

# **A Study on the Implementation of the Strengthening Innovation and Practice in Secondary Education Initiative for the Preparation of Science, Technology, English And Mathematics (Stem) Teachers in Kenya to Integrate Information and Communication Technology (Ict) in Teaching and Learning**

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## **Abstract**

The Strengthening Innovative Practice in Secondary Education (SIPSE) project was conceptualized to enhance teacher capacity in ICT competencies and skills to teach Science, Technology, English and Mathematics (STEM) subjects in Kenya secondary schools. The aim of this research study was to critically appraise the innovation model in relation to teacher development for ICT use in classroom practice associated with the SIPSE project over two cycles of the pilot phase implementation. The model integrated an ICT Competency Framework for Teachers (ICT-CFT) and Technology Pedagogy and Content Knowledge (TPACK) frameworks into a phased modular approach (ICT-CFT-TPACK-in-practice) for teacher professional development. The research addressed key questions related to: the object of ICT use as perceived by head teachers and teachers; and the characteristics of teacher design for ICT use in STEM teaching and learning as evidenced in classroom activities at different stages of their professional learning journey in the SIPSE intervention. The study used a qualitative design based research (DBR) methodology that was enhanced with the use of a 'TPACKtivity' lens combining TPACK and Activity Theory (AT) to explore, explicate and communicate the findings. The study was conducted with a purposive sample of twenty-four teachers, four head teachers and four schools drawn from the wider SIPSE programme intervention. The research data was collected over three field visits carried out between September 2014 and February 2016. The qualitative research methods included individual interviews and focus group discussions with the teachers and the head teachers. Data were also drawn from documentation of lesson plans and peer-to-peer lesson observations. The findings were illuminating. They presented participant accounts of tensions and dissonances with the introduction of technology into their school and classroom practices that reflected similar issues revealed in the literature. However, the findings elucidated some nuanced shifts and unexpected teacher design narratives for technology use to support, improve and innovate STEM teaching and learning processes. They further revealed the importance of classroom processes as the centre stage for fostering teacher collective and continual design conversations for framing and reframing ICT use solutions appropriate to the affordances and realities of their classroom and school contexts. In this the findings contribute to the current discourse by offering a TPACKtivity framework centred on authentic classroom settings as a basis for developing and appraising models of professional development for ICT use that can inform practice, policy and research.

**Keywords** Implementation, Strengthening Innovation, Preparation of Science, Technology, English, Mathematics, Integrate, Information and Communication Technology

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