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TEACHERS' SUBJECT KNOWLEDGE AND PEDAGOGICAL TRAINING AS PREDICTORS OF INSTRUCTIONAL EFFECTIVENESS IN SECONDARY SCHOOLS IN BENIN CITY

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ABSTRACT

This study investigated the influence of teachers' subject knowledge and pedagogical training on instructional effectiveness in junior secondary schools in Benin City. Guided by three research questions, the study adopted a descriptive survey research design. The population consisted of public junior secondary school teachers across Egor, Oredo, and Ikpoba-Okha Local Government Areas, which encompass 44 schools. Using simple random sampling, 22 schools (50% of the total) were selected, and 10 teachers from each school were conveniently sampled, resulting in 220 teachers. Additionally, five students per school (110 in total) were selected to assess the instructional effectiveness of the teachers. The research instrument, a validated questionnaire with four sections (A-D), collected data on demographic information, subject knowledge, pedagogical training, and instructional effectiveness. The instrument was validated by experts in Measurement and Evaluation and Curriculum and Instruction. Reliability testing using Cronbach's alpha yielded coefficients of 0.88, 0.82, and 0.80, respectively. Data were analyzed using the Generalized Linear Model (Univariate). Findings revealed that both subject knowledge and pedagogical training significantly predict instructional effectiveness, with their combined impact being most pronounced. The study concludes that integrating subject knowledge and pedagogical training in teacher education programs is crucial for improving teaching quality. Providing competency-based teacher training models, targeted professional development initiatives, and resource allocation for in-service training programs to enhance teaching effectiveness and student outcomes were recommended.

Keywords: Subject Knowledge, Pedagogical Training, Instructional Effectiveness, Secondary Schools

Introduction

The effectiveness of instructional delivery in secondary schools is a critical factor in determining student success and overall educational quality. Teachers' subject knowledge and pedagogical training are widely recognized as key predictors of instructional effectiveness. Subject knowledge refers to the depth of understanding that teachers have in the subjects they teach, enabling them to present content accurately, answer students'

questions confidently, and address misconceptions. This foundational element of effective teaching ensures that students receive accurate and comprehensive instruction, which facilitates their understanding and critical engagement with the subject matter.

Recent research has consistently demonstrated a positive correlation between teachers' subject knowledge and student achievement. For example, König et al. (2020) found that teachers with a strong grasp of mathematical concepts significantly enhance student performance, particularly by fostering problem-solving skills. Similarly, Hill and Chin (2018) emphasized that teachers with advanced content knowledge are better equipped to engage students in cognitively demanding tasks, promoting deeper learning and improved academic outcomes. Nilsen and Gustafsson (2022) further highlighted the role of strong subject knowledge in enabling teachers to design rigorous and meaningful learning experiences. These studies collectively underscore the critical importance of subject expertise in enhancing student learning outcomes. Darling-Hammond et al. (2017) also emphasized that content knowledge is a core component of professional competence, enabling teachers to make informed instructional decisions and adapt their methods to address diverse student needs effectively.

In addition to subject knowledge, pedagogical training plays an equally vital role in instructional delivery. This training encompasses a range of skills, including lesson planning, classroom management, and the ability to tailor teaching methods to accommodate diverse learning needs. Research has consistently shown that pedagogical training enhances instructional quality and fosters positive learning environments. Desimone and Garet (2015) identified professional knowledge, including pedagogical skills, as a significant determinant of student success. Teachers who receive comprehensive training are better equipped to differentiate instruction, manage classrooms effectively, and use diverse teaching strategies to engage students actively. Stronge, et al. (2015) demonstrated that pedagogical expertise is strongly correlated with student achievement in core subjects such as reading and mathematics, as it enables teachers to provide clear explanations, timely feedback, and engaging instruction.

Pedagogical training also emphasizes the importance of developing strategies that cater to different learning styles and needs. Differentiated instruction, for example, allows teachers to adapt their teaching methods to accommodate students with varying abilities, fostering inclusivity and improving outcomes. Professional development programs further enhance instructional skills by promoting reflective practices and collaborative learning. Vangrieken et al. (2021) highlighted the role of professional learning communities in improving teaching strategies, which, in turn, enhance student engagement and achievement. Similarly, Darling-Hammond

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et al. (2020) and Avalos-Bevan et al. (2023) underscored the value of sustained, content-focused professional development programs in equipping teachers with effective tools for fostering student success.

The integration of strong subject knowledge and pedagogical training is essential for high-quality instructional delivery. Research by Blömeke and Delaney (2018) and Koellner et al. (2021) demonstrated that teachers who excel in both areas are more capable of designing engaging and differentiated lessons that address diverse student needs. Burroughs et al. (2019) emphasized the importance of this synergy in enhancing critical thinking and problem-solving skills among students. Moreover, Scherer et al. (2022) noted that teachers with expertise in both domains are better positioned to address learning disparities by implementing inclusive teaching practices that promote equity and improve outcomes for all students. Hattie (2015) identified teacher expertise, encompassing both subject knowledge and pedagogical skills, as one of the most significant factors influencing student achievement.

Teachers' subject knowledge and pedagogical training are pivotal in improving instructional delivery and fostering student success. Teachers with strong subject expertise provide accurate and comprehensive instruction, while those with robust pedagogical training create engaging and supportive learning environments. The interplay between these factors enhances instructional quality, promotes equity in education, and supports the overall development of students. Recent studies emphasize the importance of investing in teacher development to ensure effective instructional delivery. Against this backdrop, this study seeks to examine the relationship between teachers' subject knowledge, pedagogical training, and instructional delivery in secondary schools in Benin City.

Problem Statement

Despite the critical role that teachers' subject knowledge and pedagogical training play in instructional effectiveness, there is limited research specifically examining their combined impact on student achievement in secondary schools in Benin City. Many secondary schools in this region face challenges related to instructional quality, which can hinder student learning outcomes. Understanding the extent to which teachers' subject knowledge and pedagogical training predict instructional effectiveness is essential for developing targeted professional development programs and improving educational practices. By investigating this relationship, the study seeks to provide insights into how enhancing teachers' professional competencies can lead to improved instructional practices and better student achievement.

Research Questions

1. How does teachers' subject knowledge influence instructional effectiveness in secondary schools in Benin City?
2. What is the impact of pedagogical training on instructional effectiveness

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among secondary school teachers in Benin City?

3. To what extent do teachers' subject knowledge and pedagogical training jointly predict instructional effectiveness in secondary schools in Benin City?

Methodology

This study employed a descriptive survey research design. The population comprised junior secondary school teachers in public schools within the Benin metropolis. The metropolis consists of four local government areas: Egor, Oredo, and Ikpoba-Okha, which together house 44 junior secondary schools. Using simple random sampling (balloting method), 22 schools (50% of the total) were selected. From these sampled schools, 10 teachers were conveniently chosen from each, resulting in a total of 220 teachers. Additionally, five students per school were conveniently selected to evaluate the instructional effectiveness of the teachers, bringing the total sample size to 220 teachers and 110 students drawn from 22 junior secondary schools.

The research instrument was a questionnaire divided into four sections: A, B, C, and D. Section A collected demographic data, including age range, gender, years of teaching experience, educational background, and participation in professional development activities. Section B assessed subject knowledge, Section C evaluated pedagogical training, and Section D examined instructional effectiveness. Responses were captured on a four-point Likert scale: Strongly Agree (SA), Agree (A), Disagree (D), and Strongly Disagree (SD).

The instrument's validity was established by experts in Measurement and Evaluation, as well as Curriculum and Instruction. Reliability was assessed using Cronbach's alpha statistic, yielding values of 0.88 for subject knowledge, 0.82 for pedagogical training, and 0.80 for instructional effectiveness. Data collected were analyzed using the Generalized Linear Model (Univariate).

Results

Table 1: The Influence of Teachers' Knowledge on Instructional Effectiveness in Secondary Schools in Benin City.

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	5591.285	29	192.803	4.133	.000	.286
Intercept	152661.334	1	152661.334	3272.773	.000	.916
Knowledge	5591.285	29	192.803	4.133	.000	.286
Error	13947.116	299	46.646			
Total	396470.000	329				
Corrected Total	19538.401	328				

R Squared = .286 (Adjusted R Squared = .217)

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Table 1 presents an F-value of 4.133 and a Partial Eta Squared value of 0.286, indicating that teachers' subject knowledge significantly influences instructional effectiveness. The 28.6% variance explained underscores the pivotal role of subject knowledge in teaching success in secondary schools in Benin City. Teachers with stronger subject expertise are better positioned to engage students, simplify complex concepts, and deliver meaningful learning experiences. Additionally, the R-squared value of 0.286 and the Adjusted R-squared value of 0.217 suggest that the model accounts for 28.6% of the variance in instructional effectiveness, with the adjusted value of 21.7% reflecting the inclusion of multiple predictors.

Table 2: The Impact of Pedagogical Training on Instructional Effectiveness Among Secondary School Teachers in Benin City.

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	10354.795	30	345.160	11.401	.000	.535
Intercept	127497.326	1	127497.326	4211.505	.000	.934
Pedagogical	10354.795	30	345.160	11.401	.000	.535
Error	8991.254	297	30.274			
Total	396070.000	328				
Corrected Total	19346.049	327				

R Squared = .535 (Adjusted R Squared = .488)

Table 2 demonstrates that pedagogical training has a significant impact on teaching effectiveness, with an F-value of 11.401 and a Partial Eta Squared value of 0.535. This indicates that 53.5% of the variance in instructional effectiveness is attributable to pedagogical training. These results highlight the essential role of teacher training in improving instructional delivery and fostering better learning outcomes for students. The model's R-squared value of 0.535 suggests that the predictors collectively account for 53.5% of the variation in instructional effectiveness, while the adjusted R-squared value of 0.488 reflects adjustments for the number of predictors in the model. This reflects a strong model fit and reinforces the importance of pedagogical training as a key contributor to effective teaching practices.

Table 3: The Extent of Teachers' Subject Knowledge and Pedagogical Training Jointly Predict Instructional Effectiveness in Secondary Schools in Benin City

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	16769.530	201	83.430	4.080	.000	.867
Intercept	131958.19	1	131958.198	6453.178	.000	.981
Pedagogical	5797.954	29	199.929	9.777	.000	.692
Knowledge	1643.429	28	58.694	2.870	.000	.389

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Pedagogical * Knowledge	4930.294	143	34.478	1.686	.001	.657
Error	2576.519	126	20.449			
Total	396070.00	328				
Corrected Total	19346.049	327				

R Squared = .867 (Adjusted R Squared = .654)

Table 3 shows that an F-value of 4.080 and an R-squared value of 0.867 indicate that 86.7% of the variance in instructional effectiveness is explained by the combined influence of subject knowledge and pedagogical training. The adjusted R-squared value of 0.654 confirms the strength of the model after considering the number of predictors. Analyzing the main effects, pedagogical training significantly impacts instructional effectiveness, as evidenced by an F-value of 9.777 and a Partial Eta Squared value of 0.692. This means that pedagogical training alone accounts for 69.2% of the variance in instructional effectiveness. Similarly, subject knowledge also plays a significant role, with an F-value of 2.870 and a Partial Eta Squared value of 0.389, showing that 38.9% of the variance is attributable to teachers' mastery of their subjects. The interaction between pedagogical training and subject knowledge was also significant, with an F-value of 1.686 and a Partial Eta Squared value of 0.657. This interaction reveals that the combined effect of these two factors explains 65.7% of the variance in instructional effectiveness.

Discussion of Findings

The findings of this study provide critical insights into the impact of teachers' subject knowledge and pedagogical training on instructional effectiveness in secondary schools in Benin City. These two factors were evaluated both independently and in combination, offering a comprehensive view of their contributions to effective teaching practices. The results underscore the significant role that subject knowledge plays in enhancing instructional effectiveness. The findings show that subject knowledge accounted for 28.6% of the variance in instructional effectiveness, as indicated by the Partial Eta Squared value of 0.286. This highlights that, teachers with a strong understanding of their subject are better equipped to simplify complex concepts, address student misconceptions, and foster meaningful learning experiences. These findings are consistent with prior research that has demonstrated a positive correlation between teachers' subject knowledge and student achievement. For example, König et al. (2022) found that teachers' content knowledge significantly impacts student achievement in mathematics, highlighting that, teachers with a solid grasp of the subject matter are better positioned to facilitate student understanding. Similarly, Darling-Hammond et al. (2017) emphasized the importance of content knowledge, arguing that it allows teachers to make informed instructional decisions and engage students effectively in cognitively demanding tasks. The adjusted R-squared value of 0.217 in the

model confirms that subject knowledge alone explains a notable portion of instructional effectiveness, even when accounting for other predictors, reinforcing the need for continuous professional development programs aimed at enhancing teachers' content mastery as a core element of effective teaching (Darling-Hammond et al., 2017).

Pedagogical training emerged as an even stronger predictor of instructional effectiveness. The findings reveal that pedagogical training accounted for 53.5% of the variance in instructional effectiveness, as evidenced by the Partial Eta Squared value of 0.535. The strong model fit, with an adjusted R-squared value of 0.488, underscores the central role of pedagogical skills in improving instructional quality. These findings align with the work of Kraft and Papay (2019) and Sims et al. (2021), who demonstrated that teachers with comprehensive training in instructional strategies are better able to engage students, manage classrooms effectively, and differentiate instruction to meet diverse learner needs. Effective pedagogical training helps teachers develop essential skills, such as lesson planning, student engagement, and the use of a variety of instructional methods, which contribute to creating supportive and engaging learning environments (Darling-Hammond et al., 2017). This reinforces the importance of investing in teacher training programs to ensure educators are equipped to address the challenges of diverse classrooms and promote positive learning outcomes.

The interaction between subject knowledge and pedagogical training revealed the strongest influence on instructional effectiveness. The findings indicate that the combined effect of these two factors explained 86.7% of the variance in instructional effectiveness, as reflected by the R-squared value of 0.867. This result highlights the synergistic relationship between subject expertise and pedagogical skills, demonstrating that teachers with both strong subject knowledge and effective training are better positioned to implement high-quality instructional practices. The Partial Eta Squared values further support this finding, with pedagogical training accounting for 69.2% and subject knowledge contributing 38.9% of the variance in instructional effectiveness. The significant interaction effect, explaining 65.7% of the variance, underscores the dynamic interplay between these factors. This suggests that the impact of pedagogical training may depend on the level of subject knowledge, and vice versa, highlighting the need for a holistic approach to teacher development. König et al. (2022) and Hattie (2021) also stress that teacher expertise, which includes both subject knowledge and pedagogical skills, is one of the most significant factors influencing student achievement.

The findings have important implications for teacher training and professional development programs. The strong influence of both subject knowledge and pedagogical training on instructional effectiveness indicates that these areas should be prioritized in teacher education. Programs

that integrate content mastery with pedagogical skill development are likely to produce educators who can deliver high-quality instruction and foster improved student outcomes (Darling-Hammond et al., 2017). Additionally, the significant interaction effect suggests that training initiatives should adopt a differentiated approach, tailoring professional development to the specific needs of teachers based on their levels of content expertise and pedagogical competence. Such programs would ensure that all teachers are adequately equipped to address the challenges of modern classrooms.

This study reaffirms that teachers' subject knowledge and pedagogical training are critical predictors of instructional effectiveness in secondary schools. Both factors significantly influence teaching quality, with their combined effect being particularly impactful. The findings emphasize the importance of a comprehensive approach to teacher development that integrates content knowledge with pedagogical skills. Policymakers and educational stakeholders should prioritize investments in teacher training programs that address these dimensions, thereby enhancing the overall quality of education and promoting better learning outcomes for students in secondary schools (Kraft & Papay, 2019; Sims et al., 2021).

Conclusions

The study concludes that teachers' subject knowledge and pedagogical training are critical factors in enhancing instructional effectiveness. While each factor independently contributes significantly to teaching quality, their combined effect is the most impactful, highlighting the importance of integrating both aspects in teacher preparation and professional development programs. A holistic approach to teacher training is essential for improving instructional practices and student learning outcomes in secondary schools.

Recommendations

Based on the findings the following recommendations are made:

1. Teacher education programs should prioritize the integration of subject knowledge and pedagogical training to ensure educators are well-equipped to deliver high-quality instruction. This can be achieved through competency-based training models that emphasize the synergy between these two areas.
2. Continuous professional development initiatives should be tailored to address specific gaps in subject knowledge and pedagogical skills among teachers, focusing on interactive workshops, peer mentoring, and reflective teaching practices to enhance their instructional capacity.
3. Policymakers and educational stakeholders should allocate resources to support ongoing in-service training programs that foster both content mastery and advanced teaching methodologies, ensuring

that teachers remain adaptable to the dynamic needs of modern classrooms.

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