

Chapter 4



Students' Backgrounds And Attitudes Toward Mathematics

In describing the educational context in which learning takes place, TIMSS focuses primarily on curricular, instructional, and school resource factors that are expected to have an impact on mathematics and science learning and that may be modified through policy initiatives. However, there is ample evidence from previous IEA studies of mathematics achievement¹ and other studies that student achievement is related to home background factors, and to student activities and attitudes. Since information on such factors is very important in interpreting the achievement results, this chapter presents detailed information about students' home backgrounds and resources for learning, homework, their attitude toward mathematics, the value they place on mathematics, and their self-confidence in learning mathematics. As a matter of interest, an average across the participating countries (not including the benchmarking participants) is provided at the bottom of the table for each of the response categories for each background factor and attitude index (labeled the international average (avg.)).

What Educational Resources Do Students Have in Their Homes?

For the 2007 data presented in this report, TIMSS has focused on just a few central variables: level of parents' education; speaking the language of the test at home; students having their parents born in the country; having books, computers, and Internet connections at home; and computer use at home and elsewhere.

¹ For example, for results from TIMSS 2003, see Mullis, I.V.S., Martin, M.O., Gonzalez, E.J., & Chrostowski, S.J. (2004). *TIMSS 2003 international mathematics report: Findings from IEA's Trends in International Mathematics and Science Study at the fourth and eighth grades*. Chestnut Hill, MA: TIMSS & PIRLS International Study Center, Boston College.

Exhibit 4.1 summarizes eighth grade students' reports of the highest level of education attained by their parents. Ordered alphabetically by country, this two-page display shows the percentage of students in each of five categories of parents' educational level, together with the average mathematics achievement of students in each category. Because students sometimes were in doubt as to their parents' educational attainment, a sixth category for students reporting "I do not know" also was included. Standard errors for percentages and averages are shown. The education level of the parent with more education was used in assigning students to categories.

As shown in the exhibit, and in line with the diversity in economic development described in the introduction, the level of parents' education varied widely both across and within the TIMSS 2007 countries and benchmarking participants. On average across countries,² 24 percent of students had at least one parent with a university degree, 14 percent had a parent who had completed post-secondary education but not university, 25 percent a parent who completed upper-secondary school, 15 percent a parent who completed lower-secondary school, 9 percent had neither parent completing secondary school, and 13 percent did not know. Countries with the highest percentages of students (40% or more) with university-educated parents included Armenia, Georgia, Korea, Kuwait, Qatar, the Ukraine, and the United States, as well as Dubai, Massachusetts, and Minnesota among benchmarking participants. In contrast, countries where students reported the greatest percentages (30% or more) of parents with less than lower secondary education included Iran, Oman, and Morocco.

Differences in educational approaches, organizations, and structures across the TIMSS participants make comparisons of educational levels difficult, and this is exacerbated by high levels of "Do Not Know" responses in some countries. Ten countries had 20 percent or more of students in this response category, most notably Norway (46%) and Sweden (50%) but also including Australia (28%), Botswana (20%), Israel (26%), Japan (21%), Lithuania (24%), Malta (27%), Singapore (21%), and Slovenia (22%), as well as four benchmarking participants: British Columbia, Dubai, Minnesota, and

2 The international average is based on all participating countries, but does not include the benchmarking participants.

Ontario. Nonetheless, Exhibit 4.1 makes it clear that higher levels of parents' education are associated with higher average mathematics achievement in almost all countries. At 485 score points, the average mathematics achievement of eighth grade students with university-educated parents was 89 points greater than the average of students whose parents had less than lower secondary schooling. It can be noted, however, that in some high performing countries, students whose parents have little education have relatively high achievement (higher than students with university educated parents in many countries).

TIMSS has shown previously that, with some exceptions, countries with large proportions of students from homes where the language of the test (and consequently the language of instruction) is not often spoken at home had lower average mathematics achievement than those who spoke it more often. Exhibit 4.2, which presents students' reports of how frequently they spoke the language of the TIMSS test at home, together with average mathematics achievement and changes since TIMSS 2003, shows that this pattern continued in 2007. At both fourth and eighth grades, on average across countries, a large majority of students reported always or almost always speaking the language of the test at home (84% at fourth grade and 78% at eighth grade), and these students had higher average mathematics achievement than those who reported speaking it less frequently—478 points on average compared with 445 for those fourth grade students who sometimes speak the language of the test at home and 395 for those who never do so; and, at the eighth grade, 454 compared to 427 and 394, respectively.

The overall pattern notwithstanding, there were several countries where the students who only sometimes or never speak the language of the test at home did have the highest average mathematics achievement. At the fourth grade, these included Morocco and the Ukraine and at the eighth grade, Bahrain, Malaysia, Tunisia, Morocco, and British Columbia among benchmarking participants. Compared with 2003, a number of countries had increased percentages of students reporting that they frequently spoke the language of the test at home, including, at the fourth grade, Chinese Taipei,

Exhibit 4.1 Highest Level of Education of Either Parent*

TIMSS2007
Mathematics 8th Grade

Country	University Degree**		Completed Post-secondary Education but Not University		Completed Upper-secondary School	
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement
Algeria	15 (0.9)	391 (3.6)	12 (0.6)	395 (3.7)	22 (0.7)	391 (2.9)
Armenia	52 (1.7)	505 (4.0)	23 (0.9)	499 (3.8)	16 (1.0)	483 (5.7)
Australia	19 (1.1)	546 (6.1)	23 (0.9)	503 (5.4)	16 (0.7)	484 (3.7)
Bahrain	21 (0.6)	429 (3.1)	8 (0.5)	415 (6.6)	33 (0.9)	402 (2.9)
Bosnia and Herzegovina	15 (1.0)	494 (4.4)	16 (0.6)	471 (4.2)	54 (1.1)	455 (2.6)
Botswana	15 (0.6)	381 (4.1)	17 (0.8)	355 (4.0)	17 (0.7)	358 (3.9)
Bulgaria	29 (1.4)	509 (6.7)	30 (1.3)	469 (4.5)	24 (1.2)	429 (8.6)
Chinese Taipei	20 (1.4)	647 (5.2)	12 (0.7)	633 (5.2)	42 (1.0)	594 (4.1)
Colombia	20 (1.1)	416 (5.4)	9 (0.6)	409 (6.6)	20 (0.7)	380 (4.6)
Cyprus	30 (0.8)	493 (2.7)	12 (0.5)	488 (3.8)	37 (0.7)	461 (2.5)
Czech Republic	17 (0.9)	547 (3.8)	11 (0.5)	512 (3.9)	57 (0.9)	499 (2.5)
Egypt	15 (0.7)	394 (4.6)	19 (1.0)	432 (5.4)	14 (0.6)	408 (6.0)
El Salvador	13 (1.1)	386 (6.4)	9 (0.7)	365 (5.5)	19 (0.9)	350 (3.6)
England	--	--	--	--	--	--
Georgia	47 (2.1)	429 (5.7)	0 (0.0)	~ ~	33 (2.1)	405 (7.0)
Ghana	11 (0.8)	341 (9.9)	20 (0.9)	321 (5.8)	24 (0.9)	314 (4.8)
Hong Kong SAR	13 (1.0)	609 (7.8)	12 (0.6)	587 (7.2)	28 (0.8)	575 (5.6)
Hungary	29 (1.3)	563 (4.6)	13 (0.7)	526 (4.9)	45 (1.2)	505 (3.2)
Indonesia	9 (0.8)	460 (7.7)	6 (0.5)	439 (8.2)	25 (1.2)	412 (5.1)
Iran, Islamic Rep. of	10 (1.0)	469 (9.5)	10 (1.0)	444 (7.7)	18 (1.0)	422 (6.1)
Israel	38 (1.2)	499 (4.3)	10 (0.6)	464 (7.1)	17 (0.8)	441 (6.9)
Italy	21 (1.2)	505 (3.6)	5 (0.4)	491 (6.1)	37 (1.1)	492 (2.8)
Japan	34 (1.0)	606 (3.4)	16 (0.6)	569 (3.7)	27 (1.0)	544 (3.1)
Jordan	29 (1.1)	461 (4.7)	18 (0.9)	455 (4.7)	28 (0.9)	415 (4.5)
Korea, Rep. of	44 (1.4)	627 (3.2)	3 (0.3)	610 (7.1)	39 (1.2)	582 (2.9)
Kuwait	43 (1.4)	370 (3.2)	15 (0.8)	365 (3.8)	26 (0.9)	336 (3.4)
Lebanon	20 (1.3)	490 (5.8)	19 (1.2)	464 (5.6)	16 (1.1)	446 (4.8)
Lithuania	14 (0.8)	549 (4.6)	34 (0.9)	517 (2.9)	23 (1.1)	495 (3.2)
Malaysia	13 (1.0)	510 (7.3)	17 (0.8)	493 (5.4)	34 (0.9)	478 (4.7)
Malta	11 (0.4)	525 (3.6)	11 (0.4)	514 (4.3)	13 (0.5)	513 (3.7)
Norway	39 (1.0)	490 (1.9)	6 (0.4)	469 (5.5)	6 (0.5)	455 (5.8)
Oman	16 (0.9)	388 (5.7)	4 (0.4)	382 (10.6)	18 (0.8)	387 (4.5)
Palestinian Nat'l Auth.	24 (0.9)	398 (5.4)	13 (0.6)	386 (5.8)	35 (0.9)	369 (4.4)
Qatar	48 (0.6)	332 (2.2)	4 (0.2)	310 (8.0)	19 (0.5)	289 (2.7)
Romania	13 (1.0)	524 (5.8)	14 (0.9)	493 (5.8)	44 (1.4)	460 (4.6)
Russian Federation	38 (1.3)	540 (4.4)	34 (1.3)	511 (5.1)	12 (1.0)	471 (6.2)
Saudi Arabia	31 (1.2)	354 (3.6)	5 (0.5)	343 (9.4)	20 (0.9)	325 (3.9)
Scotland	--	--	--	--	--	--
Serbia	20 (1.2)	533 (4.6)	16 (0.8)	496 (5.0)	51 (1.3)	477 (3.8)
Singapore	20 (0.7)	646 (3.9)	19 (0.6)	603 (4.7)	28 (0.7)	587 (4.3)
Slovenia	24 (0.9)	532 (3.3)	35 (1.0)	503 (2.6)	15 (0.7)	486 (4.6)
Sweden	19 (0.8)	515 (3.3)	13 (0.6)	510 (3.2)	13 (0.6)	487 (3.4)
Syrian Arab Republic	15 (0.9)	419 (4.7)	22 (0.9)	414 (4.8)	23 (0.8)	385 (4.3)
Thailand	12 (1.1)	522 (11.7)	5 (0.3)	481 (9.7)	14 (0.6)	455 (6.5)
Tunisia	13 (1.1)	459 (4.6)	17 (0.9)	437 (3.9)	25 (1.0)	414 (2.9)
Turkey	7 (0.8)	558 (8.7)	3 (0.3)	497 (8.8)	20 (1.2)	470 (5.2)
Ukraine	40 (1.4)	494 (4.3)	34 (0.9)	465 (3.6)	12 (0.8)	417 (6.6)
United States	44 (1.2)	531 (3.3)	7 (0.4)	503 (4.1)	21 (0.6)	495 (2.3)
‡ Morocco	20 (1.3)	407 (4.9)	0 (0.0)	~ ~	18 (1.0)	394 (5.8)
International Avg.	24 (0.2)	485 (0.9)	14 (0.1)	467 (1.0)	25 (0.1)	444 (0.9)
Benchmarking Participants						
Basque Country, Spain	--	--	--	--	--	--
British Columbia, Canada	39 (1.6)	532 (3.4)	15 (0.7)	499 (4.3)	15 (0.8)	499 (5.2)
Dubai, UAE	41 (1.0)	498 (2.4)	15 (0.9)	464 (3.7)	14 (0.6)	419 (5.6)
Massachusetts, US	56 (1.6)	571 (4.2)	6 (0.6)	524 (9.5)	16 (1.2)	512 (6.8)
Minnesota, US	46 (1.7)	552 (5.5)	9 (0.7)	527 (4.1)	18 (1.3)	516 (3.8)
Ontario, Canada	37 (1.9)	542 (3.6)	19 (0.9)	516 (4.5)	11 (0.8)	512 (5.5)
Quebec, Canada	39 (1.4)	549 (5.2)	18 (0.9)	526 (4.0)	21 (1.1)	510 (4.2)

SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007

Background data provided by students.

* Based on countries' categorizations to UNESCO's International Standard Classification of Education (Operational Manual for ISCED-1997).

** Includes postgraduate degrees (e.g., doctorate, master's, other postgraduate degree or diploma).

‡ Did not satisfy guidelines for sample participation rates (see Appendix A).

() Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals may appear inconsistent.

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

Note: The distribution of students' reports on parents' educational levels may not match the distribution from national population statistics, particularly where large percentages of students report that they "Do not know" (e.g., Sweden).



Exhibit 4.1 Highest Level of Education of Either Parent* (Continued)

TIMSS2007
Mathematics 8th Grade

Country	Completed Lower-secondary School		Less than Lower-secondary School		Do Not Know	
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement
Algeria	26 (0.8)	379 (2.0)	19 (1.2)	385 (3.3)	6 (0.3)	386 (4.6)
Armenia	2 (0.4)	~ ~	1 (0.2)	~ ~	6 (0.5)	482 (5.8)
Australia	14 (0.9)	474 (4.5)	1 (0.2)	~ ~	28 (0.9)	487 (5.0)
Bahrain	15 (0.6)	367 (4.2)	6 (0.5)	383 (6.9)	18 (0.6)	388 (3.1)
Bosnia and Herzegovina	12 (0.9)	411 (5.6)	1 (0.3)	~ ~	3 (0.3)	421 (9.0)
Botswana	18 (0.6)	359 (3.5)	14 (0.7)	368 (3.9)	20 (0.8)	381 (3.9)
Bulgaria	8 (1.1)	418 (12.3)	1 (0.2)	~ ~	9 (0.7)	451 (8.1)
Chinese Taipei	14 (0.9)	554 (6.2)	3 (0.4)	543 (11.9)	9 (0.5)	554 (9.9)
Colombia	23 (0.9)	365 (5.0)	23 (1.2)	355 (3.8)	6 (0.5)	365 (7.5)
Cyprus	9 (0.4)	437 (4.6)	4 (0.3)	413 (6.5)	7 (0.6)	418 (6.4)
Czech Republic	2 (0.2)	~ ~	0 (0.0)	~ ~	13 (0.6)	466 (3.7)
Egypt	29 (1.1)	381 (4.6)	14 (0.8)	363 (6.3)	10 (0.7)	370 (6.2)
El Salvador	39 (1.3)	326 (3.4)	16 (1.1)	323 (3.5)	4 (0.4)	323 (7.9)
England	--	--	--	--	--	--
Georgia	2 (0.3)	~ ~	0 (0.1)	~ ~	18 (1.2)	383 (10.6)
Ghana	27 (1.2)	298 (5.1)	12 (0.8)	305 (7.6)	6 (0.6)	297 (8.5)
Hong Kong SAR	29 (0.9)	563 (7.3)	3 (0.3)	567 (11.1)	16 (0.8)	547 (7.6)
Hungary	7 (0.9)	434 (7.7)	1 (0.2)	~ ~	5 (0.6)	499 (7.6)
Indonesia	24 (0.9)	380 (4.2)	28 (1.4)	380 (4.9)	9 (0.6)	369 (6.7)
Iran, Islamic Rep. of	28 (1.0)	392 (4.4)	31 (1.5)	376 (4.3)	3 (0.3)	356 (9.5)
Israel	7 (0.6)	409 (9.5)	3 (0.4)	404 (12.3)	26 (1.0)	458 (5.7)
Italy	24 (1.1)	457 (4.7)	3 (0.3)	420 (9.8)	10 (0.7)	443 (5.6)
Japan	2 (0.2)	~ ~	0 (0.1)	~ ~	21 (0.8)	553 (3.4)
Jordan	9 (0.5)	389 (8.7)	9 (0.8)	390 (8.6)	7 (0.6)	388 (11.4)
Korea, Rep. of	3 (0.3)	548 (9.9)	1 (0.1)	~ ~	10 (0.6)	545 (5.0)
Kuwait	0 (0.0)	~ ~	16 (0.9)	334 (4.3)	0 (0.0)	~ ~
Lebanon	13 (1.0)	425 (5.6)	19 (1.6)	425 (6.0)	13 (0.9)	446 (5.3)
Lithuania	4 (0.5)	436 (6.3)	0 (0.1)	~ ~	24 (1.0)	492 (4.0)
Malaysia	19 (0.9)	454 (4.8)	7 (0.6)	450 (8.5)	11 (1.0)	441 (9.1)
Malta	34 (0.7)	477 (2.2)	3 (0.3)	460 (9.7)	27 (0.6)	470 (3.1)
Norway	2 (0.2)	~ ~	1 (0.1)	~ ~	46 (0.9)	460 (2.3)
Oman	17 (0.7)	381 (4.3)	31 (1.1)	370 (3.4)	14 (0.9)	345 (6.8)
Palestinian Nat'l Auth.	11 (0.6)	347 (5.7)	9 (0.7)	340 (5.7)	8 (0.6)	323 (8.9)
Qatar	13 (0.4)	270 (3.5)	7 (0.3)	284 (3.8)	9 (0.4)	295 (4.1)
Romania	9 (1.0)	424 (8.0)	2 (0.4)	~ ~	17 (1.0)	436 (5.0)
Russian Federation	5 (0.5)	462 (8.7)	0 (0.1)	~ ~	10 (0.8)	487 (6.3)
Saudi Arabia	17 (0.9)	315 (5.0)	23 (1.2)	310 (4.5)	5 (0.5)	335 (7.8)
Scotland	--	--	--	--	--	--
Serbia	7 (0.9)	421 (10.5)	0 (0.1)	~ ~	5 (0.4)	456 (7.6)
Singapore	6 (0.4)	567 (7.8)	6 (0.4)	553 (7.2)	21 (0.7)	564 (6.2)
Slovenia	4 (0.4)	465 (7.7)	1 (0.1)	~ ~	22 (0.9)	497 (2.7)
Sweden	4 (0.3)	473 (5.1)	1 (0.2)	~ ~	50 (1.1)	484 (2.9)
Syrian Arab Republic	25 (1.0)	386 (4.8)	11 (0.8)	384 (7.2)	4 (0.4)	378 (9.7)
Thailand	26 (0.9)	421 (4.6)	26 (1.6)	429 (7.3)	18 (1.1)	417 (4.8)
Tunisia	25 (1.0)	402 (3.3)	12 (0.9)	411 (3.5)	8 (0.5)	423 (4.7)
Turkey	52 (1.3)	412 (4.8)	16 (1.0)	389 (4.7)	1 (0.2)	~ ~
Ukraine	5 (0.4)	401 (7.0)	0 (0.1)	~ ~	8 (0.6)	432 (7.0)
United States	7 (0.5)	467 (4.1)	2 (0.2)	~ ~	18 (0.5)	496 (3.3)
‡ Morocco	16 (1.0)	369 (4.5)	36 (1.7)	368 (3.3)	10 (0.9)	367 (7.9)
International Avg.	15 (0.1)	418 (1.0)	9 (0.1)	396 (1.4)	13 (0.1)	431 (1.1)
Benchmarking Participants						
Basque Country, Spain	--	--	--	--	--	--
British Columbia, Canada	3 (0.3)	468 (10.5)	0 (0.1)	~ ~	28 (0.9)	497 (3.9)
Dubai, UAE	6 (0.4)	373 (5.8)	3 (0.4)	370 (10.8)	21 (1.1)	463 (5.1)
Massachusetts, US	3 (0.4)	487 (11.1)	1 (0.2)	~ ~	18 (0.9)	531 (9.4)
Minnesota, US	3 (0.6)	468 (11.6)	1 (0.3)	~ ~	23 (1.4)	517 (5.0)
Ontario, Canada	2 (0.3)	~ ~	0 (0.1)	~ ~	31 (1.6)	497 (4.9)
Quebec, Canada	3 (0.3)	507 (6.6)	0 (0.1)	~ ~	19 (0.9)	518 (3.8)

SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007

Exhibit 4.2 Students Speak the Language of the Test at Home with Trends

TIMSS2007
Mathematics 4th Grade

Country	Always or Almost Always			Sometimes			Never		
	2007 Percent of Students	Average Achievement	Difference in Percent from 2003	2007 Percent of Students	Average Achievement	Difference in Percent from 2003	2007 Percent of Students	Average Achievement	Difference in Percent from 2003
Algeria	56 (2.4)	382 (5.4)	∅ ∅	32 (1.9)	382 (8.4)	∅ ∅	12 (1.0)	368 (8.4)	∅ ∅
Armenia	95 (0.6)	501 (4.5)	0 (0.8)	4 (0.4)	470 (6.9)	0 (0.6)	1 (0.4)	~ ~	1 (0.4)
Australia	90 (1.0)	519 (3.2)	-1 (1.5)	8 (1.0)	498 (11.5)	1 (1.4)	1 (0.2)	~ ~	0 (0.3)
Austria	88 (0.7)	510 (1.8)	∅ ∅	10 (0.6)	465 (3.9)	∅ ∅	2 (0.3)	~ ~	∅ ∅
Chinese Taipei	84 (0.8)	582 (1.7)	12 (1.4) ▲	15 (0.8)	550 (3.4)	-11 (1.4) ▼	1 (0.2)	~ ~	0 (0.2)
Colombia	89 (0.9)	363 (4.9)	∅ ∅	8 (0.8)	323 (8.9)	∅ ∅	3 (0.3)	298 (9.7)	∅ ∅
Czech Republic	97 (0.3)	487 (2.8)	∅ ∅	2 (0.3)	~ ~	∅ ∅	0 (0.1)	~ ~	∅ ∅
Denmark	94 (0.9)	527 (2.3)	∅ ∅	6 (0.9)	473 (11.4)	∅ ∅	1 (0.2)	~ ~	∅ ∅
El Salvador	93 (0.8)	336 (3.7)	∅ ∅	5 (0.6)	287 (13.4)	∅ ∅	2 (0.3)	~ ~	∅ ∅
England	93 (0.6)	545 (3.0)	-2 (1.0)	6 (0.6)	493 (7.8)	2 (0.9) ▲	1 (0.1)	~ ~	0 (0.2)
Georgia	92 (0.7)	442 (4.1)	∅ ∅	8 (0.6)	421 (9.5)	∅ ∅	0 (0.1)	~ ~	∅ ∅
Germany	92 (0.6)	532 (2.3)	∅ ∅	7 (0.6)	483 (4.7)	∅ ∅	1 (0.1)	~ ~	∅ ∅
Hong Kong SAR	82 (0.9)	614 (3.4)	7 (1.5) ▲	15 (0.9)	582 (4.9)	-5 (1.3) ▼	3 (0.3)	542 (8.6)	-2 (0.5) ▼
Hungary	98 (0.4)	512 (3.4)	-1 (0.5) ▼	2 (0.4)	~ ~	1 (0.5)	0 (0.1)	~ ~	0 (0.1)
Iran, Islamic Rep. of	62 (2.1)	421 (4.6)	4 (4.0)	21 (1.9)	381 (5.4)	0 (2.7)	16 (1.6)	365 (6.1)	-4 (3.0)
Italy	96 (0.2)	508 (3.2)	5 (0.6) ▲	3 (0.2)	477 (8.2)	-3 (0.5) ▼	0 (0.1)	~ ~	-2 (0.3) ▼
Japan	99 (0.2)	570 (2.1)	0 (0.3)	1 (0.1)	~ ~	0 (0.2)	0 (0.1)	~ ~	0 (0.1)
Kazakhstan	93 (1.3)	548 (7.3)	∅ ∅	7 (1.3)	561 (10.1)	∅ ∅	0 (0.1)	~ ~	∅ ∅
Kuwait	74 (1.8)	322 (4.4)	∅ ∅	18 (1.3)	328 (4.9)	∅ ∅	8 (1.2)	305 (8.9)	∅ ∅
Latvia	88 (1.5)	540 (2.1)	-2 (2.1)	9 (1.1)	511 (6.8)	2 (1.5)	3 (0.6)	532 (13.6)	0 (0.8)
Lithuania	98 (0.4)	531 (2.3)	1 (0.8)	2 (0.3)	~ ~	-1 (0.7)	0 (0.1)	~ ~	0 (0.2)
Morocco	50 (2.6)	334 (5.7)	4 (3.5)	29 (2.1)	369 (8.0)	1 (2.7)	21 (2.4)	335 (12.8)	-6 (3.4)
Netherlands	89 (1.2)	538 (2.3)	-3 (1.4) ▼	8 (0.8)	507 (5.2)	1 (1.2)	3 (0.6)	523 (10.9)	2 (0.6) ▲
New Zealand	87 (0.8)	498 (2.1)	-2 (1.1) ▼	12 (0.7)	458 (5.9)	2 (1.0) ▲	1 (0.2)	~ ~	0 (0.2)
Norway	94 (0.5)	476 (2.5)	1 (0.7)	5 (0.4)	435 (7.2)	-1 (0.6)	1 (0.2)	~ ~	0 (0.3)
Qatar	71 (0.6)	307 (1.5)	∅ ∅	20 (0.6)	286 (3.2)	∅ ∅	9 (0.3)	264 (3.4)	∅ ∅
Russian Federation	92 (1.4)	547 (5.0)	2 (2.5)	7 (1.2)	524 (16.7)	-2 (2.1)	2 (0.6)	~ ~	0 (0.8)
Scotland	91 (0.8)	498 (2.3)	4 (1.2) ▲	6 (0.5)	466 (5.3)	-3 (0.9) ▼	3 (0.6)	437 (9.5)	0 (0.7)
Singapore	50 (0.9)	623 (3.9)	4 (2.0) ▲	45 (0.9)	580 (4.0)	-2 (1.8)	5 (0.4)	539 (8.2)	-2 (0.7) ▼
Slovak Republic	87 (1.5)	505 (3.2)	∅ ∅	11 (1.3)	451 (11.9)	∅ ∅	3 (0.7)	438 (22.2)	∅ ∅
Slovenia	90 (0.8)	506 (2.1)	0 (1.3)	8 (0.7)	471 (5.5)	0 (1.2)	2 (0.4)	~ ~	0 (0.5)
Sweden	92 (1.0)	506 (2.4)	∅ ∅	8 (1.0)	467 (4.9)	∅ ∅	1 (0.1)	~ ~	∅ ∅
Tunisia	26 (1.7)	327 (7.0)	--	49 (2.0)	343 (5.0)	--	25 (1.8)	320 (6.5)	--
Ukraine	74 (2.1)	466 (3.3)	∅ ∅	21 (1.7)	483 (5.9)	∅ ∅	5 (0.6)	476 (8.6)	∅ ∅
United States	87 (0.8)	535 (2.3)	0 (1.2)	12 (0.8)	493 (4.4)	0 (1.1)	2 (0.1)	~ ~	0 (0.2)
Yemen	85 (1.7)	233 (6.2)	∅ ∅	11 (1.3)	212 (10.6)	∅ ∅	4 (0.9)	175 (14.5)	∅ ∅
International Avg.	84 (0.2)	478 (0.6)		12 (0.2)	445 (1.4)		4 (0.1)	395 (2.8)	
Benchmarking Participants									
Alberta, Canada	87 (1.4)	507 (3.0)	∅ ∅	11 (1.2)	497 (4.9)	∅ ∅	2 (0.3)	~ ~	∅ ∅
British Columbia, Canada	87 (1.2)	507 (2.7)	∅ ∅	12 (1.1)	502 (6.4)	∅ ∅	1 (0.3)	~ ~	∅ ∅
Dubai, UAE	55 (2.4)	463 (3.3)	∅ ∅	39 (2.1)	438 (5.5)	∅ ∅	6 (0.8)	405 (9.5)	∅ ∅
Massachusetts, US	93 (1.0)	576 (3.2)	∅ ∅	6 (1.0)	533 (12.8)	∅ ∅	1 (0.2)	~ ~	∅ ∅
Minnesota, US	89 (2.5)	561 (5.0)	∅ ∅	10 (2.3)	493 (15.2)	∅ ∅	1 (0.4)	~ ~	∅ ∅
Ontario, Canada	85 (1.0)	514 (2.7)	-1 (1.5)	13 (0.9)	508 (5.5)	0 (1.4)	2 (0.4)	~ ~	1 (0.5)
Quebec, Canada	90 (0.9)	521 (3.1)	-1 (1.3)	8 (0.8)	508 (6.4)	1 (1.1)	1 (0.2)	~ ~	0 (0.3)

▲ 2007 percent significantly higher

▼ 2007 percent significantly lower

Background data provided by students.

(1) Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals may appear inconsistent.

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

A diamond (∅) indicates the country did not participate in the assessment.


TIMSS & PIRLS
 International Study Center
 Lynch School of Education, Boston College

Exhibit 4.2 Students Speak the Language of the Test at Home with Trends (Continued)

TIMSS2007
Mathematics 8th Grade

Country	Always or Almost Always			Sometimes			Never		
	2007 Percent of Students	Average Achievement	Difference in Percent from 2003	2007 Percent of Students	Average Achievement	Difference in Percent from 2003	2007 Percent of Students	Average Achievement	Difference in Percent from 2003
Algeria	57 (1.7)	388 (2.5)	0 0	31 (1.2)	389 (2.5)	0 0	11 (1.1)	378 (3.5)	0 0
Armenia	97 (0.5)	499 (3.5)	1 (0.8)	3 (0.4)	479 (9.0)	-1 (0.7)	0 (0.1)	~ ~	0 (0.2)
Australia	96 (0.5)	498 (3.9)	4 (1.6) ▲	4 (0.5)	480 (13.4)	-3 (1.4) ▼	1 (0.1)	~ ~	-1 (0.4)
Bahrain	81 (0.8)	397 (1.8)	0 (1.3)	14 (0.6)	408 (4.5)	-1 (0.9)	5 (0.5)	397 (7.1)	1 (0.7)
Bosnia and Herzegovina	98 (0.4)	456 (2.7)	0 0	2 (0.3)	~ ~	0 0	0 (0.1)	~ ~	0 0
Botswana	34 (1.0)	371 (3.3)	23 (1.2) ▲	62 (1.0)	365 (2.3)	-18 (1.2) ▼	5 (0.4)	316 (6.7)	-4 (0.7) ▼
Bulgaria	89 (1.7)	472 (4.6)	-2 (2.4)	10 (1.6)	401 (12.8)	2 (2.2)	1 (0.3)	~ ~	0 (0.4)
Chinese Taipei	83 (1.2)	609 (4.2)	3 (1.8)	16 (1.1)	546 (7.8)	-3 (1.7)	1 (0.2)	~ ~	0 (0.3)
Colombia	96 (0.3)	382 (3.7)	0 0	4 (0.3)	337 (7.4)	0 0	0 (0.1)	~ ~	0 0
Cyprus	91 (0.5)	469 (1.7)	-1 (0.8)	6 (0.4)	440 (5.8)	0 (0.6)	2 (0.3)	~ ~	0 (0.4)
Czech Republic	98 (0.3)	504 (2.4)	0 0	2 (0.3)	~ ~	0 0	0 (0.1)	~ ~	0 0
Egypt	82 (1.2)	391 (3.7)	7 (1.6) ▲	15 (1.0)	402 (6.4)	-7 (1.4) ▼	3 (0.4)	384 (12.2)	0 (0.5)
El Salvador	97 (0.3)	342 (2.7)	0 0	2 (0.3)	~ ~	0 0	1 (0.2)	~ ~	0 0
England	97 (0.4)	514 (4.9)	0 (0.7)	2 (0.3)	~ ~	0 (0.6)	0 (0.1)	~ ~	0 (0.2)
Georgia	95 (0.9)	411 (5.9)	0 0	5 (0.9)	402 (18.1)	0 0	0 (0.1)	~ ~	0 0
Ghana	31 (1.2)	309 (5.8)	-2 (1.8)	66 (1.3)	314 (4.3)	3 (1.8)	3 (0.5)	259 (12.6)	-2 (1.0)
Hong Kong SAR	91 (1.0)	580 (5.2)	-2 (1.2)	8 (0.7)	513 (12.7)	1 (0.9)	2 (0.4)	~ ~	0 (0.4)
Hungary	99 (0.3)	518 (3.4)	-1 (0.4)	1 (0.2)	~ ~	0 (0.3)	1 (0.2)	~ ~	0 (0.2)
Indonesia	35 (2.8)	397 (6.1)	2 (3.6)	58 (2.5)	397 (4.7)	0 (3.2)	7 (0.6)	402 (7.9)	-3 (1.0) ▼
Iran, Islamic Rep. of	63 (2.2)	423 (4.9)	-2 (3.9)	22 (1.7)	373 (4.9)	1 (2.5)	15 (1.3)	367 (6.0)	0 (2.3)
Israel	92 (0.7)	467 (4.0)	-1 (0.9)	6 (0.6)	444 (10.7)	1 (0.8)	1 (0.3)	~ ~	0 (0.3)
Italy	99 (0.1)	480 (3.1)	3 (0.4) ▲	1 (0.1)	~ ~	-2 (0.3) ▼	0 (0.1)	~ ~	-1 (0.2)
Japan	98 (0.2)	571 (2.4)	0 (0.3)	1 (0.2)	~ ~	0 (0.3)	0 (0.1)	~ ~	0 (0.1)
Jordan	89 (0.9)	429 (4.1)	4 (1.4) ▲	8 (0.7)	418 (10.0)	-3 (1.0) ▼	3 (0.4)	414 (12.7)	-1 (0.7)
Korea, Rep. of	95 (0.4)	600 (2.7)	-4 (0.5) ▼	5 (0.4)	549 (7.5)	4 (0.4) ▲	0 (0.1)	~ ~	0 (0.1)
Kuwait	67 (1.2)	355 (2.4)	0 0	19 (0.8)	359 (4.4)	0 0	14 (0.9)	344 (6.2)	0 0
Lebanon	20 (1.2)	456 (7.4)	4 (1.5) ▲	64 (1.7)	450 (3.8)	-5 (2.0) ▼	16 (1.2)	443 (5.9)	1 (1.5)
Lithuania	98 (0.4)	506 (2.3)	0 (0.8)	2 (0.4)	~ ~	0 (0.6)	0 (0.1)	~ ~	0 (0.3)
Malaysia	64 (2.1)	465 (5.6)	-2 (3.2)	28 (1.6)	486 (6.9)	0 (2.5)	9 (0.9)	504 (11.0)	2 (1.2)
Malta	17 (0.4)	505 (3.1)	0 0	46 (0.7)	488 (1.9)	0 0	38 (0.7)	481 (2.2)	0 0
Norway	96 (0.4)	472 (2.0)	0 (0.6)	3 (0.3)	434 (6.4)	0 (0.5)	1 (0.2)	~ ~	0 (0.3)
Oman	76 (1.9)	373 (3.5)	0 0	19 (1.6)	377 (5.4)	0 0	5 (0.6)	378 (8.9)	0 0
Palestinian Nat'l Auth.	87 (1.4)	369 (3.7)	3 (1.8)	10 (1.1)	369 (9.8)	-3 (1.4) ▼	3 (0.5)	355 (12.7)	1 (0.6)
Qatar	72 (0.4)	312 (1.5)	0 0	20 (0.4)	307 (3.9)	0 0	8 (0.3)	266 (5.5)	0 0
Romania	98 (0.3)	463 (4.1)	5 (1.7) ▲	1 (0.3)	~ ~	-3 (1.0) ▼	0 (0.0)	~ ~	-2 (1.0) ▼
Russian Federation	93 (1.8)	513 (4.0)	-2 (2.2)	6 (1.6)	497 (11.2)	2 (1.9)	1 (0.3)	~ ~	0 (0.4)
Saudi Arabia	72 (2.2)	328 (3.1)	--	18 (1.5)	338 (4.7)	--	11 (1.1)	325 (7.5)	--
Scotland	96 (0.5)	490 (3.6)	-1 (0.6)	3 (0.4)	463 (10.5)	0 (0.5)	1 (0.2)	~ ~	0 (0.3)
Serbia	97 (0.8)	487 (3.2)	-1 (0.9)	2 (0.6)	~ ~	0 (0.7)	1 (0.2)	~ ~	0 (0.2)
Singapore	47 (0.9)	616 (3.7)	4 (1.3) ▲	46 (0.8)	576 (4.6)	-3 (1.1) ▼	7 (0.4)	553 (9.0)	-1 (0.6)
Slovenia	90 (1.1)	506 (2.0)	-1 (1.5)	7 (0.7)	465 (6.5)	0 (1.0)	3 (0.6)	455 (8.4)	1 (0.8)
Sweden	94 (0.6)	494 (2.1)	1 (1.0)	4 (0.5)	455 (7.9)	-1 (0.8)	1 (0.2)	~ ~	0 (0.3)
Syrian Arab Republic	86 (1.0)	397 (3.8)	0 0	11 (0.8)	388 (7.6)	0 0	3 (0.4)	378 (11.5)	0 0
Thailand	67 (1.9)	456 (6.0)	0 0	30 (1.6)	414 (7.1)	0 0	3 (0.6)	395 (16.8)	0 0
Tunisia	22 (0.9)	406 (3.6)	--	49 (1.0)	423 (2.7)	--	29 (1.1)	426 (2.8)	--
Turkey	89 (1.2)	440 (5.0)	0 0	10 (1.2)	370 (5.5)	0 0	1 (0.2)	~ ~	0 0
Ukraine	69 (2.6)	460 (4.3)	0 0	23 (1.9)	470 (4.6)	0 0	8 (1.0)	459 (7.5)	0 0
United States	91 (0.7)	512 (2.8)	-3 (0.9) ▼	8 (0.7)	474 (5.3)	3 (0.8) ▲	1 (0.1)	~ ~	0 (0.2)
‡ Morocco	52 (1.7)	374 (3.3)	--	37 (1.5)	387 (5.0)	--	11 (0.8)	392 (6.3)	--
International Avg.	78 (0.2)	454 (0.6)		17 (0.1)	427 (1.2)		5 (0.1)	394 (1.9)	
Benchmarking Participants									
Basque Country, Spain	93 (0.5)	501 (3.0)	4 (1.2) ▲	6 (0.5)	504 (5.8)	-2 (0.9) ▼	1 (0.3)	~ ~	-1 (0.6)
British Columbia, Canada	85 (1.8)	506 (3.0)	0 0	10 (0.9)	533 (7.5)	0 0	5 (1.2)	517 (6.6)	0 0
Dubai, UAE	58 (1.2)	463 (3.3)	0 0	37 (1.1)	466 (3.9)	0 0	5 (0.7)	471 (11.8)	0 0
Massachusetts, US	92 (0.9)	552 (4.3)	0 0	7 (0.8)	490 (11.5)	0 0	1 (0.3)	~ ~	0 0
Minnesota, US	95 (1.2)	535 (4.2)	0 0	4 (1.1)	488 (15.7)	0 0	1 (0.2)	~ ~	0 0
Ontario, Canada	90 (1.3)	518 (3.2)	1 (1.7)	9 (1.1)	515 (14.3)	0 (1.4)	1 (0.3)	~ ~	-1 (0.4)
Quebec, Canada	91 (1.2)	529 (3.3)	0 (1.7)	7 (0.9)	522 (10.7)	0 (1.3)	2 (0.4)	~ ~	0 (0.6)

▲ 2007 percent significantly higher
▼ 2007 percent significantly lower

Background data provided by students.

‡ Did not satisfy guidelines for sample participation rates (see Appendix A).

() Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals may appear inconsistent.

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

A diamond (0) indicates the country did not participate in the assessment.

Hong Kong SAR, Italy, Scotland, and Singapore, and at the eighth grade, Australia, Botswana, Egypt, Italy, Jordan, Lebanon, Romania, Singapore, and, among benchmarking participants, the Basque Country.

A contributing factor in some countries to not all students speaking the language of the test at home may be the presence of an immigrant population. Exhibit 4.3 presents students' reports on whether their parents were born in the country. The exhibit presents for each participant the percentage of students with both parents, one parent, or neither parent born in the country, together with average mathematics achievement and changes in percentages since 2003. (For clarification, as denoted by the data label, the benchmarking participants, except Dubai, asked about the entire country, that is, Spain, Canada, and the United States, respectively.)

Although response rates to questions in the TIMSS questionnaires generally were high, students in some countries had difficulties in answering specific questions. Therefore, some exhibits in this chapter, including Exhibit 4.3, have special notation on this point. For a country where responses were available for at least 70 but less than 85 percent of the students, an "r" is included next to its data. Where responses were available for at least 50 but less than 70 percent of the students, an "s" is included. Where responses were available for less than 50 percent, an "x" replaces the data.

At fourth grade, more than three-quarters (77%) of students, on average internationally, reported that both parents were born in the country, whereas 13 percent reported that only one parent and 10 percent that neither parent was born in the country. In the Czech Republic, Hungary, Iran, Japan, and Lithuania, 90 percent or more of students reported that both parents were born in the country, as well as 80 percent or more (but less than 90%) in Chinese Taipei, Denmark, Georgia, Italy, Kazakhstan, Latvia, Norway, the Russian Federation, Scotland, and the Slovak Republic. Countries with an increase since 2003 included Hungary, Iran, Japan, and Lithuania, as well as the Canadian province of Quebec. The largest percentages of students (20% or more) reporting that neither parent was born in the country were in Australia, Hong Kong SAR, New Zealand, Qatar, and among the

benchmarking participants the Canadian provinces of Alberta, British Columbia, and Ontario as well as Dubai. The high percentage of students in Dubai (72%) is a result of high immigration, but also because Dubai did not ask about the country, the United Arab Emirates, but only Dubai in particular. Australia, Hong Kong SAR, New Zealand, and Qatar also had relatively large percentages of students (20% or more) with only one parent born in the country, as did Algeria, Kuwait, Singapore, and Yemen. Countries with a decrease since 2003 in the percentage of students with neither parent born in the country included Armenia, Chinese Taipei, Hong Kong SAR, Hungary, Iran, and Scotland, while two countries, Slovenia and Tunisia, showed an increase.

Although on average across countries, fourth grade mathematics achievement was highest among students with both parents born in the country (478 points, on average), next highest among students with one parent born in the country (458 points), and lowest among those with neither parent born in the country (452 points), this was not the case in all countries. In a number of countries (for example, Australia, Kuwait, Qatar, and Dubai among benchmarking participants), students with neither parent born in the country had average mathematics achievement higher than those with both parents born in the country.

At the eighth grade, the situation was similar, although a greater percentage of students (85% on average internationally) reported that both parents were born in the country, and a smaller percentage that one parent (9%) or neither parent (7%) was born in the country. Eighteen countries had 90 percent or more of students with both parents born in the country. Countries showing an increase in percentage of students in this category included Australia, Ghana, Indonesia, Jordan, and Lithuania, and those showing a decrease included Botswana, Cyprus, Hungary, Italy, Lebanon, Malaysia, Scotland, Tunisia, and the United States. The Basque Country of Spain also showed a decrease. More than 20 percent of students reported that neither parent was born in the country in Hong Kong SAR, Israel, Qatar, and the provinces of British Columbia and Ontario as well as Dubai

Exhibit 4.3 Students' Parents Born in the Country with Trends

TIMSS2007
Mathematics 4th Grade

Country	Both Parents Born in Country			Only One Parent Born in Country			Neither Parent Born in Country		
	2007 Percent of Students	Average Achievement	Difference in Percent from 2003	2007 Percent of Students	Average Achievement	Difference in Percent from 2003	2007 Percent of Students	Average Achievement	Difference in Percent from 2003
Algeria	67 (1.9)	385 (5.9)	∅ ∅	20 (1.1)	358 (6.9)	∅ ∅	13 (1.1)	381 (7.0)	∅ ∅
Armenia	77 (1.5)	501 (3.3)	1 (1.9)	19 (1.3)	511 (16.4)	9 (1.4) ▲	5 (0.4)	476 (10.5)	-10 (1.1) ▼
Australia	57 (1.7)	512 (2.9)	0 (2.7)	21 (0.9)	513 (5.2)	1 (1.3)	21 (1.4)	535 (6.2)	-1 (2.3)
Austria	73 (1.0)	515 (1.9)	∅ ∅	11 (0.6)	498 (3.8)	∅ ∅	16 (0.8)	470 (3.5)	∅ ∅
Chinese Taipei	88 (0.6)	582 (1.6)	0 (0.9)	7 (0.5)	542 (5.1)	2 (0.6) ▲	5 (0.4)	523 (6.3)	-3 (0.6) ▼
Colombia	73 (1.3)	365 (4.8)	∅ ∅	13 (0.8)	333 (7.9)	∅ ∅	14 (0.8)	352 (5.8)	∅ ∅
Czech Republic	90 (0.6)	488 (2.8)	∅ ∅	7 (0.5)	481 (5.5)	∅ ∅	3 (0.3)	458 (10.2)	∅ ∅
Denmark	82 (1.3)	529 (2.5)	∅ ∅	8 (0.6)	516 (5.5)	∅ ∅	10 (1.2)	482 (7.5)	∅ ∅
El Salvador	78 (0.9)	339 (4.6)	∅ ∅	14 (0.7)	302 (6.0)	∅ ∅	8 (0.6)	316 (8.7)	∅ ∅
England	74 (1.5)	547 (3.1)	-4 (2.4)	16 (0.9)	540 (4.9)	4 (1.2) ▲	11 (1.0)	514 (6.0)	0 (1.8)
Georgia	84 (1.1)	449 (4.1)	∅ ∅	8 (0.6)	402 (8.0)	∅ ∅	8 (0.7)	401 (7.7)	∅ ∅
Germany	70 (1.4)	540 (2.1)	∅ ∅	12 (0.7)	509 (4.0)	∅ ∅	17 (1.0)	494 (3.6)	∅ ∅
Hong Kong SAR	48 (1.8)	606 (4.1)	1 (2.6)	24 (0.9)	599 (4.1)	4 (1.1) ▲	28 (1.4)	615 (4.5)	-5 (2.3) ▼
Hungary	91 (0.6)	515 (3.4)	2 (0.9) ▲	6 (0.5)	473 (13.0)	1 (0.8)	3 (0.3)	485 (10.9)	-2 (0.5) ▼
Iran, Islamic Rep. of	92 (1.0)	404 (4.1)	4 (1.6) ▲	4 (0.5)	380 (7.8)	-1 (0.7)	4 (0.8)	391 (8.3)	-3 (1.3) ▼
Italy	87 (0.6)	510 (3.3)	0 (0.9)	8 (0.5)	488 (5.8)	0 (0.7)	5 (0.4)	490 (6.7)	0 (0.6)
Japan	96 (0.4)	571 (2.1)	2 (0.5) ▲	3 (0.3)	530 (9.1)	-2 (0.4) ▼	1 (0.2)	~ ~	0 (0.2)
Kazakhstan	84 (1.4)	550 (8.0)	∅ ∅	8 (0.6)	541 (9.3)	∅ ∅	9 (1.3)	552 (12.4)	∅ ∅
Kuwait	65 (1.6)	325 (3.7)	∅ ∅	22 (1.1)	291 (4.9)	∅ ∅	13 (1.0)	348 (9.6)	∅ ∅
Latvia	85 (0.9)	541 (2.2)	1 (1.5)	12 (0.7)	523 (5.4)	-1 (1.2)	3 (0.4)	510 (11.6)	0 (0.7)
Lithuania	91 (0.7)	532 (2.3)	2 (1.0) ▲	7 (0.6)	510 (7.8)	-1 (0.8)	1 (0.3)	~ ~	-1 (0.4)
Morocco	76 (1.6)	349 (5.7)	4 (2.6)	17 (1.1)	326 (6.7)	-2 (1.9)	7 (0.8)	338 (7.1)	-2 (1.2)
Netherlands	77 (1.4)	544 (2.2)	3 (2.2)	11 (0.8)	525 (4.8)	-1 (1.1)	12 (1.1)	496 (6.7)	-2 (1.8)
New Zealand	60 (1.2)	494 (2.4)	-2 (1.7)	20 (0.7)	491 (4.4)	-1 (1.0)	21 (1.0)	495 (4.0)	3 (1.5)
Norway	85 (0.8)	480 (2.5)	1 (1.1)	10 (0.7)	464 (6.7)	0 (0.9)	5 (0.5)	445 (6.7)	0 (0.8)
Qatar	49 (0.6)	294 (2.0)	∅ ∅	26 (0.6)	283 (2.4)	∅ ∅	25 (0.5)	333 (2.5)	∅ ∅
Russian Federation	81 (1.1)	549 (4.9)	2 (1.6)	10 (0.6)	534 (8.5)	-1 (0.9)	8 (0.8)	509 (6.9)	-1 (1.1)
Scotland	84 (0.7)	498 (2.3)	1 (1.1)	11 (0.6)	486 (4.3)	2 (0.8)	5 (0.4)	453 (10.4)	-2 (0.8) ▼
Singapore	63 (0.8)	598 (4.1)	-2 (1.2)	20 (0.7)	600 (4.3)	1 (0.9)	16 (0.6)	606 (5.1)	1 (0.9)
Slovak Republic	87 (0.9)	504 (3.7)	∅ ∅	8 (0.7)	466 (9.5)	∅ ∅	6 (0.5)	443 (8.1)	∅ ∅
Slovenia	78 (1.1)	508 (2.1)	-3 (1.5)	10 (0.7)	488 (4.5)	-1 (1.0)	12 (0.8)	477 (4.0)	3 (1.1) ▲
Sweden	74 (1.8)	509 (2.9)	∅ ∅	12 (0.5)	501 (3.8)	∅ ∅	14 (1.7)	475 (4.8)	∅ ∅
Tunisia	79 (1.4)	339 (4.6)	-21 (1.4) ▼	16 (1.2)	299 (7.6)	16 (1.2) ▲	6 (0.6)	326 (9.9)	6 (0.6) ▲
Ukraine	76 (1.1)	475 (3.1)	∅ ∅	15 (0.7)	466 (4.4)	∅ ∅	8 (0.9)	441 (7.4)	∅ ∅
United States	70 (1.1)	536 (2.3)	-2 (1.7)	13 (0.5)	513 (3.8)	2 (0.6) ▲	17 (1.0)	518 (4.8)	0 (1.5)
Yemen	71 (1.8)	235 (6.6)	∅ ∅	22 (1.4)	212 (6.7)	∅ ∅	7 (0.9)	211 (14.3)	∅ ∅
International Avg.	77 (0.2)	478 (0.6)		13 (0.1)	458 (1.2)		10 (0.1)	452 (1.3)	
Benchmarking Participants									
Alberta, Canada	62 (2.1)	508 (3.2)	∅ ∅	15 (0.8)	500 (3.9)	∅ ∅	23 (1.8)	503 (4.7)	∅ ∅
British Columbia, Canada	51 (2.4)	502 (3.2)	∅ ∅	18 (0.9)	506 (4.1)	∅ ∅	31 (2.5)	512 (5.0)	∅ ∅
Dubai, UAE	17 (0.6)	404 (4.2)	∅ ∅	11 (0.8)	411 (7.2)	∅ ∅	72 (1.0)	466 (2.6)	∅ ∅
Massachusetts, US	73 (1.9)	577 (2.8)	∅ ∅	13 (0.7)	565 (8.2)	∅ ∅	14 (1.7)	562 (9.5)	∅ ∅
Minnesota, US	75 (3.4)	566 (5.2)	∅ ∅	9 (0.8)	528 (9.3)	∅ ∅	15 (3.3)	517 (11.3)	∅ ∅
Ontario, Canada	52 (2.0)	510 (3.5)	2 (3.4)	17 (0.8)	509 (4.5)	1 (1.3)	30 (2.1)	517 (4.5)	-3 (3.6)
Quebec, Canada	75 (2.0)	526 (3.1)	15 (2.8) ▲	10 (0.7)	505 (4.6)	-16 (1.7) ▼	15 (1.8)	499 (5.8)	1 (2.3)

▲ 2007 percent significantly higher

▼ 2007 percent significantly lower

Background data provided by students.

() Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals 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.

A diamond (∅) indicates the country did not participate in the assessment.


TIMSS & PIRLS
 International Study Center
 Lynch School of Education, Boston College

Exhibit 4.3 Students' Parents Born in the Country with Trends (Continued)

TIMSS2007
Mathematics 8th Grade

Country	Both Parents Born in Country			Only One Parent Born in Country			Neither Parent Born in Country		
	2007 Percent of Students	Average Achievement	Difference in Percent from 2003	2007 Percent of Students	Average Achievement	Difference in Percent from 2003	2007 Percent of Students	Average Achievement	Difference in Percent from 2003
Algeria	--	--	0 0	--	--	0 0	--	--	0 0
Armenia	88 (1.0)	497 (2.8)	-2 (1.2)	9 (1.0)	516 (15.9)	3 (1.1)	3 (0.3)	516 (15.6)	-1 (0.6)
Australia	61 (1.1)	496 (3.7)	7 (2.5)	21 (0.8)	498 (6.6)	0 (1.2)	18 (1.4)	502 (7.7)	-7 (2.8)
Bahrain	78 (0.6)	400 (1.9)	-1 (0.9)	10 (0.5)	387 (4.8)	1 (0.7)	11 (0.4)	413 (3.6)	0 (0.7)
Bosnia and Herzegovina	89 (0.6)	457 (2.7)	0 0	7 (0.5)	470 (5.7)	0 0	4 (0.4)	429 (7.0)	0 0
Botswana	86 (0.6)	367 (2.3)	-3 (1.1)	11 (0.6)	336 (5.1)	3 (0.7)	3 (0.3)	386 (10.6)	0 (0.8)
Bulgaria	96 (0.4)	467 (4.9)	-1 (0.5)	3 (0.4)	440 (14.6)	0 (0.5)	1 (0.2)	~ ~	0 (0.2)
Chinese Taipei	96 (0.3)	600 (4.5)	0 (0.5)	3 (0.3)	568 (16.0)	1 (0.4)	1 (0.2)	~ ~	-1 (0.3)
Colombia	96 (0.4)	382 (3.5)	0 0	3 (0.3)	364 (13.3)	0 0	1 (0.2)	~ ~	0 0
Cyprus	82 (0.6)	469 (1.8)	-2 (0.8)	13 (0.5)	462 (4.2)	2 (0.7)	5 (0.3)	429 (6.9)	1 (0.4)
Czech Republic	91 (0.5)	505 (2.5)	0 0	7 (0.4)	493 (5.0)	0 0	2 (0.3)	~ ~	0 0
Egypt	80 (1.8)	404 (3.4)	2 (2.0)	15 (1.7)	347 (8.3)	4 (1.8)	5 (0.4)	340 (7.7)	-5 (0.8)
El Salvador	94 (0.4)	342 (2.9)	0 0	4 (0.4)	331 (8.0)	0 0	2 (0.2)	~ ~	0 0
England	80 (1.4)	513 (5.2)	-2 (2.5)	11 (0.7)	513 (6.7)	1 (1.1)	9 (0.9)	528 (7.7)	2 (1.9)
Georgia	93 (0.6)	416 (5.8)	0 0	3 (0.4)	383 (15.7)	0 0	3 (0.4)	336 (15.3)	0 0
Ghana	89 (0.7)	316 (4.1)	6 (1.1)	8 (0.6)	274 (8.4)	-4 (0.9)	3 (0.3)	277 (9.4)	-2 (0.5)
Hong Kong SAR	42 (1.4)	578 (6.0)	-1 (1.8)	19 (0.7)	567 (6.3)	3 (0.9)	39 (1.3)	572 (7.5)	-1 (1.7)
Hungary	94 (0.4)	518 (3.4)	-2 (0.6)	4 (0.4)	502 (13.6)	1 (0.5)	2 (0.3)	~ ~	0 (0.3)
Indonesia	97 (0.4)	401 (3.7)	2 (0.5)	1 (0.2)	~ ~	-1 (0.3)	1 (0.2)	~ ~	-1 (0.3)
Iran, Islamic Rep. of	97 (0.3)	405 (4.1)	1 (0.6)	2 (0.3)	~ ~	0 (0.4)	1 (0.2)	~ ~	-1 (0.4)
Israel	63 (1.4)	467 (3.9)	2 (1.9)	16 (0.7)	472 (5.8)	-3 (1.0)	21 (1.4)	469 (7.6)	1 (1.8)
Italy	89 (0.6)	481 (3.2)	-2 (0.8)	7 (0.5)	483 (6.5)	0 (0.6)	5 (0.4)	455 (6.2)	1 (0.6)
Japan	98 (0.3)	571 (2.5)	1 (0.4)	2 (0.2)	~ ~	-1 (0.3)	1 (0.1)	~ ~	0 (0.2)
Jordan	70 (1.2)	423 (4.8)	6 (1.7)	15 (0.7)	427 (6.0)	-2 (1.0)	15 (0.9)	452 (5.1)	-4 (1.4)
Korea, Rep. of	100 (0.1)	598 (2.7)	0 (0.1)	0 (0.1)	~ ~	0 (0.1)	0 (0.1)	~ ~	0 (0.1)
Kuwait	77 (1.0)	356 (2.5)	0 0	13 (0.6)	349 (4.7)	0 0	9 (0.8)	369 (7.0)	0 0
Lebanon	87 (0.9)	453 (3.9)	-3 (1.2)	10 (0.7)	436 (7.3)	2 (1.0)	3 (0.4)	432 (10.2)	1 (0.5)
Lithuania	92 (0.5)	507 (2.5)	3 (0.9)	7 (0.5)	506 (5.2)	-2 (0.8)	1 (0.2)	~ ~	0 (0.3)
Malaysia	93 (0.5)	476 (4.9)	-2 (0.7)	5 (0.4)	448 (10.2)	1 (0.5)	2 (0.3)	~ ~	0 (0.5)
Malta	84 (0.5)	490 (1.4)	0 0	13 (0.5)	482 (3.7)	0 0	3 (0.2)	479 (9.3)	0 0
Norway	84 (1.0)	473 (2.2)	-2 (1.3)	9 (0.6)	469 (4.0)	1 (0.8)	7 (0.7)	436 (4.4)	1 (1.1)
Oman	84 (0.8)	379 (3.4)	0 0	10 (0.6)	341 (6.1)	0 0	6 (0.4)	355 (6.8)	0 0
Palestinian Nat'l Auth.	85 (0.7)	373 (3.5)	0 (1.0)	12 (0.6)	350 (7.1)	-1 (0.8)	3 (0.3)	321 (11.8)	1 (0.4)
Qatar	57 (0.6)	298 (1.6)	0 0	15 (0.4)	297 (3.6)	0 0	28 (0.5)	338 (2.4)	0 0
Romania	99 (0.2)	464 (4.0)	0 (0.3)	1 (0.2)	~ ~	0 (0.3)	0 (0.1)	~ ~	0 (0.2)
Russian Federation	83 (1.1)	514 (3.9)	0 (1.5)	11 (0.7)	510 (7.1)	0 (1.0)	6 (0.7)	490 (9.2)	0 (0.8)
Saudi Arabia	80 (1.3)	328 (3.3)	--	9 (0.6)	318 (7.1)	--	11 (1.0)	357 (5.8)	--
Scotland	89 (0.7)	489 (3.7)	-2 (0.9)	7 (0.5)	492 (6.9)	1 (0.7)	3 (0.5)	473 (13.9)	0 (0.6)
Serbia	79 (1.0)	487 (3.5)	-2 (1.3)	12 (0.7)	495 (5.1)	1 (0.9)	9 (0.7)	477 (8.0)	1 (1.0)
Singapore	71 (0.7)	588 (3.9)	-1 (1.0)	16 (0.5)	592 (5.2)	0 (0.7)	13 (0.6)	625 (5.9)	1 (0.8)
Slovenia	82 (1.1)	507 (2.3)	2 (1.7)	9 (0.6)	500 (4.6)	1 (0.9)	9 (0.9)	462 (5.4)	-3 (1.3)
Sweden	77 (1.3)	497 (2.2)	1 (2.2)	11 (0.5)	491 (3.9)	1 (0.8)	12 (1.2)	463 (5.0)	-2 (2.0)
Syrian Arab Republic	86 (0.8)	400 (3.4)	0 0	9 (0.6)	376 (8.4)	0 0	5 (0.4)	370 (7.4)	0 0
Thailand	96 (0.5)	443 (4.9)	0 0	3 (0.4)	408 (14.6)	0 0	1 (0.2)	~ ~	0 0
Tunisia	92 (0.4)	423 (2.5)	-7 (0.5)	5 (0.3)	404 (6.1)	4 (0.3)	3 (0.3)	382 (8.0)	3 (0.3)
Turkey	97 (0.3)	434 (4.8)	0 0	2 (0.3)	~ ~	0 0	1 (0.2)	~ ~	0 0
Ukraine	78 (1.1)	462 (3.7)	0 0	17 (0.9)	473 (5.3)	0 0	5 (0.6)	446 (9.9)	0 0
United States	74 (1.4)	515 (2.9)	-7 (1.8)	9 (0.6)	504 (4.6)	1 (0.7)	17 (1.2)	486 (4.8)	6 (1.5)
‡ Morocco	90 (0.6)	385 (2.9)	--	6 (0.5)	345 (9.2)	--	3 (0.4)	336 (7.5)	--
International Avg.	85 (0.1)	454 (0.5)		9 (0.1)	439 (1.3)		7 (0.1)	430 (1.5)	
Benchmarking Participants									
Basque Country, Spain	89 (0.9)	505 (2.8)	-3 (1.1)	6 (0.6)	474 (9.3)	1 (0.8)	5 (0.7)	453 (9.9)	2 (0.8)
British Columbia, Canada	56 (1.8)	498 (2.8)	0 0	16 (0.7)	506 (3.3)	0 0	29 (1.9)	535 (6.5)	0 0
Dubai, UAE	20 (1.1)	400 (5.2)	0 0	10 (0.6)	411 (4.8)	0 0	70 (1.0)	490 (2.7)	0 0
Massachusetts, US	75 (2.0)	556 (4.1)	0 0	9 (0.7)	541 (6.6)	0 0	16 (1.8)	514 (10.1)	0 0
Minnesota, US	84 (1.9)	538 (4.2)	0 0	5 (0.4)	518 (9.4)	0 0	10 (1.6)	499 (11.3)	0 0
Ontario, Canada	57 (2.2)	512 (4.5)	2 (3.1)	15 (0.9)	520 (4.7)	-1 (1.2)	28 (2.3)	528 (5.3)	-2 (3.3)
Quebec, Canada	78 (2.1)	531 (3.2)	-3 (2.8)	8 (0.6)	539 (7.4)	0 (0.8)	14 (1.9)	517 (8.6)	2 (2.5)

● 2007 percent significantly higher
▼ 2007 percent significantly lower

Background data provided by students.

‡ Did not satisfy guidelines for sample participation rates (see Appendix A).

() Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals may appear inconsistent.

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

A diamond (0) indicates the country did not participate in the assessment.

(where the results were only for Dubai per se and not the country). Increased percentages in this category since 2003 were found in Tunisia, the United States, and the Basque Country, and decreased percentages in Australia, Egypt, Ghana, Jordan, and Slovenia. Similar to the fourth grade, average mathematics achievement at the eighth grade was highest for students reporting both parents born in the country (454 points, on average), next for students with one parent born in the country (439 points), and lowest for students with neither parent born in the country (430 points).

Earlier cycles of TIMSS and PIRLS have shown that students from homes with abundant literacy resources have higher achievement, on average, in mathematics, science, and reading than students from less well-endowed homes.³ Exhibit 4.4, which displays students' reports about the number of books in their homes, shows that this continues to be true for mathematics achievement at both fourth and eighth grades. For each grade, the exhibit presents for each TIMSS 2007 participant the percentage of students in five categories of book ownership, *more than 200 books*, *101–200 books*, *26–100 books*, *11–25 books*, and *0–10 books*, together with average achievement in each category and changes in percentages since 2003.

As shown in the exhibit, there was a wide range of book ownership within countries at both grade levels. At fourth grade, 12 percent of students, on average across countries, reported having more than 200 books at home, 13 percent having between 101 and 200 books, 30 percent having between 26 and 100 books, 25 percent having between 11 and 25 books, and 20 percent with no more than 10 books. TIMSS participants with the highest percentages of students (at least 30%) reporting many books at home (more than 100—categories one and two combined) included Australia, Denmark, England, Georgia, Germany, Hungary, New Zealand, Norway, Qatar, Scotland, Singapore, Sweden, the United States, the U.S. states of Massachusetts and Minnesota, and the Canadian provinces of Alberta, British Columbia, and Ontario. In contrast, in Algeria, El Salvador, Iran, Morocco, and Yemen, more than half the students reported having no more than 10 books in their homes. In several countries, there was an increase since 2003 in the percentage of students from homes with many books. For example,

3 See, for example, Mullis, I.V.S., Martin, M.O., Kennedy, A.M., & Foy, P. (2007). *PIRLS 2006 international report: IEA's Progress in International Reading Literacy Study in primary school in 40 countries*. Chestnut Hill, MA: TIMSS & PIRLS International Study Center, Boston College.

Hong Kong SAR, Morocco, and the province of Quebec had increased percentages of students in the *more than 200* and in the *101–200* books categories. In contrast, Latvia, the Netherlands, and Norway had decreased percentages in both of these categories.

Fourth grade students from homes with more than 100 books had higher average mathematics achievement than those from homes with fewer books. Average achievement of those from homes with more than 200 books (494 points, on average) and from homes with 101–200 books (495 points) exceeded that for students from homes with 26–100 books (486 points), with 11–25 books (466 points), and with 0–10 books (438 points).

At the eighth grade also, there was an association between average mathematics achievement and number of books in the home. Twelve percent of students reported having more than 200 books at home and 12 percent reported having 101–200 books, and these had average achievement of 486 and 481 points, respectively. These averages were higher than the 464-point average of the 27 percent of students with 26–100 books, the 436-point average of the 29 percent of students with 11–25 books, and the 413-point average of the 20 percent of students with 10 books or fewer. TIMSS participants with the highest percentages of students in the *more than 200* book category (20% or more) included Australia, Bulgaria, Georgia, Hungary, Israel, Italy, Korea, Norway, Sweden, and among benchmarking participants, the Basque Country, Massachusetts, Minnesota, and the provinces of British Columbia and Ontario. Countries with the greatest percentages of students (30% or more) with no more than 10 books at home included Algeria, Botswana, Colombia, Egypt, El Salvador, Ghana, Iran, Thailand, and Tunisia. There were increased percentages since 2003 of students in the highest category of book ownership (more than 200 books) in Cyprus, Korea, and Lebanon, but decreases in Australia, Bahrain, Bulgaria, England, Ghana, Hungary, Romania, the Russian Federation, Scotland, Sweden, the United States, and the Canadian province of Ontario.

In today's age of virtually instantaneous access to a vast repository of information, students from homes with a computer, and particularly a computer with Internet access, may have opportunities for enhanced

Exhibit 4.4 Books in the Home with Trends

TIMSS2007
Mathematics 4th Grade

Country	More than 200 Books			101–200 Books			26–100 Books		
	2007 Percent of Students	Average Achievement	Difference in Percent from 2003	2007 Percent of Students	Average Achievement	Difference in Percent from 2003	2007 Percent of Students	Average Achievement	Difference in Percent from 2003
Algeria	2 (0.3)	~ ~	∅ ∅	3 (0.3)	384 (10.0)	∅ ∅	12 (0.9)	399 (6.3)	∅ ∅
Armenia	r 17 (1.2)	499 (4.2)	–1 (1.6)	12 (0.7)	514 (6.5)	–2 (1.0) ▼	25 (1.0)	501 (4.3)	–5 (1.5) ▼
Australia	22 (1.0)	531 (5.1)	–2 (1.6)	22 (1.0)	540 (5.3)	–1 (1.5)	36 (0.9)	517 (3.3)	2 (1.4)
Austria	12 (0.7)	535 (3.7)	∅ ∅	13 (0.6)	533 (3.1)	∅ ∅	35 (1.0)	515 (2.3)	∅ ∅
Chinese Taipei	14 (0.6)	606 (2.8)	–1 (1.0)	13 (0.6)	605 (3.3)	–1 (0.9)	32 (0.9)	588 (2.4)	1 (1.1)
Colombia	5 (0.4)	339 (8.5)	∅ ∅	5 (0.4)	364 (11.9)	∅ ∅	19 (0.9)	379 (8.5)	∅ ∅
Czech Republic	11 (0.9)	505 (5.7)	∅ ∅	16 (0.8)	515 (4.2)	∅ ∅	40 (1.0)	495 (2.5)	∅ ∅
Denmark	12 (1.0)	544 (5.6)	∅ ∅	18 (0.8)	547 (3.2)	∅ ∅	38 (1.2)	526 (2.8)	∅ ∅
El Salvador	3 (0.4)	336 (11.4)	∅ ∅	4 (0.3)	330 (10.2)	∅ ∅	14 (0.7)	355 (5.4)	∅ ∅
England	19 (1.0)	575 (4.9)	0 (1.6)	22 (1.0)	567 (5.0)	2 (1.4)	33 (1.0)	542 (3.0)	–2 (1.6)
Georgia	17 (1.3)	448 (5.6)	∅ ∅	13 (1.0)	456 (7.9)	∅ ∅	29 (1.4)	452 (4.7)	∅ ∅
Germany	14 (0.8)	561 (3.4)	∅ ∅	17 (0.8)	554 (3.3)	∅ ∅	35 (1.0)	535 (2.4)	∅ ∅
Hong Kong SAR	12 (0.7)	628 (4.5)	5 (0.9) ▲	15 (0.9)	621 (5.3)	5 (1.2) ▲	34 (0.9)	611 (3.6)	6 (1.3) ▲
Hungary	16 (1.0)	557 (4.8)	–2 (1.5)	17 (0.7)	545 (3.9)	0 (1.1)	32 (1.2)	523 (4.2)	–3 (1.5)
Iran, Islamic Rep. of	5 (0.5)	449 (8.4)	–1 (0.8)	5 (0.5)	438 (7.6)	1 (0.7)	12 (1.0)	445 (5.0)	–1 (1.3)
Italy	12 (0.7)	517 (4.8)	2 (1.1)	12 (0.5)	521 (4.2)	1 (0.8)	31 (0.8)	517 (3.4)	4 (1.1) ▲
Japan	7 (0.4)	599 (5.7)	0 (0.6)	13 (0.6)	603 (3.6)	–1 (0.9)	38 (1.0)	579 (2.7)	–2 (1.3)
Kazakhstan	6 (0.6)	560 (11.0)	∅ ∅	9 (0.9)	558 (7.2)	∅ ∅	28 (2.9)	548 (9.7)	∅ ∅
Kuwait	r 14 (0.9)	300 (6.7)	∅ ∅	10 (0.5)	325 (9.6)	∅ ∅	24 (1.0)	344 (4.8)	∅ ∅
Latvia	13 (0.9)	556 (5.5)	–6 (1.4) ▼	16 (0.8)	559 (3.9)	–5 (1.4) ▼	41 (1.2)	542 (2.7)	3 (1.7)
Lithuania	6 (0.5)	540 (7.3)	–1 (0.7)	9 (0.6)	555 (5.3)	–2 (0.9) ▼	34 (1.0)	548 (2.7)	–2 (1.4)
Morocco	r 5 (1.2)	377 (22.1)	4 (1.2) ▲	5 (0.7)	368 (17.4)	2 (0.8) ▲	13 (1.0)	364 (7.7)	3 (1.4) ▲
Netherlands	11 (0.9)	547 (6.0)	–3 (1.4) ▼	15 (0.7)	554 (3.9)	–4 (1.2) ▼	40 (1.1)	543 (2.4)	3 (1.6)
New Zealand	17 (0.8)	524 (3.7)	0 (1.1)	22 (0.7)	519 (3.0)	0 (1.0)	34 (0.7)	498 (3.2)	–2 (1.3)
Norway	13 (0.7)	489 (5.2)	–4 (1.1) ▼	19 (0.8)	493 (3.8)	–2 (1.1) ▼	37 (1.2)	480 (2.8)	1 (1.5)
Qatar	22 (0.4)	297 (3.0)	∅ ∅	14 (0.4)	313 (3.1)	∅ ∅	25 (0.5)	319 (2.6)	∅ ∅
Russian Federation	11 (0.7)	556 (6.7)	–1 (1.0)	14 (0.7)	564 (5.6)	–1 (1.1)	39 (1.1)	553 (5.3)	4 (1.6) ▲
Scotland	17 (0.9)	518 (5.2)	–4 (1.4) ▼	19 (0.9)	519 (3.3)	1 (1.2)	33 (1.0)	503 (2.5)	2 (1.4)
Singapore	13 (0.5)	627 (5.1)	2 (0.8) ▲	18 (0.8)	629 (4.4)	1 (1.2)	37 (0.8)	608 (4.0)	–2 (1.2)
Slovak Republic	8 (0.5)	517 (7.6)	∅ ∅	12 (0.6)	527 (3.9)	∅ ∅	36 (1.0)	514 (3.8)	∅ ∅
Slovenia	10 (0.6)	519 (5.1)	–3 (1.1) ▼	13 (0.6)	523 (3.4)	–2 (1.1)	38 (1.0)	515 (2.2)	1 (1.4)
Sweden	17 (1.0)	530 (3.1)	∅ ∅	21 (0.8)	517 (3.1)	∅ ∅	35 (1.0)	504 (2.6)	∅ ∅
Tunisia	r 3 (0.4)	359 (13.6)	–1 (0.7)	5 (0.5)	386 (12.0)	–3 (0.9) ▼	18 (1.1)	375 (6.3)	1 (1.6)
Ukraine	9 (0.6)	488 (6.3)	∅ ∅	12 (0.7)	501 (4.5)	∅ ∅	37 (1.0)	481 (3.3)	∅ ∅
United States	15 (0.6)	552 (3.8)	1 (0.9)	16 (0.5)	554 (3.3)	–1 (0.7)	34 (0.6)	538 (2.4)	0 (0.9)
Yemen	r 4 (0.6)	201 (18.4)	∅ ∅	4 (0.4)	213 (10.6)	∅ ∅	10 (1.0)	235 (9.5)	∅ ∅
International Avg.	12 (0.1)	494 (1.3)		13 (0.1)	495 (1.1)		30 (0.2)	486 (0.8)	
Benchmarking Participants									
Alberta, Canada	18 (1.0)	519 (4.2)	∅ ∅	23 (1.0)	517 (3.9)	∅ ∅	36 (0.8)	509 (3.2)	∅ ∅
British Columbia, Canada	19 (0.8)	525 (3.9)	∅ ∅	21 (0.7)	519 (3.9)	∅ ∅	37 (0.9)	509 (3.0)	∅ ∅
Dubai, UAE	r 11 (0.6)	463 (6.3)	∅ ∅	12 (0.8)	493 (5.3)	∅ ∅	31 (0.9)	470 (3.5)	∅ ∅
Massachusetts, US	22 (1.8)	599 (5.4)	∅ ∅	23 (1.1)	587 (3.9)	∅ ∅	37 (1.4)	567 (3.8)	∅ ∅
Minnesota, US	17 (1.0)	581 (7.6)	∅ ∅	22 (1.2)	574 (5.5)	∅ ∅	36 (1.2)	560 (5.4)	∅ ∅
Ontario, Canada	18 (1.0)	533 (4.2)	–2 (1.8)	23 (1.2)	526 (4.2)	1 (1.6)	34 (1.2)	514 (3.1)	–2 (1.8)
Quebec, Canada	11 (0.8)	531 (4.9)	4 (1.0) ▲	15 (0.9)	535 (4.1)	4 (1.1) ▲	39 (1.1)	528 (2.5)	–4 (1.5) ▼

▲ 2007 percent significantly higher

▼ 2007 percent significantly lower

Background data provided by students.

() Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals 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.

A diamond (∅) indicates the country did not participate in the assessment.


TIMSS & PIRLS
 International Study Center
 Lynch School of Education, Boston College

Exhibit 4.4 Books in the Home with Trends (Continued)

TIMSS2007
Mathematics 4th Grade

Country	11–25 Books			0–10 Books			2007 Percent of Students	
	2007 Percent of Students	Average Achievement	Difference in Percent from 2003	2007 Percent of Students	Average Achievement	Difference in Percent from 2003		
Algeria	29 (1.4)	395 (6.5)	0 0	54 (1.9)	374 (6.8)	0 0		
Armenia	r 23 (1.6)	502 (9.9)	1 (1.8)	23 (1.5)	507 (7.8)	6 (1.9)	▲	
Australia	13 (0.8)	486 (5.8)	0 (1.2)	6 (0.6)	458 (8.1)	0 (1.0)		
Austria	29 (0.9)	490 (2.7)	0 0	11 (0.6)	458 (4.1)	0 0		
Chinese Taipei	25 (0.8)	557 (2.8)	1 (1.1)	16 (0.8)	537 (3.6)	-1 (1.1)		
Colombia	26 (0.9)	371 (6.3)	0 0	44 (1.4)	345 (4.4)	0 0		
Czech Republic	26 (1.2)	466 (2.6)	0 0	6 (0.7)	424 (7.0)	0 0		
Denmark	23 (1.1)	509 (3.9)	0 0	9 (0.7)	483 (7.7)	0 0		
El Salvador	26 (0.9)	349 (4.8)	0 0	52 (1.3)	318 (4.9)	0 0		
England	17 (0.8)	513 (3.9)	0 (1.3)	9 (0.7)	473 (5.6)	1 (1.1)		
Georgia	24 (1.4)	439 (4.7)	0 0	17 (1.2)	414 (7.5)	0 0		
Germany	25 (1.0)	506 (3.1)	0 0	8 (0.7)	465 (5.1)	0 0		
Hong Kong SAR	22 (0.9)	597 (4.4)	-8 (1.2)	▼	16 (1.0)	588 (5.3)	-9 (1.7)	▼
Hungary	25 (1.0)	484 (3.9)	3 (1.3)	▲	10 (0.9)	429 (7.5)	2 (1.1)	
Iran, Islamic Rep. of	25 (1.2)	419 (5.2)	3 (1.7)	▲	53 (1.9)	380 (4.7)	-2 (2.9)	
Italy	31 (0.8)	500 (3.9)	-2 (1.3)		14 (0.9)	483 (5.7)	-4 (1.3)	▼
Japan	28 (0.9)	556 (2.6)	1 (1.2)		14 (0.7)	522 (4.3)	2 (1.1)	▲
Kazakhstan	34 (2.9)	541 (10.0)	0 0	22 (2.7)	558 (9.1)	0 0		
Kuwait	r 30 (1.2)	328 (4.7)	0 0	22 (1.2)	317 (5.6)	0 0		
Latvia	22 (1.1)	518 (4.3)	5 (1.4)	▲	8 (0.7)	501 (6.3)	2 (1.0)	▲
Lithuania	36 (1.3)	522 (3.0)	2 (1.7)		15 (0.8)	493 (5.9)	3 (1.2)	▲
Morocco	r 23 (1.3)	357 (6.8)	-2 (2.0)		53 (2.2)	336 (7.1)	-7 (3.1)	▼
Netherlands	25 (1.1)	519 (3.2)	3 (1.5)	▲	9 (0.8)	502 (6.4)	0 (1.1)	
New Zealand	18 (0.6)	460 (3.4)	1 (0.9)		10 (0.6)	432 (6.3)	1 (0.9)	
Norway	23 (0.8)	460 (3.2)	6 (1.1)	▲	7 (0.6)	420 (5.0)	0 (0.8)	
Qatar	19 (0.5)	300 (3.4)	0 0	19 (0.5)	287 (3.4)	0 0		
Russian Federation	26 (1.0)	535 (5.4)	-1 (1.8)		10 (1.8)	494 (13.8)	0 (1.9)	
Scotland	20 (0.8)	475 (3.4)	0 (1.4)		12 (0.8)	439 (4.6)	1 (1.1)	
Singapore	21 (0.8)	578 (4.9)	-1 (1.2)		10 (0.6)	540 (5.1)	0 (1.0)	
Slovak Republic	32 (0.9)	489 (4.4)	0 0	11 (1.3)	434 (8.7)	0 0		
Slovenia	30 (1.0)	487 (2.4)	2 (1.5)		9 (0.6)	459 (4.7)	2 (0.8)	▲
Sweden	21 (0.9)	483 (3.7)	0 0	7 (0.7)	454 (6.4)	0 0		
Tunisia	r 29 (1.3)	354 (5.7)	0 (2.0)		44 (2.1)	304 (5.1)	3 (3.1)	
Ukraine	31 (1.1)	459 (3.8)	0 0	11 (0.8)	425 (6.3)	0 0		
United States	21 (0.5)	512 (2.6)	-1 (0.8)		14 (0.7)	480 (3.0)	1 (0.9)	
Yemen	r 22 (1.8)	244 (9.4)	0 0	60 (2.4)	229 (7.0)	0 0		
International Avg.	25 (0.2)	466 (0.8)		20 (0.2)	438 (1.1)			
Benchmarking Participants								
Alberta, Canada	18 (0.9)	481 (4.0)	0 0	6 (0.6)	472 (5.5)	0 0		
British Columbia, Canada	18 (0.8)	478 (4.2)	0 0	6 (0.5)	463 (5.6)	0 0		
Dubai, UAE	r 29 (1.2)	441 (3.8)	0 0	17 (1.2)	410 (8.1)	0 0		
Massachusetts, US	13 (1.2)	538 (6.4)	0 0	5 (0.8)	522 (7.9)	0 0		
Minnesota, US	17 (1.1)	522 (5.9)	0 0	9 (1.3)	492 (7.5)	0 0		
Ontario, Canada	19 (1.3)	493 (4.4)	3 (1.8)		6 (0.9)	454 (9.4)	-1 (1.3)	
Quebec, Canada	23 (0.9)	506 (4.9)	-4 (1.2)	▼	11 (0.9)	488 (6.4)	0 (1.1)	

▲ 2007 percent significantly higher

▼ 2007 percent significantly lower

SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007



Exhibit 4.4 Books in the Home with Trends (Continued)

TIMSS2007
Mathematics 8th Grade

Country	More than 200 Books			101–200 Books			26–100 Books		
	2007 Percent of Students	Average Achievement	Difference in Percent from 2003	2007 Percent of Students	Average Achievement	Difference in Percent from 2003	2007 Percent of Students	Average Achievement	Difference in Percent from 2003
Algeria	2 (0.3)	~ ~	◊ ◊	4 (0.3)	395 (5.6)	◊ ◊	17 (0.8)	398 (2.7)	◊ ◊
Armenia	19 (0.9)	511 (3.8)	-1 (1.3)	13 (0.7)	511 (6.1)	0 (0.9)	28 (1.0)	503 (4.7)	0 (1.3)
Australia	22 (1.1)	532 (5.9)	-9 (1.8) ▼	22 (0.8)	516 (4.7)	-1 (1.2)	32 (1.1)	492 (4.4)	2 (1.4)
Bahrain	11 (0.5)	409 (4.3)	-6 (0.7) ▼	13 (0.6)	428 (4.3)	-1 (0.9)	32 (0.7)	411 (2.7)	1 (1.1)
Bosnia and Herzegovina	3 (0.3)	500 (8.5)	◊ ◊	4 (0.4)	487 (7.5)	◊ ◊	22 (0.8)	475 (3.4)	◊ ◊
Botswana	6 (0.4)	376 (6.8)	1 (0.6)	5 (0.4)	376 (6.9)	0 (0.5)	14 (0.7)	383 (4.9)	1 (0.9)
Bulgaria	23 (1.0)	504 (5.6)	-6 (1.7) ▼	15 (0.7)	497 (5.7)	-3 (1.1) ▼	24 (0.9)	474 (5.0)	-1 (1.4)
Chinese Taipei	18 (1.2)	649 (4.9)	3 (1.5)	13 (0.7)	636 (5.1)	-1 (0.9)	31 (0.9)	611 (4.3)	1 (1.1)
Colombia	3 (0.3)	443 (10.4)	◊ ◊	4 (0.5)	429 (9.4)	◊ ◊	20 (1.2)	406 (3.9)	◊ ◊
Cyprus	13 (0.6)	490 (4.1)	2 (0.8) ●	17 (0.7)	499 (3.4)	2 (1.0)	34 (0.6)	474 (2.4)	-1 (1.1)
Czech Republic	12 (0.6)	543 (4.3)	◊ ◊	21 (0.8)	527 (3.2)	◊ ◊	40 (0.8)	506 (2.4)	◊ ◊
Egypt	5 (0.4)	386 (9.1)	-1 (0.6)	5 (0.4)	417 (8.9)	-1 (0.6)	21 (0.7)	411 (4.8)	4 (1.0) ●
El Salvador	3 (0.4)	348 (9.9)	◊ ◊	4 (0.5)	380 (11.7)	◊ ◊	16 (0.8)	367 (4.7)	◊ ◊
England	18 (1.0)	568 (5.8)	-7 (1.5) ▼	18 (0.9)	536 (5.6)	0 (1.4)	28 (0.9)	521 (4.9)	1 (1.3)
Georgia	20 (1.5)	443 (6.0)	◊ ◊	15 (0.9)	436 (8.2)	◊ ◊	27 (1.0)	410 (7.8)	◊ ◊
Ghana	6 (0.5)	315 (10.1)	-4 (0.8) ▼	4 (0.4)	314 (10.9)	-2 (0.6) ▼	13 (0.7)	328 (6.8)	-3 (1.0) ▼
Hong Kong SAR	10 (0.6)	610 (6.7)	1 (0.9)	9 (0.5)	598 (6.4)	1 (0.7)	26 (1.0)	591 (5.8)	-1 (1.1)
Hungary	26 (1.1)	560 (4.3)	-5 (1.6) ▼	21 (0.7)	538 (4.4)	-1 (1.0)	30 (0.9)	510 (3.5)	1 (1.3)
Indonesia	1 (0.2)	~ ~	0 (0.2)	2 (0.3)	~ ~	0 (0.4)	17 (0.8)	425 (6.2)	-3 (1.1) ▼
Iran, Islamic Rep. of	6 (0.5)	445 (9.5)	-1 (0.7)	5 (0.5)	453 (10.0)	0 (0.6)	16 (1.1)	442 (6.2)	-1 (1.3)
Israel	21 (1.1)	493 (5.5)	-1 (1.4)	19 (0.8)	485 (5.3)	-3 (1.1) ▼	31 (1.0)	466 (4.7)	-2 (1.3)
Italy	22 (1.2)	505 (3.5)	3 (1.5)	16 (0.7)	498 (4.4)	2 (0.9) ●	28 (0.8)	482 (3.0)	3 (1.0) ●
Japan	16 (0.8)	604 (4.6)	-1 (1.0)	16 (0.8)	588 (3.9)	0 (0.9)	32 (0.8)	577 (3.3)	0 (1.2)
Jordan	9 (0.6)	463 (6.7)	0 (0.9)	10 (0.6)	453 (7.5)	2 (0.7) ●	29 (0.8)	444 (4.5)	2 (1.2)
Korea, Rep. of	26 (1.0)	643 (3.6)	7 (1.3) ●	25 (0.7)	613 (2.9)	3 (1.0) ●	29 (0.8)	584 (3.0)	-4 (1.1) ▼
Kuwait	10 (0.5)	354 (5.5)	◊ ◊	9 (0.4)	373 (5.2)	◊ ◊	24 (0.7)	367 (3.6)	◊ ◊
Lebanon	10 (0.7)	464 (7.6)	2 (0.9) ●	10 (0.6)	473 (6.1)	2 (1.0)	28 (1.1)	466 (5.2)	3 (1.5) ●
Lithuania	10 (0.6)	544 (4.2)	-2 (1.0)	13 (0.5)	544 (4.2)	-2 (0.8) ▼	33 (0.8)	520 (3.0)	-1 (1.2)
Malaysia	5 (0.6)	532 (9.0)	0 (0.8)	9 (0.7)	510 (6.0)	1 (0.9)	29 (0.8)	493 (5.2)	0 (1.1)
Malta	19 (0.5)	519 (3.3)	◊ ◊	19 (0.5)	516 (3.0)	◊ ◊	37 (0.7)	491 (2.4)	◊ ◊
Norway	25 (0.9)	493 (2.9)	-2 (1.5)	20 (0.7)	482 (2.3)	-2 (1.0)	30 (0.7)	471 (2.7)	-3 (1.1) ▼
Oman	9 (0.7)	395 (6.7)	◊ ◊	11 (0.8)	399 (5.3)	◊ ◊	28 (1.0)	394 (4.1)	◊ ◊
Palestinian Nat'l Auth.	7 (0.6)	380 (9.0)	0 (0.8)	7 (0.4)	398 (7.6)	0 (0.6)	23 (0.9)	386 (4.7)	-1 (1.1)
Qatar	16 (0.5)	317 (3.9)	◊ ◊	13 (0.4)	329 (3.5)	◊ ◊	27 (0.6)	326 (2.4)	◊ ◊
Romania	9 (0.7)	524 (6.4)	-3 (1.4) ▼	11 (0.6)	513 (7.2)	-2 (1.2)	30 (1.1)	485 (3.9)	1 (1.6)
Russian Federation	16 (0.8)	540 (5.9)	-6 (1.5) ▼	21 (0.8)	533 (4.7)	-5 (1.3) ▼	37 (0.9)	511 (5.0)	4 (1.6) ●
Saudi Arabia	8 (0.8)	342 (6.0)	--	7 (0.6)	358 (6.3)	--	25 (1.0)	348 (4.8)	--
Scotland	15 (0.8)	540 (5.7)	-3 (1.3) ▼	14 (0.7)	527 (4.6)	-2 (1.0) ▼	25 (0.8)	499 (3.6)	-4 (1.2) ▼
Serbia	8 (0.6)	532 (6.3)	2 (0.8)	9 (0.6)	520 (6.8)	0 (0.8)	26 (0.9)	514 (3.9)	0 (1.4)
Singapore	14 (0.6)	636 (3.6)	-1 (0.8)	15 (0.6)	625 (3.9)	-1 (0.7)	32 (0.8)	607 (3.8)	-2 (1.1)
Slovenia	11 (0.6)	535 (4.1)	-2 (1.0)	15 (0.7)	529 (3.9)	0 (1.0)	37 (0.9)	509 (2.4)	0 (1.3)
Sweden	26 (1.0)	521 (2.8)	-5 (1.6) ▼	20 (0.7)	502 (3.0)	-1 (0.9)	29 (0.8)	486 (2.8)	2 (1.2)
Syrian Arab Republic	5 (0.4)	401 (8.1)	◊ ◊	7 (0.4)	409 (6.7)	◊ ◊	22 (0.8)	409 (4.3)	◊ ◊
Thailand	3 (0.5)	538 (14.5)	◊ ◊	4 (0.4)	506 (13.4)	◊ ◊	21 (1.0)	471 (7.0)	◊ ◊
Tunisia	3 (0.3)	461 (8.0)	-1 (0.5)	5 (0.5)	477 (6.3)	-1 (0.8)	21 (1.0)	441 (3.3)	-1 (1.4)
Turkey	5 (0.5)	494 (10.8)	◊ ◊	9 (0.6)	497 (7.9)	◊ ◊	23 (0.9)	467 (5.4)	◊ ◊
Ukraine	12 (0.9)	500 (7.0)	◊ ◊	16 (0.7)	489 (4.5)	◊ ◊	35 (0.9)	472 (3.8)	◊ ◊
United States	18 (0.8)	546 (3.4)	-6 (1.2) ▼	17 (0.6)	538 (3.3)	-1 (0.8)	28 (0.7)	515 (2.4)	1 (0.9)
‡ Morocco	6 (0.7)	400 (7.4)	--	8 (0.8)	406 (5.1)	--	22 (1.4)	395 (5.9)	--
International Avg.	12 (0.1)	486 (1.0)		12 (0.1)	481 (0.9)		27 (0.1)	464 (0.6)	
Benchmarking Participants									
Basque Country, Spain	26 (1.3)	527 (3.9)	1 (1.9)	22 (1.1)	510 (3.4)	2 (1.4)	33 (1.3)	493 (3.8)	-3 (1.8)
British Columbia, Canada	24 (1.0)	531 (3.7)	◊ ◊	21 (0.8)	519 (3.5)	◊ ◊	31 (0.8)	513 (3.3)	◊ ◊
Dubai, UAE	11 (0.9)	501 (6.6)	◊ ◊	14 (0.9)	500 (5.1)	◊ ◊	29 (0.9)	481 (3.0)	◊ ◊
Massachusetts, US	26 (2.0)	587 (5.3)	◊ ◊	19 (1.1)	564 (4.1)	◊ ◊	27 (1.5)	551 (5.1)	◊ ◊
Minnesota, US	23 (1.9)	560 (6.1)	◊ ◊	21 (1.5)	551 (5.4)	◊ ◊	30 (1.6)	528 (3.9)	◊ ◊
Ontario, Canada	23 (1.3)	544 (3.8)	-5 (2.0) ▼	22 (1.0)	528 (4.0)	1 (1.3)	31 (0.9)	517 (3.6)	1 (1.5)
Quebec, Canada	12 (0.9)	567 (7.6)	-1 (1.2)	13 (0.7)	553 (6.1)	-3 (1.1) ▼	32 (1.0)	533 (3.6)	-2 (1.3)

● 2007 percent significantly higher

▼ 2007 percent significantly lower

Background data provided by students.

‡ Did not satisfy guidelines for sample participation rates (see Appendix A).

() Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals may appear inconsistent.

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

A diamond (◊) indicates the country did not participate in the assessment.



Exhibit 4.4 Books in the Home with Trends (Continued)

TIMSS2007
Mathematics 8th Grade

Country	11–25 Books			0–10 Books		
	2007 Percent of Students	Average Achievement	Difference in Percent from 2003	2007 Percent of Students	Average Achievement	Difference in Percent from 2003
Algeria	41 (0.8)	386 (2.8)	0 0	36 (1.2)	382 (2.5)	0 0
Armenia	24 (1.0)	487 (4.9)	0 (1.3)	16 (0.9)	485 (7.1)	0 (1.3)
Australia	15 (1.0)	464 (4.9)	4 (1.2) ▲	9 (0.6)	438 (5.5)	4 (0.8) ▲
Bahrain	27 (0.8)	381 (2.8)	1 (1.1)	17 (0.7)	375 (4.0)	6 (0.8) ▲
Bosnia and Herzegovina	45 (1.0)	454 (2.9)	0 0	26 (1.0)	435 (3.8)	0 0
Botswana	37 (1.0)	364 (2.5)	7 (1.3) ▲	39 (0.8)	358 (3.0)	-10 (1.5) ▼
Bulgaria	16 (0.9)	444 (7.1)	1 (1.1)	22 (1.4)	410 (9.7)	8 (2.1) ▲
Chinese Taipei	21 (0.9)	577 (5.6)	-3 (1.2) ▼	17 (1.1)	518 (5.8)	0 (1.4)
Colombia	35 (1.1)	383 (4.4)	0 0	37 (1.9)	351 (3.3)	0 0
Cyprus	25 (0.7)	444 (3.1)	-2 (1.0)	10 (0.5)	407 (4.9)	-1 (0.7)
Czech Republic	20 (0.7)	469 (3.4)	0 0	7 (0.5)	451 (5.5)	0 0
Egypt	38 (0.9)	390 (4.3)	0 (1.2)	31 (1.1)	381 (4.8)	-2 (1.6)
El Salvador	32 (1.0)	348 (3.6)	0 0	44 (1.4)	322 (3.1)	0 0
England	21 (0.9)	485 (5.3)	4 (1.3) ▲	15 (1.0)	452 (6.4)	2 (1.5)
Georgia	25 (1.3)	389 (8.8)	0 0	13 (1.4)	375 (8.6)	0 0
Ghana	39 (1.3)	306 (4.4)	5 (1.6) ▲	38 (1.7)	308 (5.6)	3 (2.2)
Hong Kong SAR	30 (0.8)	568 (6.3)	1 (1.1)	26 (1.0)	537 (7.4)	-2 (1.3)
Hungary	15 (0.9)	469 (4.5)	2 (1.1)	7 (0.6)	431 (7.5)	3 (0.9) ▲
Indonesia	55 (1.2)	389 (3.8)	10 (1.5) ▲	25 (1.3)	393 (5.4)	-7 (1.6) ▼
Iran, Islamic Rep. of	30 (1.2)	402 (5.1)	-1 (1.4)	43 (1.8)	379 (3.9)	4 (2.2)
Israel	20 (1.0)	440 (5.0)	3 (1.3)	9 (0.6)	417 (9.4)	3 (0.8) ▲
Italy	23 (0.8)	458 (4.3)	-6 (1.1) ▼	11 (0.6)	439 (6.3)	-2 (0.9) ▼
Japan	21 (0.7)	551 (4.0)	0 (0.9)	15 (0.8)	526 (4.4)	1 (1.1)
Jordan	35 (0.9)	417 (5.1)	2 (1.3)	17 (0.9)	395 (7.5)	-6 (1.2) ▼
Korea, Rep. of	11 (0.6)	548 (4.9)	0 (0.8)	9 (0.6)	528 (4.6)	-6 (0.9) ▼
Kuwait	30 (0.8)	354 (3.6)	0 0	27 (0.9)	341 (3.7)	0 0
Lebanon	30 (1.1)	442 (4.8)	-6 (1.6) ▼	22 (1.3)	425 (4.4)	-1 (1.9)
Lithuania	32 (1.0)	483 (3.1)	3 (1.5)	12 (0.9)	458 (6.1)	2 (1.2)
Malaysia	38 (1.0)	460 (4.6)	-2 (1.4)	19 (1.0)	439 (5.7)	2 (1.4)
Malta	18 (0.6)	460 (3.6)	0 0	8 (0.3)	401 (4.2)	0 0
Norway	17 (0.8)	443 (3.4)	6 (1.0) ▲	7 (0.5)	415 (3.9)	1 (0.6)
Oman	31 (0.9)	366 (4.0)	0 0	21 (1.0)	338 (4.6)	0 0
Palestinian Nat'l Auth.	35 (1.0)	369 (4.3)	-1 (1.3)	29 (1.2)	349 (4.7)	2 (1.6)
Qatar	25 (0.5)	295 (2.3)	0 0	19 (0.5)	275 (2.8)	0 0
Romania	33 (1.1)	442 (5.9)	7 (1.7) ▲	17 (1.1)	398 (6.2)	-3 (2.1)
Russian Federation	22 (0.8)	484 (5.1)	5 (1.3) ▲	5 (0.6)	467 (9.7)	1 (0.8)
Saudi Arabia	32 (0.9)	328 (4.0)	--	27 (1.1)	306 (4.7)	--
Scotland	24 (0.9)	469 (4.1)	3 (1.3) ▲	22 (1.1)	439 (4.5)	6 (1.4) ▲
Serbia	39 (1.3)	470 (3.6)	1 (1.6)	18 (1.0)	443 (5.0)	-3 (1.5)
Singapore	24 (0.8)	568 (5.0)	0 (1.0)	16 (0.8)	536 (6.6)	4 (1.0) ▲
Slovenia	29 (0.9)	479 (3.1)	3 (1.2) ▲	7 (0.5)	449 (4.5)	0 (0.8)
Sweden	16 (0.7)	468 (3.0)	2 (1.0)	8 (0.5)	442 (5.1)	2 (0.7) ▲
Syrian Arab Republic	39 (0.8)	393 (4.1)	0 0	27 (1.1)	386 (4.8)	0 0
Thailand	42 (1.2)	434 (4.3)	0 0	30 (1.5)	413 (5.5)	0 0
Tunisia	41 (1.0)	412 (2.5)	-3 (1.5) ▼	30 (1.4)	406 (3.0)	7 (1.8) ▲
Turkey	37 (1.0)	427 (4.9)	0 0	26 (1.5)	378 (4.1)	0 0
Ukraine	30 (1.1)	435 (4.3)	0 0	7 (0.5)	406 (7.3)	0 0
United States	20 (0.7)	482 (3.0)	2 (0.9) ▲	17 (0.9)	461 (3.6)	4 (1.0) ▲
‡ Morocco	38 (1.2)	374 (4.0)	--	25 (1.7)	367 (4.6)	--
International Avg.	29 (0.1)	436 (0.6)		20 (0.2)	413 (0.8)	
Benchmarking Participants						
Basque Country, Spain	15 (1.0)	468 (5.3)	-1 (1.3)	5 (0.6)	429 (8.1)	0 (0.8)
British Columbia, Canada	15 (0.8)	485 (6.2)	0 0	9 (0.6)	460 (5.9)	0 0
Dubai, UAE	29 (1.4)	445 (3.8)	0 0	17 (0.9)	414 (4.9)	0 0
Massachusetts, US	15 (0.7)	509 (6.1)	0 0	12 (1.0)	478 (9.6)	0 0
Minnesota, US	16 (1.1)	511 (7.5)	0 0	10 (0.9)	483 (6.4)	0 0
Ontario, Canada	16 (1.0)	489 (4.9)	3 (1.3) ▲	8 (0.9)	474 (10.7)	1 (1.1)
Quebec, Canada	26 (1.0)	515 (3.6)	2 (1.4)	18 (0.8)	501 (3.0)	3 (1.1) ▲

SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007

▲ 2007 percent significantly higher

▼ 2007 percent significantly lower



learning experiences. Exhibit 4.5 presents fourth and eighth grade students' reports of having a computer at home and whether or not it has an Internet connection, in relation to their average achievement in mathematics.

At both grades, 70 percent of students reported having a computer at home, and about half (56% at fourth grade, 50% at eighth grade) had an Internet connection. Ninety percent or more of the fourth grade students reported having a computer at home in Australia, Austria, the Czech Republic, Denmark, England, Germany, Hong Kong SAR, the Netherlands, New Zealand, Norway, Scotland, Singapore, Sweden, the United States, as well as Massachusetts, Minnesota, and the four Canadian provinces. In addition, in Denmark, the Netherlands, Norway, Sweden, and the state of Massachusetts, more than 90 percent of students reported having an Internet connection for the computer. Although having a computer at home is clearly very common in many countries, there also are countries where relatively few fourth grade students come from computer equipped homes, and even fewer from homes with computers connected to the Internet. More than 60 percent of students in Algeria, Colombia, El Salvador, Georgia, Iran, Kazakhstan, and Yemen are from homes without a computer, and about 80 percent (or more) do not have a computer connected to the Internet.

On average across countries at the fourth grade, students from homes with a computer had mathematics achievement nearly 40 points above those from homes without a computer (483 points, on average vs. 444 points), and those from homes with an Internet-connected computer nearly 30 points above students from homes without such a facility (483 vs. 455). These achievement differences may be at least partly a reflection of socioeconomic differences, since, in many countries, computers and Internet connections require significant financial outlay.

At the eighth grade, in 18 of the 49 countries and in all 7 benchmarking entities, 90 percent or more of the students reported that they had a computer in the home, and the vast majority of students in these countries also reported having an Internet connection for the computer. However, there also were countries where many students did not have a computer at home, including

Armenia, Botswana, Colombia, El Salvador, Georgia, Ghana, Indonesia, and Tunisia, where 60 percent or more of students reported not having a computer at home, and 80 percent or more did not have Internet access at home. Like at the fourth grade, eighth grade students with a computer at home had higher average mathematics achievement than students without a computer, and students with an Internet-connected computer had higher achievement than students than those that did not.

From an educational perspective, actually using a computer may be more important for a student than merely having one in the home. Exhibit 4.6 presents students' reports on where, if anywhere, they use a computer. This exhibit presents, for each TIMSS participant at fourth and eighth grades, the percentage of students that reported using a computer both at home and at school, at home but not at school, at school but not at home, only at places other than home and school, and not using a computer at all. Also shown is the average mathematics achievement for students in each category of computer use, as well as changes in the percentages in each category since 2003. Countries are ordered by the percentage of students using a computer both at home and at school.

At fourth grade, on average across countries, 38 percent of students reported using a computer both at home and at school and a further 31 percent at home but not at school. Just 9 percent reported using a computer at school but not at home, 5 percent only at places other than home and school, and 17 percent reported not using a computer at all. Average achievement was highest among those reporting using a computer at home and at school and at home only, perhaps reflecting an economic advantage for those with a computer at home, and lowest among those reporting that they do not use a computer at all or use one only at places other than the home and the school.

TIMSS participants with the highest percentage (more than 70%) of students reporting using a computer both at home and at school included Chinese Taipei, Scotland, Australia, England, Hong Kong SAR, the Netherlands, Denmark, and Canadian provinces of Alberta, Ontario, and British Columbia. As a contrast, 40 percent or more of fourth grade students in

Exhibit 4.5 Computer and Internet Connection in the Home

TIMSS2007
Mathematics 4th Grade

Country	Have Computer		Do Not Have Computer		Have Internet Connection		Do Not Have Internet Connection	
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement
Algeria	32 (1.5)	391 (6.6)	68 (1.5)	375 (5.4)	13 (1.0)	369 (7.6)	87 (1.0)	382 (5.3)
Armenia	38 (1.6)	499 (4.5)	62 (1.6)	504 (5.4)	21 (1.3)	506 (13.6)	79 (1.3)	500 (3.9)
Australia	95 (0.6)	521 (3.3)	5 (0.6)	446 (11.0)	84 (0.8)	527 (3.3)	16 (0.8)	470 (6.0)
Austria	93 (0.5)	509 (2.0)	7 (0.5)	471 (4.4)	73 (1.2)	516 (2.0)	27 (1.2)	478 (2.9)
Chinese Taipei	87 (0.6)	583 (1.7)	13 (0.6)	535 (3.9)	80 (0.7)	582 (1.8)	20 (0.7)	554 (3.7)
Colombia	39 (1.2)	379 (6.8)	61 (1.2)	346 (4.8)	16 (0.9)	382 (10.1)	84 (0.9)	354 (4.8)
Czech Republic	90 (0.7)	491 (2.5)	10 (0.7)	449 (6.0)	65 (1.2)	498 (3.0)	35 (1.2)	467 (3.6)
Denmark	95 (0.4)	526 (2.4)	5 (0.4)	482 (9.1)	93 (0.4)	527 (2.4)	7 (0.4)	483 (6.7)
El Salvador	26 (1.3)	358 (6.2)	74 (1.3)	325 (4.2)	14 (0.9)	348 (8.7)	86 (0.9)	331 (4.1)
England	95 (0.4)	545 (2.7)	5 (0.4)	489 (8.7)	86 (0.7)	549 (2.8)	14 (0.7)	499 (4.6)
Georgia	33 (1.5)	439 (4.8)	67 (1.5)	443 (5.0)	17 (1.5)	432 (6.1)	83 (1.5)	443 (4.6)
Germany	93 (0.5)	532 (2.3)	7 (0.5)	489 (5.9)	81 (0.8)	536 (2.2)	19 (0.8)	495 (4.0)
Hong Kong SAR	94 (0.5)	609 (3.6)	6 (0.5)	580 (7.2)	86 (0.8)	611 (3.6)	14 (0.8)	583 (5.0)
Hungary	81 (0.7)	525 (3.5)	19 (0.7)	462 (6.1)	54 (1.3)	531 (4.0)	46 (1.3)	488 (3.8)
Iran, Islamic Rep. of	29 (1.7)	444 (5.3)	71 (1.7)	388 (4.5)	18 (1.3)	450 (6.4)	82 (1.3)	394 (4.3)
Italy	88 (0.8)	510 (3.0)	12 (0.8)	482 (5.9)	54 (1.0)	513 (2.7)	46 (1.0)	499 (4.5)
Japan	82 (0.9)	577 (2.1)	18 (0.9)	539 (3.5)	70 (1.2)	579 (2.2)	30 (1.2)	545 (2.8)
Kazakhstan	28 (1.8)	555 (6.4)	72 (1.8)	547 (8.7)	16 (1.6)	547 (7.9)	84 (1.6)	549 (7.9)
Kuwait	82 (1.0)	331 (3.4)	18 (1.0)	281 (6.0)	64 (1.4)	328 (4.2)	36 (1.4)	310 (4.8)
Latvia	76 (1.2)	547 (2.4)	24 (1.2)	512 (4.0)	57 (1.3)	548 (2.5)	43 (1.3)	523 (3.5)
Lithuania	77 (0.9)	538 (2.4)	23 (0.9)	505 (4.8)	58 (1.4)	545 (2.4)	42 (1.4)	512 (3.3)
Morocco	32 (2.0)	370 (6.9)	68 (2.0)	336 (5.4)	26 (1.7)	361 (7.9)	74 (1.7)	342 (4.9)
Netherlands	95 (0.5)	537 (2.2)	5 (0.5)	494 (6.3)	96 (0.4)	537 (2.2)	4 (0.4)	498 (6.7)
New Zealand	91 (0.5)	499 (2.2)	9 (0.5)	445 (5.3)	77 (0.9)	507 (2.2)	23 (0.9)	449 (3.7)
Norway	95 (0.4)	478 (2.4)	5 (0.4)	413 (7.4)	95 (0.4)	477 (2.6)	5 (0.4)	429 (7.2)
Qatar	80 (0.5)	310 (1.2)	20 (0.5)	268 (2.8)	58 (0.6)	308 (1.3)	42 (0.6)	294 (2.4)
Russian Federation	51 (1.8)	558 (4.5)	49 (1.8)	532 (6.6)	26 (1.4)	560 (4.9)	74 (1.4)	540 (5.7)
Scotland	94 (0.5)	498 (2.2)	6 (0.5)	447 (8.3)	85 (0.7)	502 (2.3)	15 (0.7)	453 (4.2)
Singapore	90 (0.5)	606 (3.7)	10 (0.5)	543 (6.0)	80 (0.7)	612 (3.6)	20 (0.7)	552 (4.8)
Slovak Republic	77 (1.2)	507 (3.8)	23 (1.2)	471 (6.8)	43 (1.1)	509 (4.0)	57 (1.1)	489 (5.0)
Slovenia	85 (0.6)	512 (2.1)	15 (0.6)	463 (3.8)	75 (0.8)	508 (1.9)	25 (0.8)	486 (2.9)
Sweden	98 (0.2)	503 (2.6)	2 (0.2)	~ ~	93 (0.5)	506 (2.5)	7 (0.5)	468 (6.1)
Tunisia	34 (1.3)	358 (6.6)	66 (1.3)	319 (4.1)	21 (1.1)	323 (6.8)	79 (1.1)	336 (4.7)
Ukraine	40 (1.3)	491 (3.1)	60 (1.3)	459 (3.3)	24 (1.1)	484 (4.0)	76 (1.1)	468 (3.1)
United States	90 (0.5)	534 (2.5)	10 (0.5)	489 (4.0)	78 (0.9)	541 (2.4)	22 (0.9)	492 (2.9)
Yemen	18 (1.5)	225 (8.5)	82 (1.5)	228 (6.9)	11 (1.3)	216 (7.0)	89 (1.3)	229 (6.5)
International Avg.	70 (0.2)	483 (0.7)	30 (0.2)	444 (1.2)	56 (0.2)	483 (0.8)	44 (0.2)	455 (0.8)

SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007

Benchmarking Participants

Alberta, Canada	94 (0.5)	508 (2.8)	6 (0.5)	470 (6.8)	88 (0.9)	509 (2.8)	12 (0.9)	480 (5.5)
British Columbia, Canada	95 (0.5)	508 (2.7)	5 (0.5)	467 (7.3)	89 (0.8)	510 (2.7)	11 (0.8)	475 (6.2)
Dubai, UAE	89 (0.7)	455 (2.6)	11 (0.7)	398 (6.8)	78 (0.8)	461 (2.6)	22 (0.8)	408 (5.2)
Massachusetts, US	96 (0.7)	575 (3.3)	4 (0.7)	529 (11.5)	91 (1.1)	577 (3.3)	9 (1.1)	529 (8.2)
Minnesota, US	92 (0.9)	558 (5.9)	8 (0.9)	514 (5.8)	81 (1.6)	565 (5.3)	19 (1.6)	506 (9.1)
Ontario, Canada	96 (0.4)	514 (3.1)	4 (0.4)	475 (9.9)	89 (1.0)	518 (2.9)	11 (1.0)	470 (5.5)
Quebec, Canada	95 (0.6)	521 (3.0)	5 (0.6)	486 (6.2)	87 (1.0)	524 (2.8)	13 (1.0)	488 (5.3)

Background data provided by students.

() Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals may appear inconsistent.

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



Exhibit 4.5 Computer and Internet Connection in the Home (Continued)

TIMSS2007
Mathematics 8th Grade

Country	Have Computer		Do Not Have Computer		Have Internet Connection		Do Not Have Internet Connection	
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement
Algeria	53 (1.7)	386 (2.4)	47 (1.7)	389 (3.0)	15 (0.9)	386 (3.2)	85 (0.9)	388 (2.2)
Armenia	34 (1.2)	508 (6.3)	66 (1.2)	495 (3.2)	17 (0.9)	513 (9.0)	83 (0.9)	497 (3.0)
Australia	97 (0.3)	499 (4.0)	3 (0.3)	425 (9.3)	89 (0.7)	503 (3.9)	11 (0.7)	443 (6.2)
Bahrain	86 (0.8)	401 (1.7)	14 (0.8)	390 (3.8)	74 (0.8)	405 (2.0)	26 (0.8)	381 (3.2)
Bosnia and Herzegovina	72 (1.1)	468 (2.7)	28 (1.1)	427 (3.7)	31 (1.3)	485 (3.3)	69 (1.3)	445 (2.7)
Botswana	26 (0.8)	371 (3.5)	74 (0.8)	364 (2.4)	13 (0.7)	357 (5.2)	87 (0.7)	367 (2.4)
Bulgaria	70 (1.3)	480 (5.1)	30 (1.3)	434 (7.3)	57 (1.3)	486 (4.8)	43 (1.3)	438 (6.8)
Chinese Taipei	94 (0.4)	605 (4.3)	6 (0.4)	505 (9.8)	89 (0.7)	605 (4.3)	11 (0.7)	542 (7.4)
Colombia	37 (1.7)	405 (4.5)	63 (1.7)	366 (3.7)	15 (1.4)	423 (7.1)	85 (1.4)	373 (3.8)
Cyprus	94 (0.3)	471 (1.5)	6 (0.3)	395 (6.9)	65 (0.9)	479 (1.9)	35 (0.9)	443 (2.8)
Czech Republic	94 (0.5)	506 (2.4)	6 (0.5)	459 (6.6)	76 (1.1)	512 (2.3)	24 (1.1)	478 (3.8)
Egypt	48 (1.2)	407 (3.9)	52 (1.2)	384 (4.3)	25 (1.2)	405 (4.4)	75 (1.2)	390 (3.8)
El Salvador	30 (1.3)	362 (4.3)	70 (1.3)	333 (2.8)	10 (0.9)	375 (6.8)	90 (0.9)	338 (2.6)
England	98 (0.2)	515 (4.9)	2 (0.2)	~ ~	92 (0.6)	518 (4.8)	8 (0.6)	467 (8.8)
Georgia	26 (1.4)	420 (5.1)	74 (1.4)	408 (6.5)	14 (1.0)	423 (7.0)	86 (1.0)	409 (6.2)
Ghana	25 (1.2)	310 (6.9)	75 (1.2)	313 (4.4)	10 (0.7)	259 (7.7)	90 (0.7)	318 (4.0)
Hong Kong SAR	99 (0.3)	574 (5.7)	1 (0.3)	~ ~	97 (0.4)	575 (5.7)	3 (0.4)	514 (14.1)
Hungary	90 (0.8)	525 (3.4)	10 (0.8)	458 (6.3)	62 (1.6)	538 (3.7)	38 (1.6)	484 (4.0)
Indonesia	17 (1.3)	433 (8.7)	83 (1.3)	393 (3.8)	8 (0.8)	407 (14.1)	92 (0.8)	398 (3.7)
Iran, Islamic Rep. of	39 (1.9)	440 (6.3)	61 (1.9)	384 (3.6)	25 (1.6)	450 (6.9)	75 (1.6)	389 (3.4)
Israel	95 (0.7)	469 (3.9)	5 (0.7)	391 (12.3)	84 (1.2)	474 (4.2)	16 (1.2)	421 (7.5)
Italy	95 (0.4)	482 (2.9)	5 (0.4)	435 (8.9)	70 (1.1)	491 (3.0)	30 (1.1)	453 (3.9)
Japan	88 (0.7)	577 (2.4)	12 (0.7)	529 (4.4)	77 (0.9)	581 (2.5)	23 (0.9)	534 (3.5)
Jordan	66 (1.3)	445 (3.7)	34 (1.3)	395 (5.3)	24 (1.2)	453 (5.0)	76 (1.2)	421 (4.4)
Korea, Rep. of	99 (0.2)	599 (2.7)	1 (0.2)	~ ~	96 (0.3)	601 (2.6)	4 (0.3)	502 (9.7)
Kuwait	94 (0.5)	358 (2.2)	6 (0.5)	312 (7.6)	71 (0.7)	360 (2.5)	29 (0.7)	343 (2.9)
Lebanon	77 (1.4)	459 (4.4)	23 (1.4)	422 (4.0)	36 (1.6)	463 (5.6)	64 (1.6)	443 (4.1)
Lithuania	85 (0.8)	514 (2.3)	15 (0.8)	462 (4.3)	66 (1.2)	521 (2.5)	34 (1.2)	477 (3.2)
Malaysia	59 (1.7)	496 (5.5)	41 (1.7)	442 (4.5)	27 (1.7)	517 (6.3)	73 (1.7)	458 (4.6)
Malta	--	--	--	--	--	--	--	--
Norway	99 (0.2)	471 (1.9)	1 (0.2)	~ ~	97 (0.3)	471 (2.0)	3 (0.3)	427 (7.4)
Oman	67 (1.1)	388 (3.3)	33 (1.1)	348 (4.4)	35 (1.3)	393 (4.0)	65 (1.3)	365 (3.5)
Palestinian Nat'l Auth.	66 (1.3)	382 (3.5)	34 (1.3)	346 (4.9)	31 (1.2)	386 (4.5)	69 (1.2)	363 (3.9)
Qatar	92 (0.3)	313 (1.4)	8 (0.3)	252 (4.5)	74 (0.5)	315 (1.9)	26 (0.5)	289 (2.5)
Romania	64 (1.3)	481 (4.2)	36 (1.3)	436 (5.5)	33 (1.6)	498 (4.7)	67 (1.6)	447 (4.6)
Russian Federation	61 (1.8)	528 (4.4)	39 (1.8)	487 (4.5)	32 (1.4)	534 (5.1)	68 (1.4)	502 (3.9)
Saudi Arabia	81 (1.2)	335 (2.9)	19 (1.2)	313 (5.1)	41 (1.5)	350 (3.2)	59 (1.5)	318 (3.5)
Scotland	98 (0.3)	490 (3.7)	2 (0.3)	~ ~	92 (0.5)	492 (3.7)	8 (0.5)	446 (6.6)
Serbia	77 (1.0)	499 (3.5)	23 (1.0)	447 (5.0)	47 (1.4)	514 (3.7)	53 (1.4)	464 (3.8)
Singapore	94 (0.5)	599 (3.5)	6 (0.5)	509 (6.6)	87 (0.7)	604 (3.5)	13 (0.7)	514 (5.7)
Slovenia	97 (0.3)	504 (2.0)	3 (0.3)	435 (7.1)	86 (0.7)	506 (2.0)	14 (0.7)	473 (4.4)
Sweden	99 (0.2)	492 (2.3)	1 (0.2)	~ ~	97 (0.3)	493 (2.2)	3 (0.3)	455 (6.5)
Syrian Arab Republic	62 (1.3)	400 (3.8)	38 (1.3)	393 (4.7)	19 (1.1)	411 (5.2)	81 (1.1)	394 (3.7)
Thailand	41 (1.6)	478 (7.7)	59 (1.6)	417 (4.4)	20 (1.4)	503 (10.6)	80 (1.4)	426 (4.3)
Tunisia	39 (2.0)	444 (3.1)	61 (2.0)	409 (2.2)	18 (1.2)	444 (4.5)	82 (1.2)	417 (2.2)
Turkey	43 (1.6)	467 (5.6)	57 (1.6)	408 (4.5)	20 (1.2)	491 (7.3)	80 (1.2)	418 (4.2)
Ukraine	46 (1.6)	491 (4.0)	54 (1.6)	439 (3.8)	22 (1.2)	486 (5.3)	78 (1.2)	458 (3.5)
United States	94 (0.4)	511 (2.8)	6 (0.4)	463 (4.8)	87 (0.6)	514 (2.8)	13 (0.6)	472 (3.9)
‡ Morocco	45 (1.8)	399 (4.2)	55 (1.8)	368 (3.0)	37 (1.6)	391 (3.7)	63 (1.6)	376 (3.8)
International Avg.	70 (0.2)	462 (0.7)	30 (0.2)	409 (1.1)	50 (0.2)	466 (0.9)	50 (0.2)	429 (0.9)
Benchmarking Participants								
Basque Country, Spain	96 (0.5)	502 (2.9)	4 (0.5)	431 (10.9)	84 (1.0)	504 (2.9)	16 (1.0)	471 (5.2)
British Columbia, Canada	98 (0.2)	511 (3.1)	2 (0.2)	~ ~	96 (0.5)	513 (3.1)	4 (0.5)	451 (5.9)
Dubai, UAE	95 (0.5)	469 (2.6)	5 (0.5)	396 (7.2)	84 (0.6)	473 (2.6)	16 (0.6)	415 (4.1)
Massachusetts, US	97 (0.4)	549 (4.4)	3 (0.4)	490 (11.3)	93 (0.7)	552 (4.1)	7 (0.7)	482 (10.5)
Minnesota, US	96 (0.5)	535 (4.2)	4 (0.5)	474 (12.1)	89 (1.2)	537 (4.0)	11 (1.2)	492 (8.7)
Ontario, Canada	99 (0.2)	518 (3.5)	1 (0.2)	~ ~	96 (0.5)	519 (3.6)	4 (0.5)	479 (8.7)
Quebec, Canada	97 (0.4)	530 (3.5)	3 (0.4)	490 (8.1)	93 (0.6)	531 (3.5)	7 (0.6)	500 (6.2)

Background data provided by students.

‡ Did not satisfy guidelines for sample participation rates (see Appendix A).

() Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals may appear inconsistent.

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



Exhibit 4.6 Computer Use with Trends

TIMSS2007
Mathematics 4th Grade

Country	Use Computer Both at Home and at School			Use Computer at Home but Not at School			Use Computer at School but Not at Home		
	2007 Percent of Students	Average Achievement	Difference in Percent from 2003	2007 Percent of Students	Average Achievement	Difference in Percent from 2003	2007 Percent of Students	Average Achievement	Difference in Percent from 2003
Chinese Taipei	84 (0.7)	582 (2.0)	3 (1.6)	8 (0.4)	554 (4.9)	2 (1.3)	7 (0.5)	544 (5.7)	-5 (0.9)
Scotland	79 (1.0)	502 (2.2)	2 (1.4)	12 (0.7)	474 (5.7)	5 (1.0)	7 (0.5)	461 (6.6)	-6 (0.9)
Australia	79 (1.4)	525 (3.7)	-2 (2.1)	13 (1.2)	493 (6.2)	7 (1.5)	7 (0.6)	471 (8.9)	-4 (1.2)
England	78 (1.0)	551 (2.9)	-1 (1.5)	13 (0.9)	521 (5.2)	6 (1.1)	7 (0.6)	489 (8.5)	-4 (1.0)
Hong Kong SAR	78 (1.1)	613 (3.6)	2 (1.7)	16 (0.8)	587 (5.0)	7 (1.2)	4 (0.4)	591 (8.3)	-8 (1.0)
Netherlands	77 (1.3)	540 (2.2)	-2 (2.4)	16 (1.3)	521 (4.0)	4 (2.1)	3 (0.3)	517 (9.3)	-1 (0.5)
Denmark	75 (1.4)	528 (2.6)	0 0	21 (1.3)	515 (4.7)	0 0	3 (0.4)	495 (10.3)	0 0
Singapore	67 (1.1)	614 (3.5)	-4 (1.7)	22 (0.8)	584 (4.8)	5 (1.3)	7 (0.5)	548 (6.9)	0 (0.7)
New Zealand	66 (1.0)	506 (2.3)	-5 (1.5)	20 (0.9)	483 (4.4)	8 (1.2)	10 (0.5)	446 (4.9)	-2 (0.9)
Kuwait	61 (1.6)	330 (3.8)	0 0	23 (1.2)	313 (6.1)	0 0	11 (0.7)	291 (6.9)	0 0
Norway	59 (1.8)	482 (3.2)	-1 (2.5)	34 (1.7)	469 (3.2)	6 (2.4)	3 (0.3)	437 (10.9)	-2 (0.6)
United States	58 (1.0)	540 (2.6)	-16 (1.5)	26 (1.0)	524 (3.2)	14 (1.4)	10 (0.5)	496 (3.5)	-1 (0.8)
Sweden	53 (2.0)	508 (2.6)	0 0	42 (2.0)	498 (3.3)	0 0	3 (0.3)	493 (8.9)	0 0
Japan	47 (1.4)	587 (2.3)	-8 (1.8)	19 (1.2)	565 (3.2)	10 (1.4)	26 (1.0)	550 (3.0)	-5 (1.4)
Czech Republic	44 (2.5)	498 (3.4)	0 0	46 (2.4)	483 (3.0)	0 0	6 (0.7)	448 (8.0)	0 0
Qatar	44 (0.6)	314 (1.8)	0 0	38 (0.6)	297 (3.0)	0 0	11 (0.3)	267 (5.5)	0 0
Italy	37 (1.4)	523 (3.1)	7 (2.3)	24 (1.3)	505 (4.1)	-14 (2.3)	5 (0.4)	501 (7.0)	-6 (1.0)
Hungary	33 (2.0)	527 (5.7)	9 (2.9)	49 (2.1)	516 (4.4)	6 (2.9)	7 (0.8)	450 (9.2)	-2 (1.3)
Germany	30 (1.5)	533 (3.8)	0 0	55 (1.5)	528 (2.6)	0 0	3 (0.3)	486 (9.8)	0 0
Slovak Republic	30 (1.7)	517 (5.0)	0 0	46 (1.7)	496 (4.3)	0 0	13 (1.0)	478 (5.5)	0 0
Slovenia	28 (1.5)	508 (2.7)	-4 (2.4)	64 (1.4)	503 (2.0)	18 (2.4)	2 (0.3)	~ ~	-3 (0.7)
Austria	27 (1.5)	515 (2.7)	0 0	56 (1.6)	505 (2.5)	0 0	4 (0.3)	478 (6.5)	0 0
Tunisia	18 (1.4)	336 (9.2)	11 (1.6)	28 (1.5)	353 (6.5)	3 (2.1)	23 (2.1)	323 (7.2)	16 (2.3)
Colombia	15 (1.0)	383 (10.2)	0 0	18 (1.3)	369 (8.4)	0 0	30 (1.8)	357 (6.1)	0 0
Kazakhstan	14 (1.9)	560 (13.2)	0 0	22 (2.0)	543 (6.6)	0 0	26 (2.6)	547 (12.4)	0 0
Latvia	14 (1.2)	546 (6.5)	4 (1.8)	61 (1.6)	546 (2.4)	34 (2.3)	8 (1.0)	504 (8.7)	-9 (2.3)
Morocco	13 (2.2)	346 (21.1)	-3 (2.5)	25 (1.5)	354 (4.8)	0 (2.3)	6 (0.7)	310 (8.2)	-1 (1.0)
Lithuania	13 (1.2)	537 (5.0)	3 (1.7)	64 (1.7)	538 (2.4)	29 (2.2)	7 (0.9)	495 (8.2)	-11 (1.8)
El Salvador	11 (1.3)	356 (12.4)	0 0	20 (1.2)	332 (5.4)	0 0	17 (1.6)	338 (6.4)	0 0
Russian Federation	11 (1.4)	568 (7.9)	7 (1.5)	45 (2.2)	554 (4.4)	25 (2.4)	12 (1.7)	537 (15.0)	1 (2.3)
Yemen	9 (0.9)	209 (9.6)	0 0	23 (1.7)	229 (7.1)	0 0	9 (0.9)	201 (11.9)	0 0
Algeria	8 (1.1)	328 (20.0)	0 0	25 (1.7)	385 (5.8)	0 0	4 (0.5)	332 (15.4)	0 0
Armenia	7 (0.8)	489 (7.3)	2 (0.9)	44 (1.9)	493 (4.3)	14 (2.3)	15 (1.6)	508 (8.2)	6 (2.0)
Ukraine	6 (0.7)	493 (7.0)	0 0	34 (1.3)	489 (3.5)	0 0	8 (1.2)	463 (7.6)	0 0
Georgia	6 (0.6)	404 (10.0)	0 0	37 (1.8)	428 (4.5)	0 0	6 (0.9)	427 (10.9)	0 0
Iran, Islamic Rep. of	2 (0.5)	~ ~	-1 (0.6)	19 (1.3)	457 (4.2)	8 (1.9)	1 (0.2)	~ ~	-2 (0.5)
International Avg.	38 (0.2)	483 (1.3)		31 (0.2)	472 (0.8)		9 (0.2)	449 (1.5)	
Benchmarking Participants									
Alberta, Canada	77 (1.2)	512 (2.8)	0 0	13 (0.9)	483 (5.2)	0 0	7 (0.5)	484 (5.1)	0 0
Ontario, Canada	73 (1.6)	517 (3.0)	-5 (2.6)	20 (1.5)	504 (4.3)	7 (2.2)	5 (0.6)	481 (9.4)	-2 (0.8)
British Columbia, Canada	72 (1.4)	512 (3.0)	0 0	19 (1.2)	496 (4.1)	0 0	6 (0.5)	474 (6.6)	0 0
Minnesota, US	66 (1.8)	564 (5.4)	0 0	22 (1.9)	547 (9.8)	0 0	8 (1.0)	510 (7.7)	0 0
Quebec, Canada	66 (1.7)	526 (3.1)	-10 (2.2)	26 (1.5)	511 (4.5)	14 (1.9)	5 (0.6)	491 (6.7)	-4 (1.0)
Dubai, UAE	63 (1.6)	459 (2.6)	0 0	29 (1.2)	440 (4.4)	0 0	6 (0.7)	386 (14.0)	0 0
Massachusetts, US	62 (2.4)	581 (3.9)	0 0	31 (2.4)	564 (4.0)	0 0	4 (0.8)	526 (13.4)	0 0

▲ 2007 percent significantly higher

▼ 2007 percent significantly lower

Background data provided by students.

(l) Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals 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.

A diamond (◊) indicates the country did not participate in the assessment.

TIMSS & PIRLS
International Study Center
Lynch School of Education, Boston College

Exhibit 4.6 Computer Use with Trends (Continued)

TIMSS2007
Mathematics 4th Grade

Country	Use Computer Only at Places Other than Home and School			Do Not Use Computer at All		
	2007 Percent of Students	Average Achievement	Difference in Percent from 2003	2007 Percent of Students	Average Achievement	Difference in Percent from 2003
Chinese Taipei	1 (0.1)	~ ~	0 (0.2)	1 (0.1)	~ ~	0 (0.2)
Scotland	1 (0.2)	~ ~	0 (0.3)	1 (0.2)	~ ~	-1 (0.3)
Australia	1 (0.2)	~ ~	-1 (0.3)	1 (0.2)	~ ~	0 (0.2)
England	1 (0.2)	~ ~	0 (0.2)	1 (0.2)	~ ~	0 (0.3)
Hong Kong SAR	1 (0.2)	~ ~	-1 (0.3)	2 (0.3)	~ ~	-1 (0.5)
Netherlands	0 (0.1)	~ ~	0 (0.2)	4 (0.5)	515 (5.8)	0 (0.7)
Denmark	1 (0.2)	~ ~	0 0	1 (0.2)	~ ~	0 0
Singapore	1 (0.2)	~ ~	0 (0.3)	2 (0.2)	~ ~	0 (0.3)
New Zealand	2 (0.2)	~ ~	-1 (0.4)	2 (0.2)	~ ~	0 (0.3)
Kuwait	2 (0.2)	~ ~	0 0	3 (0.5)	327 (12.3)	0 0
Norway	1 (0.1)	~ ~	-1 (0.4)	2 (0.3)	~ ~	-3 (0.7) ▼
United States	3 (0.2)	502 (5.5)	1 (0.3)	3 (0.3)	515 (5.6)	1 (0.3)
Sweden	1 (0.1)	~ ~	0 0	2 (0.3)	~ ~	0 0
Japan	2 (0.3)	~ ~	0 (0.4)	6 (0.6)	533 (6.4)	2 (0.7) ●
Czech Republic	3 (0.3)	460 (8.7)	0 0	2 (0.2)	~ ~	0 0
Qatar	3 (0.2)	267 (8.4)	0 0	4 (0.2)	310 (9.0)	0 0
Italy	1 (0.1)	~ ~	-8 (0.6) ▼	33 (1.0)	491 (4.3)	21 (1.2) ●
Hungary	4 (0.6)	477 (7.0)	-8 (1.0) ▼	7 (0.5)	488 (8.5)	-5 (1.0) ▼
Germany	1 (0.2)	~ ~	0 0	11 (0.6)	535 (4.4)	0 0
Slovak Republic	4 (0.6)	481 (7.8)	0 0	7 (1.0)	478 (11.7)	0 0
Slovenia	1 (0.1)	~ ~	-4 (0.6) ▼	4 (0.4)	487 (5.7)	-7 (1.0) ▼
Austria	1 (0.2)	~ ~	0 0	12 (0.8)	503 (4.0)	0 0
Tunisia	6 (0.6)	352 (7.6)	-9 (1.2) ▼	25 (2.6)	317 (6.9)	-21 (3.4) ▼
Colombia	9 (0.9)	362 (7.6)	0 0	28 (1.9)	338 (6.0)	0 0
Kazakhstan	12 (1.4)	543 (7.5)	0 0	26 (3.4)	561 (8.4)	0 0
Latvia	10 (0.8)	524 (5.2)	-14 (2.0) ▼	7 (0.7)	519 (6.2)	-16 (2.0) ▼
Morocco	9 (0.7)	362 (6.6)	-6 (1.4) ▼	46 (2.4)	339 (7.0)	9 (4.0) ●
Lithuania	8 (0.7)	522 (4.8)	-15 (1.3) ▼	7 (0.6)	504 (7.4)	-6 (1.2) ▼
El Salvador	12 (0.9)	341 (6.5)	0 0	40 (2.4)	327 (5.2)	0 0
Russian Federation	14 (0.9)	543 (5.4)	-16 (1.6) ▼	19 (2.0)	522 (9.0)	-16 (2.6) ▼
Yemen	4 (0.5)	212 (14.1)	0 0	55 (3.0)	232 (8.3)	0 0
Algeria	7 (1.0)	382 (14.6)	0 0	55 (2.5)	385 (5.1)	0 0
Armenia	12 (0.9)	516 (9.4)	-12 (1.4) ▼	21 (1.5)	508 (7.8)	-10 (2.1) ▼
Ukraine	12 (0.8)	496 (5.6)	0 0	40 (1.4)	450 (3.6)	0 0
Georgia	10 (1.0)	455 (5.9)	0 0	42 (2.3)	459 (5.6)	0 0
Iran, Islamic Rep. of	4 (0.5)	425 (7.0)	-4 (1.1) ▼	75 (1.7)	386 (4.4)	-1 (2.6)
International Avg.	5 (0.1)	433 (1.9)		17 (0.2)	441 (1.4)	
Benchmarking Participants						
Alberta, Canada	1 (0.2)	~ ~	0 0	1 (0.2)	~ ~	0 0
Ontario, Canada	1 (0.3)	~ ~	0 (0.5)	1 (0.2)	~ ~	0 (0.3)
British Columbia, Canada	1 (0.2)	~ ~	0 0	1 (0.3)	~ ~	0 0
Minnesota, US	2 (0.3)	~ ~	0 0	2 (0.3)	~ ~	0 0
Quebec, Canada	1 (0.3)	~ ~	0 (0.4)	2 (0.3)	~ ~	1 (0.4)
Dubai, UAE	1 (0.2)	~ ~	0 0	1 (0.2)	~ ~	0 0
Massachusetts, US	2 (0.3)	~ ~	0 0	1 (0.3)	~ ~	0 0

SOURCE: IEAs Trends in International Mathematics and Science Study (TIMSS) 2007

● 2007 percent significantly higher
▼ 2007 percent significantly lower

Exhibit 4.6 Computer Use with Trends (Continued)

TIMSS2007
Mathematics 8th Grade

Country	Use Computer Both at Home and at School			Use Computer at Home but Not at School			Use Computer at School but Not at Home		
	2007 Percent of Students	Average Achievement	Difference in Percent from 2003	2007 Percent of Students	Average Achievement	Difference in Percent from 2003	2007 Percent of Students	Average Achievement	Difference in Percent from 2003
Chinese Taipei	87 (0.7)	608 (4.2)	-1 (1.1)	8 (0.5)	562 (7.6)	6 (0.5)	3 (0.4)	511 (10.8)	-6 (0.9)
Hong Kong SAR	84 (1.0)	582 (5.1)	-4 (1.2)	13 (0.9)	537 (9.1)	5 (1.1)	1 (0.3)	~ ~	-1 (0.4)
Malta	84 (0.6)	495 (1.4)	0 0	12 (0.5)	473 (3.8)	0 0	3 (0.3)	376 (8.1)	0 0
Australia	77 (1.0)	506 (4.0)	-6 (1.4)	17 (0.9)	480 (5.8)	7 (1.3)	4 (0.4)	435 (9.4)	-1 (0.6)
England	76 (1.1)	526 (4.9)	-5 (1.4)	20 (1.0)	486 (5.5)	10 (1.2)	3 (0.4)	450 (10.1)	-4 (0.8)
Czech Republic	76 (1.1)	511 (2.3)	0 0	15 (0.9)	497 (4.4)	0 0	8 (0.6)	458 (6.3)	0 0
Cyprus	74 (0.7)	477 (1.7)	3 (1.0)	17 (0.6)	459 (4.6)	10 (0.7)	6 (0.3)	410 (7.1)	-10 (0.7)
Scotland	71 (1.1)	498 (3.9)	-7 (1.5)	25 (1.0)	473 (4.8)	13 (1.3)	3 (0.3)	442 (9.4)	-6 (0.7)
United States	69 (1.0)	519 (2.7)	-10 (1.4)	22 (0.9)	496 (4.0)	10 (1.3)	6 (0.4)	468 (4.5)	-2 (0.6)
Norway	67 (1.2)	477 (2.3)	-3 (2.0)	30 (1.2)	459 (2.3)	8 (1.9)	1 (0.2)	~ ~	-3 (0.5)
Singapore	67 (1.0)	609 (3.6)	-12 (1.2)	25 (0.8)	579 (4.5)	11 (1.0)	5 (0.4)	503 (7.7)	0 (0.6)
Hungary	67 (1.1)	531 (3.6)	6 (1.8)	21 (0.9)	511 (4.0)	13 (1.3)	10 (0.7)	456 (6.0)	-16 (1.3)
Sweden	67 (1.4)	498 (2.4)	-11 (1.9)	31 (1.4)	485 (2.7)	14 (1.9)	1 (0.1)	~ ~	-2 (0.4)
Qatar	65 (0.5)	323 (1.8)	0 0	23 (0.5)	290 (2.9)	0 0	8 (0.3)	265 (4.7)	0 0
Kuwait	63 (1.0)	363 (2.7)	0 0	26 (1.0)	349 (3.4)	0 0	6 (0.5)	322 (6.2)	0 0
Japan	58 (1.6)	585 (2.5)	3 (2.0)	23 (1.5)	572 (4.6)	7 (1.9)	17 (0.9)	532 (4.2)	-10 (1.2)
Italy	54 (1.9)	490 (3.3)	16 (2.7)	36 (1.9)	478 (3.0)	-2 (2.7)	2 (0.3)	~ ~	-7 (0.7)
Jordan	53 (1.5)	451 (3.7)	17 (2.1)	14 (1.2)	418 (6.8)	5 (1.4)	26 (1.4)	392 (5.8)	-18 (2.0)
Slovenia	51 (1.5)	511 (2.6)	1 (2.1)	46 (1.5)	495 (2.4)	12 (2.3)	2 (0.2)	~ ~	-6 (0.8)
Israel	50 (2.0)	476 (4.0)	-22 (2.7)	43 (2.1)	471 (5.3)	25 (2.6)	4 (0.6)	391 (13.8)	-2 (0.8)
Lebanon	50 (2.3)	473 (4.3)	11 (2.7)	27 (2.1)	434 (6.6)	11 (2.5)	11 (1.4)	430 (5.7)	-10 (2.4)
Palestinian Nat'l Auth.	48 (1.5)	387 (4.1)	23 (2.1)	16 (1.2)	352 (5.3)	-2 (1.7)	26 (1.2)	350 (5.4)	-7 (2.0)
Bosnia and Herzegovina	46 (1.3)	471 (2.8)	0 0	25 (1.3)	463 (4.4)	0 0	22 (1.0)	426 (4.2)	0 0
Russian Federation	41 (2.0)	536 (4.3)	29 (2.3)	21 (1.8)	509 (6.3)	3 (2.9)	25 (1.9)	487 (4.8)	-3 (2.6)
Oman	38 (1.9)	391 (4.6)	0 0	27 (1.7)	378 (3.9)	0 0	18 (1.3)	349 (6.5)	0 0
Serbia	36 (1.7)	507 (4.6)	21 (2.2)	40 (1.8)	491 (4.2)	17 (2.4)	14 (1.0)	450 (6.0)	-9 (2.2)
Bahrain	36 (0.9)	415 (2.5)	5 (1.7)	50 (1.0)	397 (2.1)	5 (1.7)	5 (0.4)	348 (7.4)	-3 (0.5)
Syrian Arab Republic	36 (1.3)	405 (4.1)	0 0	14 (0.9)	399 (6.0)	0 0	34 (1.5)	384 (5.0)	0 0
Lithuania	33 (1.8)	514 (3.1)	7 (2.3)	49 (1.8)	517 (3.1)	27 (2.3)	9 (0.7)	466 (5.1)	-25 (1.8)
Korea, Rep. of	31 (1.5)	613 (3.1)	-4 (2.2)	64 (1.6)	596 (3.1)	3 (2.3)	1 (0.1)	~ ~	0 (0.2)
Romania	30 (1.9)	482 (6.0)	15 (2.6)	37 (2.3)	477 (5.1)	22 (2.6)	18 (1.7)	436 (8.6)	-8 (2.7)
Malaysia	30 (2.0)	508 (5.5)	4 (2.6)	29 (1.7)	489 (6.8)	4 (2.5)	23 (1.4)	445 (5.9)	-1 (2.2)
Thailand	29 (1.4)	491 (8.2)	0 0	8 (0.6)	483 (10.3)	0 0	50 (1.6)	419 (4.7)	0 0
Turkey	26 (1.3)	486 (6.6)	0 0	12 (1.0)	449 (8.9)	0 0	46 (1.9)	414 (4.5)	0 0
Egypt	23 (1.0)	403 (4.9)	5 (1.2)	19 (0.9)	402 (4.8)	13 (1.0)	41 (1.5)	379 (4.9)	-20 (2.0)
Colombia	21 (1.3)	420 (4.8)	0 0	10 (0.9)	404 (6.2)	0 0	48 (1.7)	365 (3.9)	0 0
Bulgaria	21 (1.7)	478 (8.8)	16 (1.9)	47 (1.5)	482 (4.9)	25 (2.0)	17 (1.2)	433 (11.3)	8 (1.6)
Saudi Arabia	18 (1.7)	331 (6.0)	--	51 (1.6)	338 (3.3)	--	7 (0.7)	298 (7.1)	--
Ukraine	16 (1.4)	503 (7.5)	0 0	32 (1.8)	481 (4.1)	0 0	22 (1.7)	445 (5.6)	0 0
Indonesia	14 (1.2)	450 (8.6)	7 (1.9)	2 (0.3)	~ ~	0 (0.4)	66 (2.5)	400 (3.8)	35 (4.1)
Botswana	13 (0.8)	389 (5.6)	8 (1.1)	3 (0.4)	370 (11.0)	-2 (0.6)	57 (1.6)	372 (3.2)	34 (2.9)
El Salvador	13 (1.3)	384 (5.5)	0 0	12 (0.8)	352 (6.0)	0 0	27 (2.2)	340 (4.2)	0 0
Ghana	11 (1.0)	317 (12.8)	1 (1.3)	13 (1.0)	312 (8.8)	4 (1.2)	20 (1.7)	300 (8.6)	-1 (2.3)
Armenia	10 (0.8)	502 (6.0)	3 (1.1)	30 (1.3)	506 (7.2)	16 (1.5)	21 (1.9)	496 (6.0)	6 (2.7)
Georgia	6 (1.1)	427 (11.3)	0 0	20 (1.4)	413 (8.9)	0 0	17 (2.2)	394 (9.2)	0 0
Algeria	6 (0.7)	378 (4.3)	0 0	27 (1.5)	395 (2.8)	0 0	6 (0.8)	372 (5.5)	0 0
Iran, Islamic Rep. of	4 (1.0)	515 (16.7)	2 (1.2)	30 (1.8)	437 (6.1)	13 (2.2)	2 (0.7)	~ ~	1 (0.8)
Tunisia	3 (0.5)	400 (6.7)	-2 (0.7)	39 (1.9)	442 (3.1)	19 (2.4)	7 (0.7)	382 (4.5)	-8 (1.7)
‡ Morocco	20 (1.3)	402 (6.4)	--	24 (1.5)	390 (5.0)	--	19 (1.5)	367 (5.4)	--
International Avg.	42 (0.2)	470 (0.8)		25 (0.2)	453 (0.8)		16 (0.2)	409 (1.1)	
Benchmarking Participants									
Ontario, Canada	80 (1.3)	522 (3.7)	-5 (1.7)	17 (1.4)	506 (5.7)	6 (1.7)	1 (0.3)	~ ~	-2 (0.6)
Minnesota, US	79 (1.5)	539 (4.5)	0 0	15 (1.3)	522 (5.4)	0 0	4 (0.5)	487 (12.0)	0 0
Massachusetts, US	71 (1.6)	556 (4.2)	0 0	25 (1.7)	536 (5.4)	0 0	2 (0.4)	~ ~	0 0
Basque Country, Spain	67 (2.2)	503 (3.5)	-3 (3.0)	27 (2.1)	501 (4.4)	11 (2.8)	3 (0.4)	451 (9.1)	-8 (0.9)
Dubai, UAE	66 (1.2)	477 (3.1)	0 0	28 (1.4)	449 (3.6)	0 0	3 (0.5)	409 (9.6)	0 0
British Columbia, Canada	65 (1.4)	513 (2.9)	0 0	32 (1.3)	511 (4.6)	0 0	2 (0.3)	~ ~	0 0
Quebec, Canada	61 (1.8)	541 (4.0)	-9 (2.6)	34 (1.7)	516 (3.7)	12 (2.5)	3 (0.4)	488 (7.4)	-3 (0.7)

● 2007 percent significantly higher

▼ 2007 percent significantly lower

Background data provided by students.

‡ Did not satisfy guidelines for sample participation rates (see Appendix A).

() Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals may appear inconsistent.

A dash (-) indicates comparable data are 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.

A diamond (0) indicates the country did not participate in the assessment.



Exhibit 4.6 Computer Use with Trends (Continued)

TIMSS2007
Mathematics 8th Grade

Country	Use Computer Only at Places Other than Home and School			Do Not Use Computer at All		
	2007 Percent of Students	Average Achievement	Difference in Percent from 2003	2007 Percent of Students	Average Achievement	Difference in Percent from 2003
Chinese Taipei	1 (0.2)	~ ~	0 (0.2)	1 (0.1)	~ ~	0 (0.2)
Hong Kong SAR	0 (0.1)	~ ~	0 (0.1)	1 (0.1)	~ ~	0 (0.2)
Malta	0 (0.1)	~ ~	◊ ◊	1 (0.1)	~ ~	◊ ◊
Australia	1 (0.2)	~ ~	0 (0.3)	0 (0.1)	~ ~	0 (0.2)
England	1 (0.2)	~ ~	0 (0.2)	0 (0.1)	~ ~	-1 (0.2)
Czech Republic	1 (0.2)	~ ~	◊ ◊	1 (0.2)	~ ~	◊ ◊
Cyprus	0 (0.1)	~ ~	-2 (0.3) ▼	3 (0.2)	408 (8.4)	-2 (0.4) ▼
Scotland	1 (0.2)	~ ~	0 (0.3)	0 (0.1)	~ ~	-1 (0.2)
United States	3 (0.2)	461 (6.6)	1 (0.3)	1 (0.1)	~ ~	0 (0.2)
Norway	0 (0.1)	~ ~	-1 (0.2)	1 (0.1)	~ ~	-1 (0.2)
Singapore	2 (0.2)	~ ~	1 (0.3)	0 (0.1)	~ ~	0 (0.1)
Hungary	1 (0.2)	~ ~	-1 (0.4)	1 (0.2)	~ ~	-2 (0.5) ▼
Sweden	0 (0.1)	~ ~	-1 (0.2)	1 (0.1)	~ ~	-1 (0.3)
Qatar	2 (0.2)	~ ~	◊ ◊	2 (0.2)	~ ~	◊ ◊
Kuwait	3 (0.3)	308 (10.2)	◊ ◊	2 (0.2)	~ ~	◊ ◊
Japan	1 (0.2)	~ ~	0 (0.3)	1 (0.2)	~ ~	0 (0.3)
Italy	0 (0.1)	~ ~	-5 (0.4) ▼	8 (0.5)	433 (6.4)	-1 (0.7)
Jordan	1 (0.2)	~ ~	-6 (0.8) ▼	5 (0.5)	422 (9.1)	1 (0.7)
Slovenia	1 (0.1)	~ ~	-3 (0.4) ▼	1 (0.1)	~ ~	-4 (0.4) ▼
Israel	1 (0.2)	~ ~	-1 (0.3)	1 (0.2)	~ ~	1 (0.3)
Lebanon	7 (1.1)	418 (7.0)	-6 (1.6) ▼	4 (0.8)	424 (9.1)	-5 (1.5) ▼
Palestinian Nat'l Auth.	3 (0.3)	348 (9.1)	-10 (1.1) ▼	7 (0.8)	366 (8.1)	-3 (1.2) ▼
Bosnia and Herzegovina	4 (0.4)	444 (6.5)	◊ ◊	3 (0.3)	429 (7.5)	◊ ◊
Russian Federation	8 (1.0)	499 (6.6)	-13 (1.5) ▼	5 (1.0)	484 (11.7)	-15 (2.0) ▼
Oman	3 (0.4)	354 (8.2)	◊ ◊	14 (1.1)	364 (6.6)	◊ ◊
Serbia	5 (0.6)	457 (7.5)	-14 (1.3) ▼	4 (0.5)	443 (6.7)	-15 (1.2) ▼
Bahrain	2 (0.3)	~ ~	-7 (0.6) ▼	6 (0.4)	389 (5.9)	0 (0.6)
Syrian Arab Republic	2 (0.2)	~ ~	◊ ◊	14 (1.1)	405 (5.8)	◊ ◊
Lithuania	4 (0.4)	475 (7.2)	-8 (1.1) ▼	5 (0.4)	460 (6.6)	0 (0.7)
Korea, Rep. of	2 (0.2)	~ ~	0 (0.3)	2 (0.3)	~ ~	2 (0.3) ▲
Romania	8 (0.8)	438 (7.5)	-16 (1.6) ▼	7 (1.3)	419 (7.5)	-13 (2.2) ▼
Malaysia	10 (0.9)	448 (4.6)	-3 (1.3) ▼	8 (0.8)	428 (7.1)	-3 (1.4) ▼
Thailand	4 (0.5)	432 (9.4)	◊ ◊	9 (0.9)	397 (6.8)	◊ ◊
Turkey	13 (1.2)	401 (8.5)	◊ ◊	4 (0.7)	366 (7.9)	◊ ◊
Egypt	10 (0.7)	404 (5.8)	2 (0.9) ▲	7 (0.5)	406 (6.2)	0 (0.9)
Colombia	12 (0.9)	380 (4.6)	◊ ◊	9 (0.8)	346 (7.4)	◊ ◊
Bulgaria	8 (0.7)	436 (9.3)	-32 (1.9) ▼	7 (0.7)	435 (9.9)	-17 (1.8) ▼
Saudi Arabia	3 (0.4)	309 (8.1)	--	20 (1.0)	327 (4.2)	--
Ukraine	19 (1.0)	451 (4.7)	◊ ◊	11 (0.9)	422 (5.8)	◊ ◊
Indonesia	3 (0.4)	385 (12.8)	-16 (1.3) ▼	15 (2.0)	367 (6.5)	-26 (3.4) ▼
Botswana	2 (0.2)	~ ~	-3 (0.5) ▼	25 (1.4)	339 (3.8)	-36 (2.9) ▼
El Salvador	21 (1.4)	339 (4.7)	◊ ◊	28 (1.9)	327 (2.6)	◊ ◊
Ghana	14 (1.0)	326 (6.1)	-12 (1.8) ▼	42 (2.5)	314 (5.9)	8 (3.5) ▲
Armenia	19 (1.1)	502 (4.6)	0 (1.6)	20 (1.2)	491 (4.3)	-25 (2.5) ▼
Georgia	12 (1.1)	420 (9.5)	◊ ◊	44 (2.6)	419 (8.4)	◊ ◊
Algeria	11 (0.8)	394 (4.0)	◊ ◊	49 (1.9)	387 (2.6)	◊ ◊
Iran, Islamic Rep. of	7 (0.6)	408 (6.8)	-5 (1.0) ▼	57 (2.1)	380 (3.8)	-11 (2.7) ▼
Tunisia	18 (0.9)	416 (3.3)	-5 (1.4) ▼	32 (1.5)	414 (2.3)	-4 (2.3)
‡ Morocco	19 (1.5)	380 (5.8)	--	18 (1.7)	369 (4.6)	--
International Avg.	6 (0.1)	409 (1.4)		10 (0.1)	399 (1.2)	
Benchmarking Participants						
Ontario, Canada	1 (0.2)	~ ~	0 (0.2)	0 (0.1)	~ ~	0 (0.1)
Minnesota, US	2 (0.4)	~ ~	◊ ◊	0 (0.2)	~ ~	◊ ◊
Massachusetts, US	2 (0.3)	~ ~	◊ ◊	0 (0.1)	~ ~	◊ ◊
Basque Country, Spain	2 (0.3)	~ ~	-1 (0.5)	1 (0.2)	~ ~	0 (0.3)
Dubai, UAE	1 (0.3)	~ ~	◊ ◊	2 (0.2)	~ ~	◊ ◊
British Columbia, Canada	1 (0.2)	~ ~	◊ ◊	1 (0.1)	~ ~	◊ ◊
Quebec, Canada	1 (0.3)	~ ~	0 (0.4)	1 (0.2)	~ ~	0 (0.2)

SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007

▲ 2007 percent significantly higher

▼ 2007 percent significantly lower



Morocco (46%), El Salvador (40%), Yemen and Algeria (55%), the Ukraine (40%), Georgia (42%), and Iran (75%) reported never using a computer.

At the fourth grade, computer use increased in a number of countries between 2003 and 2007. Students reported increases in using the computer both at home and in school in Italy, Hungary, Tunisia, Latvia, and the Russian Federation and in using the computer at home but not in school in 16 countries and 2 benchmarking entities.

At eighth grade, 42 percent of students, on average across countries, reported using a computer both at home and at school and 25 percent at home only. Compared to fourth grade, relatively more students (16% vs. 9%) reported using a computer at school but not at home and relatively fewer reported not using a computer at all (10% vs. 17%). There was a stronger association between using a computer and mathematics achievement at eighth grade, with highest average achievement (470 points) among students using a computer both at home and at school, next highest (453 points) among those using a computer at home but not at school, somewhat similar among those using a computer at school but not at home and those using a computer only at places other than home and school (409 for both), and lowest (399 points) among those not using a computer at all.

Eighth grade TIMSS participants with the highest percentages of students (more than 70%) using a computer both at home and at school included Chinese Taipei, Hong Kong SAR, Malta, Australia, England, the Czech Republic, Cyprus, Scotland, the province of Ontario, and the states of Minnesota and Massachusetts. Lowest levels of computer use were reported in Ghana, Georgia, Algeria, and Iran, where 40 percent or more of eighth grade students reported never using a computer.

Similar to the findings at the fourth grade, computer use also increased at the eighth grade in a substantial number of countries. Students in 16 countries reported more use both at home and at school, and in 11 of those countries there also were increases in use at home but not in school. Students in an additional 15 countries and 3 benchmarking entities reported increases in use at home but not at school. However, in 9 of these countries and 2 benchmarking entities the increase in use at home corresponded to a decrease in the use both at home and at school category.

How Much of Their Out-of-school Time Do Students Spend on Homework During the School Week?

Homework provides an opportunity for students to extend and consolidate what they have learned in school, and for teachers to extend the time for learning beyond what is available during the hours of formal schooling. Consequently, it might be expected that students who are assigned homework and who spend time on it would have higher achievement than students who do little or no homework. However, the situation is not as straightforward as that. The tradition of assigning homework and expecting students to devote a portion of their after-school time to completing this assignment varies from country to country and from grade to grade. In some countries and especially at the fourth grade, homework is rarely assigned, and when students spend time on homework, it often can be for remedial purposes, to enable them to catch up on material not fully mastered during class. Under these circumstances, lower achievement is associated with time spent on homework. Also, even when homework is regularly assigned as a means of extending classroom learning, the more able students may accomplish the assignment more expeditiously, resulting in a situation where high achievement is associated with less time spent on homework.

To summarize the amount of time typically devoted to mathematics homework in each country, TIMSS constructed an index that assigns students to a high, medium, or low level on the basis of the frequency of mathematics homework they are assigned each week and the amount of time they spend on it. Students at the high level of the Index of Time Spent Doing Mathematics Homework (TMH) reported that they were assigned mathematics homework at least 3–4 times a week and spend more than 30 minutes on each assignment. Students at the low level reported being assigned homework no more than twice a week and spending no more than 30 minutes on each assignment. The medium level included all other response combinations. For each TIMSS 2007 participant, Exhibit 4.7 presents the percentages of fourth and eighth grade students at the three levels of the index, together with their average mathematics achievement. Participants are ordered by the percentage of students at the high level of the index. As described in the *TIMSS 2007*

Exhibit 4.7 **Index of Time Students Spend Doing Mathematics Homework (TMH) in a Normal School Week**

TIMSS2007
Mathematics **4th**
Grade

Country	High TMH		Medium TMH		Low TMH	
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement
Kazakhstan	42 (2.0)	549 (9.3)	56 (1.9)	552 (7.3)	2 (0.3)	~ ~
Russian Federation	37 (1.4)	541 (5.7)	61 (1.3)	550 (5.0)	1 (0.3)	~ ~
Ukraine	37 (1.3)	475 (3.3)	61 (1.3)	475 (3.4)	1 (0.2)	~ ~
Algeria	r 35 (1.7)	397 (6.6)	54 (1.5)	385 (6.0)	11 (1.0)	373 (9.1)
Latvia	34 (1.3)	534 (3.2)	65 (1.3)	545 (2.6)	1 (0.2)	~ ~
Iran, Islamic Rep. of	34 (1.7)	424 (5.8)	51 (1.6)	401 (4.5)	15 (1.4)	386 (6.9)
Singapore	34 (0.9)	607 (4.4)	52 (0.9)	603 (3.7)	15 (0.8)	581 (5.6)
Tunisia	r 33 (1.7)	362 (5.5)	53 (1.4)	352 (4.8)	14 (1.2)	342 (7.7)
Armenia	r 31 (1.5)	510 (5.3)	64 (1.4)	503 (3.7)	5 (0.7)	509 (24.8)
Yemen	s 30 (2.4)	243 (9.7)	64 (2.5)	245 (6.6)	6 (1.0)	218 (11.8)
Colombia	r 29 (1.5)	384 (5.5)	58 (1.4)	369 (4.8)	13 (1.4)	354 (6.9)
Lithuania	29 (1.3)	526 (3.5)	68 (1.3)	537 (2.5)	3 (0.5)	530 (10.7)
Georgia	r 27 (1.5)	451 (5.6)	71 (1.5)	449 (4.4)	2 (0.4)	~ ~
El Salvador	r 24 (1.2)	345 (6.3)	62 (1.2)	340 (4.6)	14 (1.1)	346 (6.5)
Morocco	r 24 (1.6)	360 (9.1)	61 (1.9)	352 (5.3)	16 (1.7)	350 (12.7)
Denmark	23 (1.2)	514 (3.3)	52 (1.2)	524 (2.7)	25 (1.4)	538 (3.8)
Hungary	21 (1.0)	517 (4.3)	75 (1.1)	518 (3.5)	4 (0.7)	493 (16.6)
Qatar	s 20 (0.6)	301 (3.1)	61 (0.7)	315 (2.3)	19 (0.5)	311 (3.3)
Germany	r 19 (0.8)	517 (3.4)	76 (0.9)	534 (2.4)	5 (0.6)	496 (10.0)
Slovenia	19 (0.9)	487 (3.2)	79 (1.0)	510 (2.1)	3 (0.3)	479 (9.0)
Hong Kong SAR	18 (1.1)	599 (6.2)	78 (1.1)	613 (3.5)	4 (0.5)	562 (6.2)
Italy	18 (1.3)	498 (4.7)	62 (1.6)	508 (3.8)	19 (1.8)	515 (3.9)
Kuwait	r 17 (0.9)	313 (6.4)	63 (1.7)	336 (3.8)	20 (1.4)	350 (6.9)
Chinese Taipei	17 (0.9)	568 (4.0)	63 (1.4)	584 (1.7)	20 (1.3)	569 (3.8)
Austria	16 (0.8)	493 (3.9)	76 (1.0)	511 (2.1)	8 (0.8)	501 (5.0)
United States	12 (0.5)	522 (3.6)	65 (1.2)	535 (2.8)	23 (1.3)	528 (3.2)
Norway	12 (1.0)	465 (7.4)	53 (1.8)	478 (2.9)	35 (2.1)	487 (3.4)
Japan	11 (0.9)	542 (4.6)	64 (1.9)	573 (2.4)	25 (1.9)	572 (3.5)
Slovak Republic	10 (0.6)	481 (4.0)	79 (1.2)	508 (3.2)	11 (1.0)	496 (9.1)
Czech Republic	8 (0.6)	473 (4.7)	65 (2.0)	489 (2.9)	28 (1.9)	491 (4.6)
New Zealand	8 (0.5)	469 (5.3)	38 (1.1)	487 (3.7)	54 (1.4)	509 (2.4)
Australia	7 (0.7)	508 (10.6)	42 (1.5)	517 (3.9)	51 (1.8)	525 (4.4)
Sweden	5 (0.6)	472 (6.4)	34 (1.2)	493 (2.9)	60 (1.4)	513 (3.0)
England	3 (0.4)	525 (11.2)	31 (1.6)	547 (5.0)	66 (1.6)	544 (2.9)
Scotland	3 (0.3)	453 (10.7)	30 (1.7)	484 (3.1)	67 (1.8)	505 (2.9)
Netherlands	1 (0.2)	~ ~	10 (0.9)	507 (4.7)	89 (0.9)	541 (2.3)
International Avg.	21 (0.2)	469 (1.0)	58 (0.2)	479 (0.7)	21 (0.2)	468 (1.5)
Benchmarking Participants						
Dubai, UAE	r 17 (1.2)	456 (5.9)	62 (1.8)	450 (2.8)	21 (1.7)	469 (6.9)
Massachusetts, US	16 (1.3)	573 (5.4)	75 (1.5)	574 (3.4)	9 (1.6)	569 (12.6)
British Columbia, Canada	15 (0.9)	493 (4.4)	49 (1.3)	506 (3.2)	37 (1.6)	513 (3.6)
Ontario, Canada	13 (1.1)	513 (6.7)	52 (1.8)	514 (2.9)	35 (2.2)	515 (4.4)
Alberta, Canada	11 (0.8)	499 (5.3)	45 (1.5)	502 (3.5)	44 (1.9)	512 (3.4)
Minnesota, US	11 (1.5)	543 (12.6)	59 (3.7)	560 (6.5)	31 (4.3)	555 (8.4)
Quebec, Canada	6 (0.6)	488 (5.4)	41 (1.6)	510 (3.5)	53 (1.8)	533 (3.4)

SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007

Index based on students' reports on the frequency of mathematics homework they are given and the amount of time they spend on that homework. High level indicates mathematics homework assigned at least 3 or 4 times a week and students spend more than 30 minutes on that homework. Low level indicates mathematics homework assigned no more than twice a week and students spend no more than 30 minutes on that homework. Medium level includes all other possible combinations of responses.

- () Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals 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 4.7 Index of Time Students Spend Doing Mathematics Homework (TMH) in a Normal School Week (Continued)
TIMSS2007
Mathematics **8th**
Grade

Country	High TMH		Medium TMH		Low TMH	
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement
Romania	66 (1.3)	488 (4.0)	29 (1.3)	433 (5.1)	5 (0.5)	432 (11.4)
Russian Federation	50 (1.3)	510 (4.4)	49 (1.2)	520 (4.2)	2 (0.3)	~ ~
El Salvador	46 (1.4)	351 (3.2)	45 (1.0)	337 (3.3)	9 (0.7)	337 (5.2)
Tunisia	45 (1.3)	425 (2.8)	44 (1.0)	419 (2.9)	11 (0.9)	417 (4.1)
Italy	45 (1.3)	475 (3.1)	47 (1.2)	488 (4.1)	7 (0.6)	483 (5.5)
Syrian Arab Republic	44 (1.1)	408 (3.9)	48 (0.9)	399 (3.8)	8 (0.6)	409 (6.8)
Singapore	42 (1.0)	616 (3.2)	43 (0.9)	595 (4.3)	16 (0.9)	547 (6.9)
Malaysia	41 (1.1)	486 (5.1)	47 (1.0)	473 (5.1)	12 (0.9)	446 (9.1)
Ukraine	40 (1.2)	468 (4.5)	53 (1.1)	467 (3.5)	7 (0.7)	466 (6.8)
Thailand	39 (1.4)	461 (5.6)	45 (1.1)	435 (5.4)	15 (1.0)	419 (6.7)
Colombia	36 (1.3)	386 (4.5)	48 (0.9)	379 (3.8)	16 (1.0)	378 (6.0)
Bulgaria	36 (1.4)	475 (6.4)	48 (1.2)	472 (5.4)	15 (1.5)	458 (8.1)
Israel	34 (1.5)	485 (4.9)	53 (1.4)	472 (4.1)	13 (0.9)	448 (9.0)
Hong Kong SAR	34 (1.6)	589 (4.9)	48 (1.2)	576 (5.9)	18 (1.4)	555 (9.0)
Georgia	34 (1.5)	432 (5.1)	62 (1.6)	414 (7.0)	4 (0.5)	372 (14.2)
Armenia	32 (1.2)	501 (4.6)	64 (1.2)	502 (4.4)	4 (0.5)	499 (12.7)
Serbia	31 (1.4)	490 (5.0)	40 (1.3)	496 (4.3)	28 (1.4)	481 (4.3)
Chinese Taipei	31 (1.9)	628 (4.0)	46 (1.3)	613 (4.1)	23 (1.7)	563 (8.7)
Egypt	30 (1.1)	381 (4.6)	58 (1.1)	404 (3.6)	13 (1.0)	416 (6.8)
Botswana	29 (0.9)	383 (3.0)	50 (0.9)	365 (2.8)	20 (1.0)	356 (3.4)
Indonesia	29 (1.1)	417 (5.0)	53 (0.9)	397 (4.0)	18 (0.8)	384 (5.1)
Ghana	28 (1.2)	332 (5.2)	55 (1.0)	307 (4.8)	16 (1.0)	313 (5.4)
Lithuania	27 (1.1)	498 (2.8)	69 (1.1)	515 (2.7)	4 (0.8)	481 (8.8)
United States	26 (1.1)	522 (3.8)	62 (1.2)	510 (3.0)	12 (1.2)	484 (4.3)
Jordan	26 (1.2)	424 (5.0)	62 (1.1)	439 (4.4)	12 (0.9)	422 (7.1)
Norway	25 (1.5)	466 (2.6)	53 (1.3)	474 (2.0)	22 (1.6)	473 (3.5)
Lebanon	25 (1.3)	445 (6.0)	67 (1.4)	460 (3.9)	8 (0.9)	434 (9.0)
Palestinian Nat'l Auth.	24 (1.1)	374 (4.4)	68 (1.2)	378 (3.8)	7 (0.8)	345 (9.1)
Malta	24 (0.7)	508 (2.8)	71 (0.7)	498 (1.7)	5 (0.3)	402 (7.4)
Bosnia and Herzegovina	24 (1.2)	466 (4.0)	51 (1.2)	458 (3.2)	25 (1.4)	459 (3.8)
Turkey	22 (1.1)	428 (5.8)	49 (1.0)	433 (5.0)	29 (1.2)	443 (5.9)
Slovenia	20 (1.1)	503 (2.6)	64 (1.3)	505 (2.4)	16 (1.0)	498 (4.1)
Cyprus	20 (0.9)	463 (4.1)	70 (0.9)	480 (1.8)	11 (0.7)	451 (4.8)
Iran, Islamic Rep. of	19 (1.4)	440 (7.7)	55 (1.6)	404 (3.8)	26 (1.5)	378 (5.0)
Hungary	16 (0.9)	517 (5.6)	78 (1.2)	524 (3.4)	6 (1.0)	488 (8.0)
Qatar	16 (0.4)	300 (3.2)	67 (0.5)	319 (1.5)	17 (0.4)	308 (4.0)
Bahrain	15 (0.7)	391 (4.0)	67 (1.1)	404 (1.8)	18 (1.0)	405 (5.2)
Australia	15 (1.1)	523 (6.6)	44 (1.5)	511 (5.2)	42 (2.0)	481 (4.6)
Kuwait	14 (0.7)	334 (5.1)	58 (1.3)	358 (2.7)	27 (1.5)	373 (3.9)
Saudi Arabia	13 (0.8)	316 (4.8)	61 (1.8)	339 (3.3)	26 (1.8)	334 (4.4)
Oman	12 (0.7)	374 (5.2)	73 (1.3)	383 (3.1)	15 (1.4)	367 (7.9)
Japan	8 (1.1)	566 (10.0)	36 (1.3)	569 (3.3)	57 (2.0)	574 (3.3)
Scotland	8 (0.7)	519 (7.2)	41 (1.8)	505 (4.4)	51 (2.1)	478 (4.3)
Korea, Rep. of	6 (0.7)	591 (5.8)	31 (1.5)	595 (3.7)	62 (1.7)	605 (3.1)
Czech Republic	5 (0.6)	473 (6.4)	46 (2.1)	504 (4.1)	49 (2.4)	511 (3.4)
England	5 (0.6)	518 (11.0)	31 (1.3)	530 (6.8)	65 (1.7)	513 (4.9)
Sweden	3 (0.4)	461 (7.7)	35 (1.2)	490 (3.1)	62 (1.3)	498 (2.4)
Algeria	--	--	--	--	--	--
‡ Morocco	34 (1.3)	396 (5.0)	57 (1.2)	383 (4.2)	9 (0.7)	360 (7.9)
International Avg.	27 (0.2)	458 (0.9)	53 (0.2)	457 (0.7)	20 (0.2)	441 (1.1)
Benchmarking Participants						
British Columbia, Canada	33 (1.3)	508 (3.9)	55 (1.2)	514 (3.3)	11 (1.1)	507 (5.9)
Basque Country, Spain	33 (1.9)	494 (3.8)	58 (2.1)	508 (3.1)	9 (1.5)	486 (12.5)
Massachusetts, US	31 (3.0)	564 (7.3)	63 (2.8)	546 (4.5)	6 (1.3)	500 (11.3)
Minnesota, US	30 (2.5)	542 (7.6)	62 (2.4)	535 (4.3)	8 (1.6)	495 (7.1)
Quebec, Canada	30 (1.7)	545 (5.5)	47 (1.6)	529 (4.0)	23 (2.0)	517 (4.9)
Ontario, Canada	29 (1.5)	508 (3.5)	59 (1.6)	526 (3.8)	12 (1.5)	505 (12.3)
Dubai, UAE	29 (1.3)	461 (5.1)	57 (1.3)	463 (2.9)	15 (1.1)	488 (6.0)

SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007

Index based on students' reports on the frequency of mathematics homework they are given and the amount of time they spend on that homework. High level indicates mathematics homework assigned at least 3 or 4 times a week and students spend more than 30 minutes on that homework. Low level indicates mathematics homework assigned no more than twice a week and students spend no more than 30 minutes on that homework. Medium level includes all other possible combinations of responses.

‡ Did not satisfy guidelines for sample participation rates (see Appendix A).

() Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals may appear inconsistent.

A dash (–) indicates comparable data are 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.



Encyclopedia, countries have different policies about assigning homework and the students' responses often reflect these different policies. For example, as explained in the *TIMSS 2007 Encyclopedia* in the chapter prepared by the Netherlands, students in primary education in the Netherlands generally are not expected to do homework. However, schools can decide for themselves how to deal with homework and some primary schools give homework to prepare students for homework in secondary education.

At fourth grade, students generally reported that they spent relatively little time on mathematics homework, with 21 percent of students, on average across countries, at the low level of the index (30 minutes or less no more than twice a week) and 58 percent at the medium level. However, 21 percent were at the high level. Countries with one third or more of students at the high level of the index included Kazakhstan, the Russian Federation, the Ukraine, Algeria, Latvia, Iran, Singapore, and Tunisia. The highest percentages of students at the low level of the index (50% or more) were in Australia, New Zealand, Sweden, England, Scotland, and the Netherlands. Average mathematics achievement was highest among students at the medium level of the homework index (479 points), and about the same for students at the high and low levels (469 and 468, respectively).

At the eighth grade, 27 percent of students were at the high level of the mathematics homework index, 53 percent at the medium level, and 20 percent at the low level. Countries with the greatest homework emphasis (40% or more at the high level) included Romania, the Russian Federation, El Salvador, Tunisia, Italy, Syrian Arab Republic, Singapore, Malaysia, and the Ukraine. In contrast, 40 percent or more of students were at the low level of the index in Australia, Japan, Scotland, Korea, the Czech Republic, England, and Sweden. Average mathematics achievement was lower among students at the low level of the index than among students at the medium or high levels.

What Are Students' Attitudes Toward Mathematics?

Developing positive attitudes toward mathematics is an important goal of the mathematics curriculum in many countries. To summarize information about progress toward these goals, TIMSS examined students' general attitudes toward mathematics, the value they place on mathematics as a way of improving their lives, and their self-confidence in learning mathematics.

To investigate how students feel about mathematics, TIMSS created an Index of Students' Positive Affect Toward Mathematics (PATM), based on students' responses to three statements about mathematics:

- ▶ I enjoy learning mathematics.
- ▶ Mathematics is boring.⁴
- ▶ I like mathematics.

Students were asked to indicate if they *agreed a lot*, *agreed a little*, *disagreed a little*, or *disagreed a lot* with each statement. Students who agreed a little or a lot on average with all three statements were assigned to the high level of the index (i.e., have a positive attitude toward mathematics), while those who disagreed a little or a lot, on average, were assigned to the low level of the index. The medium level includes all other response combinations. For each TIMSS participant at the fourth and eighth grades, the percentage of students at each level of the index is presented in Exhibit 4.8, together with average mathematics achievement. The exhibit also shows changes in percentages since 1995 at the fourth grade, and since 1995 and 1999 at the eighth grade (comparable data were not available from 2003).

Fourth grade students generally had very positive attitudes toward mathematics, with 72 percent, on average across countries, at the high level of the index. There were 14 percent of students at the medium level and 14 percent at the low level. The highest percentages of students at the high level of the index (85% or more) were in Georgia, Kazakhstan, Morocco, the Ukraine, Colombia, and Tunisia, while countries with proportionately more students with less positive attitudes included the Netherlands and Chinese Taipei where more than 25 percent of students were at the low level.

4 The response categories for this statement were reversed in constructing the index.

No participants had increased percentages of students at the high level in 2007 compared to 1995, whereas 11 countries and 4 benchmarking entities had declines. Fourteen countries and three benchmarking entities had increases (small but statistically significant) at the low level. Across countries, fourth grade students at the high level of the Index of Positive Affect Toward Mathematics had higher average mathematics achievement than students at the medium or low level.

For eighth grade students, on average across countries, 54 percent were at the high level of the positive affect index, compared with 21 percent at the medium level and 26 percent at the low level. Countries with most students expressing positive attitudes included Algeria, Egypt, Botswana, Oman, and Morocco, where 75 percent or more were at the high index level. In contrast, in 22 countries and six benchmarking participants less than half the students were at the high level of the index. Only the Russian Federation and Lithuania from 1995 and Korea from 1999 showed increased percentages at the high level in 2007, while 19 countries and 4 benchmarking entities had declines since 1995, 1999, or both previous cycles. Average mathematics achievement was highest among students at the high index level (471 points), next highest among those at the medium level (441 points), and lowest at the low level (428 points).

In addition to having a positive attitude toward mathematics, students' may be more attracted to mathematics and more motivated to learn it if they perceive mathematics achievement as advantageous to their future education and the world of work. The TIMSS Index of Students Valuing Mathematics (SVM) is based on eighth grade students' responses to four statements about mathematics:

- ▶ I think learning mathematics will help me in my daily life.
- ▶ I need mathematics to learn other school subjects.
- ▶ I need to do well in mathematics to get into the university of my choice.
- ▶ I need to do well in mathematics to get the job I want.

Exhibit 4.8 Index of Students' Positive Affect Toward Mathematics (PATM) with Trends

TIMSS2007
Mathematics 4th Grade

Country	High PATM			Medium PATM			Low PATM		
	2007 Percent of Students	Average Achievement	Difference in Percent from 1995	2007 Percent of Students	Average Achievement	Difference in Percent from 1995	2007 Percent of Students	Average Achievement	Difference in Percent from 1995
Georgia	90 (0.9)	450 (3.7)	0 0	6 (0.6)	415 (9.0)	0 0	4 (0.5)	415 (10.2)	0 0
Kazakhstan	89 (0.9)	554 (6.5)	0 0	8 (0.7)	518 (16.0)	0 0	3 (0.4)	493 (11.1)	0 0
Morocco	87 (1.0)	356 (4.8)	0 0	8 (0.7)	301 (10.0)	0 0	5 (0.6)	301 (17.1)	0 0
Ukraine	86 (0.7)	479 (2.9)	0 0	8 (0.5)	449 (5.8)	0 0	5 (0.5)	442 (8.3)	0 0
Colombia	86 (0.8)	365 (4.6)	0 0	9 (0.6)	338 (10.0)	0 0	5 (0.5)	355 (15.9)	0 0
Tunisia	85 (0.9)	349 (4.3)	0 0	10 (0.6)	282 (7.0)	0 0	5 (0.6)	273 (12.6)	0 0
Algeria	84 (1.0)	389 (5.0)	0 0	10 (0.6)	343 (7.7)	0 0	5 (0.6)	339 (12.3)	0 0
Iran, Islamic Rep. of	r 83 (1.0)	418 (4.1)	-1 (1.6)	9 (0.8)	370 (6.6)	-5 (1.4)	8 (0.7)	355 (9.9)	6 (0.8)
Qatar	81 (0.5)	314 (1.3)	0 0	10 (0.4)	267 (3.8)	0 0	9 (0.3)	286 (3.9)	0 0
Russian Federation	80 (1.3)	552 (5.0)	0 0	13 (1.0)	524 (6.9)	0 0	8 (0.5)	511 (8.7)	0 0
Armenia	r 79 (1.4)	509 (4.3)	0 0	12 (0.9)	492 (10.0)	0 0	9 (0.9)	507 (12.9)	0 0
Kuwait	78 (1.1)	332 (3.5)	--	12 (0.7)	295 (7.4)	--	10 (0.7)	306 (7.6)	--
El Salvador	77 (0.9)	340 (4.0)	0 0	16 (0.8)	306 (6.4)	0 0	7 (0.5)	320 (9.4)	0 0
Italy	75 (0.9)	514 (3.3)	--	13 (0.6)	494 (4.9)	--	12 (0.7)	490 (4.4)	--
Lithuania	74 (1.2)	541 (2.3)	0 0	14 (0.8)	498 (4.8)	0 0	12 (0.8)	505 (5.0)	0 0
Yemen	r 73 (1.4)	240 (6.5)	0 0	19 (1.0)	215 (8.1)	0 0	8 (0.6)	211 (9.6)	0 0
Singapore	71 (0.8)	610 (3.5)	-15 (1.1)	14 (0.6)	575 (5.9)	5 (0.8)	15 (0.6)	575 (5.6)	11 (0.7)
Slovenia	71 (1.1)	508 (2.0)	-10 (1.6)	13 (0.6)	487 (3.8)	-1 (1.1)	16 (0.9)	490 (4.0)	11 (1.1)
Germany	70 (0.9)	534 (2.7)	0 0	16 (0.6)	520 (3.7)	0 0	14 (0.7)	509 (3.6)	0 0
Slovak Republic	68 (1.2)	505 (4.7)	0 0	14 (0.7)	484 (4.1)	0 0	18 (1.0)	482 (5.6)	0 0
Norway	68 (1.2)	478 (3.1)	-4 (2.1)	15 (0.6)	470 (5.1)	1 (1.1)	18 (1.0)	462 (3.7)	3 (1.6)
Sweden	67 (1.2)	505 (2.8)	0 0	16 (0.7)	501 (3.2)	0 0	17 (1.0)	497 (4.1)	0 0
Hong Kong SAR	67 (1.3)	619 (3.5)	-5 (1.8)	15 (0.7)	588 (4.2)	-2 (1.2)	19 (1.1)	579 (5.1)	7 (1.5)
Australia	66 (1.4)	525 (3.6)	-7 (1.7)	16 (0.8)	512 (4.6)	3 (1.0)	18 (1.1)	494 (5.1)	4 (1.2)
United States	66 (0.8)	535 (2.7)	-8 (1.4)	16 (0.5)	526 (3.0)	3 (0.8)	18 (0.6)	517 (2.5)	5 (1.0)
New Zealand	66 (1.0)	499 (2.6)	-5 (1.6)	18 (0.8)	485 (3.8)	3 (1.2)	17 (0.8)	484 (3.3)	3 (1.2)
Latvia	65 (1.1)	544 (3.0)	-6 (1.7)	17 (0.8)	528 (4.8)	-1 (1.2)	17 (0.9)	527 (3.4)	7 (1.2)
Hungary	64 (1.3)	522 (3.5)	-4 (2.1)	15 (0.7)	498 (6.4)	-3 (1.1)	21 (1.1)	492 (5.8)	7 (1.6)
Czech Republic	64 (1.3)	495 (3.1)	-9 (1.8)	15 (0.7)	479 (4.3)	-1 (1.0)	21 (1.0)	471 (3.4)	10 (1.3)
England	62 (1.4)	548 (3.1)	-14 (1.8)	17 (0.8)	544 (4.7)	7 (1.0)	21 (1.1)	524 (4.1)	7 (1.5)
Austria	62 (1.0)	513 (2.0)	-5 (1.7)	16 (0.7)	499 (4.1)	1 (1.1)	22 (0.9)	492 (2.9)	4 (1.3)
Japan	62 (1.4)	584 (2.4)	-1 (1.8)	21 (0.8)	547 (3.3)	-1 (1.2)	17 (1.0)	543 (4.4)	3 (1.2)
Scotland	59 (1.3)	497 (2.7)	--	18 (0.8)	496 (3.5)	--	24 (1.1)	490 (3.9)	--
Netherlands	56 (1.4)	540 (2.7)	-5 (2.0)	17 (0.9)	531 (3.6)	3 (1.2)	27 (1.3)	528 (3.4)	3 (1.9)
Denmark	55 (1.8)	526 (3.0)	0 0	24 (1.0)	521 (3.4)	0 0	21 (1.4)	523 (3.1)	0 0
Chinese Taipei	50 (1.2)	595 (2.4)	0 0	21 (0.8)	563 (3.2)	0 0	29 (0.9)	555 (2.9)	0 0
International Avg.	72 (0.2)	483 (0.6)		14 (0.1)	457 (1.1)		14 (0.1)	454 (1.3)	
Benchmarking Participants									
Dubai, UAE	81 (1.0)	452 (2.3)	0 0	10 (0.7)	442 (7.2)	0 0	9 (0.8)	431 (8.3)	0 0
Quebec, Canada	72 (1.3)	528 (3.1)	-10 (2.4)	13 (0.9)	503 (5.9)	3 (1.4)	15 (0.8)	494 (4.1)	7 (1.9)
Massachusetts, US	67 (1.6)	579 (4.6)	0 0	16 (1.1)	570 (5.9)	0 0	17 (1.1)	553 (4.2)	0 0
Alberta, Canada	66 (1.2)	513 (3.3)	-12 (2.2)	16 (0.7)	498 (4.1)	5 (1.1)	17 (1.0)	486 (4.4)	7 (1.9)
Minnesota, US	64 (2.4)	561 (6.9)	-8 (3.4)	19 (1.4)	550 (7.0)	4 (2.0)	18 (1.5)	536 (7.1)	4 (2.2)
British Columbia, Canada	64 (1.3)	514 (3.2)	0 0	18 (0.8)	496 (3.1)	0 0	19 (0.9)	490 (4.1)	0 0
Ontario, Canada	59 (1.5)	519 (3.6)	-21 (1.9)	18 (0.9)	512 (4.2)	6 (1.1)	24 (1.4)	495 (4.6)	15 (1.5)

▲ 2007 percent significantly higher
▼ 2007 percent significantly lower

Index based on students' responses to three statements about mathematics: 1) I enjoy learning mathematics; 2) Mathematics is boring (Reversed); 3) I like mathematics. Average is computed across the three items based on a 4-point scale: 1. Agree a lot; 2. Agree a little; 3. Disagree a little; 4. Disagree a lot. Students agreeing a lot or a little on average across the three statements are assigned to the high level. Students disagreeing a little or a lot on average across the three statements are assigned to the low level. All other students are assigned to the middle level.

() Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals may appear inconsistent.
A dash (-) indicates comparable data are not available.
An "r" indicates data are available for at least 70 but less than 85% of the students.
A diamond (0) indicates the country did not participate in the assessment.

Exhibit 4.8 Index of Students' Positive Affect Toward Mathematics (PATM) with Trends (Continued)
TIMSS2007
Mathematics **8th**
Grade

Country	High PATM				Medium PATM			
	2007 Percent of Students	Average Achievement	Difference in Percent from 1999	Difference in Percent from 1995	2007 Percent of Students	Average Achievement	Difference in Percent from 1999	Difference in Percent from 1995
Algeria	83 (0.7)	394 (2.2)	◊ ◊	◊ ◊	10 (0.5)	364 (3.9)	◊ ◊	◊ ◊
Egypt	78 (1.1)	404 (3.4)	◊ ◊	◊ ◊	14 (0.8)	362 (6.5)	◊ ◊	◊ ◊
Botswana	78 (1.0)	376 (2.3)	◊ ◊	◊ ◊	13 (0.6)	339 (3.8)	◊ ◊	◊ ◊
Oman	78 (0.9)	386 (3.3)	◊ ◊	◊ ◊	16 (0.8)	335 (4.7)	◊ ◊	◊ ◊
Tunisia	73 (1.0)	430 (2.5)	◊ (1.4)	◊ ◊	14 (0.6)	398 (4.2)	1 (0.8)	◊ ◊
Malaysia	73 (1.0)	485 (5.2)	-16 (1.2) ▼	◊ ◊	18 (0.8)	445 (5.6)	9 (0.9) ▲	◊ ◊
Jordan	72 (1.4)	448 (4.0)	3 (1.9)	◊ ◊	15 (0.8)	396 (5.5)	-3 (1.1) ▼	◊ ◊
Indonesia	72 (1.3)	400 (3.9)	-10 (1.7) ▼	◊ ◊	21 (1.0)	390 (4.9)	7 (1.3) ▲	◊ ◊
Turkey	71 (1.2)	450 (5.1)	--	◊ ◊	17 (0.8)	399 (6.3)	--	◊ ◊
Syrian Arab Republic	70 (1.1)	410 (3.6)	◊ ◊	◊ ◊	17 (0.8)	376 (5.4)	◊ ◊	◊ ◊
Ghana	70 (1.2)	327 (4.2)	◊ ◊	◊ ◊	22 (0.8)	282 (6.3)	◊ ◊	◊ ◊
Colombia	69 (1.3)	385 (3.5)	◊ ◊	-1 (1.9)	20 (1.0)	377 (4.7)	◊ ◊	-2 (1.5)
El Salvador	68 (1.3)	351 (2.7)	◊ ◊	◊ ◊	22 (1.0)	327 (3.8)	◊ ◊	◊ ◊
Iran, Islamic Rep. of	64 (1.2)	425 (4.4)	-7 (1.5) ▼	-3 (1.8)	21 (1.0)	382 (4.5)	2 (1.2)	0 (1.4)
Lebanon	63 (1.3)	465 (4.3)	◊ ◊	◊ ◊	19 (0.9)	428 (5.9)	◊ ◊	◊ ◊
Singapore	60 (1.0)	615 (3.6)	-7 (1.5) ▼	-7 (1.6) ▼	20 (0.6)	575 (5.3)	1 (1.0)	0 (1.0)
Bahrain	59 (0.9)	412 (2.0)	◊ ◊	◊ ◊	18 (0.6)	389 (2.8)	◊ ◊	◊ ◊
Georgia	58 (1.7)	436 (5.0)	◊ ◊	◊ ◊	22 (1.0)	399 (7.8)	◊ ◊	◊ ◊
Qatar	57 (0.5)	321 (1.6)	◊ ◊	◊ ◊	19 (0.5)	299 (4.0)	◊ ◊	◊ ◊
Thailand	57 (1.5)	457 (5.6)	-2 (1.9)	--	31 (1.1)	420 (5.1)	-1 (1.4)	--
Kuwait	57 (1.0)	367 (2.4)	◊ ◊	--	20 (0.7)	349 (3.7)	◊ ◊	--
Palestinian Nat'l Auth.	56 (1.3)	392 (4.1)	◊ ◊	◊ ◊	22 (0.8)	340 (5.0)	◊ ◊	◊ ◊
Armenia	55 (1.4)	511 (3.9)	◊ ◊	◊ ◊	23 (0.7)	494 (6.4)	◊ ◊	◊ ◊
Ukraine	54 (1.5)	485 (3.9)	◊ ◊	◊ ◊	23 (0.8)	456 (4.3)	◊ ◊	◊ ◊
Saudi Arabia	54 (1.4)	340 (3.7)	◊ ◊	◊ ◊	22 (0.8)	321 (4.0)	◊ ◊	◊ ◊
Russian Federation	53 (1.1)	533 (4.6)	0 (1.9)	5 (1.7) ▲	27 (0.8)	494 (4.7)	-5 (1.3) ▼	-7 (1.3) ▼
Israel	49 (1.1)	475 (4.8)	-12 (1.9) ▼	--	22 (0.8)	470 (5.3)	2 (1.2)	--
Romania	47 (1.4)	486 (4.9)	-6 (2.1) ▼	-8 (2.0) ▼	21 (0.8)	451 (5.1)	-5 (1.4) ▼	-7 (1.3) ▼
Hong Kong SAR	47 (1.2)	603 (5.5)	-9 (1.6) ▼	-2 (1.9)	22 (0.9)	566 (6.4)	-2 (1.1)	-4 (1.2) ▼
Bulgaria	46 (1.2)	487 (5.6)	-4 (2.5)	--	22 (0.9)	463 (5.5)	-3 (1.4) ▼	--
Cyprus	44 (0.9)	497 (2.4)	-23 (1.4) ▼	-21 (1.4) ▼	21 (0.6)	455 (3.4)	2 (1.0) ▲	2 (0.9)
Malta	42 (0.6)	517 (1.8)	◊ ◊	◊ ◊	21 (0.6)	474 (3.2)	◊ ◊	◊ ◊
United States	41 (0.8)	524 (2.9)	-11 (1.4) ▼	-9 (1.4) ▼	24 (0.5)	511 (3.3)	2 (0.8) ▲	-2 (0.9) ▼
Bosnia and Herzegovina	41 (1.2)	476 (3.2)	◊ ◊	◊ ◊	16 (0.6)	459 (4.2)	◊ ◊	◊ ◊
England	40 (1.4)	532 (5.7)	-25 (1.9) ▼	-27 (2.1) ▼	25 (0.9)	515 (6.1)	6 (1.2) ▲	7 (1.3) ▲
Sweden	39 (1.1)	517 (2.9)	◊ ◊	-9 (2.1) ▼	24 (0.6)	488 (2.9)	◊ ◊	-3 (1.4)
Lithuania	38 (1.1)	531 (3.4)	-14 (1.9) ▼	5 (1.8) ▲	28 (0.8)	503 (2.7)	-1 (1.3)	-6 (1.5) ▼
Italy	38 (1.2)	506 (3.3)	-16 (1.8) ▼	--	23 (0.8)	482 (4.5)	1 (1.2)	--
Chinese Taipei	37 (1.2)	657 (3.7)	-8 (1.6) ▼	◊ ◊	18 (0.6)	605 (5.1)	-4 (0.8) ▼	◊ ◊
Norway	37 (1.1)	488 (2.4)	◊ ◊	-12 (1.6) ▼	24 (0.6)	474 (2.6)	◊ ◊	-2 (1.1) ▼
Serbia	35 (1.4)	518 (4.3)	◊ ◊	◊ ◊	16 (0.7)	499 (5.7)	◊ ◊	◊ ◊
Australia	34 (1.3)	521 (6.2)	--	-10 (1.8) ▼	27 (0.8)	498 (3.7)	--	-1 (1.0)
Scotland	33 (1.0)	502 (4.5)	◊ ◊	--	29 (0.8)	490 (4.1)	◊ ◊	--
Korea, Rep. of	33 (0.9)	650 (2.9)	3 (1.1) ▲	-2 (1.4)	23 (0.6)	600 (3.4)	-12 (0.9) ▼	-13 (1.2) ▼
Czech Republic	31 (1.0)	530 (3.0)	-1 (1.9)	-1 (1.6)	22 (0.6)	501 (3.6)	-10 (1.3) ▼	-8 (1.3) ▼
Japan	30 (1.1)	609 (3.7)	-1 (1.5)	-7 (1.8) ▼	30 (1.0)	567 (3.0)	-4 (1.2) ▼	-6 (1.2) ▼
Hungary	30 (1.0)	554 (4.4)	-6 (1.6) ▼	-5 (1.6) ▼	22 (1.0)	517 (4.9)	-13 (1.2) ▼	-12 (1.5) ▼
Slovenia	25 (1.1)	520 (4.3)	--	-15 (2.0) ▼	22 (0.7)	507 (3.0)	--	-12 (1.2) ▼
‡ Morocco	84 (0.7)	387 (3.1)	--	--	10 (0.6)	353 (7.1)	--	--
International Avg.	54 (0.2)	471 (0.6)			21 (0.1)	441 (0.7)		
Benchmarking Participants								
Dubai, UAE	54 (1.3)	480 (2.9)	◊ ◊	◊ ◊	22 (1.1)	451 (5.0)	◊ ◊	◊ ◊
Ontario, Canada	48 (1.7)	537 (3.9)	-12 (2.4) ▼	-10 (2.4) ▼	23 (0.9)	512 (4.0)	3 (1.3) ▲	-2 (1.4)
Quebec, Canada	47 (1.4)	544 (4.4)	4 (2.4)	-2 (2.8) ▼	19 (0.7)	529 (4.9)	-15 (2.1) ▼	-3 (1.9)
Minnesota, US	43 (2.2)	551 (5.3)	◊ ◊	-10 (3.6) ▼	25 (1.1)	530 (5.6)	◊ ◊	2 (1.9)
Massachusetts, US	41 (1.6)	565 (5.2)	-6 (2.9) ▼	◊ ◊	26 (1.1)	549 (5.1)	1 (1.7)	◊ ◊
Basque Country, Spain	37 (1.5)	525 (3.4)	◊ ◊	◊ ◊	24 (0.9)	499 (3.7)	◊ ◊	◊ ◊
British Columbia, Canada	35 (1.0)	532 (3.5)	-7 (2.5) ▼	◊ ◊	26 (0.8)	515 (4.3)	-3 (1.5)	◊ ◊

▲ 2007 percent significantly higher

▼ 2007 percent significantly lower

Index based on students' responses to three statements about mathematics: 1) I enjoy learning mathematics; 2) Mathematics is boring (Reversed); 3) I like mathematics. Average is computed across the three items based on a 4-point scale: 1. Agree a lot; 2. Agree a little; 3. Disagree a little; 4. Disagree a lot. Students agreeing a lot or a little on average across the three statements are assigned to the high level. Students disagreeing a little or a lot on average across the three statements are assigned to the low level. All other students are assigned to the middle level.

‡ Did not satisfy guidelines for sample participation rates (see Appendix A).

() Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals may appear inconsistent.

A dash (-) indicates comparable data are not available.

A diamond (◊) indicates the country did not participate in the assessment.



Exhibit 4.8 Index of Students' Positive Affect Toward Mathematics (PATM) with Trends (Continued)

TIMSS2007
Mathematics 8th Grade

Country	Low PATM			
	2007 Percent of Students	Average Achievement	Difference in Percent from 1999	Difference in Percent from 1995
Algeria	7 (0.5)	357 (3.8)	◇ ◇	◇ ◇
Egypt	8 (0.5)	376 (7.6)	◇ ◇	◇ ◇
Botswana	9 (0.7)	332 (5.0)	◇ ◇	◇ ◇
Oman	6 (0.4)	334 (7.5)	◇ ◇	◇ ◇
Tunisia	13 (0.7)	395 (4.2)	-1 (1.0)	◇ ◇
Malaysia	10 (0.6)	445 (6.0)	7 (0.6) ▲	◇ ◇
Jordan	13 (1.0)	385 (9.2)	0 (1.3)	◇ ◇
Indonesia	7 (0.6)	402 (7.3)	3 (0.7) ▲	◇ ◇
Turkey	11 (0.8)	386 (5.8)	--	◇ ◇
Syrian Arab Republic	13 (0.6)	368 (4.5)	◇ ◇	◇ ◇
Ghana	8 (0.6)	269 (8.4)	◇ ◇	◇ ◇
Colombia	11 (0.7)	380 (6.7)	◇ ◇	2 (1.1) ▲
El Salvador	10 (0.7)	327 (6.0)	◇ ◇	◇ ◇
Iran, Islamic Rep. of	15 (0.9)	382 (6.6)	5 (1.1) ▲	2 (1.3)
Lebanon	17 (0.9)	428 (4.9)	◇ ◇	◇ ◇
Singapore	20 (0.8)	545 (5.4)	6 (1.1) ▲	6 (1.2) ▲
Bahrain	23 (0.8)	376 (3.0)	◇ ◇	◇ ◇
Georgia	20 (1.2)	392 (6.5)	◇ ◇	◇ ◇
Qatar	24 (0.5)	296 (2.8)	◇ ◇	◇ ◇
Thailand	12 (0.7)	427 (5.8)	3 (0.9) ▲	--
Kuwait	24 (0.9)	338 (4.3)	◇ ◇	--
Palestinian Nat'l Auth.	22 (1.0)	347 (4.1)	◇ ◇	◇ ◇
Armenia	22 (1.2)	489 (4.5)	◇ ◇	◇ ◇
Ukraine	23 (1.1)	440 (4.0)	◇ ◇	◇ ◇
Saudi Arabia	24 (1.0)	323 (4.7)	◇ ◇	◇ ◇
Russian Federation	20 (0.8)	488 (5.7)	5 (1.3) ▲	2 (1.2)
Israel	28 (1.1)	451 (4.8)	10 (1.4) ▲	--
Romania	31 (1.2)	443 (4.5)	11 (1.6) ▲	15 (1.5) ▲
Hong Kong SAR	31 (1.2)	532 (7.3)	11 (1.4) ▲	6 (1.7) ▲
Bulgaria	32 (1.2)	448 (6.4)	8 (2.2) ▲	--
Cyprus	35 (0.8)	436 (2.4)	21 (1.2) ▲	19 (1.2) ▲
Malta	37 (0.7)	465 (2.4)	◇ ◇	◇ ◇
United States	35 (0.8)	490 (3.3)	9 (1.2) ▲	11 (1.1) ▲
Bosnia and Herzegovina	43 (1.3)	444 (3.4)	◇ ◇	◇ ◇
England	35 (1.5)	495 (4.9)	19 (1.8) ▲	20 (1.8) ▲
Sweden	37 (1.1)	470 (2.7)	◇ ◇	12 (1.7) ▲
Lithuania	34 (1.1)	481 (3.5)	14 (1.6) ▲	0 (1.8)
Italy	39 (1.1)	455 (3.2)	15 (1.6) ▲	--
Chinese Taipei	45 (1.4)	547 (4.6)	12 (1.7) ▲	◇ ◇
Norway	39 (1.1)	451 (2.1)	◇ ◇	14 (1.5) ▲
Serbia	49 (1.6)	467 (3.7)	◇ ◇	◇ ◇
Australia	39 (1.2)	476 (4.1)	--	11 (1.5) ▲
Scotland	38 (1.0)	476 (4.1)	◇ ◇	--
Korea, Rep. of	44 (0.9)	558 (3.1)	8 (1.3) ▲	15 (1.4) ▲
Czech Republic	47 (1.1)	489 (2.7)	11 (1.9) ▲	9 (1.9) ▲
Japan	40 (1.2)	543 (2.5)	5 (1.6) ▲	13 (1.8) ▲
Hungary	48 (1.4)	496 (3.6)	19 (2.0) ▲	16 (1.9) ▲
Slovenia	53 (1.1)	492 (2.1)	--	27 (1.9) ▲
‡ Morocco	6 (0.6)	353 (9.4)	--	--
International Avg.	26 (0.1)	428 (0.7)		
Benchmarking Participants				
Dubai, UAE	24 (1.1)	442 (4.9)	◇ ◇	◇ ◇
Ontario, Canada	29 (1.4)	491 (4.9)	9 (1.9) ▲	12 (2.0) ▲
Quebec, Canada	34 (1.4)	509 (3.1)	11 (2.5) ▲	6 (2.3) ▲
Minnesota, US	32 (2.5)	509 (5.5)	◇ ◇	8 (3.4) ▲
Massachusetts, US	33 (2.1)	524 (6.4)	5 (2.8)	◇ ◇
Basque Country, Spain	39 (1.5)	476 (3.8)	◇ ◇	◇ ◇
British Columbia, Canada	38 (1.2)	486 (3.0)	10 (2.7) ▲	◇ ◇

SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007

▲ 2007 percent significantly higher
▼ 2007 percent significantly lower

Students were asked to indicate if they *agreed a lot*, *agreed a little*, *disagreed a little*, or *disagreed a lot* with each statement. Students who agreed a little or a lot on average with all four statements were assigned to the high level of the index (i.e., placed a high value on mathematics), while those who disagreed a little or a lot, on average, were assigned to the low level of the index. The medium level includes all other response combinations. The percentage of students at each level of the index is presented in Exhibit 4.9 for each eighth-grade TIMSS participant, together with average mathematics achievement and changes in percentages since 2003.

Eighth grade students generally placed a high value on mathematics, with 78 percent of students, on average across countries, at the high level of the valuing mathematics index. In addition, 17 percent of students were at the medium level and 5 percent at the low level. The highest percentages of students at the high level of the index were in Indonesia, Ghana, Oman, Thailand, Algeria, Jordan, Tunisia, El Salvador, and Morocco with more than 90 percent which included some of the lower performing countries. In contrast, less than half the students were in the high category in Chinese Taipei and Japan, two of the highest performing countries on the TIMSS assessment. There was an increase since 2003 in the percentage of students at the high level of the index in 19 countries and the Basque Country in Spain, compared to declines in only five countries. On average across the countries, eighth grade mathematics achievement was higher among students at the high level of the valuing mathematics index (458 points) than at the medium level (438 points) or the low level (435 points).

Regardless of how much students like mathematics or value it for how it can help them in their lives, students' confidence in their ability to learn mathematics is based to some extent on their past experience in learning the subject. This in turn is likely to be determined by the difficulty of the subject as well as the individual student's own learning ability.

Exhibit 4.9 Index of Students' Valuing Mathematics (SVM) with Trends

TIMSS2007
Mathematics 8th Grade

Country	High SVM			Medium SVM			Low SVM		
	2007 Percent of Students	Average Achievement	Difference in Percent from 2003	2007 Percent of Students	Average Achievement	Difference in Percent from 2003	2007 Percent of Students	Average Achievement	Difference in Percent from 2003
Indonesia	95 (0.6)	399 (3.7)	10 (1.0) ▲	5 (0.5)	379 (10.6)	-9 (0.9) ▼	1 (0.2)	~ ~	0 (0.3)
Ghana	92 (0.6)	316 (4.1)	5 (1.1) ▲	6 (0.5)	262 (11.9)	-4 (0.9) ▼	2 (0.2)	~ ~	-1 (0.4)
Oman	92 (0.5)	381 (3.2)	0 0	6 (0.5)	310 (8.3)	0 0	2 (0.2)	~ ~	0 0
Thailand	92 (0.5)	445 (4.9)	0 0	7 (0.5)	410 (7.5)	0 0	1 (0.1)	~ ~	0 0
Algeria	92 (0.5)	390 (2.0)	0 0	6 (0.4)	370 (4.9)	0 0	2 (0.2)	~ ~	0 0
Jordan	91 (0.7)	436 (3.8)	3 (1.0) ▲	7 (0.4)	391 (7.9)	-3 (0.8) ▼	2 (0.3)	~ ~	0 (0.4)
Tunisia	91 (0.5)	423 (2.5)	4 (0.8) ▲	6 (0.4)	403 (5.2)	-3 (0.6) ▼	3 (0.3)	385 (6.1)	-1 (0.5)
El Salvador	91 (0.5)	342 (2.6)	0 0	8 (0.4)	355 (5.2)	0 0	2 (0.3)	~ ~	0 0
Egypt	89 (0.7)	401 (3.3)	3 (1.0) ▲	9 (0.6)	355 (7.2)	-3 (0.8) ▼	2 (0.2)	~ ~	-1 (0.4)
Colombia	89 (0.7)	383 (3.6)	0 0	9 (0.6)	383 (5.4)	0 0	2 (0.4)	~ ~	0 0
Bahrain	88 (0.6)	401 (1.4)	6 (0.9) ▲	9 (0.5)	390 (5.2)	-5 (0.8) ▼	3 (0.3)	367 (8.5)	-1 (0.5)
Syrian Arab Republic	88 (0.6)	402 (3.6)	0 0	9 (0.5)	373 (6.4)	0 0	3 (0.3)	372 (8.7)	0 0
Turkey	87 (0.6)	438 (4.8)	0 0	10 (0.5)	407 (6.5)	0 0	3 (0.3)	361 (11.3)	0 0
Palestinian Nat'l Auth.	86 (0.9)	380 (3.6)	1 (1.2) ▲	11 (0.7)	313 (7.1)	-1 (0.9) ▼	3 (0.4)	311 (10.1)	0 (0.5)
Lithuania	85 (0.6)	511 (2.3)	-1 (0.9) ▼	11 (0.6)	489 (5.0)	0 (0.8)	4 (0.3)	454 (7.9)	1 (0.4)
Kuwait	84 (0.8)	361 (2.1)	0 0	10 (0.5)	342 (5.3)	0 0	6 (0.5)	311 (9.5)	0 0
Ukraine	84 (0.8)	470 (3.5)	0 0	13 (0.6)	454 (5.3)	0 0	3 (0.4)	451 (10.5)	0 0
Iran, Islamic Rep. of	83 (0.8)	408 (4.1)	6 (1.1) ▲	13 (0.6)	392 (7.5)	-3 (0.9) ▼	4 (0.4)	354 (9.5)	-3 (0.6) ▼
Botswana	83 (0.8)	377 (2.1)	-4 (1.0) ▼	15 (0.8)	318 (4.2)	4 (0.9) ▲	3 (0.3)	325 (8.5)	0 (0.4)
Saudi Arabia	82 (0.9)	334 (2.9)	--	13 (0.8)	322 (5.8)	--	5 (0.5)	307 (8.6)	--
United States	82 (0.7)	511 (2.8)	1 (0.8) ▲	14 (0.5)	501 (3.9)	0 (0.6)	4 (0.3)	485 (5.3)	0 (0.4)
Scotland	82 (0.7)	491 (3.8)	4 (1.2) ▲	15 (0.6)	477 (4.5)	-3 (0.9) ▼	4 (0.4)	467 (8.2)	-1 (0.6)
Georgia	81 (1.2)	421 (5.9)	0 0	15 (0.9)	403 (8.8)	0 0	4 (0.5)	381 (12.4)	0 0
Qatar	80 (0.5)	317 (1.4)	0 0	13 (0.4)	292 (3.9)	0 0	6 (0.3)	268 (5.0)	0 0
Cyprus	80 (0.7)	472 (1.8)	3 (0.9) ▲	15 (0.5)	453 (3.3)	-1 (0.7) ▼	5 (0.4)	415 (7.6)	-2 (0.6) ▼
Bosnia and Herzegovina	79 (0.9)	459 (3.0)	0 0	15 (0.7)	461 (4.0)	0 0	6 (0.5)	454 (5.9)	0 0
Russian Federation	79 (0.9)	515 (4.1)	0 (1.2)	17 (0.8)	511 (5.3)	0 (1.0)	4 (0.4)	489 (7.7)	0 (0.5)
Norway	79 (0.9)	475 (2.0)	7 (1.4) ▲	17 (0.7)	458 (3.4)	-4 (1.2) ▼	5 (0.3)	441 (6.8)	-3 (0.7) ▼
Lebanon	77 (1.2)	459 (4.5)	-3 (1.5) ▼	18 (1.1)	423 (5.5)	3 (1.4) ▲	5 (0.6)	425 (7.5)	1 (0.7)
Malta	77 (0.6)	495 (1.5)	0 0	18 (0.5)	473 (3.1)	0 0	5 (0.3)	440 (6.0)	0 0
Israel	77 (1.1)	473 (4.1)	4 (1.5) ▲	17 (0.9)	458 (5.2)	-3 (1.3) ▼	6 (0.5)	409 (9.6)	0 (0.7)
Singapore	77 (0.8)	598 (3.8)	-3 (1.0) ▼	19 (0.7)	590 (5.3)	2 (0.9) ▲	4 (0.3)	528 (8.4)	2 (0.4) ▲
Malaysia	76 (1.0)	480 (4.8)	-9 (1.3) ▼	21 (0.9)	459 (6.1)	6 (1.1) ▲	3 (0.5)	418 (15.9)	2 (0.5) ▲
Hungary	75 (1.0)	522 (3.7)	-4 (1.2) ▼	20 (0.8)	504 (4.7)	3 (1.1) ▲	5 (0.4)	494 (8.7)	1 (0.5)
Australia	75 (1.1)	502 (4.4)	1 (1.4) ▲	19 (0.9)	484 (3.8)	0 (1.2)	6 (0.4)	470 (7.0)	-1 (0.7)
England	74 (1.0)	515 (5.2)	10 (1.7) ▲	21 (0.8)	514 (5.5)	-6 (1.5) ▼	5 (0.4)	505 (8.8)	-3 (0.8) ▼
Romania	72 (1.0)	463 (5.1)	2 (1.5) ▲	20 (0.8)	470 (4.8)	-1 (1.2) ▼	7 (0.6)	455 (6.7)	-1 (0.8)
Serbia	72 (0.8)	489 (3.7)	3 (1.2) ▲	19 (0.6)	493 (5.3)	-2 (0.9) ▼	9 (0.6)	474 (5.9)	-2 (0.8) ▼
Bulgaria	71 (1.1)	471 (5.3)	-1 (1.6) ▼	20 (0.9)	471 (5.7)	0 (1.2)	9 (0.7)	447 (7.5)	1 (1.1)
Czech Republic	70 (0.8)	505 (2.7)	0 0	25 (0.7)	502 (3.3)	0 0	5 (0.4)	493 (5.0)	0 0
Sweden	68 (0.8)	497 (2.5)	9 (1.5) ▲	28 (0.7)	485 (2.6)	-9 (1.4) ▼	4 (0.3)	463 (5.5)	0 (0.5)
Slovenia	67 (0.9)	504 (2.3)	1 (1.6) ▲	29 (0.8)	501 (3.1)	0 (1.3)	5 (0.4)	472 (4.8)	-1 (0.6)
Armenia	64 (0.9)	504 (4.3)	0 (1.4)	24 (0.8)	499 (5.9)	2 (1.1) ▲	13 (0.7)	498 (5.3)	-1 (1.1)
Hong Kong SAR	60 (1.4)	588 (5.8)	3 (1.7) ▲	31 (1.1)	561 (6.5)	-5 (1.4) ▼	8 (0.7)	510 (9.7)	2 (0.8) ▲
Korea, Rep. of	53 (0.9)	617 (3.0)	10 (1.4) ▲	37 (0.7)	582 (3.4)	-6 (1.2) ▼	10 (0.5)	551 (4.8)	-4 (0.7) ▼
Italy	53 (0.8)	488 (3.7)	5 (1.4) ▲	39 (0.9)	477 (3.1)	-3 (1.3) ▼	8 (0.5)	448 (4.5)	-2 (0.8) ▼
Chinese Taipei	45 (1.2)	623 (5.3)	3 (1.6) ▲	39 (1.0)	598 (4.2)	-2 (1.3) ▼	16 (0.8)	534 (5.8)	-1 (1.1)
Japan	43 (0.9)	584 (3.3)	8 (1.2) ▲	43 (0.7)	568 (2.5)	-6 (1.0) ▼	14 (0.7)	536 (5.4)	-2 (1.0)
‡ Morocco	94 (0.5)	384 (2.9)	--	5 (0.5)	358 (13.6)	--	1 (0.2)	~ ~	--
International Avg.	78 (0.1)	458 (0.5)		17 (0.1)	438 (0.9)		5 (0.1)	435 (1.3)	

Benchmarking Participants

Minnesota, US	85 (1.4)	537 (4.8)	0 0	12 (1.0)	516 (4.4)	0 0	3 (0.6)	481 (14.2)	0 0
Ontario, Canada	84 (1.0)	522 (3.4)	0 (1.4)	13 (0.8)	498 (5.8)	1 (1.1)	3 (0.4)	479 (14.2)	-1 (0.5)
Dubai, UAE	83 (0.8)	469 (2.9)	0 0	13 (0.7)	454 (5.3)	0 0	3 (0.3)	416 (12.0)	0 0
Massachusetts, US	81 (1.2)	552 (4.8)	0 0	15 (1.1)	534 (6.2)	0 0	4 (0.5)	515 (9.5)	0 0
Quebec, Canada	80 (0.8)	534 (3.6)	-2 (1.1) ▼	17 (0.7)	514 (4.5)	2 (1.0) ▲	3 (0.3)	486 (10.2)	0 (0.4)
British Columbia, Canada	80 (0.9)	515 (3.2)	0 0	16 (0.8)	497 (4.3)	0 0	4 (0.3)	461 (6.2)	0 0
Basque Country, Spain	69 (1.1)	508 (3.0)	7 (1.7) ▲	22 (1.1)	484 (4.0)	-4 (1.5) ▼	9 (0.7)	465 (5.8)	-3 (1.1) ▼

▲ 2007 percent significantly higher ▼ 2007 percent significantly lower

Index based on students' responses to four statements about mathematics: 1) I think learning mathematics will help me in my daily life; 2) I need mathematics to learn other school subjects; 3) I need to do well in mathematics to get into the university of my choice; 4) I need to do well in mathematics to get the job I want. Average is computed across the four items based on a 4-point scale: 1. Agree a lot; 2. Agree a little; 3. Disagree a little; 4. Disagree a lot. Students agreeing a lot or a little on average across the four statements are assigned to the high level. Students disagreeing a little or a lot on average across the four statements are assigned to the low level. All other students are assigned to the middle level.

‡ Did not satisfy guidelines for sample participation rates (see Appendix A).

() Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals may appear inconsistent.

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

A diamond (0) indicates the country did not participate in the assessment.

To investigate how students think about their abilities in mathematics, TIMSS created an Index of Students' Self-Confidence in Learning Mathematics (SCM), based on students' responses to four statements about their mathematics ability:

- ▶ I usually do well in mathematics.
- ▶ Mathematics is harder for me than for many of my classmates.⁵
- ▶ I am just not good at mathematics.⁶
- ▶ I learn things quickly in mathematics.

Students were asked to indicate if they *agreed a lot*, *agreed a little*, *disagreed a little*, or *disagreed a lot* with each statement. Students who agreed a little or a lot on average with all four statements were assigned to the high level of the index (i.e., are confident about their mathematics ability), while those who disagreed a little or a lot, on average, were assigned to the low level of the index. The medium level includes all other response combinations. For each TIMSS participant at the fourth and eighth grades, the percentage of students at each level of the index is presented in Exhibit 4.10, together with average mathematics achievement. The exhibit also shows changes in percentages since 2003.

At fourth grade, on average across the countries, students expressed considerable self-confidence in their mathematics ability, with 57 percent at the high level of the index, and a further 32 percent at the medium level. Just 11 percent, on average were at the low level of the index. Highest levels of self-confidence were reported in Sweden, Austria, Germany, and Denmark, and the two benchmarking states of Massachusetts and Minnesota, with 70 percent or more at the high level of the index, and lowest levels in El Salvador (39%), Chinese Taipei (36%), and Yemen (35%), all with less than 40 percent. Ten countries showed an increase since 2003 in the percentage of students at the high index level, and five countries and one benchmarking participant had a decrease. There was a positive association between level of self-confidence in learning mathematics and mathematics achievement at the fourth grade. Achievement was highest among students at the high

5 The response categories for this statement were reversed in constructing the index.

6 The response categories for this statement were reversed in constructing the index.

level of the mathematics self-confidence index (500 points, on average), next highest among students at the medium level (449 points), and lowest among those at the low level (429 points).

Students' confidence in learning mathematics at the eighth grade was lower than at the fourth grade, on average across countries, with just 43 percent of students at the high level of the index (compared with 57% at fourth grade). At the medium level, there were 37 percent of students, on average, and 20 percent at the low level. Self-confidence levels were highest in Israel, Jordan, Qatar, and Egypt (55% or more at the high level) and lowest in Korea, Indonesia, Malaysia, Chinese Taipei, Thailand, and Japan (less than 30% at the high level). There were increased percentages since 2003 at the high level in 10 countries, compared to decreases in only three countries. As at the fourth grade, there was a positive association between self-confidence in learning mathematics and mathematics achievement at the eighth grade. Students at the high level of the self-confidence index had the highest average mathematics achievement (492 points), followed by students the medium level (433 points), and students at the low index level (412 points).

As shown in Exhibit 4.11, more boys than girls at the fourth grade reported having self-confidence in learning mathematics. On average across countries, 54 percent of the girls compared to 60 percent of the boys were at the high level of the self-confidence index. There were four countries with a difference in favor of girls at the high index level compared to 22 countries and 6 benchmarking participants with a difference in favor of boys. In contrast, more girls than boys were at the medium and low levels of the self-confidence index. At the medium level, there was a greater percentage of girls than boys in 19 countries and 4 benchmarking participants, and a greater percentage of boys in only 2 countries. At the low level, there was a greater percentage of girls than boys in 19 countries and 5 benchmarking participants, and a greater percentage of boys in only 4 countries.

At the eighth grade, the pattern was similar to that at the fourth grade, with boys having higher self-confidence in learning mathematics than girls. On average across countries, 45 percent of boys were at the high level of the

Exhibit 4.10 Index of Students' Self-Confidence in Learning Mathematics (SCM) with Trends
TIMSS2007
Mathematics **4th**
Grade

Country	High SCM			Medium SCM			Low SCM		
	2007 Percent of Students	Average Achievement	Difference in Percent from 2003	2007 Percent of Students	Average Achievement	Difference in Percent from 2003	2007 Percent of Students	Average Achievement	Difference in Percent from 2003
Sweden	77 (0.9)	514 (2.4)	◇ ◇	19 (0.8)	467 (4.5)	◇ ◇	5 (0.4)	459 (5.2)	◇ ◇
Austria	70 (0.8)	524 (1.9)	◇ ◇	22 (0.8)	470 (2.6)	◇ ◇	8 (0.5)	445 (5.5)	◇ ◇
Germany	70 (0.9)	548 (2.1)	◇ ◇	21 (0.7)	493 (3.5)	◇ ◇	10 (0.5)	468 (4.5)	◇ ◇
Denmark	70 (1.1)	540 (2.5)	◇ ◇	23 (1.0)	493 (3.5)	◇ ◇	7 (0.6)	469 (5.8)	◇ ◇
Norway	69 (0.8)	490 (2.7)	5 (1.2) ▲	24 (0.8)	441 (3.8)	-3 (1.2) ▼	7 (0.4)	429 (7.1)	-1 (0.7)
Slovenia	68 (0.9)	522 (2.0)	-8 (1.3) ▼	25 (0.8)	467 (2.9)	7 (1.2) ▲	6 (0.4)	431 (4.5)	1 (0.6)
Georgia	68 (1.3)	464 (3.9)	◇ ◇	25 (1.1)	412 (5.2)	◇ ◇	7 (0.7)	413 (11.7)	◇ ◇
United States	67 (0.8)	551 (2.4)	13 (1.1) ▲	22 (0.6)	493 (2.8)	-17 (0.9) ▼	10 (0.4)	478 (3.1)	3 (0.5) ▲
Scotland	67 (1.1)	511 (2.4)	3 (1.4) ●	24 (1.0)	472 (3.5)	-2 (1.3)	9 (0.6)	450 (5.3)	-1 (0.8)
Netherlands	66 (1.0)	551 (2.5)	0 (1.4)	22 (0.9)	511 (3.1)	-1 (1.3)	12 (0.7)	489 (4.2)	1 (0.9)
Kazakhstan	66 (1.7)	563 (6.5)	◇ ◇	24 (1.7)	524 (7.9)	◇ ◇	10 (1.1)	516 (12.4)	◇ ◇
Italy	66 (0.9)	525 (3.2)	5 (1.4) ●	27 (0.8)	481 (3.9)	-2 (1.2)	7 (0.4)	457 (5.4)	-3 (0.7) ▼
Iran, Islamic Rep. of	66 (1.3)	428 (3.8)	23 (2.0) ●	28 (1.2)	377 (5.6)	-23 (2.0) ▼	7 (0.7)	330 (10.2)	0 (0.9)
England	64 (1.0)	566 (3.0)	5 (1.5) ●	26 (0.8)	507 (3.7)	-4 (1.3) ▼	10 (0.7)	483 (5.0)	-1 (0.9)
Australia	64 (1.3)	542 (2.8)	0 (1.6)	26 (0.9)	480 (3.8)	1 (1.2)	10 (0.8)	457 (6.7)	-1 (1.1)
Hungary	62 (1.0)	543 (3.0)	-2 (1.3)	27 (0.8)	468 (4.6)	0 (1.1)	11 (0.5)	447 (6.0)	1 (0.7)
Qatar	61 (0.7)	328 (1.3)	◇ ◇	33 (0.6)	273 (2.2)	◇ ◇	6 (0.3)	275 (5.2)	◇ ◇
Slovak Republic	59 (1.1)	526 (3.5)	◇ ◇	28 (0.9)	464 (4.6)	◇ ◇	12 (0.7)	445 (8.2)	◇ ◇
Lithuania	57 (0.8)	562 (2.2)	-4 (1.5) ▼	33 (0.8)	495 (2.9)	3 (1.3) ●	9 (0.6)	466 (6.6)	2 (0.9)
Czech Republic	56 (1.0)	512 (2.5)	◇ ◇	31 (1.0)	460 (3.3)	◇ ◇	12 (0.6)	442 (4.9)	◇ ◇
Kuwait	56 (1.4)	353 (3.7)	◇ ◇	39 (1.3)	296 (4.5)	◇ ◇	5 (0.4)	280 (9.0)	◇ ◇
Ukraine	55 (1.0)	505 (2.8)	◇ ◇	34 (0.9)	443 (4.0)	◇ ◇	11 (0.7)	432 (5.4)	◇ ◇
Russian Federation	54 (1.2)	570 (5.0)	1 (1.9)	31 (1.0)	522 (5.5)	-1 (1.4)	15 (1.1)	505 (6.5)	-1 (1.3)
New Zealand	52 (0.7)	527 (2.3)	13 (1.3) ●	37 (0.7)	465 (2.6)	-19 (1.2) ▼	11 (0.5)	438 (4.8)	7 (0.6) ●
Armenia	52 (1.4)	517 (3.8)	8 (1.8) ●	35 (1.3)	500 (9.9)	-9 (1.7) ▼	13 (0.7)	489 (5.9)	0 (1.0)
Latvia	50 (0.9)	568 (2.6)	1 (1.6)	36 (0.8)	515 (2.7)	1 (1.4)	15 (0.8)	493 (4.1)	-2 (1.2)
Colombia	49 (1.4)	389 (5.0)	◇ ◇	43 (1.4)	338 (5.7)	◇ ◇	7 (0.6)	329 (6.7)	◇ ◇
Singapore	46 (1.2)	639 (3.0)	-3 (2.0)	35 (0.8)	580 (3.8)	-1 (1.3)	19 (0.8)	544 (4.9)	3 (1.2) ●
Hong Kong SAR	46 (1.0)	634 (3.7)	6 (1.5) ●	38 (1.0)	588 (3.6)	-3 (1.3) ▼	16 (0.7)	574 (4.6)	-3 (1.1) ▼
Tunisia	46 (1.4)	383 (4.4)	-10 (2.3) ▼	46 (1.4)	305 (4.5)	9 (2.1) ▲	8 (0.6)	278 (10.0)	1 (0.9)
Morocco	45 (1.5)	370 (6.1)	-9 (2.3) ▼	46 (1.6)	331 (6.1)	6 (2.2) ●	9 (1.0)	329 (16.1)	3 (1.2) ●
Japan	45 (1.1)	602 (2.4)	6 (1.4) ●	36 (0.9)	553 (2.9)	-5 (1.2) ▼	20 (0.7)	522 (3.1)	-1 (1.1)
Algeria	41 (1.5)	404 (5.3)	◇ ◇	49 (1.3)	374 (5.6)	◇ ◇	11 (0.9)	342 (8.7)	◇ ◇
El Salvador	39 (1.3)	365 (4.5)	◇ ◇	53 (1.2)	315 (4.4)	◇ ◇	8 (0.6)	303 (9.0)	◇ ◇
Chinese Taipei	36 (1.0)	612 (2.1)	-5 (1.3) ▼	37 (0.8)	566 (2.7)	-2 (1.2)	27 (0.8)	542 (2.7)	7 (1.1) ●
Yemen	35 (1.5)	261 (7.4)	◇ ◇	52 (1.5)	225 (5.8)	◇ ◇	13 (1.0)	210 (9.6)	◇ ◇
International Avg.	57 (0.2)	500 (0.6)		32 (0.2)	449 (0.8)		11 (0.1)	429 (1.2)	

SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007

Benchmarking Participants

Massachusetts, US	74 (1.4)	589 (3.6)	◇ ◇	19 (1.2)	534 (5.2)	◇ ◇	8 (0.8)	519 (5.7)	◇ ◇
Minnesota, US	71 (2.2)	575 (5.3)	◇ ◇	21 (1.4)	512 (6.2)	◇ ◇	8 (1.1)	482 (7.9)	◇ ◇
Alberta, Canada	68 (1.0)	523 (2.6)	◇ ◇	24 (0.8)	475 (3.6)	◇ ◇	8 (0.6)	451 (5.8)	◇ ◇
Quebec, Canada	68 (1.2)	540 (3.0)	-3 (1.6)	24 (1.0)	484 (3.6)	2 (1.4)	8 (0.6)	457 (5.0)	1 (0.8)
Dubai, UAE	68 (1.1)	468 (2.3)	◇ ◇	26 (1.1)	416 (4.3)	◇ ◇	6 (0.7)	401 (7.4)	◇ ◇
British Columbia, Canada	65 (0.9)	526 (2.9)	◇ ◇	27 (0.7)	475 (3.1)	◇ ◇	8 (0.7)	457 (5.7)	◇ ◇
Ontario, Canada	63 (1.3)	534 (3.0)	-4 (1.9) ▼	27 (1.1)	484 (3.9)	4 (1.6) ●	10 (0.8)	457 (4.9)	1 (1.1)

● 2007 percent significantly higher

▼ 2007 percent significantly lower

Index based on students' responses to four statements about mathematics: 1) I usually do well in mathematics; 2) Mathematics is harder for me than for many of my classmates (Reversed); 3) I'm just not good at mathematics (Reversed); 4) I learn things quickly in mathematics. Average is computed across the four items based on a 4-point scale: 1. Agree a lot; 2. Agree a little; 3. Disagree a little; 4. Disagree a lot. Students agreeing a little or a lot on average across the four statements are assigned to the high level. Students disagreeing a little or a lot on average are assigned to the low level. All other students are assigned to the middle level.

() Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals 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.

A diamond (◇) indicates the country did not participate in the assessment.



Exhibit 4.10 Index of Students' Self-Confidence in Learning Mathematics (SCM) with Trends (Continued)

TIMSS2007
Mathematics **8th** Grade

Country	High SCM			Medium SCM			Low SCM		
	2007 Percent of Students	Average Achievement	Difference in Percent from 2003	2007 Percent of Students	Average Achievement	Difference in Percent from 2003	2007 Percent of Students	Average Achievement	Difference in Percent from 2003
Israel	59 (1.0)	495 (4.1)	0 (1.5)	29 (0.9)	432 (5.3)	-1 (1.3)	12 (0.7)	417 (7.2)	1 (1.0)
Jordan	58 (1.5)	468 (3.7)	9 (1.9) ▲	34 (1.2)	388 (4.2)	-5 (1.6) ▼	9 (0.6)	361 (6.6)	-4 (0.9) ▼
Qatar	55 (0.6)	339 (2.3)	0 0	34 (0.6)	279 (2.3)	0 0	11 (0.3)	267 (3.4)	0 0
Egypt	55 (1.5)	422 (3.7)	-3 (1.8)	38 (1.4)	368 (3.8)	3 (1.7)	7 (0.4)	356 (8.0)	0 (0.6)
Kuwait	54 (0.9)	381 (2.5)	0 0	35 (0.9)	331 (2.6)	0 0	11 (0.6)	319 (5.7)	0 0
Scotland	53 (1.3)	515 (4.0)	1 (2.0)	33 (1.0)	465 (3.6)	1 (1.4)	14 (0.7)	442 (4.6)	-1 (1.2)
United States	53 (1.0)	537 (2.5)	2 (1.3)	28 (0.7)	487 (3.2)	-1 (0.9)	19 (0.7)	462 (3.0)	-1 (1.0)
England	53 (1.4)	543 (4.9)	6 (2.1) ▲	32 (1.0)	494 (4.7)	-2 (1.6)	15 (0.8)	457 (5.5)	-4 (1.3) ▼
Bahrain	53 (0.8)	435 (2.1)	8 (1.2) ▲	33 (0.7)	366 (2.4)	-5 (1.1) ▼	15 (0.6)	350 (3.0)	-4 (0.9) ▼
Cyprus	50 (1.0)	508 (1.7)	4 (1.3) ▲	30 (0.8)	437 (2.5)	-2 (1.1) ▼	20 (0.7)	411 (3.3)	-2 (1.0) ▼
Norway	50 (0.8)	505 (2.1)	4 (1.4) ▲	31 (0.7)	450 (2.1)	-1 (1.1)	19 (0.7)	415 (2.2)	-2 (1.1) ▼
Sweden	49 (1.0)	528 (2.6)	1 (1.6)	35 (0.7)	468 (2.4)	-1 (1.2)	16 (0.6)	438 (3.6)	0 (1.1)
Lebanon	49 (1.2)	483 (4.1)	6 (1.8) ▲	39 (1.3)	425 (4.2)	-5 (1.8) ▼	12 (0.9)	416 (4.9)	-1 (1.1)
Serbia	48 (1.3)	539 (3.4)	4 (1.7) ▲	25 (0.8)	464 (3.6)	-1 (1.1)	27 (1.1)	426 (3.9)	-3 (1.6)
Italy	48 (1.0)	514 (3.1)	2 (1.3)	28 (0.7)	462 (3.6)	-1 (1.1)	24 (0.9)	434 (3.7)	-2 (1.4)
Syrian Arab Republic	47 (1.1)	429 (3.5)	0 0	40 (0.9)	378 (4.2)	0 0	13 (0.7)	361 (4.7)	0 0
Saudi Arabia	47 (1.2)	361 (3.2)	--	42 (1.0)	310 (3.5)	--	11 (0.7)	294 (4.9)	--
Colombia	46 (1.3)	409 (3.6)	0 0	40 (1.2)	363 (3.8)	0 0	13 (0.7)	351 (4.5)	0 0
Algeria	46 (1.0)	412 (2.2)	0 0	41 (0.9)	372 (2.7)	0 0	12 (0.6)	358 (2.7)	0 0
Australia	45 (1.2)	539 (4.8)	-5 (2.1) ▼	35 (0.8)	472 (4.1)	5 (1.3) ▲	19 (0.9)	445 (3.7)	0 (1.5)
Iran, Islamic Rep. of	45 (1.2)	443 (5.0)	10 (1.5) ▲	40 (1.1)	380 (3.7)	-8 (1.4) ▼	14 (0.9)	368 (6.1)	-2 (1.1)
Oman	45 (1.1)	415 (3.4)	0 0	47 (1.1)	346 (3.7)	0 0	8 (0.5)	327 (5.6)	0 0
Tunisia	45 (1.3)	452 (2.8)	1 (1.6)	34 (0.8)	400 (2.6)	-2 (1.1)	21 (1.0)	391 (2.7)	1 (1.3)
Georgia	44 (1.8)	455 (4.9)	0 0	37 (1.5)	401 (7.5)	0 0	19 (1.0)	379 (7.0)	0 0
Ghana	44 (1.3)	341 (4.8)	0 (1.9)	46 (0.9)	292 (4.8)	1 (1.5)	11 (0.8)	285 (7.4)	-2 (1.0)
Palestinian Nat'l Auth.	44 (1.1)	414 (3.6)	0 (1.5)	44 (1.0)	341 (4.3)	3 (1.3) ▲	13 (0.7)	333 (5.0)	-3 (1.0) ▼
Czech Republic	43 (0.9)	542 (2.6)	0 0	31 (0.7)	490 (2.8)	0 0	25 (0.8)	456 (3.1)	0 0
Botswana	42 (1.0)	385 (3.0)	4 (1.3) ▲	41 (0.9)	355 (2.6)	-4 (1.2) ▼	17 (0.7)	354 (3.6)	0 (1.0)
Hungary	42 (1.0)	566 (3.5)	-3 (1.4)	32 (0.9)	499 (4.2)	1 (1.3)	26 (1.0)	464 (3.7)	2 (1.3)
Singapore	41 (1.0)	638 (3.3)	2 (1.3)	34 (0.9)	572 (4.6)	0 (1.1)	25 (0.8)	547 (4.7)	-2 (1.0)
Bosnia and Herzegovina	41 (1.2)	502 (2.6)	0 0	27 (0.8)	441 (3.2)	0 0	32 (1.1)	422 (3.5)	0 0
Russian Federation	41 (1.1)	560 (4.3)	-2 (1.5)	31 (0.8)	496 (4.9)	1 (1.2)	28 (0.8)	466 (4.1)	1 (1.2)
Lithuania	41 (1.0)	556 (2.7)	4 (1.4) ▲	34 (0.9)	481 (2.9)	-3 (1.2) ▼	25 (0.9)	461 (3.1)	-1 (1.2)
Slovenia	40 (1.1)	541 (2.9)	-1 (1.4)	41 (0.9)	485 (2.2)	2 (1.3)	19 (0.8)	458 (3.2)	-1 (1.2)
Turkey	39 (1.1)	494 (6.1)	0 0	36 (0.8)	403 (4.7)	0 0	24 (1.0)	384 (4.3)	0 0
Malta	38 (0.7)	536 (2.1)	0 0	35 (0.7)	467 (2.0)	0 0	27 (0.6)	449 (2.2)	0 0
Bulgaria	37 (1.3)	516 (5.5)	4 (1.8)	38 (1.1)	452 (5.3)	-1 (1.8)	25 (1.1)	430 (7.6)	-3 (1.6)
Armenia	37 (0.9)	521 (4.0)	-4 (1.5) ▼	38 (1.1)	496 (4.6)	-2 (1.5)	26 (1.0)	485 (4.7)	7 (1.4) ▲
Ukraine	36 (1.2)	523 (3.8)	0 0	36 (0.9)	448 (3.5)	0 0	28 (1.1)	423 (3.2)	0 0
El Salvador	35 (1.1)	377 (3.2)	0 0	52 (1.1)	327 (2.7)	0 0	13 (0.8)	323 (4.5)	0 0
Romania	33 (1.2)	517 (5.3)	3 (1.7)	41 (1.1)	449 (4.6)	-4 (1.6) ▼	27 (1.2)	426 (4.4)	2 (1.5)
Hong Kong SAR	30 (1.1)	622 (5.1)	1 (1.4)	40 (1.0)	562 (6.7)	2 (1.2)	30 (0.7)	539 (5.8)	-2 (1.1) ▼
Korea, Rep. of	29 (0.8)	668 (2.6)	-2 (1.1)	34 (0.7)	606 (3.1)	-2 (1.0) ▼	38 (0.8)	536 (2.8)	4 (1.2) ▲
Indonesia	28 (1.0)	405 (5.4)	2 (1.6)	58 (1.0)	394 (3.8)	-1 (1.3)	14 (0.8)	401 (5.0)	-1 (1.2)
Malaysia	27 (1.4)	521 (5.3)	-11 (1.8) ▼	50 (1.2)	458 (5.1)	5 (1.5) ▲	23 (0.8)	453 (4.5)	6 (1.0) ▲
Chinese Taipei	27 (1.1)	674 (3.7)	1 (1.5)	27 (0.7)	610 (5.0)	-3 (1.0) ▼	46 (1.2)	547 (4.4)	2 (1.6)
Thailand	22 (1.1)	489 (6.9)	0 0	60 (0.9)	428 (4.6)	0 0	18 (0.7)	430 (5.6)	0 0
Japan	17 (0.6)	638 (3.9)	0 (0.9)	35 (0.8)	586 (2.9)	-3 (1.1) ▼	48 (0.9)	535 (2.6)	2 (1.2) ▲
‡ Morocco	43 (1.6)	417 (3.7)	--	39 (1.2)	360 (3.6)	--	18 (0.9)	348 (5.4)	--
International Avg.	43 (0.2)	492 (0.6)		37 (0.1)	433 (0.6)		20 (0.1)	412 (0.7)	

Benchmarking Participants

Massachusetts, US	60 (1.6)	577 (4.0)	0 0	24 (1.1)	515 (5.1)	0 0	17 (1.1)	489 (7.6)	0 0
Ontario, Canada	59 (1.5)	548 (2.9)	-3 (2.0)	24 (1.0)	485 (4.7)	2 (1.3)	16 (1.0)	456 (5.0)	1 (1.3)
Minnesota, US	59 (1.6)	560 (4.3)	0 0	24 (1.4)	507 (5.0)	0 0	17 (1.0)	476 (5.5)	0 0
British Columbia, Canada	52 (1.3)	545 (3.2)	0 0	28 (0.9)	486 (3.9)	0 0	20 (0.9)	454 (2.9)	0 0
Quebec, Canada	51 (1.2)	560 (4.2)	-8 (1.8) ▼	27 (1.0)	511 (3.6)	3 (1.3) ▲	22 (0.9)	479 (3.5)	5 (1.3) ▲
Dubai, UAE	51 (1.1)	500 (3.1)	0 0	35 (0.8)	434 (3.4)	0 0	14 (0.9)	417 (5.9)	0 0
Basque Country, Spain	46 (1.5)	534 (3.0)	0 (2.2)	29 (1.1)	484 (3.8)	0 (1.5)	25 (1.2)	456 (4.3)	1 (1.8)

▲ 2007 percent significantly higher ▼ 2007 percent significantly lower

Index based on students' responses to four statements about mathematics:
 1) I usually do well in mathematics; 2) Mathematics is more difficult for me than for many of my classmates (Reversed); 3) Mathematics is not one of my strengths (Reversed); 4) I learn things quickly in mathematics. Average is computed across the four items based on a 4-point scale: 1. Agree a lot; 2. Agree a little; 3. Disagree a little; 4. Disagree a lot. Students agreeing a little or a lot on average across the four statements are assigned to the high level. Students disagreeing a little or a lot on average are assigned to the low level. All other students are assigned to the middle level.

‡ Did not satisfy guidelines for sample participation rates (see Appendix A).
 () Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals may appear inconsistent.
 A dash (-) indicates comparable data are not available.
 An "r" indicates data are available for at least 70 but less than 85% of the students.
 A diamond (0) indicates the country did not participate in the assessment.

Exhibit 4.11 Index of Students' Self-Confidence in Learning Mathematics (SCM) by Gender
TIMSS2007
Mathematics **4th**
Grade

Country	High SCM Percent of Students		Medium SCM Percent of Students		Low SCM Percent of Students	
	Girls	Boys	Girls	Boys	Girls	Boys
Algeria	40 (1.8)	41 (1.6)	51 (1.7)	47 (1.5)	9 (0.8)	12 (1.3)
Armenia	50 (1.7)	53 (1.8)	36 (1.5)	35 (1.7)	14 (1.0)	12 (1.0)
Australia	60 (1.7)	68 (1.7)	30 (1.2)	23 (1.3)	11 (1.1)	9 (0.9)
Austria	64 (1.2)	76 (1.0)	24 (1.1)	19 (0.9)	11 (0.8)	5 (0.5)
Chinese Taipei	29 (1.3)	43 (1.3)	39 (1.1)	36 (1.2)	33 (1.1)	21 (1.1)
Colombia	46 (1.6)	52 (1.9)	45 (1.5)	42 (1.9)	9 (0.9)	6 (0.7)
Czech Republic	52 (1.6)	60 (1.4)	34 (1.4)	29 (1.3)	14 (0.8)	10 (0.9)
Denmark	66 (1.9)	73 (1.3)	25 (1.6)	21 (1.1)	9 (0.8)	6 (0.8)
El Salvador	36 (1.5)	42 (1.7)	55 (1.4)	50 (1.6)	9 (0.9)	8 (0.8)
England	59 (1.4)	69 (1.2)	29 (1.3)	22 (1.0)	12 (0.9)	8 (0.9)
Georgia	69 (1.5)	68 (1.7)	24 (1.1)	26 (1.5)	6 (1.0)	7 (0.8)
Germany	63 (1.1)	76 (1.1)	24 (1.0)	17 (1.0)	12 (1.0)	7 (0.6)
Hong Kong SAR	37 (1.3)	54 (1.3)	43 (1.2)	34 (1.2)	20 (1.0)	12 (0.9)
Hungary	58 (1.5)	67 (1.2)	30 (1.4)	24 (1.1)	12 (0.7)	10 (0.7)
Iran, Islamic Rep. of	65 (1.9)	66 (1.8)	29 (1.7)	26 (1.8)	6 (1.0)	8 (0.8)
Italy	62 (1.2)	70 (1.2)	30 (1.1)	24 (1.1)	8 (0.6)	6 (0.5)
Japan	37 (1.4)	53 (1.4)	38 (1.1)	33 (1.2)	25 (1.1)	14 (1.0)
Kazakhstan	69 (1.9)	63 (1.7)	21 (1.8)	27 (1.9)	10 (1.0)	10 (1.4)
Kuwait	60 (1.6)	51 (2.4)	36 (1.5)	43 (2.4)	5 (0.4)	6 (0.6)
Latvia	44 (1.4)	55 (1.5)	38 (1.5)	33 (1.3)	18 (1.3)	12 (0.8)
Lithuania	52 (1.3)	62 (1.2)	37 (1.4)	30 (1.2)	11 (0.8)	8 (0.7)
Morocco	46 (2.1)	45 (2.0)	47 (2.1)	45 (2.0)	7 (1.1)	10 (1.2)
Netherlands	59 (1.4)	73 (1.2)	26 (1.2)	18 (1.1)	15 (1.3)	9 (0.8)
New Zealand	49 (1.1)	54 (1.1)	39 (1.0)	35 (1.1)	12 (0.8)	11 (0.7)
Norway	68 (1.4)	71 (1.1)	26 (1.3)	23 (1.0)	7 (0.7)	7 (0.6)
Qatar	63 (0.7)	60 (1.0)	32 (0.7)	34 (1.0)	5 (0.4)	7 (0.4)
Russian Federation	52 (1.8)	57 (1.3)	31 (1.4)	31 (1.3)	16 (1.3)	13 (1.3)
Scotland	65 (1.5)	68 (1.3)	26 (1.4)	22 (1.1)	9 (0.9)	10 (0.8)
Singapore	39 (1.3)	52 (1.5)	38 (1.0)	31 (1.1)	23 (1.0)	16 (0.9)
Slovak Republic	56 (1.5)	63 (1.4)	30 (1.3)	27 (1.3)	15 (0.9)	10 (0.9)
Slovenia	65 (1.2)	72 (1.3)	29 (1.0)	22 (1.2)	6 (0.6)	6 (0.5)
Sweden	76 (1.1)	77 (1.2)	19 (1.1)	19 (1.1)	5 (0.4)	4 (0.5)
Tunisia	48 (1.8)	43 (1.6)	45 (1.7)	48 (1.6)	7 (0.6)	9 (0.9)
Ukraine	54 (1.5)	56 (1.3)	34 (1.5)	34 (1.2)	12 (0.8)	10 (0.9)
United States	65 (0.9)	70 (1.1)	23 (0.8)	22 (0.9)	12 (0.6)	8 (0.5)
Yemen	36 (2.1)	34 (2.2)	51 (1.9)	53 (2.2)	13 (1.3)	13 (1.1)
International Avg.	54 (0.3)	60 (0.2)	34 (0.2)	31 (0.2)	12 (0.2)	9 (0.1)
Benchmarking Participants						
Alberta, Canada	65 (1.3)	71 (1.3)	26 (1.2)	22 (1.0)	9 (0.8)	7 (0.8)
British Columbia, Canada	60 (1.2)	70 (1.3)	30 (1.0)	24 (1.1)	10 (0.9)	6 (0.8)
Dubai, UAE	65 (1.6)	70 (1.5)	28 (1.4)	25 (1.5)	6 (0.9)	6 (0.7)
Massachusetts, US	69 (2.0)	79 (1.4)	21 (1.8)	16 (1.3)	10 (1.1)	5 (1.0)
Minnesota, US	71 (2.6)	72 (2.8)	23 (2.1)	20 (1.6)	7 (1.1)	8 (1.5)
Ontario, Canada	59 (1.8)	66 (1.8)	29 (1.4)	26 (1.7)	12 (1.2)	9 (0.8)
Quebec, Canada	60 (1.8)	75 (1.3)	28 (1.4)	20 (1.2)	11 (1.0)	5 (0.6)

▲ Percent significantly higher than other gender

SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007

Index based on students' responses to four statements about mathematics: 1) I usually do well in mathematics; 2) Mathematics is harder for me than for many of my classmates (Reversed); 3) I am just not good at mathematics (Reversed); 4) I learn things quickly in mathematics. Average is computed across the four items based on a 4-point scale: 1. Agree a lot; 2. Agree a little; 3. Disagree a little; 4. Disagree a lot. Students agreeing a little or a lot on average across the four statements are assigned to the high level. Students

disagreeing a little or a lot on average are assigned to the low level. All other students are assigned to the middle level.

() Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals may appear inconsistent.

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

Exhibit 4.11 Index of Students' Self-Confidence in Learning Mathematics (SCM) by Gender (Continued)

TIMSS2007
Mathematics 8th Grade

Country	High SCM Percent of Students		Medium SCM Percent of Students		Low SCM Percent of Students						
	Girls	Boys	Girls	Boys	Girls	Boys					
Algeria	43 (1.1)	50 (1.3)	▲	43 (1.2)	▲	39 (1.2)	14 (0.9)	▲	11 (0.7)		
Armenia	37 (1.4)	36 (1.3)		36 (1.6)		39 (1.4)	27 (1.6)		25 (1.3)		
Australia	39 (1.8)	51 (1.5)	▲	37 (1.3)		34 (1.5)	24 (1.5)	▲	15 (0.8)		
Bahrain	58 (1.1)	▲	47 (0.9)	29 (1.1)		37 (0.9)	▲	13 (0.9)	16 (0.8)	▲	
Bosnia and Herzegovina	43 (1.6)	39 (1.6)		25 (1.2)		29 (1.1)	▲	32 (1.5)	32 (1.5)		
Botswana	40 (1.1)	44 (1.4)	▲	42 (1.0)		40 (1.3)		18 (0.9)	▲	16 (1.0)	
Bulgaria	36 (1.6)	38 (1.7)		37 (1.5)		39 (1.6)		27 (1.6)		23 (1.3)	
Chinese Taipei	20 (1.1)	35 (1.4)	▲	25 (0.9)		28 (1.0)	▲	55 (1.4)	▲	37 (1.3)	
Colombia	43 (1.7)	50 (1.6)	▲	41 (1.6)		40 (1.2)		16 (1.2)	▲	11 (0.9)	
Cyprus	52 (1.5)	▲	48 (1.1)	28 (1.2)		33 (1.0)	▲	21 (1.1)		19 (0.9)	
Czech Republic	41 (1.2)	46 (1.2)	▲	30 (0.9)		32 (1.0)		29 (1.2)	▲	22 (1.1)	
Egypt	52 (1.8)	57 (1.8)	▲	40 (1.8)		36 (1.8)		7 (0.6)		7 (0.6)	
El Salvador	31 (1.6)	38 (1.4)	▲	53 (1.6)		51 (1.5)		15 (1.0)	▲	11 (0.9)	
England	44 (1.6)	62 (1.7)	▲	35 (1.3)	▲	29 (1.4)		21 (1.2)	▲	9 (0.8)	
Georgia	40 (2.2)	48 (2.1)	▲	38 (2.4)		36 (1.8)		21 (1.2)	▲	16 (1.5)	
Ghana	37 (1.5)	50 (1.5)	▲	51 (1.2)	▲	41 (1.2)		12 (1.0)	▲	9 (0.8)	
Hong Kong SAR	23 (1.1)	38 (1.5)	▲	39 (1.2)		40 (1.6)		38 (1.2)	▲	23 (1.0)	
Hungary	38 (1.4)	45 (1.5)	▲	33 (1.3)		32 (1.3)		29 (1.3)	▲	23 (1.2)	
Indonesia	28 (1.2)	29 (1.4)		57 (1.3)		58 (1.3)		15 (1.2)		13 (0.9)	
Iran, Islamic Rep. of	46 (1.9)	44 (1.5)		39 (1.9)		42 (1.2)		15 (1.5)		14 (1.1)	
Israel	58 (1.6)	61 (1.2)		29 (1.4)		29 (1.4)		13 (1.0)		10 (1.0)	
Italy	45 (1.4)	52 (1.3)	▲	29 (1.0)		28 (1.0)		26 (1.3)	▲	21 (1.1)	
Japan	11 (0.8)	22 (1.0)	▲	34 (1.1)		36 (1.2)		54 (1.1)	▲	41 (1.2)	
Jordan	56 (2.3)	59 (1.9)		35 (1.9)		33 (1.5)		9 (0.8)		8 (1.0)	
Korea, Rep. of	23 (1.0)	33 (1.2)	▲	35 (1.1)	▲	32 (0.9)		41 (1.1)	▲	34 (1.2)	
Kuwait	55 (1.2)	54 (1.3)		34 (1.1)		36 (1.2)		11 (0.8)		10 (0.8)	
Lebanon	46 (1.6)	52 (1.7)	▲	39 (1.6)		39 (1.8)		15 (1.2)	▲	9 (0.9)	
Lithuania	39 (1.4)	42 (1.3)		32 (1.2)		36 (1.2)	▲	29 (1.3)	▲	22 (1.0)	
Malaysia	29 (1.7)	26 (1.5)		47 (1.4)		53 (1.6)	▲	24 (1.1)	▲	21 (0.9)	
Malta	36 (1.0)	40 (1.0)	▲	33 (1.1)		37 (1.0)	▲	31 (1.0)	▲	23 (0.8)	
Norway	47 (1.1)	53 (1.1)	▲	32 (1.3)		30 (1.0)		22 (1.2)	▲	17 (0.8)	
Oman	47 (1.7)	43 (1.4)		45 (1.7)		49 (1.4)		8 (0.8)		8 (0.7)	
Palestinian Nat'l Auth.	42 (1.5)	45 (1.8)		44 (1.3)		43 (1.4)		13 (1.0)		12 (1.1)	
Qatar	57 (0.8)	▲	54 (0.9)	32 (0.8)		37 (0.9)	▲	12 (0.5)	▲	10 (0.5)	
Romania	33 (1.6)	32 (1.4)		39 (1.5)		42 (1.5)		28 (1.9)		25 (1.3)	
Russian Federation	42 (1.7)	39 (1.4)		28 (1.1)		34 (1.3)	▲	30 (1.4)		27 (1.1)	
Saudi Arabia	50 (1.6)	▲	44 (1.7)	40 (1.3)		43 (1.5)		10 (0.9)		13 (1.0)	▲
Scotland	49 (1.7)	58 (1.6)	▲	35 (1.3)	▲	30 (1.4)		16 (0.9)	▲	12 (0.9)	
Serbia	50 (1.5)	47 (1.8)		23 (1.1)		27 (1.2)	▲	27 (1.4)		27 (1.5)	
Singapore	39 (1.4)	43 (1.3)	▲	33 (1.1)		35 (1.3)		28 (1.2)	▲	22 (1.0)	
Slovenia	37 (1.5)	42 (1.3)	▲	43 (1.3)		40 (1.3)		20 (1.1)		18 (1.2)	
Sweden	43 (1.2)	55 (1.3)	▲	36 (1.1)		34 (1.1)		21 (1.0)	▲	11 (0.7)	
Syrian Arab Republic	45 (1.6)	49 (1.5)		40 (1.3)		40 (1.0)		14 (0.9)	▲	11 (1.0)	
Thailand	21 (1.2)	24 (1.3)	▲	58 (1.2)		61 (1.2)	▲	22 (1.1)	▲	15 (0.8)	
Tunisia	43 (1.5)	48 (1.6)	▲	33 (1.1)		34 (1.3)		24 (1.3)	▲	18 (1.2)	
Turkey	38 (1.5)	41 (1.3)		35 (1.1)		38 (1.1)	▲	27 (1.5)	▲	22 (1.2)	
Ukraine	37 (1.7)	36 (1.3)		35 (1.1)		37 (1.3)		28 (1.5)		27 (1.2)	
United States	49 (1.2)	57 (1.2)	▲	30 (0.9)	▲	26 (0.8)		21 (0.9)	▲	17 (0.9)	
‡ Morocco	40 (1.8)	46 (2.0)	▲	40 (1.9)		38 (1.5)		20 (1.3)		15 (1.8)	
International Avg.	41 (0.2)	45 (0.2)	▲	37 (0.2)		37 (0.2)	▲	22 (0.2)	▲	18 (0.2)	
Benchmarking Participants											
Basque Country, Spain	43 (1.9)	48 (1.8)	▲	29 (1.4)		29 (1.5)		27 (1.7)		23 (1.6)	
British Columbia, Canada	46 (1.6)	58 (1.6)	▲	30 (1.3)	▲	26 (1.2)		24 (1.2)	▲	16 (0.9)	
Dubai, UAE	47 (1.6)	54 (2.0)	▲	35 (1.3)		34 (1.4)		18 (1.0)	▲	11 (1.6)	
Massachusetts, US	56 (1.6)	63 (1.9)	▲	25 (1.3)		22 (1.2)		20 (1.3)	▲	14 (1.4)	
Minnesota, US	55 (2.0)	64 (1.7)	▲	25 (1.4)		24 (1.9)		21 (1.3)	▲	13 (1.2)	
Ontario, Canada	54 (2.3)	65 (1.9)	▲	25 (1.5)		23 (1.5)		20 (1.5)	▲	12 (1.1)	
Quebec, Canada	45 (1.6)	57 (1.5)	▲	28 (1.3)		26 (1.4)		27 (1.5)	▲	17 (1.0)	

▲ Percent significantly higher than other gender

Index based on students' responses to four statements about mathematics: 1) I usually do well in mathematics; 2) Mathematics is more difficult for me than for many of my classmates (Reversed); 3) Mathematics is not one of my strengths (Reversed); 4) I learn things quickly in mathematics. Average is computed across the four items based on a 4-point scale: 1. Agree a lot; 2. Agree a little; 3. Disagree a little; 4. Disagree a lot. Students agreeing a little or a lot on average across the four statements are assigned to the high

level. Students disagreeing a little or a lot on average are assigned to the low level. All other students are assigned to the middle level.

‡ Did not satisfy guidelines for sample participation rates (see Appendix A).

() Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals may appear inconsistent.

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



self-confidence index, compared to 41 percent of girls, while 22 percent of girls were at the low level, compared to 18 percent of boys. At the high level of the index, there were higher percentages of boys than girls in 27 countries and all 7 benchmarking entities, compared to higher percentages of girls in just 4 countries. At the low level, the pattern was reversed, with higher percentages of girls in 29 countries and 6 benchmarking entities, and higher percentages of boys in just 2 countries. There was less difference in the medium category than at the fourth grade, although the boys had higher percentages at the medium level of self-confidence in 12 countries compared to higher percentages of girls in 6 countries and 1 benchmarking participant (British Columbia).

