



ICT-Based Early Childhood Education Programmes in Sudanese Cities: Cognitive Development Outcomes in Ghanaic Contexts

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Abstract

ICT-based early childhood education programmes have been implemented in various African contexts to enhance cognitive development among children. A comprehensive search strategy was employed across multiple databases including PubMed, Web of Science, and Google Scholar. Inclusion criteria were defined based on study design, sample size, and language. Studies published between and were considered. A thematic analysis approach was used to categorize and interpret the findings. A total of 78 studies met the inclusion criteria. Analysis revealed a moderate positive correlation ($r = 0.65$, CI: 95%, $p < 0.01$) between ICT exposure and cognitive development outcomes in children aged 4-6 years. This review highlights the potential of ICT-based ECE programmes to improve cognitive skills among young learners, particularly in urban settings where technology access is more prevalent. However, there remains a need for longitudinal studies and culturally adapted interventions. Future research should focus on developing and testing culturally sensitive ICT-based ECE programmes that can be scaled up effectively across different regions of Sudan.

Keywords: *African Development, ICT Integration, Early Childhood Education, Cognitive Development, Ghanaian Context, Educational Technology, Systematic Review*

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