

Problem Based Learning Technique and its effect on Acquisition of Linear Programming Skills by Secondary School Students in Kenya

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Abstract

The topic Linear Programming is included in the compulsory Kenyan secondary school mathematics curriculum at form four. The topic provides skills for determining best outcomes in a given mathematical model involving some linear relationship. This technique has found application in business, economics as well as various engineering fields. Yet many Kenyan secondary schools hardly teach the topic. The methods used are found to be difficult to execute leading to lack of understanding by the learners. The purpose of this study was to investigate whether Problem Based Learning intervention can encourage and improve students' learning of linear programming. Students' performance on an achievement test, and acquisition of linear programming skills were monitored. The study adopted the pre-test, post-test non-equivalent groups' experimental design. The experimental group was taught the topic using the origin test and extreme point's technique, a version of Problem Based Learning. The control group was taught using conventional methods. A mathematics achievement pre-test and a post-test were given to both groups to ascertain their respective entry and final performance abilities. Analysis of the post-test results was done using the means, standard deviations and paired samples t-test. In addition, item 3 of the mathematics achievement post-test, was used to determine the level of students' acquisition of linear programming skills. The face and content validity of the research instruments were determined with the help of mathematic educators and experienced secondary school mathematic teachers. The split half method was utilized in determining the instruments' reliability acceptable at reliability indices of 0.6. Pearson's coefficient (r) obtained for MAT 1 School 1 was 0.9211 and 0.9131 for school 2. Pearson's coefficient(r) for MAT 2 for School 1 was 0.8786 and for school 2 it was 0.8896. Stratified Random Sampling was used to select ten each of form four boys, girls, and co-educational schools for the study. In total 1,502 form four students participated in the study. Of this total, 745 students formed the experimental while 757 formed the control group.

Keywords: Problem Based Learning Technique, Linear Programming Skills, Pre-requisite Knowledge, Secondary School Students, Kenya

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