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## Emphasizing concrete representation to enhance students' conceptual understanding of operations on integers (Article) **Open Access**

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### Abstract

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This paper presents the findings of an intervention study that emphasizes concrete representation to improve students' conceptual understanding in learning mathematics. The study specifically examined the effectiveness of focusing on concrete representations - the algebra tiles, in minimizing students' errors in the operation on integers. A quasi-experimental design with a sample of 60 students from two intermediate Year 7 classes was employed in this study. The control group and the experimental group consisted of 30 students each, chosen through purposive sampling. Data from pre and post-tests and field notes were collected and analysed to measure changes from the intervention. The quantitative data from the tests showed an increase from 14.70 to 23.47 for the experimental group, as compared to 18.67 to 22.57 for the control group. The ANCOVA returns statistically significant results that can be attributed to the intervention strategies. Data from field notes indicate students' improvement in problem-solving skills, and students' interest in the lessons and motivation to learn. This study suggests that teaching with emphasis on concrete representation improves students' conceptual understanding. Hence students' understanding of integers was enhanced due to the promotion of concepts through manipulatives, pictures, verbal and symbolic representation which were also employed during the intervention. This study may be useful to teachers who usually encounter problems when teaching this topic. © 2020 Karadeniz Technical University. All rights reserved.

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