Influence of the use of Information and Communication Technology on teaching and learning mathematics in secondary schools: a case of Nairobi Province, Kenya

Abstract:
This study investigates the influence of use of Information and Communication Technology (ICT) on teaching and learning of mathematics in secondary schools; a case of Nairobi province, Kenya. It was premised on the question that sought to explain status and influence of ICT integration in teaching and learning mathematics, despite an increase in clamor for ICT integration in education, investment and advocacy talk. The research sought to establish influence of computers, scientific calculators and Internet connectivity on teaching and learning of mathematics, besides computers being taught as an examinable school subject. The objective was to assess influence of experience in ICT tools' use; extent of ICT tools' access and use on teaching and learning mathematics; extent of application of ICT -process based plans, activities, resources and factors determining ICT tools' use. The study employed several approaches to data collection and analysis. Survey questionnaires and interviews were used in collecting data from teachers and students. Mathematics teachers' and students' questionnaires were used as well as students' interview guides for purposes of data triangulation with respondents being form three and four students. Descriptive and correlation analysis was used in determining status and influence. The analysis revealed that to a greater extent, ICT integration in secondary schools in Nairobi province increasingly influences the process of teaching and learning mathematics. Secondary schools that are equipped with computer technology are at different levels of entrenching ICT integration in teaching and learning mathematics. The level of ICT integration was however discovered to be slow with the rate being influenced by capacity of teachers to use the tools for subject teaching. The research indicated that factors of experience and know-how strongly influenced the process of ICT integration in teaching and learning mathematics. The inquiry on influence of access and use of ICT tools on levels of technology integration in teaching and learning mathematics revealed that to greater extent teachers who are exposed to ICT tools and its use are more likely to integrate ICT in teaching and learning process. In regard to extent of application of ICT -process based activities and resources in teaching and learning of mathematics the study showed that ICT tools are not frequently used and integrated, however the scientific calculator was found to be frequently used in computation of mathematical problems by students. On the question of application of ICT tools for various purposes, it was observed that there was no consistency in utilization of ICT tools and resources in the general teaching and learning of mathematics besides other uses. On factors that promoted ICT tools' use, the findings pointed to the fact that increased ICT tools' use encouraged better teaching and learning of mathematics. On challenges to ICT tools' use the findings and analysis revealed that nonsystematic implementation and mainstreaming of ICT tools in teaching and learning mathematics has led to poor integration of ICT -based teaching and learning activities in mathematics and related management in schools.