ABSTRACT

Chemistry occupies a central position among science subjects in the secondary school curriculum. It also takes up a significant place in the curriculum because of its applications in everyday life and the role it plays in enabling students to develop affective intellectual, and practical skills. In spite of this increasing importance in the unfolding world, the academic performance of Kenyan students in the subject in secondary schools has remained poor over the years. The fundamental challenge facing the teaching of Chemistry in Kenyan secondary schools is how to enhance students' Skills Acquisition, Conceptual understanding and Affective characteristics associated with the teaching and learning process. Innovative, research-based, and learner-centred teaching methods engage the learners in the learning process. Such methods are not only effective for mastery of concepts but also promote Psychomotor, Cognitive, and Affective characteristics of learners. The present study focused on the use of Computer Based Cooperative Mastery Learning (CBCML) in enhancing students' Skills Acquisition, Motivation and Achievement in chemistry in Bomet County. The study was guided by cognitive constructivist theory advanced by Ausubel and social constructivist theory advanced by Vygotsky. The target population for the study was all students in secondary schools in Bomet County. However, the accessible population was form three students in all co-educational secondary schools in the County. The study used Solomon Four Non-equivalent Control Group Design. Four secondary schools were purposively sampled from the accessible population. Stratified random sampling was used to select one school from each of the four sub-counties of Bomet County. This ensured that the four schools were located far apart from one another to eliminate diffusion of information from the experimental groups to the control groups. This translated to a total of 238 students. The selected schools were randomly assigned to treatment and control conditions. Students in all the four groups were taught the same Chemistry content from the topic Volumetric Analysis. In the Experimental Groups, CBCML was used while Conventional Teaching Methods (CTM) were used in the Control Groups. Groups 1 and 2 were pre-tested prior to the implementation of CBCML treatment which lasted a period of six weeks. At the end of the treatment, all the four groups were post-tested using Chemistry Practical Skills Acquisition Test (CPSAT), Students' Motivation Questionnaire (SMQ) and Chemistry Achievement Test (CAT). The instruments were validated with the help of experts from the Department of Curriculum, Instruction and Educational Management of Egerton University and Examiners of Chemistry registered with Kenya National Examinations Council (KNEC). The three instruments were pilot-tested to estimate their reliability coefficient before they were used for data collection. The reliability coefficient of the SMQ was estimated using Cronbach's alpha coefficient while that of CPSAT and CAT were estimated using Kuder-Richardson (K-R21) formula. The reliability coefficients were found to be 0.76, 0.88, and 0.85 for CPSAT, SMQ and CAT respectively. The instruments were therefore suitable for use in the study because the minimum threshold of 0.70 was met. Data were coded and analysed using Statistical Package for Social Sciences (SPSS) version 20. Descriptive as well as inferential statistics were employed in data analysis. These statistics included the mean, t-test, ANOVA and ANCOVA. The findings of the study showed that CBCML has a positive significant effect on students' Skills Acquisition, Motivation, and Achievement in Chemistry when it is used in teaching Chemistry. Moreover, gender has no significant effect on students' skills acquisition, motivation and achievement in chemistry when CBCML is used to teach. The results of this study may be beneficial to Chemistry teachers, teacher trainers and curriculum developers in improving the teaching-learning process. Consequently, the level of skills acquisition, motivation and achievement in Chemistry is enhanced. The findings also form a frame of reference for further research on innovative teaching strategies that ensure active

participation of learners during the teaching/learning process in Chemistry as well as other science subjects.

Keywords

Computer based cooperative mastery learning