Title:
Extending a Local Instruction Theory for the Development of Number Sense to Rational Number

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Abstract:
We report on results of the implementation of a local instruction theory for number sense development in a course for prospective elementary teachers. Students involved in an earlier teaching experiment developed improved number sense, particularly in the form of flexible mental computation. The previous research was informed by a conjectured local instruction theory and informed the refinement and elaboration of that local instruction theory. The present study concerns a recent iteration of the classroom teaching experiment, in which the local instruction theory guided instructional planning. In the recent iteration, the local instruction theory was extended from the whole-number portion of the course to the rational-number portion. Envisioned learning routes that were developed in the context of mental computation and estimation were applied to reasoning about fraction size. In this way, the application of the local instruction theory was extended from whole-number sense to rational-number sense.