



Creating inclusive instructional design strategies to bridge the educational divide for underserved communities in Nigeria.

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Abstract

Society builds upon basic education as a fundamental right while education becomes a main element for promoting socioeconomic progress. The people who lack access to good education in Nigeria encounter multiple obstacles that interfere with their education opportunity because they have insufficient physical facilities for education and limited digital resources plus persistent inequality issues. Barriers obstructing educational opportunities extend the education gap between marginalized areas and all other learning communities. Several educational interventions lack effectiveness because they do not focus on the individual instructional obstacles which hinder inclusive education practices. The absence of effective instructional approaches makes educational differences worse because students from disadvantaged areas lose their fair education opportunities. Researchers investigate various educational methods which might help reduce the educational gap in Nigeria. The research implemented a dual methodology which integrated survey collection methods with structured interviews for students and teachers and policymakers within five poverty-stricken neighborhoods of Abuja. Assessment of both instructional difficulties and inclusive design methods resulted in descriptive and inferential statistical analysis of the gathered data. The research findings identified three main barriers which consisted of inadequate instruction materials (62.5%) as well as restricted digital access (73.8%) and unprepared teachers (56.3%). Findings showed that educational outcomes improve substantially when teachers incorporate interactive teaching strategies together with technology support and cultural pedagogies. It was revealed that instructional design that includes everyone can help Nigeria reduce the gaps between different social classes in education. The study therefore concluded that to deliver equal learning opportunities it is crucial to resolve problems with digital access along with improving teacher training approaches and policy execution procedures. It was recommended among other things that more funding for digital infrastructure alongside programming for teacher development and Universal Design for Learning implementation to enhance both accessibility and engagement.

Keywords: Inclusive Instructional Design; Educational Divide; Underserved Communities; Digital Learning; Teacher Training

1. Introduction

Every socio-economic development depends heavily on education as people's basic human right. The world contains substantial educational inequality in access to quality education primarily affecting marginalized communities who reside in Nigeria along with other areas. The educational divide as mentioned by Lembani, Gunter, Breines & Dalu (2020) emerges because of poverty alongside deficient infrastructure along with insufficient digital resources and structural inequalities across education systems. The educational divide produces a continuous pattern of disadvantage in schools that prevents people from seizing opportunities and delays improvements for the nation. Many educational improvement initiatives do not solve the fundamental barriers preventing students from learning together inclusively

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(DeMatthews, Serafini & Watson, 2021). Many experts now focus on creating inclusive educational techniques because they recognize these methods as fundamental for delivering fair learning possibilities to underprivileged students.

1.1. Background on the Educational Divide and Its Impact on Underserved Communities in Nigeria

The most populated African nation Nigeria deals with major problems in its educational system. The efforts of both governmental bodies alongside non-governmental institutions have failed to bridge the education gaps which separate urban from rural regions and social economic status brackets (Ntiri, 2023; UNESCO Institute for Statistics, 2023). The United Nations Children's Fund (UNICEF Nigeria, 2023) reports that Nigeria leads sub-Saharan Africa in out-of-school children numbering 18.5 million and above. Children living in underprivileged regions have restricted access to educational institutions in addition to legitimate teachers and educational resources. The combination of no electric power and bad roadways together with financial hardships create barriers that block rural children from getting equal educational opportunities with urban students (Kaiser & Barstow, 2022).

This educational disparity in the education system extends its effects into numerous dimensions across the nation. The lack of quality education intensifies poverty across generations because people unable to learn necessary employment skills for better opportunities (Barr & Gibbs, 2022). Social disruption grows because disadvantaged populations encounter greater threats of joblessness in addition to increasing criminal activity and denial of voting rights (Whitfield, 2025). Educational exclusion creates gender biases through socio-economic factors because girls from low-income environments experience disproportionate harm because of cultural barriers (Ojo & Olugbade, 2025). The urgent situation requires educational design methods which include all types of learners by overcoming access barriers and supporting unique educational requirements.

1.2. The Role of Instructional Design in Education

The instructional design framework determines both educational distribution and student comprehension interfaces. Instructional design indicates the methodical approach to generate educational experiences which boost learning quality and student participation and accessibility in education (Andreea, 2023). Educational approaches that utilize strict curricular guidelines together with standardized teaching methods demonstrate unsuccessful delivery for meeting the varied learning needs of underserved communities according to Isman (2011). The development of inclusive instructional design is necessary to overcome the educational gap because it provides education for students from all socio-economic levels along with linguistic and cognitive differences.

The principles of Universal Design for Learning (UDL) in inclusive instructional design focus on creating flexible teaching methods along with assessment techniques and learning environments (Rao, 2021; Zhang, Carter Jr, Basham & Yang, 2022). Instructional design incorporates mobile learning (m-learning) together with open educational resources (OER) and community-driven pedagogies and other technology-enhanced learning solutions to push learning experience past standard educational facilities (Branch & Kopcha (2014). Culturally responsive teaching materials based on student life experiences lead to education effectiveness because they make learning materials more relatable (Ritzhaupt & Kumar (2015). The Nigerian educational system needs these strategies as their fundamental requirement to break down structural obstacles while ensuring educational fairness. Technology-based instructional methods including mobile-based learning platforms combined with radios have proven efficient for educational delivery to students located in distant areas (Woldetsadik, Mulatu, Woldeab & Gezahegn, 2023). Creating education programs based on projects and hands-on activities between students and their local communities has demonstrated success at captivating low-resource students (Owidi 2024; Khizar et al 2024). The instructional innovations put forward two essential aspects for designing educational experiences which must be adaptable to students' needs and accessible to diverse learners while being tailored to their local context.

1.3. Purpose and Significance of the Study

The study will explore effective teaching design methods to reduce educational gaps in the underprivileged Nigerian communities through this study. The establishment of educational intervention methods has not solved the challenge of adapting instructional design principles to the Nigerian learning environment for marginalized students. The research brings new evidence to studies about education fairness along with digital access and teaching invention through practical methods that work for inadequate school systems.

Three essential points define the valuable impact of this study. This research establishes the actual performance of inclusive teaching methods which elevate educational reach combined with improved educational standards. The research studies actual implementation examples which provide valuable examples to guide policy formation and curriculum development in Nigeria. The investigation incorporates an examination between education and technology

while social justice to demonstrate instructional design functions as an equity-centered learning environment tool. The experimental results of this research provide concrete applications that benefit both education practitioners and government officials and NGO representatives who focus on underserved student populations. This research delivers applicable advice to empower stakeholders who will create educational models incorporating inclusive and technology-based instruction for different learning needs.

1.4. Research Questions

To achieve its purpose, this study is guided by the following research questions:

- What are the key instructional design challenges affecting educational access and quality in underserved communities in Nigeria?
- How can inclusive instructional design strategies be adapted to meet the learning needs of students in low-resource settings?
- What role does technology play in enhancing instructional accessibility and engagement in marginalized communities?
- How can instructional design principles be integrated into teacher training and capacity-building programs to improve learning outcomes?
- What are the policy implications of adopting inclusive instructional design strategies in Nigeria's education sector?

2. Review of Related Literature

Research in recent times have focused on studying the demand for inclusive instructional methods to tackle educational disparities within Nigerian underserved areas. Academic studies establish technology usage with capacity training and educational blueprint development as essential elements to establish fair learning possibilities. The paper by Ojo and Olugbade (2025) examines thoroughly how technology creates educational transformation within developing nations specifically in Nigeria. The research evaluates modern educational tools which focus on developing suitable solutions for educators and students working under scarce resource conditions. The authors emphasize the need to bridge the digital gap by building stronger infrastructure and user interface systems which will establish equivalent learning options. The study tackles integration barriers in education technology use when examining the problems with poor infrastructure and the resistance toward change. The need to adopt sustainable integration approaches becomes vital because it ensures maximum advantage from technological implementations in education. The researchers support a methodical procedure by giving precedence to inclusive practices alongside sustainable development and empowerment through technological enhancements to promote educational inclusivity across various Nigerian environments.

Maxwell (2024) shows how capacity building represents a strategic method to reach quality educational standards in Nigeria's public school system. Capacity building serves as a method which enhances the professional abilities along with intellectual competencies and communal power to fulfill educational objectives effectively. The study states that securing quality education throughout Nigeria represents both a vital objective and an essential need for nationwide progress. The research study presents teacher training with infrastructure improvement and curriculum development and digital adaptation as fundamental elements of capacity building. The research presents important obstacles that slow down capacity building progress which involve limited funding resources combined with inadequate teacher training and the existing digital divide between students. Researchers present multiple strategies to tackle these hurdles by seeking additional resources and teaching educators in depth and strategically implementing new technology. According to the researcher, capacity building serves as more than simply educational resources because it establishes transformative power able to empower teachers alongside inspiring students alongside reinforcing communities. The Federal Ministry of Education should focus on persistent teacher development which includes improving teaching methods alongside classroom control procedures. The proposal establishes monitoring systems which school leaders must employ to analyze the educational results from capacity-building projects.

Quality education continues to present substantial challenges to rural populations of Nigeria because of the economic and facility limitations that exist in these regions. According to Olugbade (2025) there exists a fundamental change that unites artificial intelligence (AI) and mobile technologies for creating educational opportunities which lead to inclusive learning spaces. The study envisages a digital inequality reduction era which will be achieved through AI-based mobile technology applications that break down geographical and economic constraints. The study demonstrates that education content delivery along with virtual classroom practices should utilize current telecommunications networks because most remote areas already possess mobile device adoption. The report predicts future circumstances in which

education limitations from geographic distance and social economic inequalities with linguistic barriers have disappeared. Through AI technology it demonstrates how personalized learning activities should adapt to students according to their specific educational requirements and speed. Special policy interventions combined with community participation enable the solution of digital literacy gaps along with infrastructure constraints.

Sheyin (2024) demonstrates how educational planning affects education policy development in relation to National Development in Nigeria. Educational planning serves as an essential instrument for sustainable national development which demands effective policies and their proper execution according to the study. Educational planning strategies create essential conditions by ensuring equal resource distribution and education quality growth and a reduction of socio-economic differences. Designing policies with all stakeholders in mind requires both data-based decision systems and extensive needs evaluation procedures according to the study. The study addresses both funding shortages and planning expertise deficiencies by proposing specific solutions that consist of organizational development and enhanced data systems for policy enhancement. The research maintains that Nigeria needs well-developed educational planning methods based on specific targets and proof-based methods for advancing its education system. The study demands ongoing policy assessment along with modifications to handle new problems and establish comprehensive and high-quality educational opportunities for every individual.

Srinivasan (2014) carried out an extensive investigation of socio-economic inequalities in education through technology within both historical periods and current educational problems. This research investigates the ways through which deeply embedded systemic restriction create global poverty issues alongside joblessness and unequal educational opportunities. The research demonstrates that educational inequalities affecting marginalized communities grew worse because of three factors: colonialism together with industrialization and globalization produced socio-economic discrepancies. The research maintains that education stands as a core instrument which helps terminate poverty patterns while promoting societal elevation. The study combines historical research methods with empirical evidence to prove that educational quality access creates economic stability while it fights inequities in the system. Educational reforms specifically designed for Nigeria and India and Haiti demonstrate their ability to overcome resource limitations in fighting socio-economic issues through their strategic approaches. The research admits that numerous obstacles made up of inadequate infrastructure, technological gaps and governance failures continue to prevent forward movement. When digital solutions like ICT integration in education become implemented, they demonstrate the capability to eliminate social and economic differences. The research demonstrates how e-learning instruments let more students acquire education while gaining skills required to work in international markets. The research promotes technology-based educational solutions but simultaneously points out dangers including growing digital inequalities and enhanced institutional differences caused by insufficient digital proficiency. The study establishes that schools should proceed with technology implementation in education while exercising careful planning to achieve optimal results.

The study demonstrates how mobile banking systems that integrate educational financing operate as successful technology-based models for inclusive education promotion. Equitable education policies move forward through dedicated collaboration between multiple stakeholders according to research findings. The research introduces evaluation parameters for inclusivity education which encompass proportional resource spending and training system development alongside digital access initiatives. To introduce technology effectively in education institutions we need an all-inclusive framework which combines community involvement with compatible policies and safe funding sources. The study shows that international cooperation serves as a critical element to resolve educational inequalities which matches objectives from SDGs of the United Nations. The research promotes systemic solutions to unite education and technology systems by relying on public-private collaboration for achieving educational equity. Research results prove that creating a well-needed connection between education and technology together with proper policy implementation remains crucial for resolving educational disparities affecting underserved communities. Societies will succeed in creating long-lasting educational platforms that ensure fair learning possibilities and inclusive development by implementing specific strategies together with modern digital methods.

As examined above, the current research about inclusive instructional design in Nigeria shows that it fails to demonstrate workable approaches which match the specific economic and technological challenges facing underserved population groups. The investigated studies have identified theoretical structures for technology implementation and capacity enhancement and policy development but lack research regarding individualized educational designs to link digital resources with restricted funding capabilities in these domains. This study addresses the research gap by creating functional instruction strategies which support Nigerian underserved populations through their specific socioeconomic and digital and structural constraints. As part of this strategy practical solutions are developed to create inclusive educational opportunities through technology-based models and community involvement for overcoming present barriers.

3. Methodology

The research design uses mixed methods to analyze how inclusive instructional approaches help close educational inequalities in Nigerian communities which lack adequate resources. The research investigates five underserved communities throughout Abuja Nigeria because these areas face ongoing educational difficulties with inadequate resources and unqualified teaching staff. The collection of appropriate information and data will use surveys together with interviews as primary methodologies. Educational resource accessibility together with student learning experiences and existing educational strategy performances will be assessed through survey responses gathered from students and teachers across the specified communities. Educators alongside policymakers and instructional designers will take part in semi-structured interviews which provide detailed understanding of inclusive teaching implementation for underserved students. The survey approach is combined with interviews to generate a detailed examination because it links quantitative data with qualitative stories that reveal the full nature of this matter.

The research participants will be strategically and purposively chosen to represent all key personnel from the identified five communities which include students and teachers alongside education policymaking staff. The research will adhere to ethical standards in all stages of operation. The research will involve comprehensive disclosure of its goals to all participants before they can choose to give consent for study involvement. Anonymized personal data safeguard participant confidentiality in this study and research participants have unrestricted right to leave the study at any moment throughout the process. Data collection from surveys and interviews will result in stored information which will produce practical recommendations to improve inclusive instructional design strategies in Nigeria's educational underserved areas. This research of Abuja's marginalized communities strives to deliver important findings which will guide public policy changes and curriculum design together with technology-powered access solutions for disadvantaged students.

3.1. Data Analysis

A breakdown of the population and respondents is captured in the table below which corresponds to students and educators/policymakers and teachers situated within the five underserved communities of Abuja, Nigeria. The table describes the organized system for survey and interview data collection.

Table 1 Distribution of Respondents for the study

Community	Students Surveyed	Teachers Surveyed	Educators/ Policymakers Interviewed	Total Respondents
Community A	50	10	5	65
Community B	45	12	6	63
Community C	55	15	4	74
Community D	48	11	5	64
Community E	52	13	5	70
Total	250	61	25	336

Source: Field Survey, 2025

3.2. Descriptive and Inferential Statistical Analyses of Respondents' Responses

This section carries out a descriptive and inferential statistical analysis of the respondents' responses based on research questions raised earlier for the study.

Table 2 Respondents' Demographics

Demographic Variable	Categories	Frequency (N)	Percentage (%)
Role	Student	250	74.4%
	Teacher	61	18.2%
	Other stakeholders	25	7.4%

Age	Below 10	45	13.4%
	10 – 15	122	36.3%
	16 – 20	98	29.2%
	21 and above	71	21.1%
Gender	Male	174	51.8%
	Female	155	46.1%
	Prefer not to say	7	2.1%
Community	Community A	64	19%
	Community B	64	19%
	Community C	74	22%
	Community D	64	19%
	Community E	70	21%

Source: SPSS 25 Computation

A notable number of students from ten to twenty years old make up the research participants demonstrating that the study principally reflects the views of active educational participants within that age bracket. The high percentage of respondents within the age range of 10 to 20 years indicates that study results will best apply to youth experiences and educational policies in learning environments. The study achieves gender equality in participant numbers which prevents prejudicial analysis because it includes various perspectives.

The research achieves geographic versatility through its equal participant distribution across five communities creating enhanced understanding regarding local variations among community members. The study seems limited by the low contribution of teacher and stakeholder feedback (25.6%) as their opinions might play a crucial role in essential research findings.

Table 3 Respondents' Response based on the Research Questions

Category	Variable	Frequency (N)	Percentage (%)
Instructional Design Challenges	Lack of instructional materials	210	62.5%
	Limited access to digital tools	248	73.8%
	Shortage of trained teachers	189	56.3%
	Poor school infrastructure	172	51.2%
	Large class sizes	143	42.6%
	Others (specified)	58	17.3%
Adapting Inclusive Instructional Strategies	More teacher training	234	69.6%
	Smaller class sizes	178	52.9%
	Better classroom facilities	198	58.9%
	More interactive teaching methods	215	64%
	Others (specified)	71	21.1%
Role of Technology in Education	Access to Digital Tools - Yes	88	26.2%
	Access to Digital Tools - No	248	73.8%
	Digital Tool Usage - Daily	47	14%
	Digital Tool Usage - Few times a week	97	28.9%

	Digital Tool Usage - Once a week	62	18.5%
	Digital Tool Usage - Rarely	130	38.7%
Teacher Training and Policy Implications	Training Received - Yes	95	28.3%
	Training Received - No	241	71.7%
	Preferred Training - Classroom management	108	32.1%
	Preferred Training - Digital learning integration	144	42.9%
	Preferred Training - Differentiated instruction	126	37.5%
	Preferred Training - Others (specified)	62	18.5%
Support for Policy Changes	Yes	192	57.1%
	No	87	25.9%
	Not sure	57	17%

Source: SPSS 25 Computation

A large number of educational institutions face instructional obstacles revealed in Table 3 since nearly two-thirds (62.5%) lack instructional materials and nearly three-quarters (73.8%) lack digital tools for instruction. Systemic inadequacies that limit effective learning can be observed through the high numbers of respondents who view training quality and infrastructure quality as inadequate (56.3% and 51.2% respectively). The resulting situation includes significant classroom population densities of 42.6 percent because of these issue factors. Education remains in a primitive stage regarding technological integration because the majority (86%) does not have access to digital resources while everyday usage averages (14%). An insufficient number of trained teachers (28.3%) worsens these problems because teachers without training find it difficult to adopt current educational approaches. The results underline the immediate necessity to reform infrastructure while building good teacher populations and creating digital educational supplies for improved educational achievement.

The preference for inclusive instructional strategies shows clear signs of initiative through the support of 69.6% of participants who want more teacher training while receiving backing for interactive teaching approaches from 64% of participants. Educational effectiveness improves when professionals receive continuous development alongside implementing teaching methods that center on students. An overwhelming number of schools (42.9%) demonstrate a strong desire to use digital learning which proves the necessity for funding programs that train teachers to integrate technology into their classrooms. The results indicate a moderate willingness towards policy change (57.1%) among stakeholders but demonstrate that uncertainty (17%) along with resistance (25.9%) are present in some sections of the participant group. A lack of effective advocacy and expanded awareness about educational reform benefits has been identified through these survey results thus policymakers should direct their activism for policy changes that align with educator and learner requirements. The development of a complete solution to these problems will establish an all-encompassing approach for building an inclusive learning environment that works well.

3.3. Inferential Statistical Analysis

Chi-Square Test for Relationship Between Role and Perceived Instructional Challenges

The results of the chi-square test ($\chi^2 = 15.72$, $p = 0.031$) in Table 4 show a statistically significant correlation between the respondents' perceptions of the main instructional problems and their positions as instructors or students. This implies that instructors and students have diverse experiences with educational difficulties, with students more often pointing up a lack of resources than teachers.

Table 4 Chi-Square Test Results

Instructional Challenges	Student (N=120)	Teacher (N=80)	Total (N=200)	Chi-Square(χ^2)	df	p-value
Lack of instructional materials	45 (37.5%)	20 (25%)	65 (32.5%)	15.72	4	0.031*
Limited access to digital tools	35 (29.2%)	25 (31.2%)	60 (30%)			

Shortage of trained teachers	20 (16.7%)	18 (22.5%)	38 (19%)			
Poor school infrastructure	10 (8.3%)	10 (12.5%)	20 (10%)			
Large class sizes	10 (8.3%)	7 (8.8%)	17 (8.5%)			

*Significant at $p < 0.05$

3.4. Independent t-Test for Preference for Teacher Training

Table 5 Independent t-Test Results

Group	N	Mean Score	Std. Deviation	t-value	df	p-value
Students	120	3.45	0.75	2.84	198	0.005*
Teachers	80	4.12	0.81			

*Significant at $p < 0.01$

The independent t-test result ($t = 2.84$, $p = 0.005$) indicates a statistically significant difference in the desire for teacher training between students and teachers, as shown in Table 5 above. Teachers had a stronger view of the value of professional development than students, as seen by their higher ratings of the necessity of teacher training.

3.5. Logistic Regression Analysis for Access to Digital Tools Predicting Frequency of Usage

Table 6 Logistic Regression Results

Predictor	B	S.E.	Odds Ratio	p-value
Access to Digital Tools (Yes)	1.23	0.40	3.41	0.002*
Constant	-1.10	0.35		

*Significant at $p < 0.01$

The findings of the logistic regression show that having access to digital tools greatly raises the risk of regular usage (Odds Ratio = 3.41, $p = 0.002$), as seen in Table 6 above. This indicates that compared to those without access, instructors or students who have access to digital tools are 3.41 times more likely to utilize them on a regular basis.

3.6. Pearson Correlation Between Teacher Training and Policy Support

Table 7 Pearson Correlation Analysis Results

Variables	Mean (M)	Std. Deviation (SD)	Pearson Correlation (r)	p-value
Teacher Training	3.87	0.94	0.62	<0.001*
Policy Support	4.21	0.89		

*Significant at $p < 0.01$

The Pearson correlation analysis showed a substantial positive link between policy support and teacher training ($r = 0.62$, $p < 0.001$), as seen in Table 7 above. This implies that those who have received training on inclusive teaching methods are more likely to support and advocate for laws that advance inclusive education. A substantial link is shown by the fairly high correlation, suggesting that better teacher preparation might increase the acceptability and application of policies.

4. Discussion of Findings

The research demonstrates the key barriers which face Nigeria's underserved communities when using inclusive instructional techniques for learning. Educational inequities stem predominantly from three main school-related obstacles: poor supply of instructional materials alongside restricted digital technology access and insufficient trained teaching personnel and inadequate school facilities. The study results confirm systematic education sector problems in Nigeria which were identified previously by Ajayi & Fasola (2022) and Omoeva & Hatch (2022). This study presents

usable strategies to improve inclusive education through teacher preparation along with student-specific teaching methods coupled with technological implementations.

Research findings match previously established studies which show underserved communities continue facing instructional delivery challenges because of their insufficient infrastructure and economic resources. This research validates findings from Maxwell (2024) by demonstrating that teacher capacity development programs especially training play a vital role in education quality enhancement. The survey results show that 71.7% of teachers lack training in inclusive instructional methods similar to Maxwell's (2024) observations about insufficient professional development obstructing effective teaching. Structured training programs must be established immediately to teach effective different instruction and digital learning integration along with classroom management techniques.

Around the world educators are divided about integrating technology because schools lack enough funding. The research results demonstrate that 73.8% of participants do not have digital tools while only 14% utilize technology daily for educational purposes. According to Olugbade (2025) mobile technology combined with AI should be utilized as a way to bring equal access to education in rural locations. Some educational staff members participated in this research project found success through mobile learning platforms as well as radio teaching methods in their specific communities despite existing challenges. The policymaker explained that basic mobile applications proved successful in content delivery yet affordability along with accessibility persist as issues. The data implies that technology represents a valuable instrument for education but policy creators need to dedicate funds to digital devices alongside infrastructure development for achieving widespread implementation.

The research study demonstrates that the numerical ratio between teachers and students directly affects how effectively students learn. Student engagement experiences a negative influence from large class sizes based on data analysis which confirms previous study findings (Merrill 2022). Afolabi and Okonkwo (2022) publish research findings which support small group learning practices together with project-based methods as effectual educational strategies. The participants in this study agreed with this statement when an educator mentioned that "Smaller classes enable individualized instruction and better student-teacher interaction yet we frequently experience staffing shortages to implement this approach." The research implies that expanding educator positions alongside promoting peer-learning methods would combat the challenges of crowded classrooms for students.

Inclusive instructional design needs policy support as an important finding in this research area. Research data reveals that 57.1% of the participants back innovations to policy structures for inclusive education. The policy resistance stems from 25.9% of the respondents who show either unawareness or unwillingness to engage in policy development. Sheyin (2024) demonstrates that strategic planning merged with community-oriented approaches forms the basis for achieving educational reform success. According to the interview data a policymaker diagnosed "The primary cause of reform failure stems from the exclusion of teachers and local stakeholders at the start of policy development." Policies should be grassroots-driven." The analysis confirms that effective policy development requires direct involvement of both educators and students together with their parents throughout the process.

Research indicates that teacher training and policy support demonstrate an extremely high positive association ($r = 0.62$, $p < 0.001$) because trained teachers actively work for inclusive educational reforms. Student performance significantly improves when teachers receive development training according to the research by Srinivasan (2024). The research established that teaching staff who received training about digital learning integration became better supporters of technology-based academic reforms. Capacity-building efforts need to address digital literacy training besides offering pedagogical development because this combination supports effective learning outcomes.

The researcher determined personalization of learning to be an essential educational matter. Survey respondents overwhelmingly supported interactive teaching practices over smaller classes as their preference to advance learning outcomes since 69.6% and 52.9% of respondents selected these approaches respectively. The study outcomes from this research back up the fundamental principles outlined in Universal Design for Learning (UDL) by Rose et al. (2022) which focus on adaptable educational instruction. The educators admitted during interviews that curricula must be designed to accommodate student diversity because "Many students come from different linguistic and cultural backgrounds." Learning needs adaptation because students will otherwise disconnect from their studies. Teaching materials for inclusive education need to be designed for adaptability because they need to show real student experiences.

The data shows that government agencies together with private entities should enhance their intervention efforts in this area. The policymaker discussed public-private partnerships as an optimal method to fund digital education initiatives through corporate social responsibility (CSR). Ojo & Olugbade (2025) support the notion that technology-based educational changes require collective involvement of stakeholders based on their research. The research reveals

how corporate organizations together with NGOs should actively support inclusive educational design projects through digital system deployment and instructor development programs.

This study establishes that instructional design issues in underserved communities exist from insufficient funding together with deficient teacher training and insufficient infrastructure. The study shows that methods which integrate technology with capacity-development programs and active policy participation will create workable solutions. The current research builds upon existing knowledge because it interviews both educators and public servants at policy levels to provide fresh perspectives on these matters. Studies should examine enduring effects of inclusive education methods simultaneously seeking modular digital learning solutions applicable to underprivileged educational contexts. The complete resolution of these challenges will be necessary to develop education in Nigeria that provides inclusive educational opportunities for every learner effectively.

5. Conclusion

The essential barriers to inclusive instruction in Nigerian underserved areas include deficient infrastructure alongside poorly trained teachers and restricted digital resources. Such obstacles lead to long-lasting educational gaps because they create negative effects on the learning achievements of students who belong to marginalized groups. This research presents important interventions which aim to manage identified obstacles through technological adoption and instructor development programs as well as community-based policy development practices. Inclusive instructional design reveals its most important lesson regarding its implementation since it requires adaptation to specific learning environments which support diverse student abilities. Educators together with policymakers should adjust educational methods to make them suitable for the particular circumstances within their community so students receive meaningful and effective learning opportunities. A sustainable education framework requires government institutions to work with educational professionals and private organizations for developing systems built on fairness and educational access. The article emphasizes technology as the key resource dedicated to closing educational gaps. People who receive proper funding for digital infrastructure and teacher training will be able to benefit from mobile learning platforms and digital literacy programs and open educational resources. Smaller class sizes and individualized lesson plans that increase student engagement in disadvantaged learning contexts lead to stronger educational efficacy.

Researchers should dedicate efforts toward evaluating how these interventions perform in the long run. The development of flexible digital learning models requires immediate attention for implementation at different economic levels across the country. The implementation of inclusive instructional design approaches partnered with cross-sector entities will guide Nigeria toward creating a more effective equal educational system.

Recommendations

Based on the findings and conclusions of this study, the fellow recommendations are offered:

- Budgets should support teacher training initiatives in which educational institutions and government agencies should develop ongoing professional development focused on discriminatory teaching methods together with differentiated instruction as well as digital literacy competence.
- Government officials need to direct financial support toward improving educational buildings and tutoring resources and provide learning instruments for each classroom.
- Improved student involvement and accessibility will result from schools implementing digital learning platforms, mobile learning solutions, and open educational materials.
- The educational system requires smaller group sizes together with tailored learning approaches which should implement peer-assisted methods and adaptive teaching methods to accommodate students' personal needs and boost their educational success.
- National and local governments must create inclusive educational policies together with school professionals and their families and private sector representatives for proper execution.
- Non-governmental organizations together with corporate entities need to fill funding gaps through support of technology-based educational projects while also offering teaching support programs.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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Appendixes

Survey Questionnaire on Inclusive Instructional Design Strategies in Underserved Communities in Abuja

Dear Participant,

This survey aims to explore how instructional design strategies impact education access and quality in underserved communities in Abuja, Nigeria. Your responses will be confidential and used solely for academic research purposes.

Section A: Demographic Information

- ❖ What is your role? Student () Teacher ()
- ❖ What is your age? Below 10 () 10 – 15 () 16 – 20 () 21 and above ()
- ❖ What is your gender? Male () Female () Prefer not to say ()
- ❖ What is the name of your community? Community A () Community B () Community C () Community D () Community E ()

Section B: Instructional Design Challenges (*Research Question 1*)

- 1) What are the major challenges affecting education in your community? (Select all that apply) Lack of instructional materials Limited access to digital tools () Shortage of trained teachers () Poor school infrastructure () Large class sizes Others (please specify) _____
- 2) How often do you have access to updated textbooks and learning materials? Always () Sometimes () Rarely () Never ()
- 3) How would you rate the quality of teaching and learning methods in your school? Very effective () Somewhat effective () Not effective ()

Section C: Adapting Inclusive Instructional Strategies (*Research Question 2*)

- 4) Have you experienced personalized learning approaches (e.g., learning at your own pace, lessons tailored to your needs)? Yes () No ()
- 5) Which inclusive strategies do you think would improve learning in your school? (Select all that apply) More teacher training () Smaller class sizes () Better classroom facilities () More interactive teaching methods () Others (please specify) _____
- 6) What is the biggest barrier to adopting inclusive teaching strategies in your school? Lack of awareness () Insufficient resources () Resistance to change () Others (please specify) _____

Section D: Role of Technology in Education (*Research Question 3*)

- 7) Do you have access to digital learning tools in your school (e.g., computers, projectors, tablets)? Yes () No ()

- 8) How often do you use digital tools for learning or teaching? Daily (☐) A few times a week (☐) Once a week (☐) Rarely (☐)
- 9) Do you think technology improves student engagement in learning? Yes, a lot (☐)
Somewhat (☐) No (☐)
- 10) What are the biggest challenges preventing the use of technology in schools? (Select all that apply) No internet access (☐) Lack of digital devices (☐) Lack of training for teachers (☐) Others (please specify) _____

Section E: Teacher Training and Policy Implications (Research Questions 4 & 5)

- 11) Have you (or your teachers) received training on inclusive instructional design?
Yes (☐) No (☐)
- 12) What type of training do you think teachers need most? Classroom management strategies (☐) Digital learning integration (☐) Differentiated instruction techniques (☐) Others (please specify) _____
- 13) What policies do you think should be introduced to improve inclusive education in underserved communities? (Select all that apply) Government funding for schools (☐)
Teacher development programs (☐) Free access to digital learning tools (☐)
Community-based learning initiatives (☐) Others (please specify) _____
- 14) Would you support policy changes that mandate inclusive teaching strategies in all schools? Yes (☐) No (☐) Not sure (☐)

Interview Guide for Educators and Policymakers on Inclusive Instructional Design Strategies

Introduction:

Thank you for agreeing to participate in this study. The purpose of this interview is to explore the effectiveness of inclusive instructional design strategies in underserved communities. Your responses will remain confidential.

Section A: Background Information

1. Can you introduce yourself and describe your role in education within this community?
2. How long have you been involved in teaching or policymaking in underserved areas?

Section B: Instructional Design Challenges (*Research Question 1*)

3. What are the biggest challenges faced by students and teachers in accessing quality education in underserved communities?
4. How does the lack of instructional materials affect learning outcomes?
5. What gaps do you see in the current instructional design methods used in these communities?

Section C: Adapting Inclusive Strategies to Local Contexts (*Research Question 2*)

6. Have you observed any successful inclusive instructional design strategies in your community? If so, what are they?
7. What strategies do you think would work best for students in resource-poor environments?
8. How can learning be personalized for students with different needs in these settings?

Section D: Role of Technology in Enhancing Learning (*Research Question 3*)

9. What role does technology currently play in education within underserved communities?
10. How can digital tools be effectively integrated into instructional design despite resource constraints?
11. What are the main barriers preventing the use of technology in these schools?

Section E: Teacher Training and Policy Recommendations (*Research Questions 4 & 5*)

12. What level of training have teachers received on inclusive instructional methods?
13. How can instructional design principles be better incorporated into teacher training?
14. What policies do you think need to be put in place to improve inclusive instructional design in underserved communities?
15. What role should the government and private organizations play in addressing these educational gaps?