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ROLE OF TEACHER PROFESSIONAL DEVELOPMENT IN CURRICULUM IMPLEMENTATION IN SENIOR SECONDARY SCHOOLS

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ABSTRACT

This study investigates the influence of teacher professional development (TPD) on curriculum implementation in senior secondary schools in Maiduguri Metropolis, Borno State, focusing on how instructional material availability, teacher preparedness and instructional challenges affect student academic performance. A correlational research design was used. The target population of the study is two thousand, two hundred and ninety-eight (2,298) senior secondary school teachers in Borno State, from which a sample of 376 was randomly selected. Data were collected using a structured questionnaire and analyzed through Confirmatory Factor Analysis (CFA) and Structural Equation Modelling (SEM). Findings revealed that teacher preparedness significantly enhances both instructional material utilization ($\beta = 2.205$, $p = 0.008$) and student academic performance ($\beta = 3.022$, $p < 0.001$), confirming its central role in effective curriculum delivery. Instructional challenges negatively affect material utilization ($\beta = -0.863$, $p = 0.051$) while instructional material availability showed no significant effect on utilization ($\beta = -0.417$, $p = 0.336$), implying that availability alone does not guarantee use. However, instructional material availability had a significant direct positive impact on student performance ($\beta = 1.110$, $p = 0.003$). Instructional material utilization itself had a positive effect on student performance ($\beta = 0.938$, $p = 0.011$). The model demonstrated strong fit indices with CFI = 0.931, TLI = 0.917, RMSEA = 0.049 which validated the structural relationships and supported the theoretical framework. Based on the findings, it is recommended that school administrators and policymakers prioritize ongoing, school-based professional development programs that focus on equipping teachers with practical strategies for integrating instructional materials effectively.

Keywords: Teacher Professional Development, Curriculum Implementation, Structural Equation Modelling, Teacher Preparedness, Student Performance.

Introduction

The successful implementation of an educational curriculum is a complex process that transcends the mere dissemination of new content; it is the critical translation of policy into meaningful, effective, and sustainable classroom practice (Emehinola, 2020). In Nigeria, recent reforms, notably the shift towards a competency-based curriculum, are pushing schools to undergo a significant pedagogical transformation, compelling a re-evaluation of both what is taught and how it is taught. For such reforms to take root, teachers must be adequately equipped to adapt, which places Teacher Professional Development at the forefront of effective curriculum delivery as the essential mechanism for building the requisite skills, confidence, and innovative mind-set among educators (Guskey, 2002).

Effective Teacher Professional Development, spanning workshops,

mentoring, in-service training, and peer learning, is widely recognized as a cornerstone for improving instructional quality. When conducted consistently and with quality, it leads to refined teaching practices and improved student outcomes. Studies confirm that teachers who receive targeted support are more likely to implement learner-cantered methods and utilize formative assessments effectively (Emehinola, 2020). However, the reality in many Nigerian secondary schools is that Teacher Professional Development is often irregular, underfunded, or disconnected from curriculum goals, leading to uneven classroom delivery and missed opportunities for student success.

As noted by Okudo (2024), systemic challenges further exacerbate these issues, hindering the potential of Teacher Professional Development to act as a robust engine for curriculum reform. Research consistently points to funding gaps, poor coordination, and regional inequalities as significant barriers, with rural areas being disproportionately affected (Bernard *et al*., 2023). Moreover, fragmented approaches such as one-off workshops without follow-up often fall short of creating sustainable change (Osei-Owusu, 2022). This is compounded by a critical disconnect between teacher education programs and current curriculum reforms, which often leaves teachers unprepared to implement new standards upon entering the classroom (Ahmed, 2023).

Grounded in Guskey's Model of Teacher Change (2002), which posits that sustainable change in teacher practice occurs primarily after they witness improvements in student learning, this study investigates the role of Teacher Professional Development in curriculum implementation. Guskey's model underscores the need for continuous, reflective, and evidence-driven professional development programs, as opposed to the fragmented trainings that have proven ineffective in the Nigerian context (Ajayi & Olatunji, 2021; Iroegbu & Ede, 2024). Against this backdrop, this research employs a quantitative methodology to empirically examine the relationships between key variables Instructional Material Utilization, Teacher Preparedness, Instructional Challenges, and Student Academic Performance to offer practical, evidence-based insights for optimizing teacher development and, ultimately, improving educational outcomes across Nigeria.

Recent scholarship highlighted the role of teacher professional development in enhancing curriculum implementation in Nigerian senior secondary schools. Studies show that well-structured TPD programs improve instructional delivery, teacher confidence and curriculum alignment. Hart (2024) found that teachers who participated in targeted workshops and in-service training demonstrated stronger engagement with curriculum goals and student-cantered practices. Similarly, Itua and Akhigbe emphasized that professional development contributes to the professionalization of teaching, fostering a sense of ownership and competence among educators. However, they also noted systemic challenges such as poor funding and lack of mentorship that hinder effective implementation.

Other researchers have explored the link between teacher capacity and curriculum fidelity. Amugo (2007) reported that schools with access to trained subject-specialist teachers achieved higher

curriculum compliance and student performance. Innovative approaches to TPD, such as blended learning and peer coaching, have also gained traction. For instance, recent studies advocate for school-based learning communities and reflective practice as more sustainable alternatives to one-off workshops. These models not only improve pedagogical skills but also promote collaborative problem-solving and continuous improvement. Despite these advances, several studies highlight persistent barriers to curriculum implementation (Okudo, 2022). Inadequate teacher preparation, limited access to instructional materials, and resistance to change remain common challenges. Capacity-building initiatives such as ICT integration, curriculum mapping and leadership development are recommended to bridge these gaps. In view of the above background therefore, this study seeks to investigate the role of teacher professional development in curriculum implementation in senior secondary schools in Maiduguri Metropolis, Borno State.

Research Objectives

The objectives of the study are:

1. To examine the effect of instructional material availability on instructional material utilization in Senior Secondary Schools in Maiduguri Metropolis, Borno State.
2. To investigate the impact of teacher preparedness on instructional material utilization and student academic performance in Senior Secondary Schools in Maiduguri Metropolis, Borno State.
3. To assess the influence of instructional challenges on instructional material utilization.
   To evaluate the effect of instructional material utilization on student academic performance in Senior Secondary Schools in Maiduguri Metropolis, Borno State.
4. To determine the direct effect of instructional material availability on student academic performance in Senior Secondary Schools in Maiduguri Metropolis, Borno State.

Research Hypotheses

H_{01}: Instructional Material Utilization has no significant effect on Student Academic Performance in Senior Secondary Schools in Maiduguri Metropolis, Borno State.

H_{02}: Availability of Instructional Material positively influences Instructional Material Utilization in Senior Secondary Schools in Maiduguri Metropolis, Borno State.

H_{03}: Teacher Preparedness positively influences Instructional Material Utilization in Senior Secondary Schools in Maiduguri Metropolis, Borno State.

H_{04}: Instructional Challenges negatively affect Instructional Material Utilization in Senior Secondary Schools in Maiduguri Metropolis, Borno State.

H_{05}: Instructional Material Utilization mediates the relationship between Teacher Preparedness and Student Academic Performance in Senior Secondary Schools in Maiduguri Metropolis, Borno State.

H_{06}: Instructional Material Utilization mediates the relationship between Instructional Material Availability and Student Academic Performance in Senior Secondary Schools in Maiduguri Metropolis, Borno State.

Methodology

This study employed a correlational research design to investigate the influence of teacher professional development on curriculum implementation in Nigerian senior secondary schools. The design was appropriate for examining relationships among multiple variables and testing structural pathways using Structural Equation Modelling (SEM). A sample of 376 teachers was selected through simple random sampling. Data were collected using a structured questionnaire comprising 25 items grouped under five latent constructs: Instructional Material Utilization (IMU), Instructional Material Availability (IMA), Teacher Preparedness (TP), Instructional Challenges (IC), and Student Academic Performance (SAP). Each item was rated on a 5-point Likert scale ranging from Strongly Disagree (1) to Strongly Agree (5).

The instrument was validated through expert review and pilot testing, yielding a Cronbach's alpha of 0.87, indicating strong internal consistency. Data collected were analyzed using Confirmatory Factor Analysis (CFA) to assess the validity of the measurement model and SEM to test the hypothesized relationships among constructs, including direct and indirect effects. Model fit was evaluated using standard indices such as Chi-square, CFI, TLI, RMSEA, and SRMR, all of which indicated acceptable to excellent fit.

Presentation of Results

This section presents the empirical findings of the study, structured to address the research hypotheses. The presentation begins with an assessment of the measurement model through Confirmatory Factor Analysis to establish the validity and reliability of the constructs. Subsequently, the results of the Structural Equation Model are detailed, outlining the direct relationships between the latent variables. The goodness-of-fit of the model indices are first reported to confirm the robustness of the proposed structural framework, followed by the specific path coefficients that test the hypothesized relationships.

Table 1: Model Fit Summary

S/N	Fit Index	Obtained Value	Interpretation
1.	Chi-square	425.382 (0.001)	Moderate fit
2.	Comparative Fit Index	0.931	Good fit
3.	Tucker–Lewis Index	0.917	Good fit
4.	RMSEA	0.049 (90% CI = 0.041–0.057)	Excellent fit
5.	SRMR	0.041	Excellent fit

Table 1 presents the model fit. The Comparative Fit Index of 0.931 and the Tucker–Lewis Index of 0.917 both exceed the accepted threshold of 0.90, indicating a good model fit. The Root Mean Square Error of Approximation is 0.049, with a 90% confidence interval between 0.041 and 0.057. Values below 0.05 suggest excellent fit and the narrow confidence interval reinforces model stability. The Standardized Root Mean Square Residual is 0.041 is also below the 0.08 threshold,

indicating excellent fit between the predicted and observed correlations. Therefore, the SEM model provides a well-fitting representation of the relationships among the latent variables. The model is robust enough to support hypothesis testing and interpretation of structural paths.

Table 2: Latent Variable Loadings

Latent Variable	Indicator	Estimate	Std. Error	z-value	p-value	Std.lv	Std.all
IMU	IMU1	1	—	—	—	0.71	0.967
	IMU2	0.352	0.020	17.749	0.000	0.25	0.692
	IMU3	0.225	0.021	10.684	0.000	0.16	0.492
	IMU4	0.196	0.020	9.845	0.000	0.139	0.461
	IMU5	1.093	0.028	39.385	0.000	0.776	0.928
IMA	IMA1	1	—	—	—	0.657	0.867
	IMA2	0.841	0.071	11.783	0.000	0.552	0.544
	IMA3	1.369	0.041	33.397	0.000	0.899	0.901
	IMA4	1.116	0.046	24.343	0.000	0.733	0.875
	IMA5	0.697	0.041	17.029	0.000	0.458	0.713
TP	TP1	1	—	—	—	0.313	0.694
	TP2	0.101	0.026	3.8850	0.000	0.032	0.196
	TP3	0.883	0.086	10.277	0.000	0.276	0.525
	TP4	1.267	0.111	11.379	0.000	0.397	0.582
	TP5	2.429	0.136	17.825	0.000	0.760	0.932
IC	IC1	1	—	—	—	0.859	0.928
	IC2	0.231	0.026	9.0020	0.000	0.198	0.400
	IC3	0.535	0.029	18.589	0.000	0.459	0.699
	IC4	0.403	0.031	12.884	0.000	0.346	0.540
	IC5	0.405	0.028	14.624	0.000	0.347	0.595
SAP	SAP1	1	—	—	—	0.346	0.490
	SAP2	1.980	0.169	11.686	0.000	0.685	0.871
	SAP3	2.405	0.203	11.829	0.000	0.832	0.902
	SAP4	0.491	0.070	7.0420	0.000	0.170	0.357
	SAP5	1.223	0.115	10.605	0.000	0.423	0.689

Table 2 presents the results of the Confirmatory Factor Analysis, showing how well each observed item loads onto its respective latent variable. These loadings reflect the strength and validity of the measurement model. For the construct Instructional Material Utilization, items IMU1 and IMU5 demonstrated very strong standardized loadings (0.967 and 0.928 respectively), indicating they are highly representative of the construct. Similarly, Instructional Material Availability showed excellent loadings for IMA3 and IMA4 (0.901 and 0.875), while IMA2 had a moderate loading of 0.544. Teacher Preparedness was strongly represented by TP5 (0.932), TP4 and TP3. Instructional Challenges (IC) showed significance across all items, with IC1 being the strongest (0.928) and IC2 the weakest (0.400). For Student Academic Performance, SAP3 and SAP2 are the most reliable indicators (0.902 and 0.871), while SAP4 had the lowest loading (0.357). Therefore, the CFA results confirm that most items are valid and reliable measures of their respective constructs.

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Table 3: Structural Model (Regressions)

Dependent Variable	Predictor	Estimate	SE	z-value	p-value	Std.lv	Std.all
IMU	IMA	-0.451	0.469	-0.963	0.336	-0.417	-0.417
	TP	5.004	1.888	2.651	0.008	2.205	2.205
	IC	-0.714	0.365	-1.953	0.051	-0.863	-0.863
SAP	IMU	0.457	0.179	2.557	0.011	0.938	0.938
	TP	3.342	0.502	6.662	0.000	3.022	3.022
	IMA	0.585	0.198	2.953	0.003	1.110	1.110

Table 3 presents the structural model. The first set of regressions shows how Instructional Material Utilization is influenced by three predictors: Instructional Material Availability, Teacher Preparedness and Instructional Challenges. The path from TP to IMU is statistically significant (estimate = 5.004, p = 0.008), indicating that teachers who are better prepared are more likely to utilize instructional materials effectively. The path from IC to IMU is marginally significant (estimate = -0.714, p = 0.051), suggesting that challenges such as lack of resources or large class sizes may negatively affect material usage. The path from IMA to IMU is not significant (estimate = -0.451, p = 0.336), implying that availability alone does not guarantee utilization, other factors like training and support may be more critical.

The second set of regressions examines how Student Academic Performance is influenced by IMU, TP and IMA. All three paths are statistically significant. IMU positively predicts SAP (estimate = 0.457, p = 0.011). TP has a strong positive effect on SAP (estimate = 3.342, p < 0.001), reinforcing the importance of teacher competence in driving student outcomes. The path from IMA to SAP is also significant (estimate = 0.585, p = 0.003), which may reflect that mere availability of materials without proper integration or support does not enhance performance.

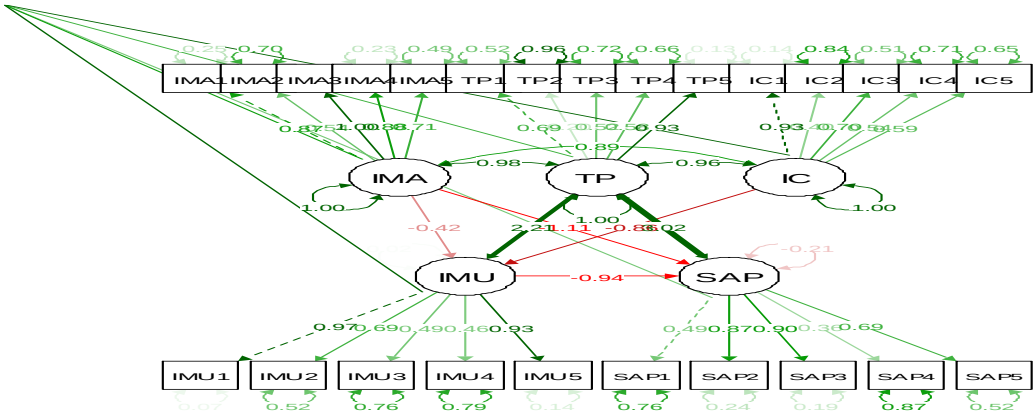


Figure 1: Path Diagram

The SEM diagram illustrates the structural relationships among five latent variables: Availability of Instructional Material, Teacher Preparedness, Instructional

Challenges, Instructional Material Utilization and Student Academic Performance using standardized path coefficients to show the strength and direction of influence. Teacher Preparedness has a strong positive effect on both IMU and SAP, highlighting its critical role in enhancing instructional practices and learning outcomes. Instructional Challenges positively affect IMU. The diagram also revealed significant covariances among IMA, TP and IC, suggesting that these factors are interrelated within the school environment.

Table 4: Covariances

Variables	Estimate	Std. Error	z-value	p-value	Std.lv	Std.all
IMA ~~ TP	0.201	0.019	10.463	0	0.977	0.977
IMA ~~ IC	0.499	0.043	11.579	0	0.885	0.885
TP ~~ IC	0.257	0.024	10.624	0	0.957	0.957

Table 4 presents the estimated covariances among IMA, TP and IC. All three covariances are statistically significant ($p < 0.001$), indicating strong interrelationships among these latent constructs. The covariance between IMA and TP is 0.201 with a standardized estimate of 0.977, suggesting a very strong positive relationship. This means that schools where instructional materials are more available also tend to have better-prepared teachers possibly due to stronger institutional support or better funding. Similarly, the covariance between IMA and IC is 0.499 (standardized = 0.885), indicating that as availability increases, instructional challenges may also rise, perhaps due to uneven distribution or implementation issues. The covariance between TP and IC is 0.257 (standardized = 0.957), showing that teacher preparedness and instructional challenges are closely linked teachers facing more challenges may feel less prepared, or vice versa.

Conclusion

This study highlighted the role of Teacher Professional Development in enhancing curriculum implementation and student academic performance in senior secondary schools in Maiduguri Metropolis, Borno State. The findings reveal that teacher preparedness is the most influential factor, significantly improving both instructional material utilization and student outcomes. While the availability of instructional materials contributes positively to performance, its direct impact on utilization is limited without adequate teacher support and training. Instructional challenges, such as resource constraints and classroom management issues, further hinder effective material use, emphasizing the need for holistic interventions.

The structural model validated through SEM demonstrates strong interrelationships among the key variables, confirming that curriculum implementation is a process requiring coordinated efforts. The study advocates for sustained, school-based professional development programs that are reflective, practical, and aligned with curriculum goals. By investing in teacher capacity and addressing systemic barriers, policymakers and school administrators can foster a more effective and equitable educational environment that supports both teaching excellence and student success.

Recommendations

Based on the findings of the study, the following recommendations were made:

1. Government should prioritize continuous school-based professional development programs that equip teachers with practical strategies for curriculum delivery.
2. Government should provide adequate instructional materials and resources to ensure that availability translates into effective utilization in classrooms.
3. Government should invest in teacher preparedness through training and mentoring, enabling teachers to confidently integrate instructional materials and adopt learner-centered approaches.
4. School managers should address systemic instructional challenges such as overcrowded classrooms and lack of coordination, which hinder effective curriculum implementation.
5. Government should encourage collaborative and reflective teacher learning communities, where peer coaching and shared problem-solving sustain improvements in teaching effectiveness.

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