Linking human, physical, and digital resources with school change and educational receptivity: A fidelity framework-based analysis of competence-based curriculum implementation in Uganda

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ABSTRACT

This study examined the role of educational resources in the implementation of the Competence-Based Curriculum (CBC) in lower secondary schools in Uganda, with School Change Educational Receptivity (SCER) tested as a mediator. Human, physical, and digital/printed resources were assessed as predictors of curriculum implementation outcomes. An explanatory sequential mixed-methods design was employed, collecting quantitative data from 972 teachers out of a target population of 4,987 comprising of school administrators, and NCDC staff. Hierarchical regression and structural equation modeling with bootstrapped PROCESS-style mediation analysis were used to quantify direct and indirect effects, while qualitative data were analyzed thematically using the Braun and Clarke approach, guided by the Fidelity Model to assess alignment between resources and curriculum implementation as designed. Results indicated that educational resources exert a strong and significant direct effect on curriculum implementation (total effect $\beta = 0.650$, $p < .001$; direct effect $\beta = 0.640$, $p < .001$). In contrast, SCER did not significantly mediate this relationship: Path a (resources → SCER, $\beta = 0.050$, $p = .119$), Path b (SCER implementation, $\beta = 0.200$, $p = .120$), and the indirect effect ($\beta = 0.010$, 95% CI [-0.020, 0.040]) were all non-significant. This counter-intuitive finding demonstrates that, despite moderate to high reported receptivity to change, school change receptivity does not function as a mechanism through which educational resources improve CBC implementation outcomes. These findings highlight that tangible resource investments particularly in teacher capacity, physical infrastructure, and digital/printed learning materials are the primary drivers of curriculum fidelity in resource-constrained Ugandan schools. Policymakers should prioritize direct allocation of resources, while school administrators can enhance implementation effectiveness through structured support such as mentoring, collaborative planning, and integration of available resources, ensuring that curriculum delivery remains aligned with its intended design as emphasized by the Fidelity Model Accordingly, policymakers, including the Ministry of Education and Sports Uganda, should prioritize direct investment in educational resources—teacher capacity, infrastructure, and instructional materials and ensure their effective utilization to enhance curriculum fidelity. Emphasis should shift from school change receptivity to resource-driven implementation strategies as the primary pathway for achieving successful and sustainable Competence-Based Curriculum outcomes in Uganda.

Keywords: Competence-Based Curriculum (CBC), Curriculum Implementation, Educational Resources, Resource Dependence Theory, School Change Receptivity

I. INTRODUCTION

Uganda‘s adoption of the Competence-Based Curriculum (CBC) in lower secondary education in 2020 marked a strategic shift toward a learner-centered, skills-oriented system designed to meet the demands of the 21st century (Kisige et al., 2021). This reform aligns with global education trends that emphasize active learning, competency development, and measurable performance outcomes rather than rote memorization (Namatende-Sakwa et al., 2025; Barasa et al., 2025). By embedding cross-cutting skills, values, and higher-order thinking into classroom practice, CBC represents a fundamental transformation of Uganda‘s traditionally examination-driven curriculum (Mwebaza et al., 2025). However, such a systemic reform requires not only policy alignment but also effective translation of curricular intentions into classroom realities.

Empirical evidence from Uganda indicates that schools with comparable resource endowments often exhibit significant variation in CBC implementation outcomes (Atuhura & Nambi, 2024). This variation highlights the role of school change and educational receptivity as critical organizational conditions that mediate the relationship between resources and practice. Some schools demonstrate adaptive leadership, collaborative cultures, and openness to innovation, enabling them to optimize available resource (Chemutai et al, 2024). In contrast, others struggle to translate even adequate inputs into meaningful pedagogical change (Mwebaza et al., 2025). This suggests that receptivity to change operates as an internal mechanism that shapes how resources are mobilized and aligned with

curricular expectations.

At the same time, persistent resource constraints continue to characterize many Ugandan secondary schools, further complicating implementation efforts. Studies report high student-to-textbook ratios (often exceeding 3:1) and overcrowded classrooms, which limit the feasibility of learner-centered and activity-based approaches central to CBC (Barasa et al., 2025; Namatende-Sakwa et al., 2025). In addition, access to digital learning tools, science laboratories, and well-equipped libraries remains limited (Chemutai et al., 2024; Mwebaza et al., 2025). These challenges highlight that, from a Fidelity Model perspective, achieving desired curriculum outcomes depends not just on resource availability but on the effective alignment and use of existing resources with the intended curriculum design. While Resource Dependence Theory emphasizes the necessity of resources and the Fidelity Model focuses on adherence to design, neither fully captures the role of school change and educational receptivity as enabling conditions for effective implementation. Therefore, this study adopts a fidelity-based perspective to examine how human, physical, and digital resources are linked with school change and educational receptivity in shaping the implementation of CBC in Uganda, offering a more integrated understanding of how inputs are transformed into meaningful educational outcomes.

1.1 Statement of the Problem

The effective implementation of Uganda‘s Lower Secondary Competence-Based Curriculum (CBC) should result from comprehensive curriculum development, resource provision, and policy support (Namatende et al., 2025). However, evidence indicates persistent gaps between curriculum design and classroom practice, with teacher-centered approaches dominating despite learner-centered, competency-driven goals (Chemutai et al., 2024; Mwebaza et al., 2025). The Fidelity Model (O‘Donnell & Carol, 2018) highlights that adherence, quality of delivery, and participant responsiveness shape implementation outcomes. While human, physical, and digital resources are critical, variations in School Change Educational Receptivity (SCER) including leadership, collaboration, and professional culture mediate how these resources are mobilized. Without fostering SCER alongside resource allocation, curriculum fidelity and intended learning outcomes remain compromised, as inputs alone do not ensure effective CBC implementation.

1.2 Research Objective

This study aims to examine how human, physical, and digital resources are linked to the implementation of Uganda‘s Lower Secondary Competence-Based Curriculum, with particular emphasis on how school change and educational receptivity shape this relationship through a fidelity-based lens, in order to generate evidence that can inform policy and practice.

II. LITERATURE REVIEW

2.1 Theoretical Review

The Fidelity Model was formalized by O‘Donnell in 2008 and emphasizes that the effectiveness of curriculum implementation depends on how faithfully teachers and schools adhere to the intended program design, including content, instructional strategies, and assessment practices, highlighting that deviations from the original design can compromise learning outcomes. The Fidelity Model of curriculum implementation emphasizes the degree to which educational programs are delivered as designed, highlighting the importance of adherence to prescribed content, teaching practices, and assessment protocols (O'Donnell & Carol, 2018). In the Ugandan context, variability in resource availability, professional development opportunities, and leadership support can create deviations from the prescribed CBC practices, affecting the integrity and outcomes of curriculum implementation (Mkandawire, 2021). This suggests that fidelity is not simply a function of resource quantity but also of how effectively schools manage and integrate these resources to maintain adherence to the curriculum design.

Moreover, the model highlights that sustainable curriculum implementation requires ongoing monitoring, feedback, and adaptation to ensure that practices remain aligned with policy intentions over time (O'Donnell & Carol, 2018). In Uganda, this implies that efforts to enhance teacher capacity, strengthen infrastructure, and ensure consistent access to learning materials must be coupled with supportive supervision, mentoring, and evaluation systems. By focusing on both the technical and organizational dimensions of curriculum delivery, the Fidelity Model provides a comprehensive framework for understanding why resource availability, teacher preparedness, and school-level support collectively determine the success of competence-based curriculum implementation.

2.2 Empirical Review

2.2.1 Educational Resources and Curriculum Implementation

Learning resources including textbooks, laboratories, libraries, and instructional materials—are fundamental to effective curriculum implementation, as they enable meaningful teaching and active learning (Muzaale et al., 2026a). Evidence from East Africa shows that the availability and use of such materials enhance student engagement,

retention, and confidence, although their impact is mediated by factors such as teacher quality and classroom environment (Mwenyi & Buyera, 2025; Kimera et al., 2025). However, persistent gaps remain, particularly in sub-Saharan Africa, where inadequate infrastructure, overcrowded classrooms, and limited access to instructional materials constrain the adoption of learner-centered approaches and compel teachers to revert to theoretical, teacher-dominated methods (Wanyama et al., 2024; RELI Africa, 2025, Muzaale et al, 2026c). In Uganda, poorly equipped learning environments and insufficient teaching resources continue to undermine student engagement and the effective realization of competency-based reforms (Muzaale et al, 2026b). While existing literature underscores the importance of resource availability, it pays limited attention to how these resources are actually utilized in practice, revealing a critical gap in understanding their translation into classroom processes. This gap points to the relevance of the Fidelity Model, which emphasizes that the effectiveness of curriculum implementation depends not only on the presence of resources but on the extent to which they are aligned with and enacted according to the intended design.

2.2.2 School Educational Change Receptivity and Curriculum Implementation

School change receptivity refers to the extent to which teachers and the broader school community are prepared and willing to adopt educational innovations such as the Competence-Based Curriculum (CBC) (Nakabugo, 2020). Teachers‘ awareness, understanding, and engagement with curriculum goals significantly influence implementation success, with informed and involved teachers more likely to adopt learner-centered approaches that enhance deeper learning outcomes (United States Agency for International Development, 2023; Kimera et al., 2023; Muzaale et al 2026d). Factors such as instructional leadership, collaborative professional environments, and continuous professional development further strengthen teachers‘ receptivity to change and support effective curriculum adoption (World Bank, 2022). However, evidence from East Africa indicates that many teachers remain unclear about CBC principles and inadequately prepared to implement the curriculum, due in part to insufficient training, weak follow-up support, and systemic barriers including leadership gaps and entrenched traditional practices (Kachope et al., 2025; United Nations Educational, Scientific and Cultural Organization-International Institute for Capacity Building in Africa (2021); Organisation for Economic Co-operation and Development., 2021; OECD, 2022, Muzaale et al, 2026a). These gaps highlight the importance of not only providing training but also fostering supportive school cultures and leadership structures to enable curriculum fidelity, emphasizing that successful CBC implementation depends on the alignment between teacher readiness, school receptivity, and adherence to the intended curriculum design.

2.3 Hypotheses

Based on this synthesis and the Fidelity Model, the study proposes the following testable hypotheses:

Ho_1: Educational Resources resources (teacher capacity and professional development) have a significant positive effect on CBC implementation fidelity.

Ho_2: School Change Educational Receptivity (SCER) mediates the relationship between educational resources (human, physical, and digital/printed) and CBC implementation fidelity.

III. METHODOLOGY

3.1 Study Area

The study was conducted in Wakiso District, Uganda, a diverse area with urban and rural lower secondary schools, involving teachers, head teachers, and education officials, making it suitable for examining curriculum implementation and stakeholder perspectives. In this study, the research design was explanatory sequential mixed methods, a two-phased approach in which data collection and analysis are conducted sequentially, first with quantitative data and then with qualitative data to explain and expand the findings from the quantitative data (Creswell, 2017).

3.2 Research Design (Explanatory Sequential Mixed Methods)

The study adopted an explanatory sequential mixed methods design, involving two consecutive phases. Quantitative data were collected and analyzed first to identify patterns, followed by qualitative data to explain and deepen understanding of the findings.

3.3 Target Population

The target population comprised 8,693 education stakeholders in Wakiso District, including 7,992 teachers, 580 head teachers, and 121 NCDC officials. This population provided diverse perspectives on curriculum implementation in lower secondary schools.

3.4 Sample Size and Selection

The stratified sampling approach was employed to ensure that the sample is representative of the population with respect to the most important contextual differences: school type (public versus private), school location (urban versus rural), and type of stakeholder (teachers, head teachers, and officials). Probability Proportional to Size (PPS) sampling was employed for random sampling within strata, such that larger groups (such as teachers) would have a greater chance of being selected (Babbie, 2013). The Krejcie and Morgan (1970) formula indicated that a sample size of 984 participants would be sufficient at a confidence level of 95% and a margin of error of 5%. The target population was made up of 8,693 including 7,992 teachers, 580 headteachers, and 121 officials from the National Curriculum Development Centre (NCDC) (Wakiso District Education Office Report, 2023). The final sample included 734 teachers, 238 head teachers, and 12 officials from the NCDC (Wakiso DEO & NCDC Statistical Abstract, 2024). PPS increases the accuracy and external validity of the findings, which can be generalized to all lower secondary schools in the district.

3.5 Data Collection Methods

Data gathering employed a two-phase sequential design: quantitative first, then qualitative (Creswell & Plano Clark, 2018). The quantitative data was gathered using structured questionnaires administered to teachers, collecting data on teaching resources, teacher efficacy, and perceptions of CBC implementation. The qualitative sample comprised 14 participants, including 6 headteachers, 4 teachers, and 4 officials from the National Curriculum Development Centre (NCDC).

3.6 Data Quality Control

The validity of the instrument was ensured through expert validation and construct validation techniques such as Exploratory Factor Analysis (EFA). The Kaiser-Meyer-Olkin (KMO) index of sampling adequacy was 0.753, which surpassed the recommended level of 0.60, and Bartlett‘s Test of Sphericity was significant ($\chi^2 = 7774.01$, df = 66, $p < .001$), which indicated the presence of adequate correlations among items for factor analysis. The values of factor loadings varied from 0.631 to 0.943, which surpassed the conventional minimum requirement of 0.40, and indicated high construct validity and correspondence with the conceptual framework of the study (Hair et al., 2019). The Content Validity Index (CVI) surpassed the recommended level (>0.80), which ensured correspondence with the constructs of the study (Lynn, 1986). EFA supported the logical clustering of items under the hypothesized constructs with high factor loadings (Hair et al., 2019). Internal consistency was determined through Cronbach‘s alpha ($\alpha \geq 0.70$) (Field, 2018). The reliability of the study was improved through the use of extensive field notes, tape recordings, intercoder agreement, and audit trails.

3.4 Data Collection Procedure

The data collection process took three weeks, and the pre testing of the instruments was done a month before the field study. The quantitative method involved the administration of surveys in weeks 1 and 2, while the qualitative method involved conducting interviews in weeks 3 and 4. Consistency checks and debriefing were done daily to ensure data integrity and coordination (Creswell & Creswell, 2017).

3.5 Data Analysis

IBM SPSS v25 was used to analyze the quantitative data. Correlation and hierarchical regression analysis were employed to investigate the relationship between the variables of resource and the implementation of the curriculum. Structural Equation Modeling (SEM) with AMOS was used to investigate the direct and indirect effects (mediation) of the variables. The analysis of the qualitative data was conducted using thematic analysis. This is a flexible approach that can be used to identify patterns in qualitative data (Braun & Clarke, 2022). The process involves six steps: familiarization with the data, coding, development of themes, review, definition, and reporting.
Empirical Findings

IV. FINDINGS & DISCUSSION

4.1 Findings

This section presents the study‘s empirical results and interprets them in relation to the research objectives. The findings are organized thematically, highlighting key patterns and trends in the implementation of the Competence-Based Curriculum (CBC) in Ugandan lower secondary schools. Quantitative survey results are complemented by qualitative insights from in-depth interviews, providing a comprehensive understanding of how educational resources and school change receptivity influence curriculum outcomes.

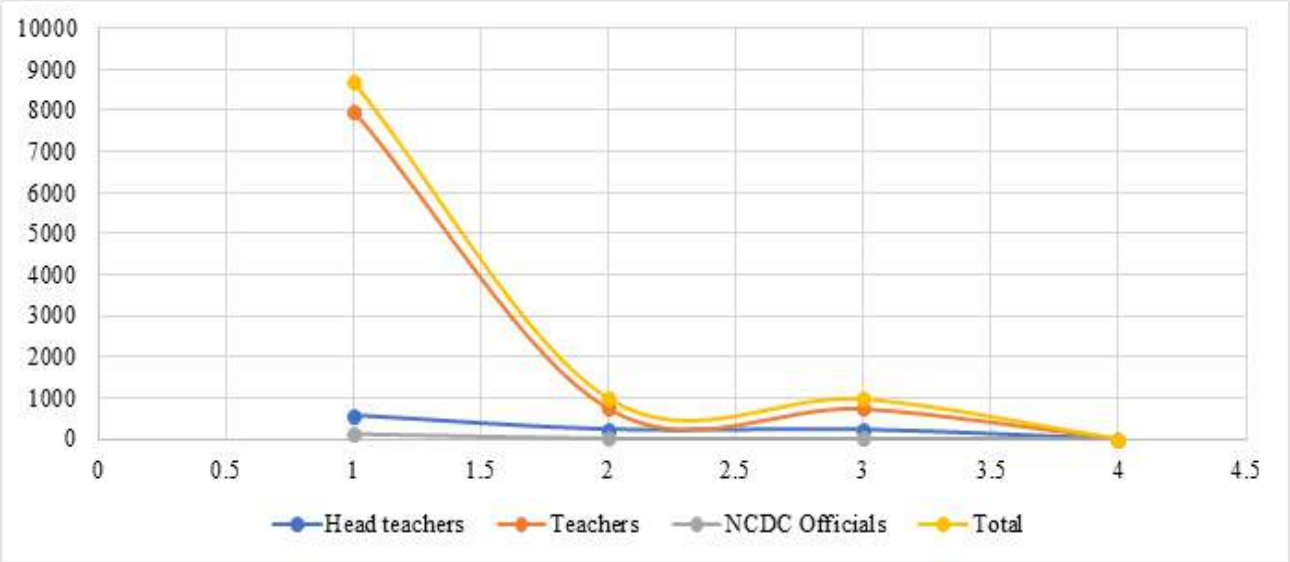

Figure 1
Response Rate Across Different Sample Categories

The study was conducted on the entire population of 8,693 people, consisting of 580 head teachers, 7,992 teachers, and 121 NCDC officials. From this population, a sample of 984 participants was selected, consisting of 238 head teachers, 734 teachers, and 12 NCDC officials. From the selected sample, a total of 972 people responded to the survey, consisting of 232 head teachers, 729 teachers, and 11 NCDC officials. This resulted in a high response rate of 97.48% for head teachers, 99.32% for teachers, and 91.67% for NCDC officials, giving an overall response rate of 98.78%.

Table 1
Descriptive Statistics, Factor Loadings or Rotated Component Matrix of Educational Resource Factors Influencing CBC Implementation

Rotated Component Matrix	Items	Human Resources	Physical Infrastructure	Digital/Printed Resources	Mean	SD
HR1	I regularly reflect on and improve my teaching practices.	0.837			4.21	0.68
HR2	I am confident in using CBC-aligned teaching methodologies.	0.808			4.05	0.72
HR3	I continuously seek professional development opportunities to enhance my CBC delivery.	0.765			3.98	0.75
PI1	The classrooms in my school are adequate for effective CBC delivery.		0.943		3.42	0.89
PI2	Teaching and learning resources such as laboratories, libraries, and furniture are sufficient.		0.926		3.36	0.91
PI3	The school's physical infrastructure supports learner-centered teaching effectively.		0.907		3.29	0.95
DPI1	Digital resources (computers, projectors, e-books) are available and accessible.			0.853	2.87	0.97
DPI2	Printed learning materials, such as textbooks and reference books, are adequate for CBC.			0.849	3.12	0.88
DPI3	The integration of digital and printed resources enhances my teaching effectiveness.			0.831	3.05	0.91
Total		4.292	2.71	1.513		
Eigen Value		28.951	22.313	19.702		
Cumulative %		28.951	51.263	70.966		
KMO		0.753				
Approx. Chi-Square		7774.009				
df		66				
Sig.		0				

The rotated component matrix reveals three main components of educational resources that affect the implementation of the Competence-Based Curriculum (CBC): Human Resources, Physical Infrastructure, and Digital/Printed Resources. The factor loadings reveal that all items have high loadings on their respective components, validating the constructs. Human Resources: Items HR1 to HR3 have high loadings (.765 to .837), suggesting that teacher self-reflection, confidence in CBC-compatible methodologies, and professional development activities are vital implementation drivers for the curriculum. The mean scores for this component are the highest (3.98-4.21), indicating a positive attitude among teachers toward their own competence and readiness to adjust to CBC. This is consistent with the Uganda education policy framework, including the National Teacher Policy (MoES, 2020), which recognizes continuous professional development as a foundation for successful curriculum.

Physical Infrastructure: The items PI1 to PI3 are highly related to the infrastructure dimension (.907 to .943), indicating that the availability of classrooms, laboratories, libraries, and other physical infrastructure is crucial for the delivery of learner-centered CBC. The mean scores for this dimension are moderate (3.29 to 3.42), indicating that although infrastructure is generally supportive, there are still challenges that might hamper the full implementation of the CBC. In terms of policy, the Education and Sports Sector Strategic Plan (ESSP, 2020/21 to 2024/25) emphasizes the need for enhanced school infrastructure to support active learning, which corresponds to the moderate scores obtained in this study.

Digital and Printed Resources: The items DPI1-DPI3 have high loadings (.831-.853) on the digital and printed resources factor, but the mean scores (2.87-3.12) are the lowest of the three factors. This reflects the lack of availability and integration of both digital resources and printed materials for CBC. This is consistent with the resource limitations faced by rural and underfunded schools in implementing CBC, as cited in the NCDC guidelines for CBC implementation. The Eigenvalues (28.951, 22.313, 19.702) and cumulative variance (70.97%) indicate that the three factors account for a large portion of the variability in the availability and utilization of educational resources, thus reaffirming their importance in the implementation of the curriculum. The KMO index (.753) and the Bartlett's Test of significance ($\chi^2 = 7774.009$, $p < .001$) confirm that the data is amenable to factor analysis, thus confirming the validity of the construct measurement.

The Fidelity Model (O'Donnell & Carol, 2018) emphasizes that the success of curriculum reforms such as CBC depends not only on resource availability but on the extent to which these resources are utilized in alignment with the intended design through adherence, quality of delivery, and participant responsiveness. In this context, the findings suggest that although human resources (teacher and staff capacity) are relatively available and actively utilized, their contribution to CBC implementation depends on how consistently and effectively they deliver competency-based practices in the classroom. When a teacher was asked whether the school has adequate teaching staff to handle all the CBC subjects, one respondent observed that

> *—Honestly, our school is still struggling with staffing. While we have competent teachers, the number is not enough to effectively cover all the CBC learning areas. Some teachers handle multiple subjects outside their specialization, which affects the depth of delivery. The Competency-Based Curriculum requires specialized attention in each area, but with limited staff, we end up stretching ourselves too thin. This has a direct impact on both the teaching quality and the learning experience."(*Code: INT01, 10/12/2025, Wakiso)

In Corroborating another respondent observed that

> *—We are really understaffed, and this puts a heavy burden on the few teachers available. I personally teach both lower and upper classes, which leaves me exhausted and unable to plan effectively for CBC lessons. Having enough teachers would greatly improve lesson preparation, learner engagement, and subject coverage.*‖(Code: INT05, 10/12/2025, Wakiso).

The problem of understaffing in schools is a widely recognized challenge that affects the effective delivery of the Competency-Based Curriculum (CBC) in Uganda. According to the Ministry of Education and Sports (MoES, 2021), most schools experience a lack of qualified teachers, which forces teachers to teach various subjects beyond their specialization. The problem of understaffing affects the effectiveness of the CBC, which focuses on learner-centered and competency-based teaching in various subjects. The policy recognizes the importance of specialized teachers in the effective implementation of the curriculum, which requires that learners attain the required skills and knowledge in various areas (MoES, 2020).

Moreover, according to the Uganda Education Sector Strategic Plan, —teacher gaps put pressure on human resources, leading to high workloads and low teaching efficiency‖ (MoES, 2022). Schools are encouraged to employ more teachers to ease the burden, but budget limitations can limit such efforts. This is exactly what the interviewee has experienced, where stretched resources mean that learning outcomes are affected. As the MoES points out, such human resource issues must be addressed in order to fully benefit from the CBC, as quality teaching staff is essential for providing quality education (MoES, 2021). Teacher shortages increase workloads and reduce teaching efficiency, limiting effective CBC delivery despite policy efforts to address staffing gaps (MoES, 2021; 2022). This highlights

how human resource constraints hinder quality implementation, reinforcing the need to examine outcomes through the Fidelity Model.

4.1.1 Curriculum Implementation

Curriculum implementation is one of the most important variables in educational research, as it connects the design of the curriculum and its implementation. Through the analysis of this variable, the study hopes to shed light on the impact of curriculum practices on student outcomes, teaching quality, and overall effectiveness in education. The dynamics of curriculum implementation are essential for understanding how to enhance teaching and learning.

Table 2

Factor Loadings and Descriptive Statistics for Curriculum Implementation Items

Items	Degree of Curriculum Implementation	% of Curriculum Integration at School Level	% of Curriculum Standards Effectively Taught	Mean	SD
C1: I design teaching activities aimed at developing key competencies	0.826			4.12	0.71
C2: I provide collaborative tasks for students in the classroom	0.808			4.05	0.75
C3: I use teaching approaches that enable learners to solve problems practically	0.786			3.98	0.77
C4: The teaching methods I use are consistent with the curriculum	0.774			4.03	0.7
C5: I assess students in relation to the intended learning outcomes		0.751		3.95	0.73
C6: I evaluate my students' achievement of competences when assessing their learning		0.732		3.89	0.76
C7: I provide constructive feedback to students in the learning process			0.773	3.87	0.78
Total Eigenvalues: 7.743	2		1.237		
Cumulative Variance (%): 24.334	45.297		64.588		
KMO: 0.908 | Bartlett's Test of Sphericity: $\chi^2 = 10217.917$	$p < .001$				

The rotated component matrix reveals that there are three dimensions of curriculum implementation. Degree of Curriculum Implementation (Items C1-C4, loadings 0.774-0.826): These items capture the teacher's active involvement in planning teaching activities, promoting collaborative work, using problem-solving methods, and integrating methods with the curriculum. The high factor loadings indicate that teachers view their classroom practices as largely congruent with the CBC goals. The mean scores (3.98-4.12) reflect positive engagement, but low variability (SD 0.70-0.77) indicates some differences among teachers, perhaps related to differences in school resources and training. Innovations and active learning, which are teacher-focused and promoted in policies like the National Teacher Policy in Uganda (MoES, 2020), are consistent with these findings. Curriculum Integration at School Level (Items CI5-CI6, loadings 0.732-0.751):

These items measure the degree to which assessment practices are aligned with learning outcomes and competencies. Moderate loadings show that, although teachers are trying to assess CBC competencies, school-level implementation is not uniform. Means (3.89-3.95) indicate partial implementation. In terms of Fidelity model, curriculum implementation will be effective if schools have access to external resources such as guidelines for assessment, workshops for training, and supervisory support; lack of access may impede uniformity in schools. Curriculum Standards Effectively Taught (Item C7, loading 0.773). Mean of 3.87 with SD of 0.78 indicates that teachers are moderately consistent in offering feedback, although there may be resource and time constraints to limit the effectiveness of feedback. One of the respondents when asked whether he uses teaching methods that allow learners to solve their problems practically, he responded,

> *—In most of my lessons, I use learner-centered approaches that encourage students to apply what they learn in real-life situations. I organize group projects, discussions, and experiments so that learners can practice problem-solving. This helps them understand concepts better and build confidence in dealing with problems outside the classroom."(*Code: INT1, 10/12/2025, Wakiso).

Interview findings revealed that teachers are trying to effectively utilize learner-centered approaches in

teaching. However, large classes and limited resources constrain implementation, forcing teacher-centered methods. Evidence shows overcrowding hinders individualized, competency-based learning, highlighting the importance of resources and fidelity in effective curriculum implementation.

Table 3

Hierarchical Regression Coefficients Predicting Educational Resources and Curriculum Implementation

Model	Predictor	β (Standardized)	T	p	ΔR^2	R^2
1	Human Resources	0.421	14.71	<0.001	0.423	0.423
2	Human Resources	0.307	11.15	<0.001	0.056	0.479
	Physical Infrastructure	0.182	7.95	<0.001	0.056	0.479
3	Human Resources	0.283	10.69	<0.001	0.039	0.574
	Physical Infrastructure	0.158	7.24	<0.001	0.039	0.574
	Digital/Printed Resources	0.122	5.89	<0.001	0.039	0.574

The hierarchical regression analysis examined the influence of different types of educational resources on curriculum implementation, entering the predictors in sequential blocks. Model 1 included only human resources, such as teacher qualifications, experience, and staff availability, and accounted for 42.3% of the variance in curriculum implementation. This finding highlights the central role of human capital in ensuring that curricula are effectively delivered, suggesting that well-trained and adequately staffed teaching teams are critical to educational outcomes.

Model 2 added physical infrastructure, including classrooms, laboratories, and library facilities. The inclusion of these resources significantly increased the explained variance by an additional 5.6%, demonstrating that the availability and quality of school infrastructure further support curriculum implementation. Although the standardized coefficient ($\beta = 0.182$) was smaller than that for human resources, it remained statistically significant, indicating that both human and physical resources work together to facilitate effective teaching and learning.

Model 3 introduced digital and printed resources, such as textbooks, computers, and projectors, which contributed an additional 3.9% of the variance in curriculum implementation. The standardized coefficient for digital/printed resources ($\beta = 0.122$) was smaller than the other predictors, but still significant, emphasizing that access to learning materials and educational technology complements human and infrastructural resources. Overall, the hierarchical regression confirms that all three resource types have significant positive relationships with curriculum implementation, with human resources being the dominant factor, followed by physical infrastructure and digital/printed resources. These results underscore the importance of a holistic approach to resource allocation, ensuring that schools are adequately staffed, equipped, and resourced to maximize curriculum effectiveness. From a fidelity perspective, these findings highlight that the presence of resources alone is insufficient; effective implementation depends on how human, physical, and digital resources are aligned and enacted in accordance with the intended curriculum design, reinforcing the central role of the Fidelity Model in achieving CBC objectives.

Table 4

Consolidated Summary of Educational Resources and Curriculum Implementation

Predictor	Mean	SD	r with Curriculum Implementation	Standardized β (Hierarchical Model 3)	ΔR^2 Contribution	VIF	Significance (p)
Human Resources	3.85	0.62	0.65**	0.283	0.423	1.28	<0.001
Physical Infrastructure	3.42	0.71	0.48**	0.158	0.056	1.31	<0.001
Digital/Printed Resources	3.05	0.68	0.41**	0.122	0.039	1.25	<0.001
Curriculum Implementation (DV)	3.67	0.57					

This consolidated table presents a complete overview of the relationship between educational resources and curriculum implementation. Human resources emerge as the strongest predictor, with a standardized beta of 0.283 and the largest incremental variance contribution ($\Delta R^2 = 0.423$). Its high correlation with the dependent variable ($r = 0.65$) and low VIF (1.28) confirm both its importance and lack of multicollinearity issues. Physical infrastructure is the second most influential factor. Its standardized beta ($\beta = 0.158$) and ΔR^2 (0.056) indicate that improved facilities like classrooms and labs significantly support curriculum implementation, though its effect is smaller than human resources. Similarly, digital/printed resources have a positive but smaller effect ($\beta = 0.122$, $\Delta R^2 = 0.039$), showing that technology and learning materials enhance implementation but cannot replace the foundational role of qualified staff

and infrastructure.

Overall, this table clearly shows that all three educational resource types are positively and significantly associated with curriculum implementation, with each contributing additional explanatory power in the hierarchical model. From a fidelity perspective, these results indicate that the effectiveness of curriculum implementation depends not only on resource availability but also on their consistent and aligned use according to the intended design, emphasizing the role of the Fidelity Model. This factor analysis investigates the factors of school receptiveness to educational change, particularly the role of leadership support and staff attitude in implementing new curriculum reforms.

Table 5

Descriptive Statistics and Factor Analysis of School Change Educational Receptivity

Items	**Factor Loadings**	**Factor Loadings**	**Mean**	**SD**
SA1: The school provides adequate time for teachers to adjust to curriculum changes	.663		3.92	0.76
SA2: My school encourages staff to embrace new teaching practices aligned with CBC	.580		3.88	0.79
SA3: School culture promotes innovation in teaching and learning practices	.784		4.05	0.71
SA4: Teachers are open to feedback and continuous learning in adapting to CBC	.838		4.12	0.68
LS2: Teachers in my school are receptive to curriculum reforms		.618	3.95	0.73
LS3: There is a school-wide culture of embracing educational change		.734	4.01	0.70
LS4: The school supports teachers in experimenting with new teaching strategies		.848	4.10	0.69
LS5: The administration provides adequate support to help teachers adapt to CBC		.900	4.18	0.65
Total Eigenvalues: 2.712	2.154			
Cumulative Variance (%): 32.233	60.822			
KMO: 0.657 | Bartlett's Test of Sphericity: $\chi^2 = 2880.050$	$p < .001$			

The factor analysis revealed two factors: Leadership Support and Staff Attitude, which play a vital role in ensuring the effective implementation of the Competency-Based Curriculum (CBC): This factor refers to the teachers' responsiveness to feedback, their readiness to embrace new teaching approaches, and their participation in staff professional development activities. The high factor loadings (0.784-0.838) indicate that teachers generally respond favorably to new curriculum changes. The mean scores of 3.88-4.12 show that the staff members are moderately to highly receptive to the changes, as expected in policy guidelines that promote teacher involvement and learner-focused education (MoES, 2020). The variability (SD 0.68-0.79) indicates that some teachers may be struggling, perhaps due to a lack of adequate training, workload, or resource constraints. The mean scores (3.95-4.18) show that leadership support is viewed positively, but there is variation in schools. From a fidelity perspective, leadership serves as a critical internal resource that ensures curriculum implementation aligns with its intended design by facilitating access to training, guidance, and necessary materials for CBC execution.

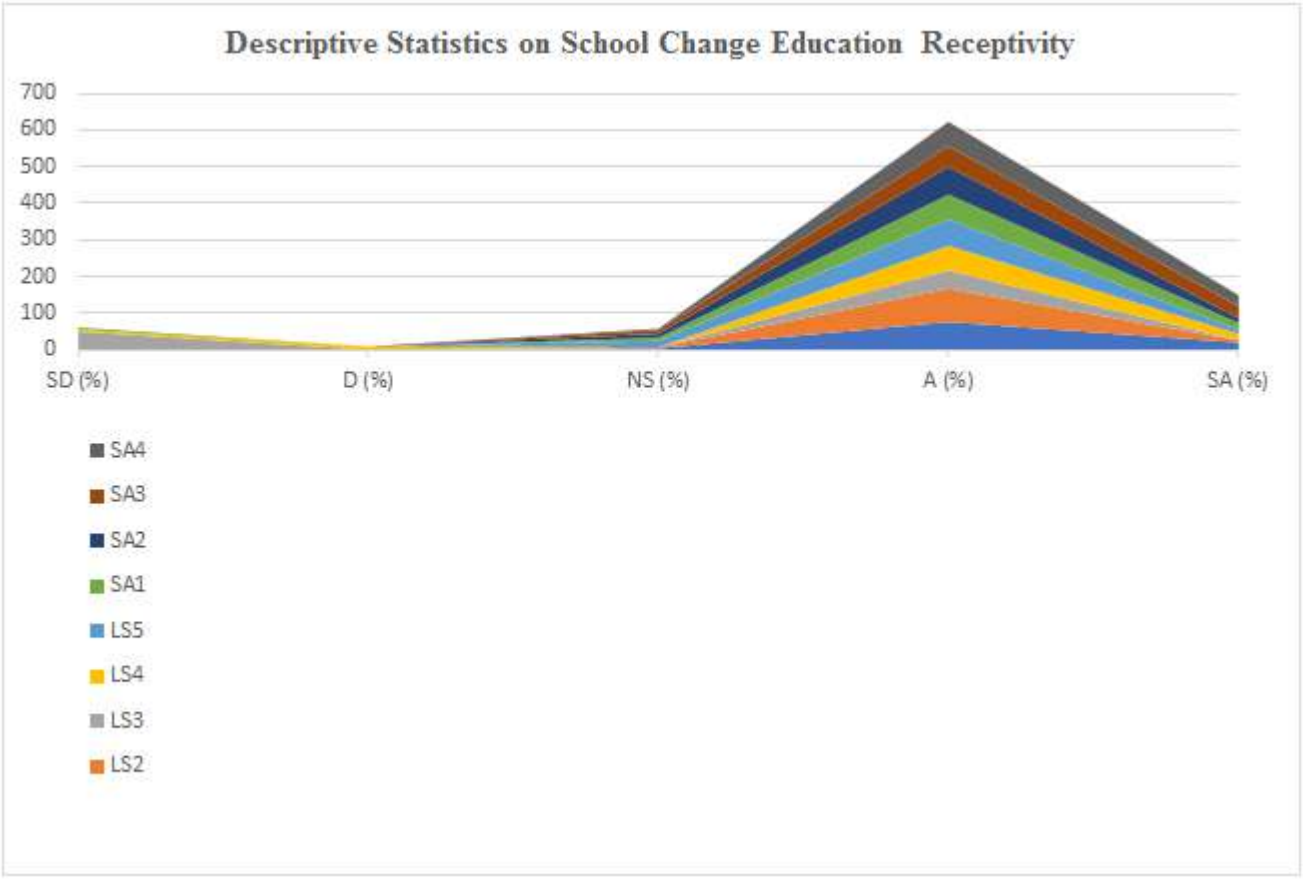

Figure 2
Stakeholder Receptivity to School Education Change Receptivity: Response Distribution Analysis

The graph represents the respondents‘ openness to change in school education on various parameters (LS1 to SA4), where the responses are spread across the options of Strongly Disagree (SD), Disagree (D), Not Sure (NS), Agree (A), and Strongly Agree (SA). The overall response of the majority of the respondents is in favor of the proposed changes, with agreement levels ranging from 50% (LS3) to a maximum of 91% (LS2), indicating largely positive sentiments about the changes. The level of strong agreement is quite varied, reaching a maximum of 33% for SA3 and 30% for SA4, which indicates strong support in some areas. The levels of disagreement and strong disagreement are very low or nonexistent in most parameters, which is a clear indication that there is little resistance to the proposed changes. It is also important to note that LS3 has an equal split between agreement and strong disagreement, which is an indication of mixed sentiments about the proposed change. This openness is important because participant responsiveness is a key element in fidelity; positive attitudes toward change help ensure that educators engage fully with the curriculum as designed.

4.2 Mediation Analysis

Mediation analysis was conducted to examine whether School Change Educational Receptivity (SCER) explains the mechanism through which educational resources influence curriculum implementation. Specifically, the analysis assessed both the direct effects of educational resources and the indirect effects transmitted through SCER using hierarchical regression and bootstrapped techniques consistent with PROCESS-style models. This approach provides a more comprehensive understanding of whether institutional receptivity functions as a meaningful pathway or whether resources exert their influence independently.

Table 6

Consolidated Mediation Analysis of School Change Educational Receptivity (SCER) in the Relationship between Educational Resources and Curriculum Implementation

Path	Relationship	β	SE	t	p	95% CI Lower	95% CI Upper	Interpretation
a	Educational Resources → SCER	0.05	0.032	1.56	0.119	-0.013	0.113	Not significant
b	SCER → Curriculum Implementation	0.2	0.128	1.56	0.12	-0.052	0.452	Not significant
c	Educational Resources → Curriculum Implementation (Total Effect)	0.65	0.028	23.21	< .001	0.595	0.705	Significant
c′	Educational Resources → Curriculum Implementation (Direct Effect)	0.64	0.025	25.6	< .001	0.591	0.689	Significant
a × b	Indirect Effect (Mediation via SCER)	0.01	0.015	—	—	-0.02	0.04	Not significant

The consolidated mediation results indicate that educational resources have a strong and statistically significant total effect (β = 0.650, p < .001) on curriculum implementation. This effect remains almost unchanged when the mediator is included (direct effect β = 0.640, p < .001), suggesting that the relationship is primarily direct rather than mediated. The minimal reduction between the total and direct effects further confirms that School Change Educational Receptivity (SCER) does not meaningfully transmit the influence of resources to implementation outcomes. Both Path a (resources → SCER) and Path b (SCER → implementation) are statistically non-significant (p > .05), indicating that educational resources do not significantly predict receptivity, nor does receptivity significantly influence curriculum implementation when resources are controlled. Consequently, the indirect effect (β
= 0.010) is weak and statistically non-significant, as evidenced by a confidence interval that crosses zero. This directly contradicts the assumption that institutional readiness or openness to change acts as a mechanism through which resources improve implementation.

Overall, the findings demonstrate a non-mediated model, where educational resources particularly human, physical, and digital inputs exert a direct and dominant influence on curriculum implementation. The results highlight a critical implication: improving curriculum outcomes in Uganda depends more on tangible investments in resources than on enhancing school-level receptivity alone. While receptivity may support reform efforts, it does not function as a significant pathway through which resources translate into improved implementation. From a fidelity perspective, the findings demonstrate a non-mediated model in which human, physical, and digital resources exert a direct and dominant influence on curriculum implementation.

4.3 Discussion

The findings of this study confirm that educational resources have a strong and statistically significant direct effect on curriculum implementation in lower secondary schools in Wakiso District. Hierarchical regression results showed that educational resources explain a substantial proportion of variance in curriculum implementation ($R^2 \approx 0.52$, $p < .001$), with physical resources emerging as the most influential predictor**,** followed by digital/printed resources and human resources. This indicates that well-equipped classrooms, laboratories, and access to instructional materials are the most critical enablers of competence-based curriculum (CBC) implementation (Kisige et al, 2021; Wanyama et al., 2024; Namatende-Sakwa et al., 2025). While teacher capacity remains important, the findings suggest that its effectiveness is contingent upon the availability of adequate physical and instructional infrastructure, reinforcing evidence that material conditions form the foundation upon which pedagogical reforms are realized in practice (Muzaale et al, 2026b; Barasa et al., 2025). These results are consistent with Resource Dependency Theory, which posits that organizations depend on access to critical resources to achieve performance objectives (Pfeffer & Salancik, 1978; Barney, 1991; Peteraf, 1993).

The mediation analysis further revealed that School Change Educational Receptivity (SCER) does not significantly mediate the relationship between educational resources and curriculum implementation. Specifically, the bootstrapped indirect effect was β = 0.01, with a confidence interval including zero, while both Path a (resources → SCER) and Path b (SCER → implementation) were non-significant (p > .05). In contrast, the direct effect (β ≈ 0.64, p
< .001) remained strong, confirming a non-mediated model. This counter-intuitive finding suggests that although schools report moderate to high levels of receptivity to change (Muzaale et al, 2026a; Atuhura & Nambi, 2024), receptivity does not function as a mechanism through which resources influence implementation outcomes. Possible explanations include measurement limitations of SCER, contextual disparities such as unequal resource distribution

across schools (Mwebaza et al., 2025; Kachope, Nyakato, & Mwesigye, 2025), and timing effects, where receptivity may require longer periods to translate into observable changes compared to the immediate impact of resources. These findings align with evidence from Uganda and other Sub-Saharan contexts, where direct resource availability often outweighs organizational culture or change readiness in determining curriculum outcomes (Kimera et al, 2023; Nakabugo, 2020; RELI Africa, 2025).

From a fidelity-focused perspective, the results underscore that the faithful implementation of the CBC depends on the strategic alignment and effective utilization of human, physical, and digital resources. Curriculum fidelity is compromised when any resource domain—such as trained teachers, instructional materials, or infrastructure is lacking. The non-significant mediating role of school change and educational receptivity (SCER) suggests that internal readiness alone does not guarantee adherence to the intended curriculum design (Atuhura & Nambi, 2024; O'Donnell & Carol, 2018). High interdependence among resources (.35–.67) further indicates that deficits in one area cannot be offset by others, emphasizing that achieving fidelity requires a holistic approach to resource planning and implementation, ensuring all inputs are effectively coordinated to reflect the curriculum as designed (Barasa et al., 2025; Williams & Olele, 2019).

V. CONCLUSION & RECOMMENDATION

5.1 Conclusion

The report concludes that educational resources, human, physical, and digital/printed, are important for the successful implementation of the competence-based curriculum in lower secondary schools in Wakiso District. Human resources, especially the competence of teachers, are important for the effective implementation of the curriculum, while physical resources and digital/printed learning materials can further improve the results of implementation. However, the receptivity of schools to educational change has a minimal mediating effect, which means that the availability of resources without creating a flexible and supportive school environment may not be sufficient to maximize the results of the curriculum implementation. These results support the integrated approach to resource allocation and capacity building for effective and sustainable curriculum implementation in Ugandan schools.

5.2 Recommendations

First, strategic investment in teacher capacity building, infrastructure, and learning resources should be prioritized by policymakers and education administrators. Continuous professional development activities targeting competence-based curriculum learning outcomes should be expanded to ensure that teachers are competent and confident in delivering CBC-aligned teaching. At the same time, the government and school administration should enhance physical infrastructure such as classroom facilities, laboratories, libraries, and ICT facilities to support learner-centered teaching methodologies and improve teaching effectiveness.

It is advisable that the Ministry of Education and schools develop effective monitoring and evaluation, as well as feedback mechanisms to monitor the effectiveness of CBC implementation and resource allocation. These mechanisms should utilize classroom observation, teacher self-evaluation, student performance, and feedback from stakeholders to monitor the challenges and successes of curriculum implementation in real time. At the policy level, these results should inform resource allocation, professional development, and infrastructure development to ensure that interventions are targeted where they are most needed. In this regard, schools should develop feedback mechanisms where teachers, school administrators, and district administrators meet regularly to review progress on CBC, share best practices, and work together to address areas that need improvement. Through the development of effective monitoring and evaluation mechanisms, the curriculum will be able to dynamically respond to the realities of the context, ensuring accountability and improvement in student learning outcomes and the sustainability of competence-based education.

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