The Effect of Rephrasing Word and Geometrical problems on the Achievements of Arab Students in Mathematics

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Language plays a significant role in mathematics and in math education. Language is the learning device and the device which forms the student's knowledge in math, his ability to define concepts, express mathematical ideas and solve mathematical problems.
Difficulties in the Language are seen more in word problems, clarity and in the way the text is read by the student have a direct effect on the understanding of the problem and therefore, on its solution. If the problem is phrased in a language that is difficult for the student, it could in fact be an obstacle in the student's comprehension of the problem and certainly could delay the problem solving process.
The connection between language and mathematical achievements has a more distinctive significance regarding the Arab student. This is due to the fact that the language which is used in the schools and in textbooks is Arabic .It is far different than the language used in everyday conversations with family and friends (the spoken Arabic). Moreover, during the lessons the interaction between the student and the teacher and between fellow students is carried out while using the spoken Arabic form of the language. However, during math lessons the interaction between the student and the text books is carried out using a different form of the Arabic language. This means that at one period of time, the student is required to make transitions from one language to another, creating a burden on the student and delaying his comprehension of word problems. Approaching the matter above can most certainly help in promoting the Arab student's achievements in mathematics.

Our research examines whether or not rephrasing word problems can effect the achievements of the Arab student in Mathematics. In order to do so we selected 538 4^{th} and 5^{th} grade students (283 4^{th} grade students and 255 5^{th} grade students, 287 boys and 251 girls) from eight different elementary schools in Israel. Eight word problems were chosen according to their potential, in regard to the language, for disrupting and delaying the students' achievements. The problems were divided among the groups; each group was presented with four problems.
In the next stage, each one of the problems was rephrased: the problems where now written in a simpler language, preserving the content and mathematical difficulty. These problems were presented to the Arab's sector mathematics education department; they confirmed that indeed the rephrasing of problems made it easier for students.

Two different verses of exams were created: verse1 contains the four original problems and four rephrased problems. Verse2 contains the four original problems that appear in verse1, only now they have been rephrased, and the four rephrased problems that appear in verse1.
The exams were carried out by eight teachers that participated in the research; they have all received the same briefing for evaluating the students' solutions. The students received both verses of the exam.
The results show that there was a significant improvement in the students' achievements in the second verse of the exam, which contained the rephrased problems. The improvement was more significant among the boys than among the girls, and was clear also among the students with low achievements in mathematics. There was no difference in the improvement between the 4^{th} and 5^{th} grade students.
It may be concluded that rephrasing word problems has a significant effect on the Arab student's achievements in mathematics.