

## WHAT MENTAL MODELS DO STUDENTS USE REGARDING THE STRUCTURE OF THE DOMAIN OF RATIONAL NUMBERS?

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In teaching mathematics, it is often assumed that, due to the hierarchical structure of Mathematics, new ideas about numbers will smoothly follow from prior ones. However, learning difficulties in this area suggest that the conceptual shift from prior to new mathematical concepts is not as smooth as often supposed. Theories of conceptual change suggest that the enrichment of a conceptual structure by simple addition of new information is not enough to achieve understanding of certain mathematical notions.

In this study, we monitored the changing understanding of “number density” while students acquire expertise on rational numbers. We claim that we detect the need of a radical kind of conceptual change.

We interviewed twenty students of the ninth grade. They were given tasks regarding the internal structure of the set of rational numbers. (e.g. “How many numbers can you find between ... and ...?”). Both the prior knowledge about the natural numbers and their properties, and the use of the number line, influenced clearly the way the students responded. We report our first results in identifying and categorizing the mental models that students construct when dealing with questions about density of rational numbers.

### References

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