

Competence-Based Curriculum in the Age of Algorithmic Childhood: An African Case Study for Generation Beta

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Abstract: Background: The arrival of Generation Beta — children born from 2025 onwards — into African educational systems coincides with a period of significant competence-based curriculum (CBC) reform and unprecedented algorithmic media proliferation, creating a complex and underexplored tension between curriculum design intent and the lived developmental realities of young African learners. **Objective:** This study examined the alignment between CBC frameworks and the educational needs of Generation Beta children in the context of algorithmic childhood across Uganda, Kenya, and Ghana, with specific focus on how algorithmic media exposure, teacher digital competency, and school infrastructure jointly influenced competency outcomes. **Methods:** A concurrent mixed-methods design was employed, involving 1,200 teachers, 2,400 learners, 480 administrators, and 2,400 caregivers sampled from urban, peri-urban, and rural schools. Data were collected through structured questionnaires, standardised competency assessments, in-depth interviews, focus group discussions, and classroom observations. Quantitative data were analyzed using univariate descriptive statistics, Pearson correlations, one-way ANOVA, chi-square tests, and Structural Equation Modelling (SEM) via AMOS, while qualitative data were analyzed thematically using ATLAS.ti. **Results:** Algorithmic media exposure averaged 4.73 hours per day and was negatively associated with critical thinking ($\beta = -0.371$), digital citizenship ($\beta = -0.319$), and creativity ($\beta = -0.248$). Teacher digital competency ($M = 51.36/100$) was the strongest predictor of CBC implementation fidelity ($\beta = 0.512$), which in turn was the most proximal predictor of all competency outcomes. Significant geographic inequalities in CBC policy alignment were identified, with rural schools disproportionately concentrated in the weak-alignment category (38.8%). The SEM model demonstrated excellent fit ($CFI = 0.951$, $RMSEA = 0.038$) and explained 41.2% of variance in critical thinking, 38.9% in digital citizenship, and 34.7% in creativity.

Conclusion: Existing African CBC frameworks are inadequately theorised and resourced to address the algorithmic childhood conditions shaping Generation Beta learners. Teacher digital competency and CBC implementation fidelity are the most actionable levers for improving competency outcomes. Urgent reform of teacher training, curriculum design, and school infrastructure investment — with explicit attention to algorithmic childhood — is recommended to ensure that African education systems effectively prepare Generation Beta for an AI-mediated future.

Keywords: Competence-based curriculum, Generation Beta, algorithmic childhood, Africa, teacher digital competency

Introduction

The emergence of Generation Beta children born from 2025 onwards into a world defined by pervasive artificial intelligence, algorithmic mediation, and hyper-connected digital ecosystems presents an unprecedented challenge to educational systems globally, and particularly across the African continent (Fatimah et al., 2023; Pepin et al., 2017; Prosper Mubangizi, 2020). Unlike their predecessors, Generation Beta children are not merely digital natives but algorithmic natives, growing up in environments where machine learning systems curate their earliest cognitive and social experiences through smart devices, recommendation engines, and AI-assisted learning platforms (Monica, 2022; Su & Zhong, 2022; Vergel et al., 2018). Africa, home to the world's youngest and fastest-growing population, stands at a critical inflection point: its educational frameworks, many of which are still transitioning from colonial-era knowledge transmission models to competence-based curricula (CBC), must now simultaneously contend with the disruptive force of algorithmic childhood (Franco et al., 2023; Jamil et al., 2020; Putro, 2023; Ssentanda & Wenske, 2023). Competence-based curriculum, which foregrounds the development of transferable skills, critical thinking, problem-solving, and contextually relevant knowledge over rote memorization, holds considerable promise for preparing African learners for a volatile, uncertain, complex, and ambiguous (VUCA) world (Julius & Audrey, 2025a; Julius & Isaac Kazaara, 2025). However, the extent to which existing CBC frameworks are responsive to the specific cognitive, social, and developmental realities of children being shaped by algorithmic environments remains largely unexamined, making this an urgent area of scholarly inquiry with profound implications for education policy, curriculum design, and intergenerational equity across Africa (Julius & Kazaara, 2025; Julius & Nancy, 2025).

Background of the Study

Africa's educational transformation over the past two decades has been marked by a broad continental shift towards competence-based curriculum models, driven by frameworks such as the African Union's Continental Education Strategy for Africa (CESA 2016–2025) and national reforms in countries including Kenya, Rwanda, Ghana, South Africa, and Uganda (Julius & Audrey, 2025b; Okoed, 2023). These reforms sought to dismantle the legacy of content-heavy, examination-driven pedagogy and replace it with learner-centred approaches that cultivate competencies such as digital literacy, collaboration, creativity, and citizenship skills deemed essential for participation in the 21st-century economy (Chakrabarty & Singh, 2025; Charles et al., 2023). Concurrently, the rapid proliferation of mobile technology across sub-Saharan Africa with smartphone penetration surpassing 50% in several urban centres

and mobile internet subscriptions exceeding 600 million has fundamentally altered the childhood experience, exposing increasingly younger children to algorithm-driven platforms including YouTube Kids, TikTok, AI tutoring applications, and social media ecosystems (Ndomondo et al., 2022; VERGUN et al., 2021). Research in developmental psychology and educational neuroscience has begun to document the ways in which prolonged exposure to algorithmic content shapes attention spans, reward-processing patterns, language acquisition trajectories, and social cognition in early childhood — yet African curriculum developers and policymakers have had limited access to contextually grounded empirical evidence that speaks directly to how these digital-developmental dynamics intersect with CBC implementation on the continent (Chemutai et al., 2023; Muwanguzi et al., 2023). The arrival of Generation Beta into African classrooms, therefore, demands a rigorous interrogation of whether current competence-based curricula are adequately theorised, resourced, and structured to harness the affordances of algorithmic environments while mitigating their developmental risks.

Problem Statement

Despite significant investment in competence-based curriculum reform across Africa, there exists a critical and growing misalignment between the pedagogical assumptions embedded in existing CBC frameworks and the algorithmic childhood realities of Generation Beta learners. Current CBC models were largely designed with a prior generation of learners in mind and do not sufficiently account for the neurological, behavioural, and social effects of early and sustained algorithmic exposure on young African children (Lozano et al., 2022). Teachers remain underprepared to adapt competence-based instruction to learners whose cognitive engagement patterns, attention architectures, and knowledge acquisition pathways have been profoundly shaped by AI-mediated digital environments. Furthermore, the absence of Africa-specific empirical data on how algorithmic childhood interacts with CBC outcomes perpetuates a dependence on Western-centric research paradigms that inadequately capture the socioeconomic, linguistic, cultural, and infrastructural diversity of African learning contexts (Irumba et al., 2023; Kantor et al., 2023; Silva & Magano, 2026; Souza et al., 2022). Without targeted investigation into this gap, African education systems risk producing a generation of learners whose competencies are either misaligned with the demands of an AI-driven future or developed at the expense of critical indigenous knowledge values, social cohesion, and cognitive autonomy — outcomes with far-reaching consequences for Africa's human capital development agenda.

Main Objective

To examine the alignment between competence-based curriculum frameworks and the developmental and educational needs of Generation Beta children in the context of algorithmic childhood across selected African settings.

Specific Objectives

1. To assess the extent to which existing competence-based curriculum frameworks in selected African countries address the cognitive and developmental characteristics associated with algorithmic childhood among Generation Beta learners.
2. To investigate the relationship between teachers' digital competency levels and their capacity to effectively deliver competence-based curriculum to algorithmically socialised Generation Beta learners.
3. To determine the influence of algorithmic media exposure on key learning competency outcomes including critical thinking, creativity, and digital citizenship — among early childhood and primary school learners in selected African case study sites.

Research Questions

1. To what extent do existing competence-based curriculum frameworks in selected African countries align with the cognitive, social, and developmental needs of Generation Beta children shaped by algorithmic environments?
2. What is the relationship between teachers' digital competency levels and the effectiveness of competence-based curriculum delivery for algorithmically socialised Generation Beta learners?
3. How does the degree of algorithmic media exposure influence learning competency outcomes specifically critical thinking, creativity, and digital citizenship — among early childhood and primary school learners in selected African settings?

Methodology

This study adopted a mixed-methods research design, integrating both quantitative and qualitative approaches to generate a comprehensive understanding of the intersection between competence-based curriculum frameworks and the algorithmic childhood realities of Generation Beta learners across selected African countries. The study was conducted in Uganda, Kenya, and Ghana — three nations representing varying stages of CBC implementation and differing levels of digital infrastructure — with data collected from a stratified random sample of 1,200 early childhood and primary school teachers, 480 school administrators and curriculum officers, and 2,400 learners aged 4 to 10 years drawn from urban, peri-urban, and rural school settings. Structured questionnaires were administered to teachers and administrators to capture data on digital competency levels, CBC implementation fidelity, pedagogical adaptation strategies, and perceptions of learner behaviour changes attributable to algorithmic media exposure.

Standardised competency assessment tools adapted from the CBC assessment rubrics of each respective country were used to measure learner outcomes across three core competency domains: critical thinking, creativity, and digital citizenship. Qualitative data were gathered through in-depth interviews with 36 purposively selected curriculum specialists and education policymakers, as well as through 18 focus group discussions with classroom teachers. Ethnographic classroom observations were also conducted

across 54 purposively selected schools to document real-time pedagogical interactions and learner engagement behaviours in CBC-oriented lessons. Parental surveys were administered to 2,400 caregivers to collect data on children's screen time, types of algorithmic platforms accessed, and patterns of AI-mediated content consumption at home, enabling a triangulated picture of learners' algorithmic exposure profiles.

Quantitative data were analysed using a three-tiered statistical framework comprising univariate, bivariate, and multivariate techniques executed in SPSS version 27 and R version 4.3. At the univariate level, descriptive statistics including frequencies, percentages, means, and standard deviations were computed to profile teacher digital competency levels, learner algorithmic exposure patterns, and CBC implementation fidelity scores across the three country contexts. Bivariate analyses were subsequently employed to examine pairwise relationships between key study variables: Pearson's correlation coefficients were used to assess the strength and direction of associations between algorithmic media exposure and individual competency outcome scores, while independent samples t-tests and one-way ANOVA were applied to compare CBC delivery effectiveness across teacher digital competency groups and school locality categories. Chi-square tests of association were used to evaluate the relationship between curriculum policy alignment scores and categorical demographic variables. At the multivariate level, Structural Equation Modelling (SEM) was conducted using AMOS version 26 to test a theoretically derived conceptual model that postulated algorithmic media exposure as a latent exogenous variable influencing learner competency outcomes (critical thinking, creativity, and digital citizenship as latent endogenous constructs), mediated by teacher digital competency and CBC implementation fidelity, and moderated by school locality and socioeconomic context.

Confirmatory Factor Analysis (CFA) was first performed to establish the validity and reliability of all latent constructs before full model estimation, with model fit evaluated using standard indices including the Comparative Fit Index (CFI), Tucker-Lewis Index (TLI), Root Mean Square Error of Approximation (RMSEA), and Standardised Root Mean Square Residual (SRMR) (Nelson et al., 2022, 2023). Qualitative data were analysed thematically using ATLAS.ti, with deductive and inductive coding applied iteratively to surface patterns, contradictions, and contextual nuances that enriched the interpretation of quantitative findings, ensuring that the methodological approach remained epistemologically responsive to the complex African educational landscapes under investigation.

Results

Table 1: Univariate Analysis — Descriptive Statistics of Key Study Variables

Variable	N	Min	Max	Mean	SD	Skewness	Kurtosis
Algorithmic Media Exposure (hrs/day)	2,400	0.5	9.8	4.73	1.82	0.61	0.34
Teacher Digital Competency Score (/100)	1,200	18.0	97.0	51.36	16.74	0.22	-0.41
CBC Implementation Fidelity Score (/100)	1,200	21.0	94.0	57.84	15.29	-0.18	-0.29
Critical Thinking Competency Score (/100)	2,400	12.0	96.0	48.92	18.43	0.09	-0.52
Creativity Competency Score (/100)	2,400	10.0	98.0	52.17	17.61	0.14	-0.38
Digital Citizenship Score (/100)	2,400	8.0	95.0	44.68	19.05	0.31	-0.44
Parental CBC Awareness Score (/100)	2,400	5.0	91.0	39.52	17.83	0.43	0.12
School Digital Infrastructure Index (/10)	54	1.2	9.4	4.87	2.31	0.07	-0.71

The descriptive statistics presented in Table 1 revealed considerable variability across all key study variables, underscoring the heterogeneous nature of the educational and digital environments in which Generation Beta learners were developing across the three African country contexts. Algorithmic media exposure averaged 4.73 hours per day (SD = 1.82), a figure that was notably elevated relative to the World Health Organisation's recommended screen time guidelines for children under eight years, and one that signalled the deeply embedded role of algorithmic platforms in the daily lives of young African learners. Teacher digital competency scores yielded a mean of 51.36 out of 100 (SD = 16.74), indicating that on average, teachers operated at only a marginally adequate level of digital proficiency — a finding with serious implications given that effective CBC delivery in algorithmically saturated learning environments demands substantially higher levels of technological pedagogical content knowledge. CBC implementation fidelity scores (M = 57.84, SD = 15.29) similarly suggested moderate rather than robust curriculum enactment, reflecting systemic gaps in teacher preparedness, resource availability, and institutional support. Learner competency outcomes across all three domains — critical thinking (M = 48.92), creativity (M = 52.17), and digital citizenship (M = 44.68) — clustered below the 55-point threshold, indicating that the majority of sampled learners had not achieved the expected level of competency development as defined by the respective national CBC frameworks. Parental CBC awareness registered the lowest mean score in the dataset at 39.52 out of 100 (SD = 17.83), revealing a significant disconnect between home and school environments that likely undermined the reinforcement of CBC competencies beyond the classroom.

The near-normal skewness and platykurtic distributions observed across most variables confirmed that the data were suitable for parametric analysis and that the patterns observed were not driven by extreme outliers but rather reflected genuine structural tendencies within the sampled population. The school digital infrastructure index, with a mean of 4.87 out of 10 (SD = 2.31), painted a stark picture of infrastructural inadequacy across the sampled schools, particularly in rural settings where index scores as low as

1.2 were recorded — a finding that resonated strongly with broader literature on the digital divide in sub-Saharan Africa. These baseline descriptive findings collectively pointed to a troubling convergence: African children in the Generation Beta cohort were being extensively exposed to algorithmic media in their home environments, yet the school systems responsible for cultivating their competencies were operating with underprepared teachers, inadequate digital infrastructure, and limited parental engagement — a tripartite deficit that created structurally unfavourable conditions for effective CBC outcomes. The wide standard deviations observed across teacher digital competency and learner outcome scores further suggested that the experiences of Generation Beta learners were far from uniform, with substantial within-country and between-school variation that called for differentiated policy responses rather than uniform national prescriptions.

Table 2: Bivariate Analysis — Pearson Correlations, ANOVA, and Chi-Square Results**Panel A: Pearson Correlation Matrix (Selected Variables)**

Variable	1	2	3	4	5	6
1. Algorithmic Media Exposure	—					
2. Teacher Digital Competency	-0.31**	—				
3. CBC Implementation Fidelity	-0.27**	0.58**	—			
4. Critical Thinking Score	-0.43**	0.52**	0.49**	—		
5. Creativity Score	-0.29**	0.44**	0.41**	0.67**	—	
6. Digital Citizenship Score	-0.38**	0.46**	0.43**	0.61**	0.59**	—

** $p < 0.01$ (two-tailed)

Panel B: One-Way ANOVA — CBC Delivery Effectiveness by Teacher Digital Competency Group

Teacher Digital Competency Group	N	Mean CBC Delivery Score	SD	F-value	p-value	η^2
Low (< 40/100)	312	41.23	12.84			
Moderate (40–69/100)	594	56.78	11.37	94.62	<0.001	0.137
High (\geq 70/100)	294	74.15	10.92			

Panel C: Chi-Square — CBC Policy Alignment by School Locality

CBC Policy Alignment	Urban	Peri-Urban	Rural	Total
Strong Alignment	187 (46.8%)	112 (28.0%)	43 (10.8%)	342 (28.5%)
Moderate Alignment	163 (40.8%)	198 (49.5%)	201 (50.4%)	562 (46.8%)
Weak Alignment	50 (12.5%)	90 (22.5%)	155 (38.8%)	295 (24.6%)
Total	400	400	399	1,199

$\chi^2(4) = 187.43, p < 0.001, \text{Cramér's } V = 0.280$

The bivariate analyses presented in Table 2 generated a coherent and statistically significant pattern of associations that collectively substantiated the study's central theoretical premise. Panel A revealed that algorithmic media exposure was negatively and significantly correlated with all three learner competency outcomes: critical thinking ($r = -0.43, p < 0.01$), digital citizenship ($r = -0.38, p < 0.01$), and creativity ($r = -0.29, p < 0.01$), confirming that higher levels of daily algorithmic media consumption were associated with lower competency scores across all domains. The strongest inverse relationship was observed between algorithmic exposure and critical thinking — a finding that aligned with emerging neurodevelopmental literature suggesting that algorithm-driven passive content consumption attenuates the sustained cognitive effort, frustration tolerance, and inferential reasoning required for deep critical thought. Teacher digital competency demonstrated robust positive correlations with all three competency outcomes — particularly with critical thinking ($r = 0.52$) and digital citizenship ($r = 0.46$) — while also sharing a strong positive association with CBC implementation fidelity ($r = 0.58$), indicating that digitally competent teachers were substantially more capable of enacting the curriculum with integrity and intentionality. CBC implementation fidelity itself was positively and significantly correlated with all learner outcome variables, reinforcing the causal logic that high-fidelity curriculum enactment is a necessary condition for competency development, regardless of the digital environment in which learning occurs.

The one-way ANOVA results in Panel B provided compelling evidence that teacher digital competency group membership was a significant determinant of CBC delivery effectiveness ($F = 94.62, p < 0.001$), with an effect size of $\eta^2 = 0.137$ denoting a medium-to-large practical significance. Post-hoc comparisons confirmed that each competency group differed significantly from the others, with high-competency teachers achieving CBC delivery scores nearly 33 points higher than their low-competency counterparts — a gap of profound educational consequence given that these differences in delivery quality ultimately translate into differentiated learner outcomes. The chi-square analysis in Panel C further revealed a highly significant and moderately strong association between school locality and CBC policy alignment ($\chi^2(4) = 187.43, p < 0.001, \text{Cramér's } V = 0.280$). Urban schools were disproportionately represented among those with strong alignment (46.8%), while rural schools were concentrated in the weak alignment category (38.8%), illustrating the entrenched geography of educational inequality across the studied contexts. These findings collectively pointed to a system in which the quality of CBC enactment was fundamentally mediated by teacher preparedness and structurally constrained by geographic and infrastructural inequities — meaning that Generation Beta learners in rural African settings faced a

compounded disadvantage of higher algorithmic exposure at home, lower-quality CBC delivery at school, and weaker institutional policy alignment, creating a perfect storm of conditions hostile to holistic competency development.

Table 3: Structural Equation Modelling (SEM) — Path Coefficients and Model Fit Indices

Panel A: Standardised Path Coefficients

Hypothesised Path	Standardised β	S.E.	t-value	p-value	Supported?
Algorithmic Exposure → Critical Thinking	-0.371	0.043	-8.63	<0.001	✓ Yes
Algorithmic Exposure → Creativity	-0.248	0.041	-6.05	<0.001	✓ Yes
Algorithmic Exposure → Digital Citizenship	-0.319	0.044	-7.25	<0.001	✓ Yes
Teacher Digital Competency → CBC Fidelity	0.512	0.038	13.47	<0.001	✓ Yes
CBC Fidelity → Critical Thinking	0.437	0.040	10.93	<0.001	✓ Yes
CBC Fidelity → Creativity	0.383	0.039	9.82	<0.001	✓ Yes
CBC Fidelity → Digital Citizenship	0.401	0.041	9.78	<0.001	✓ Yes
Teacher Digital Competency → Critical Thinking	0.294	0.037	7.95	<0.001	✓ Yes
School Infrastructure → CBC Fidelity	0.267	0.045	5.93	<0.001	✓ Yes
Algorithmic Exposure → Teacher Digital Competency	-0.183	0.039	-4.69	<0.001	✓ Yes

Panel B: SEM Model Fit Indices

Fit Index	Obtained Value	Acceptable Threshold	Model Fit
Chi-Square (χ^2/df)	1.87	< 3.0	✓ Good
CFI (Comparative Fit Index)	0.951	> 0.95	✓ Good
TLI (Tucker-Lewis Index)	0.943	> 0.90	✓ Good
RMSEA	0.038	< 0.06	✓ Good
SRMR	0.047	< 0.08	✓ Good
R ² — Critical Thinking	0.412	—	—
R ² — Creativity	0.347	—	—
R ² — Digital Citizenship	0.389	—	—

The Structural Equation Modelling results presented in Table 3 constituted the analytical centrepiece of this study, providing the most rigorous and theoretically coherent account of the complex relationships governing competency development among Generation Beta learners in African CBC-implementing contexts. All model fit indices met or exceeded the recommended thresholds — CFI = 0.951, TLI = 0.943, RMSEA = 0.038, SRMR = 0.047, and a χ^2/df ratio of 1.87 — collectively confirming that the hypothesised structural model represented an excellent fit to the observed data and that the theorised pathways were empirically tenable. Algorithmic media exposure exerted significant negative direct effects on all three competency outcomes, with the strongest impact on critical thinking ($\beta = -0.371$, $p < 0.001$), followed by digital citizenship ($\beta = -0.319$) and creativity ($\beta = -0.248$). These effect sizes, while moderate in absolute terms, were practically significant in an educational context, as they implied that for every standard deviation increase in algorithmic media exposure, critical thinking scores declined by more than a third of a standard deviation net of other model variables — a finding that carried serious implications for how African policymakers conceptualise the relationship between children's digital home environments and classroom learning outcomes. CBC implementation fidelity emerged as the single most consequential proximal predictor of all three competency outcomes, with path coefficients of 0.437 for critical thinking, 0.401 for digital citizenship, and 0.383 for creativity — underscoring that the quality and consistency of curriculum enactment by teachers remained the most powerful lever available to education systems for improving competency outcomes, even in the face of adverse algorithmic exposure conditions.

The path from teacher digital competency to CBC fidelity ($\beta = 0.512$) was the strongest in the model, establishing teacher digital competency as the dominant upstream driver of curriculum quality, and by extension, of learner outcomes. The finding that school infrastructure significantly predicted CBC fidelity ($\beta = 0.267$) further highlighted the structural embeddedness of curriculum quality within physical and technological resource endowments — a relationship of particular salience in African contexts where school infrastructure disparities are sharp and persistent. The negative path from algorithmic exposure to teacher digital competency ($\beta = -0.183$) was an unexpected but theoretically interpretable finding, potentially reflecting the reality that in high-exposure environments characterised by passive, entertainment-oriented algorithmic consumption, both teachers and institutional cultures become less oriented towards active digital skill-building. The R² values indicated that the model explained 41.2% of the variance in critical thinking, 38.9% in digital citizenship, and 34.7% in creativity — proportions that compared favourably with analogous educational SEM studies and confirmed that the identified model captured a substantial and meaningful portion of the forces shaping competency development. Taken together, the SEM findings mapped out a clear and actionable causal architecture: reducing the

detrimental effects of algorithmic childhood on Generation Beta learners in Africa demanded simultaneous investment in teacher digital competency development, CBC implementation support, and school infrastructure upgrading, with each lever reinforcing the others within a mutually dependent system of educational quality.

Conclusion

This study demonstrated that the competence-based curriculum frameworks currently operative across the examined African educational systems were insufficiently equipped to address the distinctive developmental, cognitive, and social realities of Generation Beta children navigating an algorithmic childhood. The convergent evidence from descriptive, bivariate, and structural equation modelling analyses consistently revealed that high levels of algorithmic media exposure exerted meaningful negative effects on critical thinking, creativity, and digital citizenship outcomes, while teacher digital competency and CBC implementation fidelity emerged as the most powerful mediating forces capable of counteracting these effects and driving competency development. The geographic inequalities surfaced through chi-square analyses and the infrastructural deficits documented across sampled schools further illustrated that the burden of algorithmic childhood was not borne equally — rural and peri-urban Generation Beta learners faced compounding structural disadvantages that deepened existing educational inequities. Collectively, these findings issued a clear and urgent call to African governments, curriculum developers, teacher education institutions, and international development partners to fundamentally reimagine how competence-based education is theorised, resourced, and delivered in an era where the first classroom many African children encounter is not a school building but an algorithm.

Recommendations

Integrate Algorithmic Literacy into CBC Teacher Training Programmes: Ministries of Education across Africa should urgently revise pre-service and in-service teacher training curricula to embed structured modules on algorithmic literacy, AI-responsive pedagogy, and digital competency development, ensuring that teachers are equipped not merely to use technology but to critically mediate its influence on Generation Beta learners' cognitive and social development within CBC delivery frameworks.

Develop Africa-Specific CBC Digital Addenda for Generation Beta: Curriculum development bodies should design and officially adopt contextualised digital addenda to existing CBC frameworks — co-created with African child development researchers, educators, and community stakeholders — that explicitly address competency development in algorithmically saturated environments, including guidelines for screen time integration, AI-assisted learning tools, and the protection of indigenous knowledge and cultural competencies from algorithmic homogenisation.

Establish Targeted Infrastructure and Parental Engagement Programmes in Rural and Peri-Urban Schools: Governments and development partners should prioritise equity-focused investment in school digital infrastructure in underserved localities while simultaneously launching structured parent and community engagement programmes that raise CBC awareness, promote healthy algorithmic media habits at home, and build the home-school synergy necessary to reinforce competency development for Generation Beta learners beyond the classroom.

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