

Investigating the procedural and structural conception of algebraic expressions of seventh, eighth, ninth students

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Abstract

Algebraic expressions are the important part of Algebra and it is necessary for problems solving. The purpose of this study was to investigate students' understanding of the 7th, 8th and 9th grade of students. 400 students were selected by multistage cluster sampling from the students in Tehran. A researcher-made test was designed and implemented. Out of 400 students, 15 students were selected and semi-structured interviews were conducted in order to clarify and interpret students' perceptions. The results of the test and interviews showed that most students have a poor structural understanding of algebraic expressions and they have understood them merely procedurally. Increasing academic bases did not almost improve structural understanding, but procedural understanding improves with increasing levels.

Table2. Percentage of 7th, 8th and 9th student's answers to task 1of algebraic expression test

	Option 1	Option 2	Option 3	Option 4
7 th grade	5%	39%	17%	17%
8 th grade	4%	52%	9%	26%
9 th grade	2%	57%	10%	19%

Table9. Percentage of 7th, 8th and 9th student's answers to task 2of algebraic expression test

	Option 1	Option 2	Option 3	Option 4
7 th grade	9%	34%	14%	9%
8 th grade	19%	28%	12%	19%
9 th grade	13%	23%	23%	19%

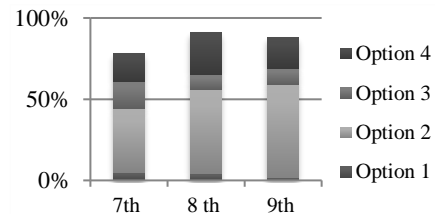


Fig.2.Diagram of frequency Percentage of 7th, 8th and 9th student's answers to task 1of algebraic expression test

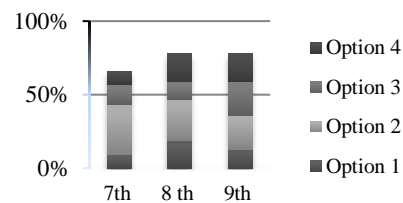


Fig.5.Diagram of frequency Percentage of 7th, 8th and 9th student's answers to task 2of algebraic expression test

Conclusions

The goal of this study was to assess understanding of 7th, 8th and 9th grades students of algebraic expressions. The analysis of algebraic expression test showed that most students have perceived both simple and complex algebraic expressions procedurally. According to interviews, reducing the percentage of frequency of procedural in complex terms was because of ignoring the distributive and equality of terms. With increasing educational grades, the percentage of students in a simple algebraic expression increases, but decreases in complex algebraic expression. Fewer students have come to understand the dual procedural-structural understanding in both simple and complex algebraic expression