

Effects of Computer Assisted Learning on Instruction in Organic Chemistry in Public Secondary Schools in Kwale County, Kenya

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Abstract

The study was informed by the need to contribute in mitigating the persistent poor achievement by a majority of students in chemistry, organic chemistry topic being a major contributor. With evidence indicating insignificant effect of interventions previously implemented, a change in pedagogical approach through use of Computer Assisted Learning (CAL) was proposed. However, paucity of empirical data on its efficacy with regard to instruction for organic chemistry limited discussion on relevance of use of the method. A Solomon's four quasi – experimental study was therefore designed in which 182 form four students and 37 chemistry teachers purposively selected from schools with ICT infrastructure took part. The students in whole class groups were categorized either as control or experimental groups. Two groups (control and experimental each) were pre-tested, intervention (CAL for experimental and conventional for control) administered for three weeks and all the four groups post-tested. Data was obtained using students' questionnaire, pre-test and post-test students chemistry achievement test, teachers' questionnaire, interview schedule and observation checklist. Qualitative data was analysed thematically while quantitative techniques were used for quantitative data with the aid of SPSS. Descriptive statistics including mean, percentages and frequencies as well as inferential statistics in the form of t-test, ANOVA and multiple linear regression were used for data analysis. Post-test results indicated significant mean achievement for students exposed to CAL and significant effect for low ability students in experimental group. Similarly, significant effect was reported for change in students' attitude, the effect being more for students with negative attitude in experimental groups. However, insignificant mean difference was observed for students based on their age and gender. The study thus established that integration of CAL positively impacts learners' achievement in organic chemistry, the impact being greater for low ability students. Additionally, it showed that the strategy positively impacts students' attitude, the change being more prominent for students with negative attitude. For teachers, main effect was reported for their gender, level of education, IT competence, attitude and computer anxiety. Specifically, while level of education, workload and ICT competence had a significant negative effect, effect of computer anxiety was positive. With regard to institutional factors, the effect was positive and significant for leadership support, insignificantly positive for access and negatively significant for technical support. Lastly, inadequate access to ICT facilities, limited leadership support and limited technical support were found to be posing challenges to integration of CAL. It is therefore recommended that stakeholders speed up the roll out of ICT program to all schools in the country, preference being given to county and sub-county schools populated with low ability students. At the same time, adequate ICT hardware, software and reliable internet connectivity should be provided to schools

to ease the burden placed on existing infrastructure. At the same time, ICT technicians should be employed in every school to assist with technical cases. Lastly, administrative support to teachers on use of ICT should be enhanced.

Keywords: Computer Assisted Learning, Instruction, Organic Chemistry, Public Secondary Schools, Kwale County, Kenya

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