

Exhibit 3.18: Differences in Achievement for Mathematics Cognitive Domains Across Assessment Years[◇]

Read across the row to determine if the performance in the row year is significantly higher (▲) or significantly lower (▽) than the performance in the column year.

| Country | Average Scale Score | Knowing | | | Average Scale Score | Applying | | | Average Scale Score | Reasoning | | |
|------------------------------|---------------------|---------------------------|-------|-------|---------------------|---------------------------|-------|------|---------------------|---------------------------|------|-------|
| | | Differences Between Years | | | | Differences Between Years | | | | Differences Between Years | | |
| | | 2015 | 2011 | 2007 | | 2015 | 2011 | 2007 | | 2015 | 2011 | 2007 |
| Australia | | | | | | | | | | | | |
| 2019 | 511 (4.0) | 6 | 7 | 21 ▲ | 521 (3.8) | 19 ▲ | 15 ▲ | 23 ▲ | 515 (3.9) | 3 | 9 | 12 ▲ |
| 2015 | 504 (3.1) | | 0 | 15 ▲ | 502 (3.0) | | -4 | 4 | 512 (3.1) | | 6 | 9 |
| 2011 | 504 (5.2) | | | 14 ▲ | 506 (4.9) | | | 8 | 506 (5.2) | | | 3 |
| 2007 | 490 (3.9) | | | | 498 (3.8) | | | | 503 (4.0) | | | |
| Bahrain | | | | | | | | | | | | |
| 2019 | 471 (1.7) | 8 ▲ | 60 ▲ | 82 ▲ | 479 (1.7) | 34 ▲ | 79 ▲ | 79 ▲ | 489 (2.1) | 38 ▲ | 75 ▲ | 83 ▲ |
| 2015 | 463 (2.3) | | 52 ▲ | 74 ▲ | 445 (1.7) | | 45 ▲ | 45 ▲ | 452 (2.2) | | 37 ▲ | 46 ▲ |
| ψ 2011 | 411 (2.4) | | | 23 ▲ | 400 (2.4) | | | 0 | 415 (2.1) | | | 9 ▲ |
| 2007 | 389 (1.8) | | | | 400 (2.4) | | | | 406 (2.4) | | | |
| Chile | | | | | | | | | | | | |
| ψ 2019 | 434 (3.0) | 11 ▲ | 28 ▲ | | 438 (2.9) | 11 ▲ | 13 ▲ | | 451 (3.2) | 19 ▲ | 29 ▲ | |
| ψ 2015 | 423 (3.4) | | 17 ▲ | | 427 (3.3) | | 2 | | 432 (3.3) | | 10 ▲ | |
| 2011 | 405 (2.9) | | | | 425 (2.6) | | | | 422 (2.9) | | | |
| Chinese Taipei | | | | | | | | | | | | |
| 2019 | 616 (3.0) | 18 ▲ | 5 | 12 ▲ | 610 (2.6) | 8 ▲ | -5 | 13 ▲ | 616 (2.7) | 14 ▲ | 7 | 14 ▲ |
| 2015 | 598 (2.9) | | -13 ▽ | -6 | 602 (2.5) | | -12 ▽ | 5 | 602 (2.5) | | -7 | 0 |
| 2011 | 611 (3.6) | | | 7 | 614 (3.4) | | | 17 ▲ | 609 (3.4) | | | 7 |
| 2007 | 604 (5.0) | | | | 597 (4.8) | | | | 602 (4.4) | | | |
| Cyprus | | | | | | | | | | | | |
| 2019 | 509 (2.0) | | | 45 ▲ | 496 (1.7) | | | 31 ▲ | 505 (2.1) | | | 47 ▲ |
| 2007 | 464 (1.8) | | | | 465 (2.0) | | | | 458 (2.6) | | | |
| Egypt | | | | | | | | | | | | |
| 2 ψ 2019 | 416 (5.8) | 17 ▲ | | 31 ▲ | 405 (5.3) | 21 ▲ | | 14 ▲ | 411 (5.6) | 32 ▲ | | 25 ▲ |
| ψ 2015 | 399 (4.3) | | | 14 ▲ | 385 (3.9) | | | -6 | 379 (4.3) | | | -7 |
| 2007 | 385 (3.7) | | | | 391 (3.9) | | | | 386 (3.7) | | | |
| England | | | | | | | | | | | | |
| 2019 | 510 (5.5) | -3 | 9 | 3 | 518 (5.3) | -1 | 10 | 4 | 512 (5.7) | -10 | 2 | -6 |
| 2015 | 513 (4.1) | | 12 | 5 | 519 (4.1) | | 11 | 6 | 522 (4.4) | | 12 | 4 |
| ‡ 2011 | 501 (5.5) | | | -6 | 508 (5.6) | | | -5 | 510 (5.6) | | | -8 |
| † 2007 | 508 (4.7) | | | | 514 (5.1) | | | | 518 (5.1) | | | |
| Finland | | | | | | | | | | | | |
| 2019 | 505 (2.5) | | -3 | | 510 (2.7) | | -10 ▽ | | 506 (2.9) | | -5 | |
| 2011 | 508 (2.4) | | | | 520 (2.5) | | | | 512 (2.7) | | | |
| Hong Kong SAR | | | | | | | | | | | | |
| † 2019 | 580 (4.0) | -20 ▽ | -11 | -3 | 575 (4.0) | -20 ▽ | -12 ▽ | 3 | 582 (4.4) | -9 | 2 | 15 ▲ |
| 2015 | 600 (5.1) | | 9 | 17 ▲ | 595 (4.5) | | 8 | 23 ▲ | 591 (5.1) | | 11 | 24 ▲ |
| 2011 | 591 (4.1) | | | 8 | 587 (3.8) | | | 15 ▲ | 580 (4.0) | | | 13 |
| † 2007 | 583 (6.0) | | | | 572 (6.2) | | | | 567 (6.1) | | | |
| Hungary | | | | | | | | | | | | |
| 2019 | 516 (3.1) | 5 | 9 | -6 | 517 (3.0) | 1 | 12 ▲ | 3 | 512 (3.0) | -3 | 10 ▲ | -2 |
| 2015 | 511 (3.9) | | 4 | -10 | 516 (3.8) | | 11 ▲ | 3 | 515 (3.9) | | 13 ▲ | 0 |
| 2011 | 507 (3.9) | | | -15 ▽ | 505 (3.6) | | | -9 | 502 (3.8) | | | -13 ▽ |
| 2007 | 522 (3.7) | | | | 513 (3.5) | | | | 515 (3.7) | | | |
| Iran, Islamic Rep. of | | | | | | | | | | | | |
| 2019 | 441 (4.2) | 5 | 30 ▲ | 43 ▲ | 443 (3.5) | 8 | 31 ▲ | 43 ▲ | 457 (4.0) | 21 ▲ | 29 ▲ | 40 ▲ |
| ψ 2015 | 435 (4.9) | | 25 ▲ | 38 ▲ | 434 (4.4) | | 23 ▲ | 35 ▲ | 436 (4.7) | | 8 | 19 ▲ |
| ψ 2011 | 410 (4.4) | | | 13 ▲ | 411 (4.6) | | | 12 | 428 (4.3) | | | 11 |
| 2007 | 397 (4.3) | | | | 399 (4.4) | | | | 417 (3.9) | | | |
| Ireland | | | | | | | | | | | | |
| 2019 | 530 (2.8) | 3 | | | 526 (2.7) | 6 | | | 508 (3.4) | -13 ▽ | | |
| 2015 | 527 (3.0) | | | | 520 (3.0) | | | | 521 (3.1) | | | |
| Israel | | | | | | | | | | | | |
| ³ 2019 | 516 (4.8) | 5 | 0 | | 519 (4.2) | 7 | 6 | | 525 (4.7) | 15 ▲ | 5 | |
| ³ 2015 | 511 (4.2) | | -5 | | 512 (4.0) | | -1 | | 510 (4.4) | | -10 | |
| ³ 2011 | 516 (4.2) | | | | 513 (4.4) | | | | 520 (4.2) | | | |

▲ Average from more recent year significantly higher
 ▽ Average from more recent year significantly lower

◇ Trend reporting in cognitive domains using current methodology began with TIMSS 2007.

ψ Reservations about reliability because the percentage of students with achievement too low for estimation exceeds 15% but does not exceed 25%.

See Appendix B.7 for target population coverage notes 1, 2, and 3. See Appendix B.10 for sampling guidelines and sampling participation notes †, ‡, and ⋊.

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

Exhibit 3.18: Differences in Achievement for Mathematics Cognitive Domains Across Assessment Years^o

(Continued)

| Country | Average Scale Score | Knowing | | | Average Scale Score | Applying | | | Average Scale Score | Reasoning | | |
|-----------------------|---------------------|---------------------------|-------|-------|---------------------|---------------------------|-------|-------|---------------------|---------------------------|-------|-------|
| | | Differences Between Years | | | | Differences Between Years | | | | Differences Between Years | | |
| | | 2015 | 2011 | 2007 | | 2015 | 2011 | 2007 | | 2015 | 2011 | 2007 |
| Italy | | | | | | | | | | | | |
| 2019 | 492 (2.8) | 4 | -2 | 19 ▲ | 497 (2.4) | 2 | -6 | 14 ▲ | 505 (3.6) | 5 | 8 | 22 ▲ |
| ² 2015 | 489 (2.7) | | -5 | 15 ▲ | 495 (2.6) | | -8 ▽ | 13 ▲ | 500 (2.8) | | 4 | 18 ▲ |
| 2011 | 494 (2.7) | | | 20 ▲ | 503 (2.3) | | | 20 ▲ | 496 (2.6) | | | 14 ▲ |
| 2007 | 474 (3.4) | | | | 482 (3.0) | | | | 482 (3.4) | | | |
| Japan | | | | | | | | | | | | |
| 2019 | 589 (3.1) | 11 ▲ | 31 ▲ | 20 ▲ | 596 (2.8) | 5 | 22 ▲ | 28 ▲ | 599 (3.2) | 8 ▲ | 20 ▲ | 22 ▲ |
| 2015 | 578 (2.6) | | 20 ▲ | 9 ▲ | 592 (2.3) | | 17 ▲ | 23 ▲ | 591 (2.6) | | 12 ▲ | 14 ▲ |
| 2011 | 558 (2.8) | | | -11 ▽ | 574 (2.5) | | | 6 | 579 (3.0) | | | 2 |
| 2007 | 569 (2.9) | | | | 568 (2.3) | | | | 577 (2.6) | | | |
| Jordan | | | | | | | | | | | | |
| ^ψ 2019 | 414 (5.0) | 23 ▲ | 9 | -12 | 415 (4.0) | 37 ▲ | 18 ▲ | -6 | 431 (4.4) | 51 ▲ | 16 ▲ | -3 |
| [✳] 2015 | 391 (3.2) | | -14 ▽ | -35 ▽ | 378 (3.2) | | -19 ▽ | -43 ▽ | 380 (3.3) | | -36 ▽ | -55 ▽ |
| ^ψ 2011 | 405 (4.2) | | | -20 ▽ | 397 (3.7) | | | -24 ▽ | 416 (4.0) | | | -19 ▽ |
| 2007 | 425 (4.5) | | | | 421 (4.5) | | | | 434 (4.1) | | | |
| Kazakhstan | | | | | | | | | | | | |
| ² 2019 | 488 (3.7) | | -1 | | 486 (3.2) | | 2 | | 487 (3.4) | | 5 | |
| 2011 | 489 (4.4) | | | | 484 (4.3) | | | | 482 (4.9) | | | |
| Korea, Rep. of | | | | | | | | | | | | |
| 2019 | 614 (3.2) | 7 | -2 | 6 | 604 (2.7) | -2 | -12 ▽ | 4 | 609 (3.0) | 1 | -3 | 17 ▲ |
| 2015 | 607 (2.8) | | -9 ▽ | -1 | 606 (2.8) | | -10 ▽ | 6 | 608 (2.7) | | -5 | 15 ▲ |
| 2011 | 616 (3.1) | | | 8 | 617 (2.8) | | | 16 ▲ | 612 (2.6) | | | 20 ▲ |
| 2007 | 608 (3.1) | | | | 600 (2.8) | | | | 592 (2.5) | | | |
| Lebanon | | | | | | | | | | | | |
| 2019 | 456 (2.9) | 0 | -8 | -1 | 412 (3.5) | -27 ▽ | -24 ▽ | -35 ▽ | 407 (3.7) | 1 | -19 ▽ | -16 ▽ |
| 2015 | 456 (3.8) | | -8 | -1 | 439 (3.9) | | 3 | -8 | 406 (4.5) | | -20 ▽ | -17 ▽ |
| 2011 | 464 (3.9) | | | 7 | 436 (4.1) | | | -11 | 426 (4.6) | | | 3 |
| 2007 | 457 (4.2) | | | | 447 (4.5) | | | | 423 (4.7) | | | |
| Lithuania | | | | | | | | | | | | |
| 2019 | 518 (2.8) | 16 ▲ | 17 ▲ | 9 ▲ | 524 (3.1) | 4 | 16 ▲ | 13 ▲ | 514 (3.6) | 13 ▲ | 21 ▲ | 27 ▲ |
| ² 2015 | 502 (3.1) | | 0 | -7 | 520 (2.6) | | 12 ▲ | 9 ▲ | 501 (3.0) | | 9 ▲ | 14 ▲ |
| ¹ 2011 | 502 (2.6) | | | -8 ▽ | 508 (2.4) | | | -3 | 493 (2.6) | | | 6 |
| ¹ 2007 | 509 (2.7) | | | | 511 (2.5) | | | | 487 (2.8) | | | |
| Malaysia | | | | | | | | | | | | |
| 2019 | 451 (3.8) | -21 ▽ | 7 | -22 ▽ | 464 (3.1) | 0 | 25 ▲ | -13 ▽ | 462 (3.1) | 9 | 35 ▲ | -4 |
| 2015 | 472 (3.8) | | 28 ▲ | -1 | 463 (3.6) | | 24 ▲ | -14 ▽ | 453 (3.7) | | 27 ▲ | -13 ▽ |
| 2011 | 444 (5.8) | | | -29 ▽ | 439 (5.3) | | | -38 ▽ | 426 (5.6) | | | -40 ▽ |
| 2007 | 473 (5.4) | | | | 477 (5.2) | | | | 466 (4.6) | | | |
| Morocco | | | | | | | | | | | | |
| ^ψ 2019 | 382 (2.9) | 0 | 19 ▲ | | 389 (2.4) | 3 | 11 ▲ | | 381 (2.9) | 7 | 24 ▲ | |
| [✳] 2015 | 382 (2.4) | | 19 ▲ | | 385 (2.2) | | 7 ▲ | | 374 (2.8) | | 17 ▲ | |
| [✳] 2011 | 363 (2.3) | | | | 378 (2.0) | | | | 357 (2.8) | | | |
| New Zealand | | | | | | | | | | | | |
| [†] 2019 | 468 (3.5) | -20 ▽ | -13 ▽ | | 486 (3.1) | -7 | -5 | | 486 (3.4) | -12 ▽ | -7 | |
| [†] 2015 | 488 (3.4) | | 7 | | 493 (3.3) | | 2 | | 499 (3.5) | | 5 | |
| 2011 | 481 (5.7) | | | | 491 (5.2) | | | | 494 (5.5) | | | |
| Norway (9) | | | | | | | | | | | | |
| [†] 2019 | 499 (2.3) | -1 | | | 504 (2.7) | -13 ▽ | | | 496 (2.8) | -20 ▽ | | |
| 2015 | 500 (2.3) | | | | 516 (2.3) | | | | 516 (2.5) | | | |
| Oman | | | | | | | | | | | | |
| ^ψ 2019 | 406 (2.8) | 5 | 42 ▲ | 41 ▲ | 409 (2.5) | 8 ▲ | 49 ▲ | 44 ▲ | 412 (2.8) | 10 ▲ | 43 ▲ | 23 ▲ |
| ^ψ 2015 | 401 (3.1) | | 37 ▲ | 36 ▲ | 401 (2.5) | | 41 ▲ | 36 ▲ | 402 (3.1) | | 33 ▲ | 14 ▲ |
| ^ψ 2011 | 365 (3.0) | | | -1 | 360 (3.0) | | | -5 | 369 (3.0) | | | -20 ▽ |
| 2007 | 366 (3.6) | | | | 365 (3.1) | | | | 389 (3.1) | | | |
| Qatar | | | | | | | | | | | | |
| ^ψ 2019 | 443 (4.6) | 3 | 25 ▲ | | 438 (4.1) | 3 | 41 ▲ | | 448 (3.8) | 16 ▲ | 41 ▲ | |
| ^ψ 2015 | 440 (3.1) | | 22 ▲ | | 435 (2.9) | | 39 ▲ | | 431 (2.8) | | 25 ▲ | |
| ^ψ 2011 | 418 (3.0) | | | | 396 (3.4) | | | | 406 (3.6) | | | |
| Romania | | | | | | | | | | | | |
| 2019 | 482 (5.0) | | 22 ▲ | 18 ▲ | 475 (4.1) | | 22 ▲ | 14 ▲ | 481 (4.5) | | 25 ▲ | 36 ▲ |
| 2011 | 460 (4.5) | | | -4 | 454 (4.0) | | | -7 | 455 (4.2) | | | 11 |
| 2007 | 464 (4.5) | | | | 461 (4.2) | | | | 445 (4.9) | | | |

▲ Average from more recent year significantly higher
 ▽ Average from more recent year significantly lower

^ψ Reservations about reliability because the percentage of students with achievement too low for estimation exceeds 15% but does not exceed 25%.
[✳] Reservations about reliability because the percentage of students with achievement too low for estimation exceeds 25%.

Exhibit 3.18: Differences in Achievement for Mathematics Cognitive Domains Across Assessment Years^o

(Continued)

| Country | Average Scale Score | Knowing | | | Average Scale Score | Applying | | | Average Scale Score | Reasoning | | |
|----------------------------------|---------------------|---------------------------|-------|------|---------------------|---------------------------|------|------|---------------------|---------------------------|------|-------|
| | | Differences Between Years | | | | Differences Between Years | | | | Differences Between Years | | |
| | | 2015 | 2011 | 2007 | | 2015 | 2011 | 2007 | | 2015 | 2011 | 2007 |
| Russian Federation | | | | | | | | | | | | |
| ² 2019 | 550 (5.2) | 7 | 1 | 29 ▲ | 543 (4.5) | 2 | 5 | 33 ▲ | 536 (4.8) | 9 | 5 | 37 ▲ |
| 2015 | 543 (5.6) | | -5 | 22 ▲ | 541 (4.6) | | 3 | 31 ▲ | 528 (5.0) | | -4 | 28 ▲ |
| ² 2011 | 548 (3.8) | | | 28 ▲ | 538 (3.6) | | | 28 ▲ | 531 (3.8) | | | 32 ▲ |
| 2007 | 521 (4.5) | | | | 510 (3.9) | | | | 499 (4.0) | | | |
| Singapore | | | | | | | | | | | | |
| ² 2019 | 614 (4.3) | -19 ▽ | -3 | 22 ▲ | 614 (3.8) | -5 | 1 | 17 ▲ | 620 (4.5) | 4 | 16 ▲ | 31 ▲ |
| ² 2015 | 633 (3.4) | | 16 ▲ | 41 ▲ | 619 (3.2) | | 7 | 22 ▲ | 616 (3.7) | | 12 ▲ | 27 ▲ |
| ² 2011 | 617 (3.9) | | | 25 ▲ | 613 (4.0) | | | 16 ▲ | 604 (4.3) | | | 15 ▲ |
| 2007 | 592 (3.7) | | | | 597 (3.9) | | | | 589 (4.5) | | | |
| Sweden | | | | | | | | | | | | |
| ² 2019 | 496 (2.6) | 12 ▲ | 18 ▲ | 16 ▲ | 501 (2.6) | -6 | 12 ▲ | 6 | 514 (2.9) | 4 | 36 ▲ | 21 ▲ |
| 2015 | 484 (2.8) | | 7 | 4 | 507 (2.8) | | 17 ▲ | 12 ▲ | 509 (3.5) | | 32 ▲ | 17 ▲ |
| 2011 | 478 (2.0) | | | -2 | 489 (2.2) | | | -6 | 478 (2.4) | | | -15 ▽ |
| 2007 | 480 (2.2) | | | | 495 (2.2) | | | | 493 (2.8) | | | |
| Turkey | | | | | | | | | | | | |
| 2019 | 494 (5.0) | 47 ▲ | 54 ▲ | | 491 (4.0) | 32 ▲ | 33 ▲ | | 504 (4.1) | 32 ▲ | 39 ▲ | |
| 2015 | 447 (4.9) | | 7 | | 460 (4.3) | | 1 | | 472 (4.8) | | 7 | |
| 2011 | 441 (4.2) | | | | 459 (4.0) | | | | 465 (3.7) | | | |
| United Arab Emirates | | | | | | | | | | | | |
| 2019 | 478 (1.9) | 3 | 11 ▲ | | 466 (1.8) | 8 ▲ | 24 ▲ | | 479 (1.9) | 18 ▲ | 30 ▲ | |
| 2015 | 476 (2.2) | | 9 ▲ | | 457 (2.1) | | 16 ▲ | | 461 (2.2) | | 12 ▲ | |
| 2011 | 467 (2.2) | | | | 442 (2.3) | | | | 449 (2.2) | | | |
| United States | | | | | | | | | | | | |
| [†] 2019 | 522 (5.2) | -6 | 3 | 5 | 515 (4.9) | 0 | 12 ▲ | 13 ▲ | 507 (4.6) | -7 | 4 | 1 |
| [†] 2015 | 528 (3.5) | | 9 ▲ | 11 ▲ | 515 (3.2) | | 12 ▲ | 13 ▲ | 514 (3.1) | | 11 ▲ | 8 |
| ² 2011 | 519 (2.7) | | | 2 | 503 (2.9) | | | 1 | 503 (2.7) | | | -3 |
| ^{2†} 2007 | 517 (2.9) | | | | 502 (3.1) | | | | 506 (2.8) | | | |
| Benchmarking Participants | | | | | | | | | | | | |
| Ontario, Canada | | | | | | | | | | | | |
| 2019 | 518 (4.2) | 5 | 15 ▲ | 9 | 531 (4.5) | 8 | 21 ▲ | 13 ▲ | 540 (4.6) | 6 | 16 ▲ | 15 ▲ |
| 2015 | 513 (3.0) | | 10 ▲ | 4 | 522 (2.8) | | 12 ▲ | 4 | 534 (3.1) | | 10 ▲ | 9 |
| ² 2011 | 503 (2.6) | | | -6 | 510 (2.3) | | | -8 | 524 (2.7) | | | -1 |
| ² 2007 | 509 (3.6) | | | | 518 (4.0) | | | | 526 (3.8) | | | |
| Quebec, Canada | | | | | | | | | | | | |
| [‡] 2019 | 546 (3.8) | 5 | 18 ▲ | 21 ▲ | 544 (4.1) | -2 | 9 | 15 ▲ | 538 (3.8) | 0 | 9 | 9 |
| [‡] 2015 | 541 (4.2) | | 13 ▲ | 16 ▲ | 546 (4.0) | | 11 ▲ | 17 ▲ | 538 (4.2) | | 9 | 10 |
| 2011 | 528 (2.9) | | | 4 | 536 (2.7) | | | 6 | 529 (2.7) | | | 1 |
| ³ 2007 | 524 (3.1) | | | | 529 (3.3) | | | | 528 (3.5) | | | |
| Abu Dhabi, UAE | | | | | | | | | | | | |
| ^ψ 2019 | 440 (3.2) | -13 ▽ | -19 ▽ | | 428 (2.9) | -6 | -6 | | 441 (2.8) | 1 | -1 | |
| 2015 | 453 (4.8) | | -6 | | 434 (4.7) | | -1 | | 440 (4.7) | | -2 | |
| 2011 | 459 (3.8) | | | | 434 (4.3) | | | | 442 (4.2) | | | |
| Dubai, UAE | | | | | | | | | | | | |
| ² 2019 | 540 (2.2) | 19 ▲ | 52 ▲ | 75 ▲ | 532 (2.2) | 27 ▲ | 67 ▲ | 78 ▲ | 541 (2.1) | 32 ▲ | 72 ▲ | 82 ▲ |
| 2015 | 521 (2.3) | | 33 ▲ | 56 ▲ | 505 (2.5) | | 40 ▲ | 51 ▲ | 509 (2.8) | | 40 ▲ | 50 ▲ |
| 2011 | 488 (2.4) | | | 23 ▲ | 465 (2.5) | | | 11 ▲ | 470 (2.7) | | | 10 ▲ |
| [‡] 2007 | 465 (2.6) | | | | 454 (3.2) | | | | 460 (3.0) | | | |

▲ Average from more recent year significantly higher

▽ Average from more recent year significantly lower

^ψ Reservations about reliability because the percentage of students with achievement too low for estimation exceeds 15% but does not exceed 25%.