

Influence of Computer Aided Instruction on Students' Achievement, Self-Efficacy and Collaborative Skills in Chemistry in Secondary Schools of Tharaka-Nithi County, Kenya.

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Abstract

The study investigated how the use of Computer Aided Instruction (CAI) affects students' achievement, self-efficacy and collaborative skills in learning Chemistry when compared with the use of Conventional Instructional Methods (CIM). The objectives of the study were: To investigate the effect of CAI on students' achievement in Chemistry when compared with CIM, to establish gender difference in Chemistry achievement when students are taught using CAI, to assess students' self-efficacy in the learning of Chemistry when taught using CAI and CIM, to establish gender difference in students' self-efficacy in Chemistry when students are taught with CAI, to determine students' development of collaborative skills in Chemistry when taught using CAI and CIM, and to establish the challenges of employing CAI In Chemistry. The study adopted quasi experimental design, based on Solomon Four- Group, Non-equivalent Control Group Design. There were 15 secondary schools with computer laboratory in Maara District, Tharaka Nithi County. Four Extra-County secondary schools with computer laboratory were purposively sampled which included two girls' only and two boys' only schools. The four schools were then randomly assigned to either experimental or control groups. The study sample comprised of 174 Form Two Chemistry students from the four sampled schools. The study involved two Experimental groups which were taught through CAI method (use of tutorials, simulations and drill and practice applications) and two Control groups which were taught through CIM (non- computer aided methods) on the topics "Atomic structure, Periodic Table and Chemical families" for six weeks. Data was collected using three instruments namely; Chemistry Achievement Test (CAT), Students' Self-efficacy Scale (SSES) and Classroom Observation Schedule (COS). Each of the instruments was administered before and after exposure of treatment (CAI) to both experimental and control group. Pilot testing of the treatment instrument, CAT, SSES and COS was done in two secondary schools in Maara Sub-county having the same characteristics as the sample schools. The reliability coefficients of the CAT and SSES were estimated using Cronbach's Alpha Coefficient and an alpha coefficient of 0.720 and 0.884 was obtained respectively. The researcher administered the CAT and SSES instruments with the assistance of Chemistry teachers in the sampled schools while the COS was utilized by the researcher. Data was analyzed using both descriptive and inferential statistics. The differences between the group means was analyzed using t-test, Analysis of Variance and Analysis of Covariance. The statistical significance was tested at $\alpha = 0.05$. The study revealed that, the students who were taught chemistry with CAI obtained higher chemistry achievement scores, higher selfefficacy scores and higher collaborative skills scores than the students who were taught with CIM. The study further revealed that girls obtained higher chemistry achievement

scores and also higher self-efficacy scores than boys when taught with CAI. The study further revealed that chemistry teachers faced some challenges including inadequate ICT resources when employing CAI in classroom instruction. The findings of this study would be beneficial to chemistry teachers in adopting instructional strategies that would help improve students' achievement, self-efficacy and collaborative skills in chemistry. In addition, the findings would be valuable to all stakeholders concerned with the enhancement of learning chemistry.

Keywords: Computer Aided Instruction, Students' Achievement, Self-Efficacy, Collaborative Skills, Chemistry Secondary Schools, Tharaka-Nithi County, Kenya

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