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Investigating the improvement of prospective elementary teachers' number sense in reasoning about fraction magnitude.

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Summary: We report on interview results from a classroom teaching experiment in a Number and Operations course for prospective elementary teachers. Improving the number sense of this population is an important goal for mathematics teacher education, and researchers have found this goal to be difficult to accomplish. In earlier work, we devised a local instruction theory for the development of number sense, which focused on whole-number mental computation. In this study, the local instruction theory was applied to the rational-number domain, with the help of a framework for reasoning about fraction magnitude, and it guided instruction in the content course. We interviewed seven participants pre- and post-instruction, and we found that their reasoning on fraction comparison tasks improved. The participants made more correct comparisons, reasoned more flexibly, and came to favor less conventional and more sophisticated strategies. These improvements in number sense parallel those that we found previously in mental computation. In addition to the overall results, we highlight two cases of improvement that illustrate ways in which prospective elementary teachers' reasoning about fraction magnitude can change.

Classification: F49 D39

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