

Characteristics of Middle Grade Students' Solution Strategies While Reasoning the Correctness of the Statements Related to Numbers

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Abstract : Mathematics is a sense-making activity so that it requires meaningful learning. Hence based on this idea, meaningful mathematical connections are necessary to learn mathematics. At that point, the major question has become that which educational methods can provide opportunities to provide mathematical connections and to understand mathematics. The amalgam of reasoning and proof can be the one of the methods that creates opportunities to learn mathematics in a meaningful way. However, even if reasoning and proof should be included from prekindergarten to grade 12, studies in literature generally include secondary school students and pre-service mathematics teachers. With the light of the idea that the amalgam of reasoning and proof has significant effect on middle school students' mathematical learning, this study aims to investigate middle grade students' tendencies while reasoning the correctness of statements related to numbers. The sample included 272 middle grade students, specifically 69 of them were sixth grade students (25.4%), 101 of them were seventh grade students (37.1%) and 102 of them were eighth grade students (37.5%). Data was gathered through an achievement test including 2 essay types of problems about algebra. The answers of two items were analyzed both quantitatively and qualitatively in terms of students' solutions strategies while reasoning the correctness of the statements. Similar on the findings in the literature, most of the students, in all grade levels, used numerical examples to judge the statements. Moreover the results also showed that the majority of these students appear to believe that providing one or more selected examples is sufficient to show the correctness of the statement. Hence based on the findings of the study, even students in earlier ages have proving and reasoning abilities their reasoning's generally based on the empirical evidences. Therefore, it is suggested that examples and example-based reasoning can be a fundamental role on to generate systematical reasoning and proof insight in earlier ages.

Keywords : reasoning, mathematics learning, middle grade students

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