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SESEMAT In-service Pedagogical Strategies and Students' Achievement in Science at Ordinary Level in Tororo SESEMAT Region

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Abstract Across the globe, nations have put in place interventions to boost learners' achievement in science at various levels because science plays a key role in development. In Uganda, secondary science and mathematics teachers (SESEMAT) program is one of the major interventions set up to improve students' academic performance and their attitude towards science. This study aimed to establish whether implementation of SESEMAT in-service pedagogical strategies has resulted in improved student achievement in science at secondary schools in Tororo Region. A cross-sectional survey research design was adopted. Quantitative and qualitative data were collected from a probability sample of 380 senior four students; and a non-probability sample of 20 head teachers, 12 teachers. The results revealed that SESEMAT strategies were being implemented at a moderate level (*M = 19.88, SD = 4.49*). SARB was by far the most implemented strategy while lesson study was the least. Student achievement was high (*M* = 37.96, *SD* = 5.70) while the strategies greatly enhanced teachers' knowledge and practices (*M = 35, SD = 5.40*). The indirect effects of teachers' classroom practices on implementation of SESEMAT strategies significantly improved students' achievement in science (z = .16, $p < .01$, $k^2 = .28$). In conclusion, the implementation of SESEMAT strategies enhanced teachers' knowledge and classroom practices, boosting student achievement in science in terms of attitude change, skills acquisition, and daily life application. However, the level of academic performance was still low. The study recommends improved monitoring of the implementation of SESEMAT strategies in addition to SESEMAT trainers helping the science teachers to intensify the use of interactive strategies to enhance learners' understanding of the subject matter.

Keywords: *SESEMAT, pedagogical strategies, student achievement, science*

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1. Introduction

Teaching and learning of Science has been the emphasis of both developed and developing countries because of the key role science and technology play in social and economic development [1]. However, despite the expected positive impacts of science on agriculture, health, communication and other spheres of life, there is still low achievement of students in science disciplines world over. Countries have, as a result, put in place innovations to improve students' achievement in science. For instance, in Japan, a science education promotion law was enacted to regulate the standards of teaching/learning aids so that every child has an opportunity to learn science [2]. Other developed countries such as the US, Malaysia, and Britain also put interventions in place to raise students' achievement in science. The Malaysian Ministry of Education, for this matter, has been implementing lesson study at school level [3] in an effort to boost teaching/learning of science.

On the other hand African countries established a platform for Strengthening of Mathematics and Science Education in Western, Eastern, Central, and Southern Africa (SMASE-WECSA) to share experiences in, and knowledge of, mathematics and science education [4]. Sessay [5] explains that the SMASE-WECSA platform saw the governments of Kenya and Japan (through Japan International Cooperation Agency) set up the SMASE program in response to the poor performance in mathematics and science in Kenya Certificate of Secondary Education (KCSE). Similarly, in Uganda, secondary science and mathematics teachers (SESEMAT) program is one of the major interventions set up to improve students' achievement in science.