Table 1. Item psychometric characteristics by statistical model and test

| Item | CTT | | | IRT 1PL RASCH | | IRT 2PL | | IRT 3PL | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *p* value  (% correct) | Point biserial  correlation (*r*pb) | DE | Difficulty  (b) | χ2 *p* | Difficulty  (b) | Discrimination (a) | Discrimination  (a) | Difficulty  (b) | Chance  (c ) |
| *Final Exam* | | | | | | | | | | |
| E01 | 27.10 | .14 | 1.00 | 1.13 | 0.57 | 2.57 | 0.40 | 0.64 | 2.59 | 0.11 |
| E02 | 84.90 | .36 | 1.00 | -1.95 | 0.02 | -1.61 | 1.45 | 2.39 | -0.68 | 0.46 |
| E03 | 46.90 | .15 | 1.00 | 0.14 | 0.18 | 0.38 | 0.33 | 0.32 | 0.40 | 0.00 |
| E04 | 59.90 | .22 | 1.00 | -0.46 | 0.97 | -0.93 | 0.46 | 0.58 | 0.11 | 0.22 |
| E05 | 83.60 | .32 | 1.00 | -1.84 | 0.21 | -1.85 | 1.06 | 1.11 | -1.49 | 0.20 |
| E06 | 4.80 | .20 | 1.00 | 0.42 | 0.02 | 0.80 | 0.48 | 6.64 | 1.26 | 0.34 |
| E07 | 58.60 | .45 | 1.00 | -0.40 | 0.00 | -0.34 | 1.54 | 1.92 | -0.09 | 0.11 |
| E08 | 24.10 | .09 | 0.67 | 1.30 | 0.27 | 4.78 | 0.24 | 0.49 | 4.02 | 0.12 |
| E09 | 53.10 | .39 | 1.00 | -0.14 | 0.01 | -0.15 | 1.13 | 2.02 | 0.32 | 0.21 |
| E10 | 6.10 | .00 | 1.00 | 3.00 | 0.13 | 82.28 | 0.03 | 2.55 | 3.41 | 0.06 |
| E11 | 7.80 | .26 | 1.00 | -1.01 | 0.97 | -1.69 | 0.56 | 0.57 | -1.67 | 0.00 |
| E12 | 63.70 | .15 | 1.00 | -0.64 | 0.58 | -1.62 | 0.36 | 0.37 | -1.54 | 0.00 |
| E13 | 94.70 | .19 | 0.33 | -3.18 | 0.35 | -3.49 | 0.93 | 0.88 | -3.69 | 0.00 |
| E14 | 79.60 | .27 | 1.00 | -1.54 | 0.60 | -1.85 | 0.84 | 2.13 | 0.07 | 0.60 |
| E15 | 59.40 | .19 | 1.00 | -0.44 | 0.02 | -0.77 | 0.53 | 19.80 | 0.77 | 0.51 |
| E16 | 95.20 | .16 | 0.67 | -3.30 | 0.15 | -4.15 | 0.79 | 0.71 | -4.53 | 0.01 |
| E17 | 47.70 | .13 | 1.00 | 0.10 | 0.52 | 0.26 | 0.36 | 0.64 | 1.51 | 0.26 |
| E18 | 56.00 | .28 | 1.00 | -0.28 | 0.28 | -0.40 | 0.67 | 0.67 | -0.39 | 0.00 |
| E19 | 69.20 | .11 | 1.00 | -0.93 | 0.01 | -3.59 | 0.23 | 0.27 | -3.07 | 0.00 |
| E20 | 97.90 | .09 | 0.33 | -4.16 | 0.70 | -6.19 | 0.65 | 0.62 | -6.43 | 0.05 |
| E21 | 82.00 | .53 | 0.67 | -1.71 | <0.0001 | -1.14 | 2.42 | 2.26 | -1.13 | 0.00 |
| E22 | 55.40 | .37 | 1.00 | -0.25 | 0.01 | -0.26 | 1.09 | 1.28 | 0.06 | 0.13 |
| E23 | 87.80 | .42 | 0.67 | -2.22 | 0.01 | -1.67 | 1.71 | 1.67 | -1.58 | 0.10 |
| E24 | 66.30 | .34 | 1.00 | -0.77 | 0.33 | -0.94 | 0.84 | 1.15 | -0.09 | 0.29 |
| E25 | 51.20 | .34 | 1.00 | -0.06 | 0.24 | -0.07 | 0.94 | 1.17 | 0.33 | 0.15 |
| E26 | 63.10 | .22 | 1.00 | -0.62 | 0.38 | -1.07 | 0.54 | 1.37 | 0.83 | 0.47 |
| E27 | 63.70 | .25 | 1.00 | -0.64 | 0.40 | -0.95 | 0.65 | 1.53 | 0.65 | 0.46 |
| E28 | 85.70 | .41 | 0.67 | -2.02 | 0.00 | -1.58 | 1.58 | 1.93 | -1.06 | 0.32 |
| E29 | 72.40 | .40 | 1.00 | -1.10 | 0.07 | -1.03 | 1.21 | 1.15 | -1.04 | 0.00 |
| E30 | 82.80 | .34 | 0.67 | -1.77 | 0.51 | -1.72 | 1.13 | 1.28 | -1.06 | 0.33 |
| E31 | 21.50 | .24 | 1.00 | 1.46 | 0.07 | 1.88 | 0.77 | 1.61 | 1.62 | 0.09 |
| E32 | 78.20 | .36 | 1.00 | -1.45 | 0.15 | -1.39 | 1.15 | 1.31 | -0.94 | 0.22 |
| E33 | 87.50 | .47 | 0.67 | -2.19 | <0.0001 | -1.58 | 1.86 | 1.74 | -1.63 | 0.00 |
| E34 | 74.50 | .13 | 1.00 | -1.22 | 0.15 | -2.89 | 0.39 | 1.51 | 0.87 | 0.64 |
| E35 | 77.50 | .42 | 1.00 | -1.40 | 0.01 | -1.22 | 1.36 | 1.32 | -1.22 | 0.00 |
| E36 | 13.80 | -.10 | 1.00 | 1.39 | 0.00 | -70.25 | -0.02 | -0.07 | -19.63 | 0.02 |
| E37 | 73.20 | .36 | 1.00 | -1.15 | 0.02 | -1.22 | 0.99 | 0.94 | -1.25 | 0.00 |
| E38 | 82.00 | .27 | 0.67 | -1.71 | 0.62 | -2.18 | 0.78 | 0.76 | -2.21 | 0.00 |
| E39 | 52.30 | .32 | 1.00 | -0.10 | 0.40 | -0.15 | 0.72 | 0.87 | 0.17 | 0.10 |
| E40 | 5.40 | .27 | 1.00 | -0.02 | 0.19 | -0.03 | 0.63 | 1.24 | 0.74 | 0.26 |
| E41 | 68.40 | .22 | 1.00 | -0.88 | 0.15 | -1.39 | 0.60 | 1.94 | 0.64 | 0.54 |
| E42 | 93.90 | .12 | 0.67 | -3.03 | 0.92 | -5.65 | 0.50 | 0.50 | -5.64 | 0.00 |
| E43 | 72.10 | .20 | 1.00 | -1.09 | 0.13 | -2.09 | 0.48 | 0.52 | -1.95 | 0.00 |
| E44 | 17.20 | .04 | 0.33 | 4.01 | 0.00 | -4.01 | -1.05 | -0.99 | -4.23 | 0.00 |
| E45 | 71.90 | .37 | 1.00 | -1.07 | 0.12 | -1.10 | 1.05 | 1.04 | -1.08 | 0.00 |
| E46 | 76.70 | .29 | 1.00 | -1.35 | 0.17 | -1.58 | 0.87 | 2.53 | 0.16 | 0.57 |
| E47 | 85.70 | .45 | 0.67 | -2.02 | 0.00 | -1.46 | 1.89 | 1.83 | -1.37 | 0.09 |
| E48 | 89.10 | .39 | 0.67 | -2.36 | 0.01 | -1.69 | 1.87 | 2.10 | -1.37 | 0.25 |
| E49 | 81.40 | .47 | 0.67 | -1.68 | <0.0001 | -1.25 | 1.80 | 2.39 | -0.77 | 0.28 |
| E50 | 19.40 | -.02 | 1.00 | 1.61 | 0.00 | -68.59 | -0.02 | -0.02 | -74.32 | 0.06 |

Note. DE=discriminator efficiency; Items marked in red were rejected as not meeting model conventions.