

NOVICE TEACHERS INTERPRETATION OF FRACTIONS

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Past research suggests that teacher's intentions to root mathematics instruction in conceptual understanding is impeded by their content knowledge and pedagogical beliefs (Borko et.al., 1992; Fuller, 1996). A significant source of this knowledge and beliefs may be attributed to their own experiences as mathematical learners (Chicoine, 2004). Implementation of the Common Core Mathematical Standards and Practices, launched in 2009, have emphasized the importance of instruction and learning focused on developing both mathematical procedural knowledge and conceptual understanding. Novice teachers have experienced the implementation of the Common Core during their own k-12 experience, as well as within their teacher preparation program. It may be that the renewed emphasis on productive mathematical dispositions and conceptual understanding present in the Common Core era may be realized in the content and pedagogical knowledge of these novice teachers.

In an effort to better understand novice teacher's mathematics knowledge and the potential influence of development of mathematical understanding under the Common Core, we have designed a study to examine one specific content area- the interpretation of fraction concepts. Fraction were chosen specifically due to the challenge they present to both pre-service and in-service teachers (Ma, 1999). Our data collection initially focused on how novice teachers across the k-12 grade level apply their own mathematical understanding to interpreting fractions and applying fraction operation. To address this area, artifacts of teacher work comparing, adding, and division of fractions was collected. We then compared the solution strategies utilized by the teachers in their own work was compared to the instructional strategies chosen by these teachers in their classrooms. Within this comparison, we questioned teachers to understand the impetus for these instructional decisions.

Results of the study suggest diverse solution strategies to the fraction problems within and across certification levels (e.g. elementary compared to high school). When choosing instructional strategies to apply for the instruction of fraction concepts the school curriculum was not often cited as a common resource. Instead, many of the teachers focused on their own backgrounds and experiences to determine their instructional approaches. This finding is of interest because of the potential for contradictions between teacher held beliefs on appropriate methods of instruction and instruction that exists in school and state curriculums.

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