

Digital personalised learning in Kenya: findings from a multi-strand implementation research study

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Extended abstract:

Growing evidence suggests Digital Personalised Learning (DPL) – technology that responds or adapts to learners' characteristics, interests and needs – could enable more equitable access to education, address a 'one-size-fits-all' approach (FitzGerald et al., 2018), and positively impact learning outcomes (Major et al., 2021). However, limited research has examined the effectiveness of DPL integrated into classroom practice, with DPL typically being used in 'supplementary' settings outside of regular teaching (UNICEF, 2022; Major & Francis, 2020).

This paper presents findings from a multi-strand implementation research study, which investigated the impact of and contextually appropriate implementation approaches for integrating DPL into pre-primary schools in Kenya. The research focused on a classroom-integrated DPL tool provided by EIDU – a tool, installed on low-cost Android smartphones and part-funded by county governments, which has around 200k active learners daily, and is due to be scaled to 46 counties by 2025. The tool features DPL content mapped to the national curriculum and digitised lesson plans to facilitate alignment with classroom teaching. The personalisation software further adapts the sequencing of learning content to maximise learner engagement.

The study comprised both design-based and experimental methodologies. A randomised controlled trial (RCT), conducted from October 2022 to October 2023 in Murang'a county, Kenya, involved 291 schools and 1955 pre-primary learners, assessing numeracy and literacy outcomes in the control and treatment groups across three timepoints. This was preceded by a phase of design-based research, involving co-learning strategies which investigated the effective integration of the tool into classrooms with teachers working alongside researchers.

Furthermore, A/B testing in over 5,000 schools explored the comparative impact of different personalisation designs within the DPL software.

The results reveal that EIDU's classroom-integrated DPL tool had a statistically significant, moderate effect (0.534 SD, $p < 0.001$) on pre-primary learning outcomes. This figure measures the impact of the treatment compared to the control, across the full duration of the RCT (four full school terms). The impact on numeracy and literacy outcomes was also statistically significant ($p < 0.001$), with similar impacts observed (0.450 SD and 0.449 SD respectively). Results indicate that tool does not have a gendered effect on learning outcomes: while the effect of the treatment was significant for both male and female learners (0.526 SD and 0.543 SD respectively), regression modelling revealed the absence of a statistically significant interaction between gender and experimental groups (overall IDELA: $p = 0.638$; numeracy: $p = 0.541$; literacy: $p = 0.88$).

The design-based research phase, however, indicated a potential issue of equity: that those learners whom teachers class as "fast learners" receive more access to EIDU's DPL tool than "time-takers". This is in part due to the times in the school day when learners are most likely to use the DPL tool (predominantly after individual lesson activities are completed). This, and other results, highlight the critical role of supporting teachers in facilitating the integration of a digital learning environment into their classroom. Results from the A/B testing also exemplify the significant positive impact which feeding teachers' pedagogical judgement into the personalisation design can have on learner scores and tool usage.

Drawing together this range of nuanced and complementary results, this paper will facilitate evidence-based discussion around the conditions required to integrate quality DPL into LMIC education systems in an equitable manner.