# Supplementary Material

Item Examples and Translations

Fig.1 Example Item for CK scale of the professional knowledge test.

Begründen Sie auf dem Niveau der 6. Jahrgangsstufe, warum ist!

Nutzen Sie nicht die übliche Rechenregel zur Multiplikation von Dezimalbrüchen!

(Translation: Explain on the level of 6th graders, why . Do not use the common rule for multiplying decimal fractions.)

Description: This item covers conceptual mathematical content knowledge of the multiplication of decimals. The participants are asked to argue, *why* the result of this multiplication is correct. The hint that they should not use the common rule for multiplying decimal fractions, aims to trigger an answer which relies on a correct mathematical proof.

Fig.2 Example Item for PCK scale of the professional knowledge test.

Betrachten Sie die Divisionsaufgabe .

Geben Sie einen typischen falschen Lösungsweg (mit falschem Ergebnis) für diese Aufgabe an, der auf mangelndes Verständnis zu Dezimalbrüchen hinweist.

(Translation: Have a look at the division of 4.8 by 2.2. Give a typical incorrect student solution for this calculation (leading to a wrong result), which is based on a lack of understanding of decimal fractions.)

Description: This item covers conceptual mathematical pedagogical content knowledge. The participants are asked to provide a typical incorrect student solution, which would reflect students’ misunderstanding of decimal fractions.

Detailed item statistics

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Table 1.1**  Detailed item statistics. | | | | |
|  |  | CK | PCK | PK |
| *Whole sample*  *(N = 357)* | # of items, whole test | 24 | 16 | 11 |
| EAP Reliability | 0.60 | 0.58 | 0.55 |
| *Outfit-MNSQ* |  |  |  |
| max | 1.16 | 1.30 | 1.09 |
| min | 0.81 | 0.84 | 0.97 |
| *Infit-MNSQ* |  |  |  |
| max | 1.10 | 1.16 | 1.03 |
| min | 0.93 | 0.90 | 0.95 |
| *Cor* |  |  |  |
| CK |  | 0.41 | 0.22 |
| PCK |  |  | 0.37 |
| PK |  |  |  |
|  |  |  |  |  |
| *Whole sample*  *(N = 357)* | *Item-parameters* |  |  |  |
| # of items, this study | 12 | 8 | 11 |
| M | 1.07 | 0.66 | 0.90 |
| SD | 1.06 | 0.88 | 0.83 |
| max | 2.76 | 1.63 | 2.61 |
| min | -1.02 | -0.97 | -0.15 |
|  |  |  |  |  |
| *Scaling sample*  *(N = 292)* | *Person-parameters* |  |  |  |
| M | 0.30 | 0.14 | -0.03 |
| SD | 1.05 | 1.28 | 1.12 |
| max | 2.47 | 3.26 | 2.43 |
| min | -2.95 | -2.78 | -2.49 |
|  |  |  |  |  |
| *Sample of current study*  *(N = 65)* | *Person-parameters* |  |  |  |
| M | 0.98 | 0.88 | 0.08 |
| SD | 1.02 | 0.91 | 0.87 |
| max | 3.50 | 2.51 | 1.91 |
| min | -1.42 | -2.58 | -2.49 |
|  |  |  |  |  |
| *Note*. Item-parameters are only given for items included in the current study. | | | | |