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TEACHING-LEARNING PROCESS AND ACHIEVEMENT OF PHYSICS CONCEPTS AT GRADE NINE

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This study was conducted to investigate the effect of teaching-learning methods on the achievement level of some Physics based concepts: Force, Energy and Work at Grade 9. The instructional methods, 5E, Traditional and a combination of both (a mixed teaching method) which is practically used by teachers were used as the treatments. The mixed teaching method is a teacher adapted method from the 5E model in which the second step "Exploration" is done by the teacher using traditional methods (teacher centered), leaving four other steps as student centered. In addition, the teacher provides a systematic summary note of the content for future reference under the mixed teaching method. The study was conducted in two schools using 155 male and female students in Grade 9. Students were randomly divided into three classes in each school, and one experienced teacher for each instructional method was employed for the classroom teaching of the selected Physics unit. Two specially formulated tests 'Force, Energy and Work Concept Achievement Test' (FEWCAT) with equal weight questions were administered as the pretest for assessing their prior knowledge and as the post-test for assessing the achievement level. The test items which had the Cronbach α estimate of above 0.7 were included in both tests. The experiment was conducted using the mixed method approach and therefore, classroom observation was also conducted to investigate the qualitative data collection of the teaching-learning process. Qualitative data were analyzed using the Grounded Theory while the quantitative data were statistically analyzed using the Analysis of Covariance test (ANCOVA) and the Turkey test, in which pretest scores were considered as the covariate. According to the results, the students learnt under the mixed teaching method achieved the highest post-test mean (19.5) but it was not significantly different to 5E method (19.0). However, the students learnt under the traditional method performed significantly low with the lowest post-test mean of 14.7. In the qualitative data analysis, six assertions were formed and they revealed that, although the students were very active under 5E method they learn theory only after doing an activity. Whereas in the mixed teaching method, students were less active in the teacher centered step, but interested in the note provided by the teacher. They learnt the theory first and tested it as an activity and this combination was more effective in achieving new abstract concepts than 5E and traditional methods of instruction. Further, it was also revealed that they learned the content limited to their group and had no written materials for refreshing their knowledge under 5E method. Although, the students received a systematic note of the theory they learned in the traditional method, they were found to be extremely passive in learning, no confirmation of theory by practice (activity) and poor in concept achievement. Therefore, it was concluded that the abstract concepts were better achieved by students under the mixed method of teaching than 5E and traditional methods.