Show how many – Analysis of student strategies

Link to the assessment resource *Show how many* (NM1343)

Table 1:   Frequency of use and success rates of different strategies

Strategy	Quest. a)	Quest. b)	Quest. c)	Total	
Unitises on rate or on the ratio of dissimilar entities	-	8 (7)	5 (5)	13 (12)	92%
Unitises on the ratio of similar entities	66 (65)	41 (41)	14 (12)	121 (118)	96%
Uses doubling strategy	3 (3)	27 (23)	18 (15)	48 (41)	85%
Uses rate or ratio table	35 (31)	53 (47)	30 (24)	118 (102)	86%
Uses a diagram	8 (7)	4 (2)	7 (4)	19 (13)	69%
ALL STRATEGIES	**112**	**133**	**74**	**317 (286)**	**90%**
Misinterprets remainder	-	-	25 (2)	25 (2)	8%
Other strategies / missing	75 (10)	54 (6)	88 (2)	217 (18)	8%
TOTAL	**187**	**187**	**187**	**561 (306)**	**55%**

66 (65) means 66 used the strategy and 65 of these obtained the correct answer.

Table 2: Mean ability of students using different strategies

Mean ability* (out of 69)				
Strategy	Quest. a)	Quest. b)	Quest. c)	Weighted average**
Unitises on rate or on the ratio of dissimilar entities	-	24.1	30.4	26.5
Unitises on the ratio of similar entities	26.8	25.6	28.1	26.6
Uses doubling strategy	21.3	22.4	25.3	23.4
Uses rate or ratio table	21.8	22.7	24.5	22.9
Uses a diagram	18.9	18.5	20.7	19.5
Misinterprets remainder	-	-	25.0	25.0
Other strategies / missing	16.4	15.9	16.7	16.4

 * Mean ability – average score out of 69 of all students using this strategy on a series of questions taken by our representative sample of 174 students. It is a measure of the relative level of sophistication of students' responses.

** [Σ (mean ability × number using strategy in each part of the question)] / total number of students using the strategy in any part of the question

e.g., for using a diagram = [18.9×8 + 18.5×4 + 20.7×7] ÷ 19 = 19.5

Main features

- Unitising on rate or on the ratio of similar entities gives almost equally high success rates and attracts the students with the highest (and virtually identical) mean abilities as those of students who unitise on the ratio of similar entities.
- Using either a rate/ratio table or doubling had high success rates and attracted students with the next highest (and virtually identical) mean abilities.
- The use of diagrams was the least successful strategy, and was used by students with lower mean abilities than other acceptable strategies.
- In part c), students who misinterpreted the remainder when looking at the ratio of boys:girls had reasonably strong mean abilities.