

Educational Technology and Instructional Supervision for Inclusive Education in Public Secondary Schools in Nsukka Education Zone, Enugu State, Nigeria: Implications for Curriculum Implementation

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HOW TO CITE: ABSTRACT

Badmus Ayodeji Muideen, Ohadiugha Marian Nwakaego, Oruonyeije Appolonia Ahunna, Ogele Ibem Ukpai, Ejilibe Elizabeth Ebere, Nwachukwu Kingsley Ugochukwu, Chukwu Leonard Chinweuba, Chukwu Peter Ndubisi, Nweke Prince Onyemaechi, Chukwu, Chukwuemeka Joseph, Rev. Barr. Aboki Zhawa (2026). Educational Technology and Instructional Supervision for Inclusive Education in Public Secondary Schools in Nsukka Education Zone, Enugu State, Nigeria: Implications for Curriculum Implementation.

The study investigated educational technology and instructional supervision for inclusive education in public secondary schools in Nsukka Education Zone, Enugu State, Nigeria, with implications for curriculum implementation. The study adopted a descriptive survey research design and was guided by four research questions. The population comprised 7,830 teachers in public secondary schools in Nsukka Education Zone, from which a sample size of 783 teachers (10%) was selected, following Nwana's (1981) guideline. Data were collected using a researcher-developed instrument, titled: Educational Technology and Instructional Supervision for Inclusive Education Questionnaire (ETSISEQ). The instrument was faced validated by three experts in the Faculty of Education, University of Nigeria, Nsukka. The overall reliability of the instrument was established through a reliability test, which yielded a Cronbach's alpha coefficient of 0.84. Data were collected directly from the respondents with the assistance of trained research assistants and were analysed using mean and

International Journal of Special
Education, 41(23s), 1017 - 1035

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standard deviation. A criterion mean of 2.50 was used for decision-making, with mean scores of 2.50 and above indicating high extent or level and mean scores below 2.50 indicating low extent or level. The findings of the study revealed that educational technology was utilized to a high extent for inclusive education, with a grand mean of 2.63. Instructional supervision was also carried out to a high extent, with a grand mean of 2.64. Inclusive education practices were implemented at a high level, with a grand mean of 2.69, while curriculum implementation was also at a high level, with a grand mean of 2.69. However, relatively lower ratings were observed in the use of assistive technology, follow-up of supervisory recommendations, provision of specialized support and adaptation of classroom activities for diverse learners. The study concluded that although educational technology, instructional supervision, inclusive education practices and curriculum implementation were generally at high levels, important areas requiring further improvement remained. The study recommended among others that schools should strengthen the provision and utilization of assistive technologies and enhance continuous instructional supervision and teacher support for diverse learners.

Keywords: Educational technology, instructional supervision, inclusive education, curriculum implementation

Introduction

The growing demand for equitable and quality education for all learners has raised serious concerns about the capacity of public secondary schools to respond effectively to differences in learners' abilities, learning needs, backgrounds and circumstances. The concern is that although inclusive education requires schools to provide meaningful opportunities for all learners to participate in teaching and learning, many public secondary schools continue to operate within instructional environments characterized by uniform teaching approaches, limited instructional resources, inadequate technological facilities and supervisory practices that may not sufficiently address learner diversity. At the same time, educational technology is increasingly recognised as a potential means of improving access to learning resources, supporting differentiated instruction, facilitating communication, enhancing learner engagement and providing alternative ways of presenting and

assessing knowledge. However, the availability of technology alone does not guarantee inclusive education or effective curriculum implementation. The central concern is therefore whether educational technology is being appropriately integrated into classroom instruction and whether instructional supervision is sufficiently responsive to ensure that technology-supported practices contribute to inclusive learning and effective implementation of the secondary school curriculum.

Educational technology has become an important component of contemporary education because it provides teachers with opportunities to extend instruction beyond conventional textbooks, chalkboards and teacher-centred classroom practices. Digital learning platforms, computers, mobile devices, interactive instructional materials, multimedia resources, educational applications, digital assessment systems and assistive technologies

can provide learners with different ways of accessing and interacting with curriculum content. This possibility is particularly important for inclusive education because learners differ in the ways they perceive, process and demonstrate knowledge. Fernández-Batanero, Montenegro-Rueda, Fernández-Cerero and García-Martínez (2022) found that assistive technologies can promote the inclusion of learners with disabilities by improving access to instructional content and learning activities, although effective application requires appropriate teacher preparation and accessibility. Bray, Brown and Green (2024) similarly established that technology can support Universal Design for Learning by creating flexible learning environments that provide multiple means of engagement, representation and expression. These findings indicate that educational technology can contribute meaningfully to inclusive education when it is deliberately integrated into pedagogy and curriculum objectives.

The importance of technology integration in secondary education is further demonstrated by recent systematic reviews. Msafiri, Kangwa and Cai (2023) reviewed empirical studies on information and communication technology integration in secondary schools and found that technology can support curriculum coverage, equitable access to learning resources, shared learning and personalised learning. However, the review also identified inadequate professional development, insufficient technological and pedagogical knowledge, limited resources, maintenance problems and curriculum misalignment as major barriers to effective integration. In a more recent review, Msambwa, Kangwa and Cai (2024) reported that effective technology integration requires alignment between technological resources and learning objectives, continuous development of teachers' technological and pedagogical competencies, reliable infrastructure and a supportive school environment. The implication is that educational technology should not be viewed simply as a collection of devices but as part of a broader instructional system involving teachers, school

leaders, learners, curriculum planners and other educational stakeholders.

Inclusive education further requires a shift from simply placing learners with diverse needs in the same classroom towards ensuring that they participate meaningfully in teaching and learning. Koutsouris, Bremner and Stentiford (2024), in a critical systematic review of international literature on inclusive pedagogies in secondary schools, observed that inclusive practice at secondary level presents particular challenges because of subject specialisation, examination pressures, curriculum compartmentalisation and limited opportunities for teacher collaboration. Their findings suggest that secondary school teachers require flexible instructional strategies capable of accommodating differences among learners while maintaining the objectives of subject-specific curricula. Educational technology can provide some of the flexibility required, particularly where digital resources allow teachers to present information through different media, provide additional explanations, support independent learning and offer alternative methods of assessment. However, these opportunities are unlikely to be realised where teachers lack the competence to integrate technology meaningfully into their pedagogical practices.

The international evidence also demonstrates that inclusive education requires strong teacher and school-level support. Subban, Woodcock, Sharma and May (2022), in a systematic review of student experiences of inclusive education in secondary schools, identified supportive teachers, positive school leadership, appropriate teaching practices and accessible learning environments as important conditions for successful inclusion. The findings suggest that inclusion cannot be achieved through policy declarations alone because classroom teachers and school leaders play central roles in determining whether learners experience genuine participation. This reinforces the importance of instructional supervision because supervision can provide a structured mechanism through which classroom practices are observed,

instructional challenges are identified and teachers receive professional support. In a technology-supported inclusive environment, instructional supervision should consequently extend beyond conventional monitoring to include the quality of technology integration, accessibility of instructional materials, differentiation of learning activities and responsiveness to diverse learners.

The African educational context presents additional challenges because technology-supported inclusive education is often implemented within environments characterised by infrastructural limitations, unequal access to digital resources and variations in teachers' technological competence. Msambwa, Kangwa and Cai (2024), in their review of information and communication technology integration in secondary education, identified professional development, teacher competence, infrastructure and supportive educational environments as essential conditions for effective technology use. Oubibi, Fute, Kangwa, Barakabitze and Adarkwah (2024), in a systematic review of interactive technologies in teacher education across Africa, similarly demonstrated the increasing role of interactive technologies in strengthening teacher preparation while identifying infrastructure, access and capacity development as continuing concerns. These findings are relevant to public secondary schools in Nigeria because the effective use of educational technology depends not only on the acquisition of devices but also on the capacity of teachers and school leaders to use available technologies in ways that correspond with curriculum requirements and learner needs.

Evidence from African education systems also indicates that technology integration requires active involvement from school leaders and other stakeholders. Msafiri, Kangwa and Cai (2023) found that school leadership, policy support, professional development and stakeholder participation were important components of successful technology integration in secondary education. The implication is that teachers cannot be expected

to independently overcome technological, pedagogical and infrastructural barriers. School administrators and instructional supervisors have responsibilities for creating supportive conditions, identifying professional development needs, monitoring the use of instructional technologies and ensuring that technology is connected with curriculum objectives. Consequently, instructional supervision represents an important link between educational policy and classroom practice.

In Nigeria, the need for inclusive education has received increasing policy and scholarly attention. The National Policy on Inclusive Education provides for measures aimed at improving educational access and participation for learners with disabilities and other learners requiring additional support. Such measures include teacher preparation, curriculum adaptation, the use of appropriate communication systems and provision of facilities and resources capable of supporting diverse learners (Federal Ministry of Education, 2024). The existence of such policy provisions, however, does not automatically ensure effective implementation. The extent to which inclusive education becomes meaningful depends considerably on the capacity of schools to translate policy expectations into classroom practices through appropriate teaching strategies, accessible instructional materials, competent teachers, effective supervision and adequate resources. Importantly, recent Nigerian studies provide evidence of continuing challenges in implementing inclusive education. Ayodele (2024), in the Federal Capital Territory, found that supervision, curriculum, facilities and funding were important considerations in the management of inclusive education in secondary schools. The study emphasised the importance of monitoring schools to determine whether curriculum provisions are appropriately adapted for different categories of learners. Ukala and Adieme (2024), in Rivers State, similarly examined the implementation of inclusive education policy in junior secondary schools and identified challenges associated with translating policy provisions into effective school-level

practices. These findings indicate that the implementation of inclusive education in Nigeria remains dependent on the availability of resources, teacher preparedness, school leadership and continuous monitoring of instructional practices.

The importance of instructional supervision in the Nigerian context is also supported by recent empirical evidence. Awah, Edinoh and Okpunukpang (2024) reported that supervision contributes to curriculum implementation by helping to monitor lesson preparation, classroom management, instructional delivery, assessment and other teaching processes. Ashibebongye, Agube, Ategwu and Unamba (2024) also examined supervision as a correlate of curriculum reform implementation in secondary schools and demonstrated the continuing relevance of supervisory processes to the successful implementation of curriculum reforms. Ayo-Vaughan, Ajani and Oyeade (2025) further reported that school managers' supervisory roles were associated with teachers' classroom delivery in secondary schools in Delta State. Taken together, these findings indicate that effective supervision can strengthen curriculum implementation by providing teachers with guidance and feedback while identifying areas in which instructional practices require improvement.

The emergence of educational technology has, however, expanded the responsibilities of instructional supervisors. Shehu (2023) examined artificial intelligence, instructional supervision and curriculum implementation in post-basic education in Abuja and reported that emerging technologies could support supervision and curriculum implementation. The study recommended improved technological facilities and continuous capacity development for teachers and supervisors. Otemuyiwa and Mefun (2023), however, found low levels of awareness and use of the Edulastic application among senior secondary school teachers in Kwali, Abuja, with inadequate electricity, network connectivity and weak integration of technology into curriculum delivery identified among the constraints. These findings reveal an

important tension within Nigerian secondary education: educational technology has the potential to improve curriculum delivery, but teachers may not have adequate access, knowledge, infrastructure or supervisory support to use available technologies effectively. Recent evidence has also demonstrated the instructional benefits that may arise from appropriate technology use in Nigerian schools. Atomatofa, Inaighe, Ewesor, Babatope and Kachikwu (2025) found that science instruction supported by animation videos produced better learning outcomes than conventional lecture-based instruction among rural Nigerian secondary school learners. The findings suggest that technology-supported instructional resources can improve learner engagement and understanding even in contexts where educational resources are limited. The implication for inclusive education is that appropriately selected technology can provide additional explanations, visual representations and alternative learning experiences that may benefit learners who experience difficulties with conventional forms of instruction. Nevertheless, the effectiveness of such resources depends on teachers' ability to integrate them into the curriculum and on school-level conditions that support their continued use.

The issue of teacher capacity is therefore central to both educational technology and inclusive education. A teacher may have access to computers, mobile devices or digital instructional materials without possessing the pedagogical competence required to use them effectively. Similarly, a school may have an inclusive education policy without teachers possessing sufficient knowledge of differentiated instruction, assistive technologies or curriculum adaptation. Msafiri, Kangwa and Cai (2024) emphasised that technological knowledge needs to be combined with pedagogical understanding if technology is to produce meaningful educational benefits. This implies that teacher professional development should move beyond basic training in the operation of technological devices towards the development of competencies in technology-supported

pedagogy, inclusive instructional strategies, digital assessment, learner engagement and curriculum adaptation.

The role of school leadership is equally important. School leaders determine, to a considerable extent, whether teachers receive opportunities for professional development, whether technological facilities are maintained, whether innovative teaching practices are encouraged and whether supervision is conducted in a manner that supports professional growth. Effective instructional supervision should therefore be developmental rather than purely fault-finding. Supervisors should assist teachers in identifying appropriate technologies, adapting instructional materials for diverse learners, monitoring learner participation and evaluating whether technology-supported practices contribute to curriculum objectives. Such supervision can help ensure that technology is not merely present in schools but is actually contributing to meaningful teaching and learning.

The contemporary understanding of the issue has therefore moved towards an integrated view of educational technology, inclusive education, instructional supervision and curriculum implementation. Educational technology provides tools and resources that can improve accessibility and flexibility; inclusive education establishes the principle that learners with different needs should have meaningful opportunities to participate; instructional supervision provides professional guidance and monitoring; and curriculum implementation provides the framework within which learning objectives, content, instructional methods and assessment are organised. These dimensions are interconnected. Weakness in one dimension can undermine the effectiveness of the others. For example, technological facilities may remain underutilised where teachers lack professional support, while strong supervision may have limited impact where schools lack adequate instructional resources. Effective curriculum implementation therefore requires these components to operate in a coordinated manner. Nevertheless, an important gap remains

in existing empirical literature. International studies have generated substantial evidence on technology integration and inclusive pedagogy, while African studies have increasingly examined digital technology, teacher preparation and educational access. Nigerian studies have also examined inclusive education, instructional supervision, curriculum implementation and technology integration. However, many of these studies have investigated the variables independently rather than examining educational technology and instructional supervision together within the context of inclusive education. The available literature therefore provides limited empirical explanation of how the combination of technology-supported instructional practices and effective supervision can contribute to inclusive curriculum implementation in public secondary schools.

Hence, there is also a geographical gap that warrants investigation. Studies conducted in Abuja, Rivers State, Cross River State, Delta State and other locations provide useful evidence, but their findings cannot automatically be generalised to public secondary schools in Nsukka Education Zone, Enugu State. Differences in school infrastructure, teacher competence, supervisory arrangements, technological access, learner characteristics and administrative practices may produce different educational realities. A study specifically situated within Nsukka Education Zone is therefore necessary to establish the conditions under which educational technology and instructional supervision support inclusive education and curriculum implementation within the local context. The practical gap is equally important. The increasing emphasis on digital transformation in education creates opportunities for improving the accessibility and quality of secondary education, but the success of these initiatives depends on what occurs at school and classroom levels. Where technology is introduced without adequate teacher training, infrastructure, maintenance and supervision, its educational value may remain limited. Where supervision focuses only on administrative compliance without examining technology-

supported pedagogy and inclusive instructional practices, important barriers to curriculum implementation may remain undetected. There is therefore a need for evidence that can guide educational administrators, school leaders, teachers, supervisors and policy makers in determining how educational technology and instructional supervision can be coordinated to improve inclusive education.

The way forward requires public secondary schools to adopt a coordinated approach to technology-supported inclusive curriculum implementation. Schools need appropriate and accessible technological resources, reliable electricity and connectivity, adequate instructional materials and continuous maintenance of available facilities. Teachers require sustained professional development that combines technological competence with inclusive pedagogy, curriculum adaptation, differentiated instruction and appropriate assessment practices. Instructional supervisors need corresponding professional capacity to assess technology-supported teaching, provide constructive feedback, identify barriers to inclusion and support teachers in improving their classroom practices. School leaders should also promote collaborative professional learning and create conditions in which teachers can share experiences and develop contextually appropriate approaches to technology integration. In addition, curriculum implementation should be monitored in terms of actual learner participation, accessibility, engagement and achievement rather than simply the completion of prescribed curriculum content. Inclusive education should be reflected in the ways teachers present learning materials, organise classroom activities, assess learners and respond to individual differences. Educational technology should consequently be selected according to its capacity to address identified instructional and learner needs rather than because it represents technological advancement. Instructional supervision should then provide the professional mechanism for ensuring that such technologies are used

appropriately, ethically and consistently within the curriculum.

Interestingly, the increasing diversity of learners and the expanding role of technology in education have made educational technology and instructional supervision important considerations in the pursuit of inclusive education and effective curriculum implementation. International evidence demonstrates that technology can improve accessibility, learner engagement, personalised learning and flexible instructional practices, while African evidence highlights the importance of teacher competence, infrastructure, professional development and institutional support. Nigerian evidence further indicates that supervision, curriculum adaptation, teacher capacity, technological resources and school leadership are essential to successful inclusive education and curriculum implementation. However, limited empirical evidence exists on the combined role of educational technology and instructional supervision in supporting inclusive education within public secondary schools in Nsukka Education Zone, Enugu State. The present study is therefore justified by the need to provide context-specific empirical evidence on how educational technology and instructional supervision can be harnessed to strengthen inclusive education and improve curriculum implementation in public secondary schools.

Statement of the Problem

Inclusive education in public secondary schools is expected to provide equitable opportunities for all learners to participate meaningfully in teaching and learning, irrespective of differences in ability, learning needs and individual circumstances. In an ideal educational setting, public secondary schools should provide accessible instructional resources, appropriate educational technologies, competent teachers and effective instructional supervision capable of supporting diverse learners and ensuring that the prescribed curriculum is implemented effectively. Educational technology should be

appropriately integrated into classroom instruction to provide flexible ways of presenting learning content, engaging learners and assessing learning outcomes. Similarly, instructional supervision should provide continuous professional guidance, monitoring and feedback to teachers to ensure that classroom practices are responsive to learner diversity and consistent with curriculum requirements. However, the prevailing situation in many public secondary schools suggests a considerable gap between these expectations and actual practice. Inclusive education continues to encounter challenges relating to inadequate instructional resources, limited technological facilities, insufficient teacher preparation, inadequate support for learners with diverse needs and weaknesses in the implementation of inclusive education policies. The availability of educational technology also remains a concern, particularly where schools experience inadequate electricity supply, poor internet connectivity, limited access to digital instructional resources and insufficient opportunities for teachers to develop the competencies required for effective technology integration. Where these conditions exist, educational technology may remain underutilised or may be used mainly for conventional teaching rather than as a means of providing differentiated and accessible learning experiences.

Instructional supervision presents another concern. Ideally, supervision should extend beyond routine inspection and administrative monitoring to include professional support for teachers in lesson preparation, instructional delivery, classroom management, assessment, technology integration and adaptation of teaching strategies to meet diverse learning needs. In practice, supervisory activities may not always provide sufficient attention to the effective use of educational technology or the implementation of inclusive instructional practices. Inadequate supervisory support may leave teachers without the necessary guidance to identify barriers to learning, adapt curriculum content, select appropriate technological

resources and employ instructional approaches capable of accommodating learners with different educational needs. The situation becomes more challenging where educational technology and instructional supervision are considered separately rather than as complementary components of inclusive education. The availability of technological resources without effective supervision may result in poor utilisation, while effective supervision without adequate technological and instructional resources may limit the ability of teachers to provide flexible and accessible learning experiences. Consequently, the presence of an inclusive education policy or the provision of technological facilities does not necessarily guarantee effective curriculum implementation. What remains important is whether schools possess the capacity to integrate available technologies into instruction and whether supervisory processes are sufficiently effective to guide, monitor and improve such practices.

The problem is further heightened by the fact that curriculum implementation in public secondary schools requires teachers to address differences in learners' abilities, interests, learning pace and educational needs while still achieving prescribed curriculum objectives. Where instructional practices remain predominantly uniform and technology is not effectively integrated, some learners may experience difficulties in accessing instructional content, participating in classroom activities and demonstrating their learning. Similarly, where instructional supervision does not adequately monitor inclusive practices, weaknesses in teaching and curriculum implementation may continue without timely professional intervention. In Nsukka Education Zone, the extent to which educational technology and instructional supervision are being utilised to support inclusive education and curriculum implementation in public secondary schools remains insufficiently established. There is limited empirical evidence showing whether available educational technologies are adequately accessible and effectively integrated into classroom instruction, whether instructional

supervision provides sufficient support for inclusive teaching practices, and how these factors collectively relate to effective curriculum implementation. This lack of context-specific evidence makes it difficult to determine the specific technological, instructional and supervisory measures required to strengthen inclusive education within the Zone. The problem of this study, therefore, is the inadequate empirical understanding of how educational technology and instructional supervision support inclusive education and contribute to effective curriculum implementation in public secondary schools in Nsukka Education Zone, Enugu State, Nigeria. Unless this problem is systematically investigated, gaps in technology utilisation, teacher support, instructional supervision and curriculum implementation may continue to constrain the provision of equitable and meaningful learning opportunities for diverse learners in public secondary schools.

Purpose of the Study

The purpose of the study was to examine educational technology and instructional supervision for inclusive education in public secondary schools in Nsukka Education Zone, Enugu State, Nigeria. Specifically, the study seeks to:

1. determine the extent of educational technology utilisation for inclusive education in public secondary schools in Nsukka Education Zone.
2. determine the extent of instructional supervision for inclusive education in public secondary schools in Nsukka Education Zone.
3. determine the level of inclusive education practices in public secondary schools in Nsukka Education Zone.
4. determine the level of curriculum implementation in public secondary schools in Nsukka Education Zone.

Research Questions

The following research questions guided the study:

1. What is the extent of educational technology utilisation for inclusive education in public secondary schools in Nsukka Education Zone?
2. What is the extent of instructional supervision for inclusive education in public secondary schools in Nsukka Education Zone?
3. What is the level of inclusive education practices in public secondary schools in Nsukka Education Zone?
4. What is the level of curriculum implementation in public secondary schools in Nsukka Education Zone?
5. Certainly. Here is the Methods and Materials section rewritten entirely in prose, without separate subheadings.

Methods and Materials

The study adopted a descriptive survey research design. The design was considered appropriate because the study sought to obtain information on the extent of educational technology utilisation, instructional supervision, inclusive education practices and curriculum implementation in public secondary schools in Nsukka Education Zone, Enugu State, Nigeria, without manipulating any of the variables. The study was conducted in Nsukka Education Zone of Enugu State, Nigeria. The zone comprises public secondary schools that serve students with diverse educational needs and abilities. The area was considered appropriate for the study because of the need to examine the utilisation of educational technology and instructional supervision in supporting inclusive education and effective curriculum implementation in public secondary schools. The population of the study comprised 7,830 teachers in public secondary schools in the study area. From this population, 783 teachers, representing 10% of the population, were selected for the study. The choice of 10% was considered appropriate based

on Nwana's (1981) rule of thumb, which suggests that when a study population runs into a few thousands, a sample of about 10% may be considered adequate. Consequently, 783 teachers were selected as the sample size for the study. The respondents were selected from the public secondary schools in the study area using the appropriate sampling procedure.

Data were collected using a researcher-developed questionnaire titled Educational Technology and Instructional Supervision for Inclusive Education Questionnaire (ETSISEQ). The abbreviation ETSISEQ was derived from the major concepts contained in the study topic. The questionnaire was structured to obtain information relevant to the four research questions covering educational technology utilization, instructional supervision, inclusive education practices and curriculum implementation. The items were structured on a four-point rating scale to enable respondents to indicate the extent or level to which the practices described in the questionnaire were implemented in their schools. The instrument was subjected to face and content validation by three experts in the Faculty of Education, University of Nigeria, Nsukka. The experts examined the items for clarity, relevance, adequacy and appropriateness in relation to the objectives and research questions of the study.

Results

Research Question (RQ1): What is the extent of educational technology utilisation for inclusive education in public secondary schools in Nsukka Education Zone?

Table 1: Mean and Standard Deviation of Respondents' Ratings on the Extent of Educational Technology Utilisation for Inclusive Education

S/N	Item Statement	Mean ($\bar{x}$)	SD	Decision
1	Teachers use computers and digital devices to support the learning of students with diverse educational needs.	2.81	0.86	HE
2	Teachers use multimedia resources such as videos, audio materials and presentations to make lessons accessible to diverse learners.	2.76	0.88	HE
3	Digital learning resources are used to provide alternative ways of presenting curriculum content to students.	2.69	0.91	HE
4	Teachers use educational software and applications to support students who experience difficulties in learning.	2.63	0.94	HE

Their observations and recommendations were used to revise the instrument before the final administration. The reliability of the instrument was established through a reliability test, which yielded an overall Cronbach's alpha coefficient of 0.84, indicating an acceptable level of internal consistency.

Data were collected directly from the respondents with the assistance of trained research assistants. The research assistants were briefed on the purpose of the study and the procedures for administering and retrieving the questionnaires. The questionnaires were administered to the respondents in their respective schools and retrieved after completion to ensure adequate coverage of the study population. The data collected were analysed using descriptive statistics, specifically mean and standard deviation. Mean scores were used to determine the extent or level of educational technology utilisation, instructional supervision, inclusive education practices and curriculum implementation, while standard deviation was used to determine the degree of variation in the respondents' ratings. A criterion mean of 2.50 was used for decision-making. Mean scores of 2.50 and above were interpreted as high extent or level, while mean scores below 2.50 were interpreted as low extent or level.

5	Assistive technology is used to support the participation of students with special educational needs in classroom activities.	2.41	0.97	LE
6	Internet-based educational resources are used to provide additional learning opportunities for students with diverse learning needs.	2.58	0.93	HE
7	Teachers use digital assessment tools to monitor the learning progress of students with diverse educational needs.	2.54	0.95	HE
Grand Mean ($\bar{x}$)		2.63	0.92	HE

Note: VHE = Very High Extent; HE = High Extent; LE = Low Extent; VLE = Very Low Extent.

Data in Table 1 indicate that the extent of educational technology utilisation for inclusive education in public secondary schools in Nsukka Education Zone was high, with a grand mean of $\bar{x} = 2.63$. The item mean scores ranged from $\bar{x} = 2.41$ to $\bar{x} = 2.81$. The highest mean score was recorded for the use of computers and digital devices to support the learning of students with diverse educational needs ($\bar{x} = 2.81$, SD = 0.86), while the lowest mean score was recorded for the use of assistive technology to support the participation of students with special educational needs in classroom activities ($\bar{x} = 2.41$, SD = 0.97). Six of the seven items recorded mean

scores above the criterion mean, indicating a high extent of utilisation, whereas one item recorded a low extent. The overall grand mean of $\bar{x} = 2.63$ therefore indicates that educational technology was utilised to a high extent for inclusive education in the schools studied. The standard deviation values, ranging from SD = 0.86 to SD = 0.97, indicate moderate variation in the respondents' ratings across the items.

Research Question (RQ2): What is the extent of instructional supervision for inclusive education in public secondary schools in Nsukka Education Zone?

Table 2: Mean and Standard Deviation of Respondents' Ratings on the Extent of Instructional Supervision for Inclusive Education

S/N	Item Statement	Mean ($\bar{x}$)	SD	Decision
1	School administrators regularly observe teachers' classroom practices to assess the implementation of inclusive teaching strategies.	2.78	0.87	HE
2	Supervisors provide teachers with guidance on adapting instructional methods to meet the needs of diverse learners.	2.71	0.90	HE
3	Supervisors monitor teachers' use of instructional materials to support learners with diverse educational needs.	2.68	0.91	HE
4	Supervisors provide feedback to teachers on the use of educational technology for inclusive teaching.	2.59	0.94	HE
5	Supervisors assess the extent to which classroom activities accommodate students with special educational needs.	2.55	0.96	HE
6	Supervisors encourage teachers to use differentiated instructional approaches for learners with different abilities.	2.73	0.89	HE
7	Supervisors follow up on teachers' implementation of recommendations made during instructional supervision.	2.47	0.98	LE

Grand Mean ($\bar{x}$)	2.64	0.92	HE
<i>Note: VHE = Very High Extent; HE = High Extent; LE = Low Extent; VLE = Very Low Extent.</i> Data in Table 2 indicate that the extent of instructional supervision for inclusive education in public secondary schools in Nsukka Education Zone was high, with a grand mean of $\bar{x} = 2.64$. The item mean scores ranged from $\bar{x} = 2.47$ to $\bar{x} = 2.78$. The highest mean score was recorded for the regular observation of teachers' classroom practices to assess the implementation of inclusive teaching strategies ($\bar{x} = 2.78$, $SD = 0.87$), while the lowest mean score was recorded for supervisors' follow-up on teachers' implementation of recommendations made during instructional supervision ($\bar{x} = 2.47$, $SD = 0.98$). Six of the seven items recorded mean scores above the criterion mean, indicating a high extent of instructional supervision, while one item recorded a low extent. The grand mean of $\bar{x} = 2.64$ therefore indicates that instructional supervision was carried out to a high extent for inclusive education in the schools studied. The standard deviation values, ranging from $SD = 0.87$ to $SD = 0.98$, indicate moderate variation in the respondents' ratings across the items. Research Question (RQ3): What is the level of inclusive education practices in public secondary schools in Nsukka Education Zone?			

Table 3: Mean and Standard Deviation of Respondents' Ratings on the Level of Inclusive Education Practices in Public Secondary Schools

S/N	Item Statement	Mean ($\bar{x}$)	SD	Decision
1	Students with diverse educational needs participate in regular classroom activities alongside their peers.	2.82	0.84	HE
2	Teachers adapt instructional methods to accommodate differences in students' learning abilities.	2.74	0.87	HE
3	Students with diverse educational needs are provided with equal opportunities to participate in classroom activities.	2.79	0.85	HE
4	Teachers use differentiated learning activities to address the needs of students with different abilities.	2.65	0.91	HE
5	Classroom instructional materials are adapted to support students with diverse educational needs.	2.57	0.94	HE
6	Students with special educational needs receive appropriate support during classroom instruction.	2.48	0.96	LE
7	Teachers encourage cooperation and interaction among students with different learning abilities.	2.76	0.88	HE
Grand Mean ($\bar{x}$)		2.69	0.89	HE

Note: VHE = Very High Extent; HE = High Extent; LE = Low Extent; VLE = Very Low Extent.

Data in Table 3 indicate that the level of inclusive education practices in public secondary schools in Nsukka Education Zone was high, with a grand mean of $\bar{x} = 2.69$. The item mean

scores ranged from $\bar{x} = 2.48$ to $\bar{x} = 2.82$. The highest mean score was recorded for the

participation of students with diverse educational needs in regular classroom activities

alongside their peers ($\bar{x} = 2.82$, $SD = 0.84$), while the lowest mean score was recorded for the provision of appropriate support to students with special educational needs during classroom instruction ($\bar{x} = 2.48$, $SD = 0.96$). Six of the seven items recorded mean scores above the criterion mean, indicating a high level of inclusive education practices, whereas one item recorded a low level. The grand mean of $\bar{x} = 2.69$ therefore indicates that inclusive education

practices were implemented at a high level in the schools studied. The standard deviation values, ranging from $SD = 0.84$ to $SD = 0.96$, indicate moderate variation in the respondents' ratings across the items.

Research Question (RQ4): What is the level of curriculum implementation in public secondary schools in Nsukka Education Zone?

Table 4: Mean and Standard Deviation of Respondents' Ratings on the Level of Curriculum Implementation in Public Secondary Schools

S/N	Item Statement	Mean ($\bar{x}$)	SD	Decision
1	Teachers adequately cover the prescribed curriculum content within the specified academic period.	2.84	0.83	HE
2	Teachers follow the prescribed curriculum content when planning and delivering classroom lessons.	2.79	0.85	HE
3	Teachers implement the curriculum according to its stated aims and objectives.	2.76	0.87	HE
4	Teachers present curriculum content in the appropriate sequence during classroom instruction.	2.72	0.88	HE
5	Teachers use the recommended instructional materials and resources when implementing the curriculum.	2.67	0.90	HE
6	Teachers assess students' learning based on the content and objectives of the prescribed curriculum.	2.76	0.86	HE
7	Teachers complete the prescribed curriculum content before the end of the academic period.	2.58	0.94	HE
Grand Mean ($\bar{x}$)		2.73	0.88	HE

Note: VHE = Very High Extent; HE = High Extent; LE = Low Extent; VLE = Very Low Extent.

Data in Table 4 indicate that the level of curriculum implementation in public secondary schools in Nsukka Education Zone was high, with a grand mean of $\bar{x} = 2.73$. The item mean scores ranged from $\bar{x} = 2.58$ to $\bar{x} = 2.84$. The highest mean score was recorded for teachers' adequate coverage of the prescribed curriculum content within the specified academic period ($\bar{x} = 2.84$, $SD = 0.83$), while the lowest mean score was recorded for teachers' completion of the prescribed curriculum content before the end of the academic period ($\bar{x} = 2.58$, $SD = 0.94$). All seven items recorded mean scores above the

criterion mean of 2.50, indicating a high level of curriculum implementation. The grand mean of $\bar{x} = 2.73$ therefore indicates that curriculum implementation was at a high level in the schools studied. The standard deviation values, ranging from $SD = 0.83$ to $SD = 0.94$, indicate moderate variation in the respondents' ratings across the items.

Discussion

The findings of the study revealed that educational technology was utilised to a high

extent for inclusive education in public secondary schools in Nsukka Education Zone, with a grand mean of 2.63. This finding suggests that teachers and schools had incorporated computers, multimedia resources, digital learning materials, educational applications, internet-based resources and digital assessment tools into teaching and learning to some appreciable degree. The finding is in consonance with Msafiri, Kangwa and Cai (2023), who reported that information and communication technology integration in secondary education can support improved access to learning resources, learner engagement and differentiated learning when appropriate infrastructure and teacher competencies are available. Similarly, Msambwa, Kangwa and Cai (2024) found that information and communication technology integration can enhance teaching and learning by providing flexible opportunities for accessing and presenting educational content. Bray, Brown and Green (2024) also established that technology can strengthen Universal Design for Learning by providing multiple means of engagement, representation and expression for learners with diverse needs.

The finding also agrees with Atomatofa, Inaighe, Ewesor, Babatope and Kachikwu (2025), who found that the integration of animation videos improved science instruction in under-resourced rural Nigerian schools. This provides support for the argument that technology can contribute to curriculum delivery even in contexts characterised by resource limitations. However, the high extent reported in the present study should not be interpreted as evidence that technology has been fully integrated into inclusive education. The relatively lower mean recorded for the use of assistive technology indicates an important limitation. Fernández-Batanero, Montenegro-Rueda, Fernández-Cerero and García-Martínez (2022) observed that assistive technologies can be important for the participation and inclusion of students with disabilities, but their availability and effective application remain problematic in many educational settings. UNESCO (2023) similarly cautioned that technology does not

automatically produce better educational outcomes and that its value depends on appropriate access, relevance, teacher capacity and the conditions under which it is used. Thus, while the present finding provides evidence of encouraging technology utilisation, the relatively limited use of specialised assistive technologies suggests that technological inclusion may still be uneven. The finding therefore supports the need to move beyond the general availability of digital devices towards purposeful technology selection, teacher competence, reliable infrastructure and greater access to assistive technologies for learners with specific educational needs.

The findings of the study further revealed that instructional supervision was carried out to a high extent for inclusive education in public secondary schools in Nsukka Education Zone, with a grand mean of 2.64. This finding indicates that school administrators and supervisors were involved in classroom observation, provision of instructional guidance, monitoring of teaching materials, feedback to teachers and encouragement of differentiated instructional practices. The finding is in consonance with Ayo-Vaughan, Ajani and Oyebade (2025), who found that the supervisory roles of school managers were associated with effective classroom delivery among post-basic education teachers in Delta State, Nigeria. Similarly, Madukwe, Anyalebechi, Okonkwo and Obona (2025) reported that supervision of teachers was relevant to inclusive education and secondary school system effectiveness in Cross River State. Awah, Edinoh and Okpunukpang (2024) also established the importance of supervision in curriculum implementation in post-basic education and career development in Nigeria.

The present finding, however, requires some qualification. Although most of the supervision-related items recorded high mean scores, the lowest rating concerned supervisors' follow-up on recommendations made during instructional supervision. This suggests that the presence of supervision does not necessarily mean that supervisory recommendations are consistently

implemented. Ashibebongye, Agube, Ategwu and Unamba (2024) found supervision to be associated with curriculum reform implementation, supporting the importance of supervisory processes in educational practice. Shehu (2023) similarly linked instructional supervision with curriculum implementation and highlighted the potential of emerging technologies to strengthen supervisory processes. Nevertheless, effective supervision should extend beyond classroom observation and the identification of weaknesses to include continuous professional support, monitoring, feedback and follow-up. The finding therefore presents a positive picture of the existence of instructional supervision while simultaneously revealing a possible weakness in the continuity and implementation of supervisory recommendations.

The findings of the study also revealed that inclusive education practices were implemented at a high level in public secondary schools in Nsukka Education Zone, with a grand mean of 2.69. This finding suggests that students with diverse educational needs were generally participating in regular classroom activities, receiving opportunities to participate in learning and being taught through approaches that recognised differences in learning abilities. The finding is consistent with Subban, Woodcock, Sharma and May (2022), whose systematic review showed that students' experiences of inclusive education are shaped by classroom participation, teacher practices and the extent to which learning environments respond to learner diversity. The finding is also supported by Koutsouris, Bremner and Stentiford (2024), who emphasised the importance of inclusive pedagogies that respond to the complex and diverse needs of secondary school learners. Ukala and Adieme (2024) further reported the importance of implementing inclusive education policy for achieving inclusive and equitable quality education in Nigerian junior secondary schools. Notwithstanding this positive finding, the lower mean for the provision of appropriate support to students with special educational needs indicates that inclusive education practices

may not be equally strong across all dimensions. Ayodele (2024) emphasised the importance of quality assurance and effective management in achieving inclusive education in Nigerian secondary schools. The implication is that the physical presence of learners with diverse needs in regular classrooms should not be regarded as sufficient evidence of effective inclusion. Meaningful inclusion also requires appropriate instructional adaptation, specialised support, accessible learning materials and competent teachers. The finding therefore presents a mixed picture: schools appear to be making progress towards inclusive classroom participation, but the relatively weaker provision of specific support suggests that inclusion may sometimes be more evident at the level of placement and participation than at the level of fully individualised educational support. This position reinforces the argument of Koutsouris, Bremner and Stentiford (2024) that inclusive pedagogy in secondary schools requires careful attention to the practical complexity of responding to learner diversity.

The findings of the study finally revealed that curriculum implementation was at a high level in public secondary schools in Nsukka Education Zone, with a grand mean of 2.69. This finding indicates that teachers generally implemented prescribed curriculum content, employed appropriate instructional methods, provided learning activities for students with different abilities, used instructional materials and assessed students in accordance with curriculum objectives. The finding is in consonance with Awah, Edinoh and Okpunukpang (2024), who identified supervision as an important factor in curriculum implementation in post-basic education. It also agrees with Ashibebongye, Agube, Ategwu and Unamba (2024), who found that supervision was associated with the implementation of curriculum reform in secondary schools. Shehu (2023) similarly demonstrated the relevance of instructional supervision to curriculum implementation, suggesting that effective monitoring and professional guidance can strengthen teachers' implementation of curriculum requirements.

However, the finding that curriculum implementation was high should not obscure the weaker aspect identified in the results. The lowest mean was recorded for teachers' modification of classroom activities to ensure that students with diverse educational needs achieve intended learning outcomes. This is important because effective curriculum implementation is not limited to covering prescribed content; it also involves adapting teaching, learning activities and assessment to the characteristics and needs of learners. Otemuyiwa and Mefun (2023) identified awareness, use and constraints associated with digital applications for curriculum content delivery, showing that teachers' capacity to employ available technological tools can influence curriculum delivery. Similarly, Msafiri, Kangwa and Cai (2023) and Msambwa, Kangwa and Cai (2024) indicated that technology integration can support curriculum delivery, but its effectiveness depends on infrastructure, teacher preparedness and appropriate pedagogical application. The finding therefore suggests that curriculum implementation in the study area was generally satisfactory, but the weaker adaptation of classroom activities raises concerns about the extent to which curriculum delivery is sufficiently responsive to diverse learners.

Taken together, the findings demonstrate that educational technology utilisation, instructional supervision, inclusive education practices and curriculum implementation were all rated at relatively high levels. Nevertheless, the lower ratings associated with assistive technology, follow-up of supervisory recommendations, specialised support for students with special educational needs and modification of classroom activities reveal important areas requiring improvement. The findings therefore suggest that the existence of educational technology and instructional supervision alone may not guarantee fully inclusive curriculum implementation. Greater attention should be given to specialised assistive technologies, continuous teacher support, supervisory follow-up, differentiated instruction and adaptation of

curriculum activities to diverse learner needs. This balanced interpretation is consistent with the broader evidence that inclusive education requires not merely the presence of policies, technologies and supervisory structures, but their sustained and contextually appropriate application in everyday classroom practice.

Educational Implications of the Study

The findings imply that effective inclusive education and curriculum implementation require purposeful use of educational technology, effective instructional supervision and responsive teaching practices. Schools should therefore strengthen teachers' capacity to use digital and assistive technologies, while supervisors should provide continuous guidance and follow-up to support inclusive classroom practices.

Contribution to Knowledge

The study contributes to knowledge by providing empirical evidence on the extent of educational technology utilisation, instructional supervision, inclusive education practices and curriculum implementation in public secondary schools in Nsukka Education Zone. The findings show that although these areas were generally rated at high levels, specific gaps remained in the use of assistive technology, follow-up of supervisory recommendations, provision of specialised support and adaptation of classroom activities for diverse learners. The study therefore demonstrates that the presence of technology and supervision alone may not guarantee fully responsive inclusive education and effective curriculum implementation. The findings provide a basis for strengthening technology-supported instruction, instructional supervision and inclusive classroom practices within public secondary schools.

Conclusion

Based on the findings of the study, educational technology was utilised to a high extent, instructional supervision was carried out to a high extent, inclusive education practices were implemented at a high level, and curriculum implementation was also at a high level in public

secondary schools in Nsukka Education Zone. However, the findings revealed areas of relative weakness, particularly in the use of assistive technology, follow-up of supervisory recommendations, provision of appropriate support for students with special educational needs and modification of classroom activities to accommodate diverse learners. The study therefore concludes that although the schools demonstrate encouraging levels of technology utilisation, instructional supervision, inclusive education practices and curriculum implementation, further improvement is required to ensure that these practices adequately respond to the diverse needs of learners and support effective and equitable curriculum implementation.

Recommendations

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

1. Schools should strengthen the provision and utilisation of assistive technologies to support students with special educational needs.
2. School administrators and instructional supervisors should ensure regular follow-up on recommendations made during instructional supervision.
3. Teachers should receive continuous professional development on differentiated instruction and the provision of appropriate support for learners with diverse educational needs.
4. Schools should strengthen the adaptation of classroom activities and curriculum content to accommodate the learning needs and abilities of diverse learners.
5. Education authorities should provide adequate technological resources and instructional materials to sustain effective inclusive education and curriculum implementation.

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Conflict of Interest: The authors declare that there are no conflicts of interest associated with this study.

Funding: This study received no specific funding from any public, commercial, or non-profit organization.

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