 (4.7)	25 (3.6)	531 (7.4)	2 (0.9)	~ ~	2 (1.3)	~ ~
Indonesia	r 1 (0.5)	~ ~	11 (2.6)	403 (10.6)	87 (2.7)	391 (4.7)	2 (1.3)	~ ~
Iran, Islamic Rep. of	1 (0.9)	~ ~	5 (2.0)	488 (18.5)	44 (3.1)	425 (7.1)	49 (3.2)	393 (4.6)
Israel	19 (3.2)	526 (11.7)	35 (4.3)	522 (7.3)	41 (4.0)	508 (9.1)	4 (1.9)	531 (16.5)
Italy	16 (2.8)	500 (6.8)	43 (4.2)	495 (4.8)	41 (3.9)	504 (4.3)	0 (0.4)	~ ~
Japan	31 (2.4)	572 (6.4)	48 (3.2)	573 (3.6)	22 (2.7)	561 (5.3)	0 (0.0)	~ ~
Jordan	31 (3.1)	399 (6.9)	41 (4.0)	413 (6.8)	26 (2.9)	406 (5.8)	2 (1.2)	~ ~
Kazakhstan	57 (3.8)	491 (5.6)	26 (3.7)	478 (9.5)	17 (3.0)	491 (8.3)	0 (0.0)	~ ~
Korea, Rep. of	6 (2.3)	589 (9.3)	26 (3.6)	610 (4.9)	68 (4.0)	616 (3.2)	0 (0.0)	~ ~
Lebanon	38 (4.1)	461 (6.2)	40 (4.3)	451 (6.8)	16 (3.0)	449 (10.6)	5 (2.0)	395 (9.0)
Lithuania	62 (3.8)	494 (3.6)	30 (3.8)	511 (5.0)	8 (2.7)	528 (13.1)	0 (0.0)	~ ~
Macedonia, Rep. of	r 72 (3.8)	431 (6.8)	16 (2.9)	425 (13.1)	9 (2.3)	423 (17.8)	3 (1.3)	369 (43.7)
Malaysia	2 (1.1)	~ ~	13 (2.7)	429 (16.3)	78 (3.1)	436 (5.4)	6 (1.9)	464 (12.5)
Morocco	6 (1.5)	405 (13.4)	10 (1.5)	394 (11.3)	70 (2.8)	368 (2.9)	13 (2.6)	364 (5.2)
New Zealand	r 88 (4.2)	483 (5.2)	8 (3.4)	519 (15.4)	4 (2.7)	527 (32.0)	0 (0.0)	~ ~
Norway	73 (4.2)	479 (2.9)	23 (3.9)	462 (4.7)	4 (1.9)	479 (18.3)	0 (0.0)	~ ~
Oman	47 (3.1)	373 (3.9)	34 (3.2)	359 (5.5)	15 (2.5)	369 (10.5)	4 (1.6)	373 (14.0)
Palestinian Nat'l Auth.	25 (3.2)	433 (8.7)	21 (2.9)	416 (6.7)	49 (3.7)	390 (4.9)	5 (1.4)	362 (12.6)
Qatar	r 44 (0.5)	422 (6.0)	48 (0.5)	406 (4.2)	7 (0.1)	407 (8.3)	1 (0.0)	~ ~
Romania	45 (3.8)	455 (8.0)	34 (4.0)	449 (7.7)	19 (3.4)	484 (10.2)	2 (1.2)	~ ~
Russian Federation	50 (3.3)	540 (5.3)	40 (3.6)	542 (6.5)	10 (2.3)	533 (8.9)	0 (0.0)	~ ~
Saudi Arabia	14 (2.5)	404 (13.4)	17 (3.3)	415 (11.2)	37 (3.8)	386 (7.5)	32 (3.7)	389 (6.9)
Singapore	68 (0.0)	613 (4.5)	28 (0.0)	607 (7.1)	4 (0.0)	625 (21.5)	0 (0.0)	~ ~
Slovenia	70 (4.1)	507 (2.4)	28 (4.1)	500 (4.6)	1 (1.1)	~ ~	0 (0.0)	~ ~
Sweden	r 54 (4.3)	486 (2.8)	38 (4.3)	483 (3.5)	8 (2.6)	485 (7.5)	0 (0.0)	~ ~
Syrian Arab Republic	8 (2.4)	371 (18.7)	24 (4.0)	390 (10.9)	68 (3.9)	377 (4.7)	1 (0.7)	~ ~
Thailand	28 (3.4)	413 (7.9)	37 (4.1)	426 (10.1)	35 (4.2)	440 (9.0)	0 (0.0)	~ ~
Tunisia	5 (1.5)	399 (8.1)	10 (2.3)	426 (14.8)	86 (2.5)	427 (3.4)	0 (0.0)	~ ~
Turkey	16 (1.9)	440 (11.8)	33 (2.9)	463 (9.5)	41 (2.6)	449 (5.5)	10 (1.9)	442 (10.1)
Ukraine	35 (4.0)	466 (7.8)	39 (4.4)	478 (6.6)	25 (3.3)	499 (7.3)	1 (1.0)	~ ~
United Arab Emirates	37 (2.1)	457 (3.7)	41 (2.3)	449 (3.6)	21 (2.4)	469 (6.1)	1 (0.4)	~ ~
United States	58 (2.1)	512 (3.9)	32 (2.1)	507 (5.1)	9 (1.2)	511 (11.7)	0 (0.0)	~ ~
International Avg.	40 (0.5)	472 (1.4)	28 (0.5)	472 (1.5)	28 (0.4)	467 (1.8)	4 (0.2)	396 (4.7)

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2011

() 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 5.15: Schools with Computers Available for Instruction (Continued)

Country	1 Computer for 1–2 Students		1 Computer for 3–5 Students		1 Computer for 6 or More Students		No Computers Available	
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement
Ninth Grade Participants								
Botswana	8 (2.1)	411 (17.1)	11 (2.4)	408 (4.7)	76 (3.2)	394 (2.8)	5 (2.0)	407 (14.5)
Honduras	23 (3.2)	359 (13.6)	20 (4.0)	333 (8.8)	22 (3.4)	340 (5.9)	35 (4.4)	323 (5.3)
South Africa	15 (1.9)	382 (11.4)	9 (1.8)	408 (15.9)	30 (3.8)	347 (6.3)	46 (4.1)	336 (3.7)
Benchmarking Participants								
Alberta, Canada	90 (2.9)	506 (3.0)	10 (2.8)	510 (6.0)	1 (0.0)	~ ~	0 (0.0)	~ ~
Ontario, Canada	62 (3.9)	509 (3.4)	27 (4.1)	517 (6.0)	11 (2.8)	510 (7.7)	0 (0.0)	~ ~
Quebec, Canada	51 (4.4)	533 (3.7)	35 (4.4)	530 (5.5)	14 (3.0)	539 (9.4)	0 (0.0)	~ ~
Abu Dhabi, UAE	36 (3.5)	450 (6.9)	42 (4.5)	445 (6.5)	20 (4.1)	452 (11.5)	2 (1.1)	~ ~
Dubai, UAE	r 45 (0.5)	482 (4.2)	32 (0.4)	467 (3.3)	23 (0.5)	501 (4.2)	0 (0.0)	~ ~
Alabama, US	r 63 (6.9)	464 (9.0)	31 (6.8)	474 (15.8)	6 (3.7)	463 (16.8)	0 (0.0)	~ ~
California, US	r 26 (6.9)	489 (10.7)	43 (6.5)	497 (9.0)	31 (5.9)	487 (13.1)	0 (0.0)	~ ~
Colorado, US	72 (6.1)	515 (5.9)	24 (5.9)	523 (14.0)	4 (3.0)	511 (64.3)	0 (0.0)	~ ~
Connecticut, US	r 59 (7.1)	508 (9.6)	38 (7.1)	527 (12.5)	3 (2.5)	484 (6.6)	0 (0.0)	~ ~
Florida, US	51 (7.1)	504 (11.3)	37 (6.3)	518 (10.6)	12 (4.7)	535 (22.3)	0 (0.0)	~ ~
Indiana, US	r 81 (6.4)	520 (6.3)	19 (6.4)	535 (16.8)	0 (0.0)	~ ~	0 (0.0)	~ ~
Massachusetts, US	51 (7.2)	548 (8.3)	45 (6.7)	576 (7.4)	4 (3.0)	574 (89.9)	0 (0.0)	~ ~
Minnesota, US	62 (7.7)	540 (7.2)	36 (7.4)	556 (7.2)	2 (2.2)	~ ~	0 (0.0)	~ ~
North Carolina, US	51 (6.9)	541 (9.6)	38 (7.3)	530 (14.8)	11 (4.5)	548 (25.0)	0 (0.0)	~ ~

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2011

The number of students per computer was calculated by dividing the number of students by the number of computers.

- 1) **What is the total enrollment of eighth grade students in your school as of the first day of the month TIMSS 2011 testing begins?**

- 2) **What is the total number of computers that can be used for instructional purposes by eighth grade students?**
