HOW GRADE 12 STUDENTS UNDERSTAND AND SOLVE GEOMETRIC PROBLEMS

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This paper is based on a study that investigated how grade 12 students understand and solve geometric problems. A review of the literature on "how students learn and understand geometry" was used to develop a conceptual framework. This framework was used to assess the students' level of understanding and used to analyse their difficulties in solving geometric problems.

The study was conducted at four low achieving schools in mathematics (based on student performance in the South African Senior Certificate Examination). It involved 267 students across the schools. The students' level of understanding was assessed through the use of two tests. These tests were designed to cover 80% of the grade 11 syllabus and involved the testing of a terminology framework (test 1) and problem solving exercises (test 2). Test 1 included 10 items where students were asked to complete statements, as well as 9 items where students were asked to write down properties from given sketches. Test 2 included 16 items of true or false responses.

An in-depth analysis of 21 students, who produced a score of more than 70% in test 1, provided greater insight into how students learn and engage in problem solving activity. The 21 students were interviewed and questioned in connection with their performance in test 2.

The results of the study suggested that the majority of students do not possess a theoretical framework, consequently showing that they were unable to engage in problem solving. However, the fact that some students possessed a theoretical framework, did not necessarily mean a better performance in problem solving. The findings of the study suggest that students' lacked a strategy for applying their theory. They were looking for 'prototypes', as presented by their teacher and were unable to engage with the problems where the orientation of the diagrams was different.

The overall findings of the study revealed that at least 75% of the students had low levels of understanding geometry. The potential value of the results in this research for the use in geometry classrooms will be discussed during the presentation.

References

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