

Abstract

The fundamental challenge facing the teaching and learning of physics as a science in Kenya secondary schools is how to enhance students' conceptual understanding as well as affective characteristics associated with teaching and learning process. The challenge is clearly depicted by low academic achievement both at school level and national level. Application of new teaching strategies that will not only improve students' achievement in physics but also positively change their attitude towards physics as a subject should be used. One of these teaching strategies is experiential concept mapping. The purpose of the study was to investigate the effectiveness of using experiential concept mapping teaching and learning strategy on students' achievement and attitude in physics in secondary school. The target population of the study was 8430 physics student in Maara Sub County. Accessible population was 3137 form one students, from purposively sampled co-educational secondary schools in Maara sub-county. Solomon's Four Group Non-Equivalent Control Group Design was used in the study. Based on the design, four co-educational schools forming the sample size of 182 form one students, was randomly sampled. The researcher ascertained the validity of the instruments by seeking opinions from experts in the field of study as well as assistance from supervisors. The experimental groups were taught using experiential concept mapping teaching and learning strategy while the control groups were taught using other conventional methods of teaching. Two instruments were used to collect data; Physics Students Achievement Test (PSAT) and Student Attitude towards Physics Learning Questionnaire (SATPQ). Piloting was conducted prior to data collection to improve reliability of the instruments. Reliability of the instrument was computed using Cronbach Alpha formula. Reliability coefficient of 0.783 and 0.705 for PSAT and SATPQ respectively were obtained. The raw data obtained was scored, coded and analysed using descriptive statistics (mean, standard deviation and percentages) as well as inferential statistics (ANOVA, and t-test). Hypothesis were tested at the alpha (α) value of 0.05 level of significance using Computer Statistical Package for Social Sciences (SPSS) version 20. The result of the study indicates a statistically significant difference between students' achievement when exposed to experiential concept mapping teaching and learning strategy and students who were taught using conventional teaching methods. Further, the results from the current study showed that students attitude towards teaching and learning of physics was influenced by the method of instruction. The analysis of items in the SATPQ revealed that students in the experimental groups that were instructed using experiential concept mapping teaching and learning strategy had positive attitude towards physics as compared to those in control group that were instructed using conventional teaching methods. The results of the study also show that boys and girls when exposed to experiential concept mapping teaching and learning strategy improved their achievement in physics. From the study there was evidence that experiential concept mapping influence both students' achievement and attitude towards physics learning. The researcher therefore recommends the inclusion of experiential concept mapping teaching and learning strategy as a teaching strategy to improve achievement and attitude in physics.