

Exhibit 9.5: Teachers Majored in Education and Mathematics

Students' Results based on Teachers' Reports

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

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

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

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

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

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

Exhibit 9.6: Teachers Majored in Education and Science

Students' Results based on Teachers' Reports

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

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

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

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

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

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

Exhibit 9.7: Teachers Majored in Education and Mathematics

Students' Results based on Teachers' Reports

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

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

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

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

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

Exhibit 9.8: Teachers Majored in Education and Science

Students' Results based on Teachers' Reports

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

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

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

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

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

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

