

# ANSWER-CHECKING STRATEGIES REVEAL GROWTH IN COGNITIVE POWERS: NUMERICAL REASONING OF A STUDENT WITH LEARNING DIFFICULTIES IN MATH

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This is a case study of a 6<sup>th</sup> grade boy identified as having learning difficulties in mathematics. He was a participant in a larger research and professional development project focused on teaching math conceptually (grades K-5). We used constructivist teaching experiments (Cobb & Steffe, 1983) to make inferences about and build models of how the learners constructed conceptual structures and operations.

A major challenge for students experiencing difficulties in learning mathematics is to overcome a long-learned coping mechanism of looking to others as authorities for “right or wrong answers” (Brousseau & Warfield, 1999). Therefore, we examined what strategies the student used to check his answers. This led to the research question: how do the student's answer-checking strategies relate to his problem-solving strategies? The video data was collected across four teaching episodes during which we used an activity designed to support an advance from count-all to count-on.

| Episode | Problem-solving strategy | Answer-checking strategy |
|---------|--------------------------|--------------------------|
| 1       | Count All                | No strategy              |
| 2       | Prenumerical Count-On    | Count All                |
| 3       | Numerical Count-On       | Prenumerical Count-On    |

Table 1: Correspondence of problem-solving to answer-checking strategies

As seen in Table 1, this boy's answer-checking strategies remained one conceptual step behind the ones he used for problem-solving. His answer-checking strategies were evidence of what he could achieve independently, whereas his problem-solving strategies were those he was still developing. Therefore, answer-checking strategies can serve as a formative assessment for what strategies children use independently.

## References

- Brousseau, G., & Warfield, V. M. (1999). The case of Gaël. *Journal of Mathematical Behavior*, 18(1), 7-52.
- Cobb, P., & Steffe, L. P. (1983). The constructivist researcher as teacher and model builder. *Journal for Research in Mathematics Education*, 14(2), 83-94.