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Stocktaking to support information and communication technology integration into mathematics teaching in initial teacher education

Dewa, Alton

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Abstract

There is growing concern about pedagogically integrated information and communication technology (ICT) in the teaching of mathematics; however, this integration does not happen among all mathematics lecturers in and around Schools of Education in South Africa. There is an ICT knowledge gap between mathematics education lecturers and pre-service teachers. The current crop of students is part of the Net Generation, meaning they have access to digital technologies and in most cases use them for social purposes. On the other hand, lecturers still use their old methods of teaching and these needs to be improved to meet the demands of the 21st century. The literature revealed that most mathematics lecturers have difficulty in integrating ICT in their teaching because they lack the technological knowledge to use computer applications, especially software applications that can be used to prepare lessons and in classrooms. For successful integration of ICT in teaching and learning mathematics, the mathematics lecturers must be resourced with the needed technological knowledge first before upgrading and installing digital resources in schools and then expect ICT integration to happen.

The study used a qualitative approach. The instrument used was interviews with 12 mathematics education lecturers and 20 Further Education and Training B.Ed. fourth year mathematics major pre-service teachers in schools of education in South African. The interview was used to understand to what extent they pedagogical integrate ICT in teaching. The findings obtained assisted to ascertain the reason for low ICT pedagogical integration by mathematics lecturers. At the same time, the digital competency of pre-service teachers was established. The findings revealed that the slow integration was caused by a lack of professional development, a knowledge sharing space and an operational policy or framework that guides ICT integration in teaching. These findings seem to be a barrier to the pedagogical ICT integration in the teaching of mathematics. The study concludes by discussing the findings that were later used to propose a working model/structure that can work within the South African education context. The Transformed Activity Theory (TAT) model was developed to assist mathematics education lecturers to adopt and appropriate ICT in their teaching. The results revealed the mathematics education lecturers' need for a knowledge sharing space that equips them with substantial

knowledge to help them determine the type of ICT software to be used in teaching. This knowledge will help them fit into the 21st-century classroom and meet the expectations of the Net Generation students.

Key Words: Pedagogical ICT Integration, Mathematics Application Software, Transformed Activity Theory Model, Net Generation