

WHAT DOES THE EQUAL SIGN MEAN? FROM TEACHER TRAINING TO TEACHING PRACTICE

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Understanding the equal sign is crucial for developing algebraic thinking. However, pre-service teachers (PSTs) face difficulties anticipating responses, interpreting student work, and making decisions when analyzing tasks related to equal signs. This paper presents findings from a case study conducted during the initial phase of an ongoing project aimed at generating pedagogical knowledge to improve teacher training. The research question addressed in this phase was: What meanings of the equal sign can be identified in the classroom practice of a PST?

The theoretical framework categorizes meanings attributed to the equal sign in school mathematics (Molina et al., 2009). The authors distinguish between *operational meanings*, such as the equal sign used as an operator ($3+4=7$) or a separator ($3+4=7+2=9$), and *relational meanings*, such as the expression of a numerical equivalence ($3+4=5+2$) or symbolic equivalence ($x+3x=6x-2x$). Research has shown that a relational understanding of the equal sign promotes better performance in solving algebraic equations.

This case study involved a fourth-year PST (23 years old). Data was collected by analyzing a narrative in which she described her class implementation, centered on discussing equal sign meanings. The data comprise the lesson plan, the 45-minute lesson audio recording, and the PST's reflection. The analysis identified segments that revealed key aspects of teaching and learning related to the equal sign.

The results indicate that the PST prioritized correctly writing equations without explicitly addressing the meanings of the equal sign. This approach implicitly validated the equal sign as a separator while neglecting its interpretation as a conditional equivalence. These findings show how these difficulties emerge not only in analyzing student responses outside the classroom (e.g., Pinto et al., 2024) but also in teaching practice. The study highlights the need for training programs that promote reflection on the role of the equal sign and strategies to strengthen its relational interpretation.

References

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