

ZMATH 2015e.00699

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Mapping conceptual understanding of algebraic concepts: an exploratory investigation involving grade 8 Chinese students.

Int. J. Sci. Math. Educ. 13, No. 3, 683-703 (2015).

Summary: Conceptual understanding is a major aim of mathematics education, and concept map has been used in non-mathematics research to uncover the relations among concepts held by students. This article presents the results of using concept map to assess conceptual understanding of basic algebraic concepts held by a group of 48 grade 8 Chinese students. The concept maps constructed by these students were scored by the number of links and propositions based on linking phrases, and these scores were analyzed to yield three types of results as follows: (a) relations associated with individual concepts, (b) relations between pairs of concepts, and (c) relations among all the given concepts at the whole class level to reveal the structure encompassing these concepts. It was found that the students tended to link from superordinate concepts to subordinate concepts. They seemed to hold different ideas about the relations among the concepts since there were more weak links than moderate and strong links in the collective map. A gap in the students' understanding of equations and functions was captured. The future use of concept map to study conceptual understanding of specific mathematics topics should deal with the issues of training and translation of findings into classroom practices.

Classification: H33 I23 C33

Keywords: algebra; concept map; conceptual understanding; social network analysis

doi:10.1007/s10763-013-9500-2