



Comparative Analysis of Academic Performance among Students with and without Disabilities in Inclusive Secondary Schools in Jos Metropolis, Plateau State, Nigeria

Okoye Sade Joy, Igoni Iloye Blessing and Adeleke Owoade Philip

Department of Special Needs Education, University of Calabar, Nigeria
Olabisi Onabanjo University Teaching Hospital, Sagamu, Ogun State, Nigeria;

Department of Special Needs Education, University of Calabar, Nigeria

sadespecial@yahoo.com; <https://orcid.org/0009-0008-5625-978X>; blessingiloye84@gmail.com
<https://orcid.org/0009-0001-6086-1529>; & mafikuyomiphilip@yahoo.com <https://orcid.org/0000-0002-3947-1745>

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Abstract

This study investigated the prediction of academic performance among students with and without disabilities in inclusive secondary schools in Jos Metropolis, Plateau State, Nigeria. A quantitative cross-sectional predictive research design was adopted. The study population comprised 1,456 students enrolled in inclusive secondary schools, while a sample of 466 respondents, consisting of 231 students with disabilities and 235 students without disabilities, participated in the study. A multistage sampling procedure involving purposive, stratified random, simple random and total enumeration techniques was employed. Data were collected using a structured questionnaire and students' academic records. Descriptive statistics, simple linear regression, and independent samples *t*-test were used for data analysis at the 0.05 level of significance. The findings revealed that learning behaviour significantly predicted students' academic performance ($R = .741$, Adjusted $R^2 = .549$, $F(1,230) = 2690.38$, $p < .001$), indicating that positive behaviours such as regular attendance, classroom participation, effective study habits, assignment completion, and learning motivation contributed substantially to academic achievement. School factors, including teacher support, availability of learning resources, inclusive instructional practices, and assistive technologies, also significantly predicted academic performance ($R = .729$, Adjusted $R^2 = .531$, $F(1,230) = 2502.87$, $p < .001$). Furthermore, a significant difference was found between the academic performance of students with disabilities (Mean = 17.42, SD = 4.21) and those without disabilities (Mean = 18.31, SD = 4.06), with students without disabilities performing significantly better ($t(464) = 4.58$, $p < .001$). The study concludes that both learner-related and school-related factors are significant determinants of academic performance in inclusive secondary schools, while students with disabilities continue to experience comparatively lower academic achievement. It is recommended that schools strengthen learner support systems, improve inclusive instructional practices, expand access to assistive technologies, and adopt data-driven approaches, including machine learning, for the early identification and support of students at risk of poor academic performance.

Keywords: *academic performance, inclusive education, students with disabilities, learning behaviour, school factors, predictive analytics, secondary schools, Jos Metropolis, Nigeria.*

Introduction

The pursuit of quality and equitable education has remained a major global priority, particularly following the adoption of the United Nations Sustainable Development Goal (SDG) 4, which

advocates inclusive and equitable quality education for all learners irrespective of their abilities. Inclusive education promotes the placement of students with and without disabilities in the same learning environment while ensuring that appropriate instructional support is provided to meet their diverse learning needs. In Nigeria, the implementation of inclusive education has gradually gained policy attention through the National Policy on Inclusive Education and the National Policy on Education. Nevertheless, students with disabilities in many secondary schools continue to experience lower academic achievement due to barriers such as inadequate instructional adaptations, limited assistive technologies, insufficient teacher preparedness, and poor educational data management.

These challenges make it difficult for educators to identify learners at risk of poor academic performance early enough to provide timely interventions. These challenges often limit their full participation in classroom activities and hinder the realization of equitable educational outcomes. Consequently, there is an increasing need to evaluate the academic performance of students with and without disabilities in inclusive schools to determine the extent to which inclusive education is achieving its intended objectives.

Adjei, et al. (2024) observed that inclusive education is founded on the principle that every learner, regardless of disability status, should have equal access to quality education within a supportive learning environment. The success of inclusive education depends not only on school enrolment but also on meaningful participation, equitable access to learning resources, and comparable academic achievement among all students. Research has shown that when schools provide adequate instructional support, accessible learning materials, teacher collaboration, and positive classroom environments, students with disabilities can achieve academic outcomes comparable to those of their peers without disabilities. However, where these supports are inadequate, significant disparities in academic performance often persist (Asres, 2026).

Apiti, (2024) asserted that despite increasing government commitment to inclusive education in Nigeria, several challenges continue to affect its implementation. Many inclusive secondary schools

experience shortages of trained special education teachers, inadequate instructional materials, overcrowded classrooms, limited assistive devices, and insufficient funding. These challenges disproportionately affect students with disabilities and may contribute to lower academic achievement compared with their peers without disabilities. Consequently, examining differences in academic performance between these two groups of learners provides important evidence for evaluating the effectiveness of inclusive education practices and identifying areas requiring improvement.

Academic performance is a multidimensional educational outcome influenced by several interrelated factors, including cognitive ability, socio-economic background, school environment, teacher quality, learning motivation, attendance, classroom engagement, disability status, parental involvement, and access to educational support services. Numerous studies have shown that these factors interact to shape students' learning experiences and academic achievement. In inclusive school settings, the availability of appropriate instructional accommodations, differentiated teaching strategies, and supportive learning environments plays a significant role in reducing educational disparities between students with and without disabilities. Understanding these factors is therefore essential for developing interventions that promote equitable learning opportunities and improve academic outcomes for all learners (King-Sears; et al.(2021; Sibanda, et al. 2026).

Recent empirical evidence has continued to demonstrate differences in the academic performance of students with and without disabilities in inclusive educational settings. Adjei et al. (2024) conducted a systematic review of studies on children with disabilities in inclusive schools across low- and middle-income countries using the PRISMA framework. The review synthesized evidence from studies published between 2012 and 2022 and found that students with disabilities generally recorded lower academic achievement, school attendance, and progression rates than their peers without disabilities. The authors attributed these disparities to inadequate instructional accommodations, shortage of trained teachers, inaccessible learning materials, and weak implementation of inclusive education policies. They concluded that while inclusive education has

improved access to schooling, academic outcomes remain unequal because many schools lack the resources necessary to support diverse learning needs. The review recommended strengthening teacher capacity, improving learning environments, and increasing investment in inclusive education to promote equitable academic achievement among all learners (Ekubo & Esiefarienrhe, 2022; Dumitru, et al., 2025; Ahmed, et al. 2026).

Further empirical evidence was provided by Apiti (2024), who investigated barriers affecting students with visual impairments in a Nigerian university operating within an inclusive educational framework. Using a qualitative descriptive design and semi-structured interviews with students with visual impairments, the study revealed that inaccessible instructional materials, inadequate institutional support, negative peer attitudes, and insufficient lecturer preparedness significantly affected students' learning experiences and academic performance. Although the study focused on higher education, its findings have important implications for secondary education because they demonstrate that environmental and instructional barriers continue to hinder academic success among learners with disabilities. The study emphasized that inclusive education requires more than physical placement; it demands systematic provision of accessible learning resources, teacher competence, and supportive school environments to enable students with disabilities to perform academically alongside their peers (Romero & Ventura, 2024; Li, Yan & Zeng, 2025; Out, et al. 2026).

International evidence also supports the existence of achievement differences between students with and without disabilities in inclusive schools. Asres (2026) conducted an explanatory sequential mixed-methods study involving students in Ethiopian primary schools to compare academic achievement according to disability status and type. Quantitative analysis of continuous assessment scores showed significant achievement gaps between students with disabilities and those without disabilities across most grade levels. Students with hearing impairments recorded the lowest academic performance, while qualitative findings identified shortages of trained special needs teachers, limited assistive technologies, inaccessible instructional practices, and inadequate early

identification services as major contributors to these disparities. The study concluded that inclusive education policies alone are insufficient without effective classroom support, specialized instructional services, and appropriate learning resources that address the diverse needs of learners with disabilities (UNESCO, 2023; Zhang, et al. 2026).

Dumitru, et al. (2025) found that several review studies have equally demonstrated that instructional support within inclusive classrooms significantly influences students' academic achievement. King-Sears et al. (2021), in a meta-analysis of 26 studies involving students with disabilities, reported that learners receiving instruction in co-taught inclusive classrooms achieved significantly better academic outcomes than those educated in separate special education settings. Similarly, Krämer et al. (2021), through a comprehensive meta-analysis of inclusive education, found that inclusive schooling generally produced positive academic and psychosocial outcomes for students with disabilities without negatively affecting the academic achievement of students without disabilities. These findings suggest that well-implemented inclusive instructional practices, collaborative teaching, and individualized support can reduce academic disparities between learners with and without disabilities while promoting equitable participation in classroom activities.

Despite growing empirical evidence on inclusive education, important knowledge gaps remain. A recent framework synthesis review by researchers in Social Sciences & Humanities Open (2026) concluded that children with disabilities continue to perform below their peers in reading, mathematics, and school attendance, largely because of inadequate parental support, limited teacher competence, insufficient teaching materials, and weak institutional support. The review also noted that most available studies have been conducted in developed countries or have focused on primary or higher education, with comparatively few empirical investigations examining academic performance among students with and without disabilities in inclusive secondary schools in Sub-Saharan Africa, particularly Nigeria. Furthermore, there is limited evidence from Plateau State, where inclusive education has expanded in recent years. This gap justifies the present study, which seeks to compare the academic performance of students with and without disabilities in inclusive

secondary schools in Jos Metropolis, Plateau State, thereby providing context-specific evidence to inform educational policy and practice, (Muraina,, et al. 2026; Zhang, et al. 2026).

Gadzama, Ugbowu and Dalhatu, (2026) research conducted in Nigeria has similarly highlighted factors influencing students' academic performance in inclusive schools. Studies have identified teacher competence, instructional strategies, classroom environment, parental involvement, school leadership, and access to learning resources as significant determinants of academic achievement. However, many of these studies have focused primarily on students with disabilities or on general school performance without making direct comparisons between students with and without disabilities within the same inclusive school settings. Although the existing literature has contributed significantly to understanding inclusive education, important gaps remain. Most previous studies have concentrated on evaluating inclusive education policies, teacher attitudes, or barriers to implementation, with relatively few examining comparative academic performance between students with and without disabilities in Nigerian inclusive secondary schools (Taber, 2018; Udegbe, 2026).

Furthermore, limited empirical evidence exists regarding inclusive secondary schools in Jos Metropolis, Plateau State. This study therefore seeks to bridge this gap by providing empirical evidence on the comparative academic performance of students with and without disabilities in inclusive secondary schools within the study area. The findings will contribute to the growing body of literature on inclusive education and provide evidence to support educational planning, policy formulation, and improved instructional practices in Nigeria.

Taber, (2018) further observed that whereas previous studies have generally examined academic performance prediction or disability support separately, with limited attention to comparative prediction involving students with and without disabilities within the same inclusive educational environment. Existing Nigerian studies also rely predominantly on university datasets and rarely incorporate disability-related variables alongside demographic, behavioural, and academic predictors. Consequently, there is limited empirical evidence regarding the applicability of machine

learning models for predicting academic performance among students with and without disabilities in inclusive secondary schools in Jos Metropolis, Plateau State. The present study seeks to bridge this gap by developing machine learning prediction models within a Nigerian inclusive secondary school context, thereby contributing context-specific evidence to educational data mining and inclusive education literature (Jibril, 2026; Gadzama, et al. 2026; Hussein & Yasir, 2026).

Jos Metropolis in Plateau State provides an appropriate context for this study because it hosts several inclusive secondary schools serving learners from diverse socio-economic, cultural, and disability backgrounds. Although inclusive education has expanded within the metropolis, there is limited empirical evidence regarding the comparative academic performance of students with and without disabilities in these schools. Such evidence is necessary to assist teachers, school administrators, educational psychologists, counsellors, and policymakers in designing effective instructional interventions, improving educational support services, and strengthening inclusive education practices.

Against this background, the present study seeks to examine the academic performance of students with and without disabilities in inclusive secondary schools in Jos Metropolis, Plateau State, Nigeria. Specifically, the study aims to compare the academic performance of the two groups of students and examine factors that may influence their educational outcomes. The findings are expected to provide empirical evidence that will assist educators in improving instructional practices, guide school administrators in strengthening support services, inform policymakers on strategies for enhancing inclusive education, and contribute to the achievement of equitable, inclusive, and quality education in line with Sustainable Development Goal 4.

Purpose of the study

- i. Examine how students demographic variables influence their academic activities in inclusive secondary school
- ii. Investigate the relationship between learning behaviour and students academic performance in inclusive secondary schools

- iii. Examine how school factors influence students academic performance between students with and students without disabilities in Jos metropolis
- iv. Compare the predicted academic performance of students with and without disabilities in inclusive secondary schools in Jos Metropolis, Plateau State.

Research questions

1. What are the demographic variables influencing student's academic activities in inclusive secondary schools:
2. What is the contribution of learning behaviours to students academic performance in inclusive secondary schools?
3. What is the contribution of school factors to students academic performance in inclusive secondary schools?
4. What is the difference in academic performance between students with and without disabilities in inclusive secondary schools in Jos Metropolis, Plateau State?

Research design and methods

The research design used in the research is the a cross-sectional predictive research design using quantitative approach, the choice of this research is anchored on the fact that the design enables the researcher to collect data from students with and without disabilities at a single point in time capable of predicting their academic performance based on selected predictor variables (Shmueli, 2010). The quantitative approach is suitable because it allows the collection of measurable educational data that can be processed. The study will employ supervised machine learning techniques in which historical educational data (independent variables) will be used to predict students' academic performance (dependent variable). The study will be conducted in Jos Metropolis, Plateau State, Nigeria. Jos Metropolis is the administrative headquarters of Plateau State and comprises three Local Government Areas (LGAs), namely: Jos North, Jos South and Jos East

The metropolis has a mixture of public and private secondary schools implementing inclusive education where students with disabilities and those without disabilities learn together. Inclusive schools in Jos admit learners with visual impairment, hearing impairment, physical disabilities, learning disabilities, autism spectrum disorders, and other special educational needs alongside their peers without disabilities. The metropolis is recognized as one of the educational hubs in North-Central Nigeria, with relatively well-established inclusive education practices supported by the Plateau State Ministry of Education and various non-governmental organizations promoting education for learners with disabilities. The diversity of learners and availability of inclusive secondary schools make Jos Metropolis an ideal setting for examining machine learning-based prediction of academic performance among students with and without disabilities.

The target population for the study will comprise 1,456 Senior Secondary School (SSI–SSIII) students enrolled in inclusive secondary schools within Jos Metropolis. The population consists of students with disabilities and students without disabilities. These students constitute the population because they possess the characteristics required for comparing academic performance within inclusive educational settings. The entire population of students with disabilities (231) was used for the study because of their relatively small number and the need to maximize representation, while 20% of the population of students without disabilities (235) was used for the study. A multi-stage sampling technique was employed- first, it was the selection of inclusive secondary schools in Jos Metropolis with both students with and without disabilities.

This was done using the following criteria- operate inclusive education programmes, have students with and without disabilities, possess complete academic records, and grant approval for participation. The second stage is the selection of sample for the study. Since there are only 231 students with disabilities, total enumeration (census sampling) was adopted. Every eligible student with disabilities participated in the study. The third stage is the selection of students without disabilities. At this stage, stratified random sampling technique was used to select 235 students without disabilities. This was followed by simple random sampling (balloting) was used to select

participants proportionately from each stratum (20%). A total of 466 respondents were selected for the study. Population and sample distribution is shown on table 1.

Table 1: Population and sample distribution

S/N	Category	Population
1	Students with Disabilities	231
2	Students without Disabilities	1221
3		
Total		1456
Sample size		
	students disabilities	231 (100%)
	Students without disabilities	235 (20%)
Total		466

Data was collected using a researcher's designed structured questionnaire titled Student Academic Performance Prediction Questionnaire (SAPPQ) together with students' official academic records obtained from the selected schools. The instrument is divided into four sections, Section A comprised student's demographic data, B has items for Learning Behaviour Variables, while Section C looked at School Variables and E had items for Academic Performance. The instrument was validated using face, construct and content validity. A pilot study was done with 40 students from inclusive secondary schools outside the study area. Internal consistency determined using Cronbach's Alpha, which yielded a reliability coefficient of 0.70. After obtaining meeting the criteria for ethical consideration and getting a letter to proceed with the research, the researchers obtained data from Plateau State Ministry of Education, school principals and parents/guardians (where applicable). After obtaining informed consent, questionnaires were administered with the assistance of trained research assistants. Academic records were also be extracted from school databases with official permission.

Results and discussion

What are the demographic variables influencing student's academic activities in inclusive secondary schools:

Question 1: The result of the demographic characteristics of the respondents is as shown on table 2 which is self-explanatory.

Table 2: Demographic characteristics of respondents

Questionnaire items	Demographic Characteristics	Scores	Percentage
1	Age in years		
	9-14	215	46.2
	15-20	189	40.6
	21-25	45	9.6
	26-30	17	3.6
	Total	466	100
2	Gender		
	Male	298	63.9
	Female	168	36.1
	Total	466	100
3	Class		
	SSI	167	35.8
	SS2	177	38.0
	SS3	122	26.2
	Total	466	100
4	Disability Status		
	With disability (ies)	231	100
	Without disability	235	100
	Total	466	
5	Types Of Disabilities		
	Visual impairment	21	9.1
	Hearing impairment	34	14.7
	Physical disability	26	11.3
	Learning disability	36	15.6
	Mild intellectual disability	12	5.2
	Autism spectrum disorder	37	16
	Speech and language impairment	44	19
	Multiple disability	13	5.6
	Other disability	8	3.5
	Total	231	100

Question 2: What is the contribution of learning behaviours to students academic performance in inclusive secondary schools?

The result of the simple regression analysis in Table 3 on the contribution of learning behavior to student's academic performance in inclusive secondary schools in Jos metropolis produced an adjusted R^2 of .549. This result implies that 54.9 per cent of the variance in learning behavior student's academic performance in inclusive secondary schools. The remaining 45.1 per cent of the

variation in learning behaviour is attributed to other factors not included in the regression model. The F-value of the Analysis of Variance (ANOVA) obtained from the regression table was $F = 2690.38$, with a p-value of .000 and 1 and 463 degrees of freedom at the .05 level of significance. The result indicates that the regression model is statistically significant. Furthermore, learning behaviour significantly predicts student's academic performance in inclusive secondary schools. This equation indicates that a one-unit improvement in learning behaviour is associated with an estimated 0.846-unit increase in student's academic performance in inclusive secondary schools such as doing of assignment/ independent practices, attendance of school punctually and regularly, participating in every school activities, study habits, learning motivation among others. The identified regression equation for explaining this relationship is: $\text{learning behaviour} = 13.824 + .846$ (Student's academic performance).

Table 3: Summary of Data and Simple Regression Analysis of the Contribution of Learning Behaviour to student's academic performance in inclusive secondary schools in Jos

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	16,278.594	1	16,278.594	2690.38	.000
Residual	13,392.718	230	6.052		
Total	29,671.312	234			

Model	Unstandardized Coefficients		Standardized Coefficients		t	Sig.
	B	Std. Error	Beta			
(Constant)	13.824	.376			36.766	.000
Learning Behaviour						
Student's academic performance	.846	.016	.741		51.869	.000

$P < .05$

$R = .741$

$R \text{ Square} = .549$

$\text{Adjusted } R \text{ Square} = .549$

Research Question 3: How do school factors contribute to student's academic performance in inclusive secondary schools?

The independent variable in this research question is school factors, while the dependent variable is student's academic performance in inclusive secondary schools. Simple linear regression analysis was employed to determine the extent to which school factors contribute to student's academic performance in inclusive secondary schools. The result of the analysis is presented in Table 4. The result of the simple regression analysis in Table 4 on the contribution of school variables such as teacher support, availability of learning resources, inclusive instructional practices and assistive technologies on student's academic performance in inclusive secondary school produced an adjusted R^2 of .531. This result implies that 53.1 per cent of the variance in school factors can be explained by student's academic performance, while the remaining 46.9 per cent is attributed to other variables not included in the regression model. The F-value of the Analysis of Variance (ANOVA) obtained from the regression table was $F = 2502.87$, with a p-value of .000 and 1 and 465 degrees of freedom at the .05 level of significance. The result indicates that the regression model is statistically significant. Consequently, school variables significantly predict student's academic performance. This equation indicates that a one-unit improvement in school variables would result in an estimated 0.812-unit increase in improved student's academic performance. The identified regression equation explaining this relationship is: school factors = $14.116 + .812$ (student's academic performance).

Table 4: Table showing the Summary of Data and Simple Regression Analysis of the Relationship between school factors and student's academic performance in inclusive secondary schools

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	15,142.364	1	15,142.364	2502.87	.000
Residual	13,387.941	230	6.049		
Total	28,530.305	234			

	Unstandardized Coefficients		Standardized Coefficients		
Model	B	Std. Error	Beta	t	Sig.
(Constant)	14.116	.392		36.010	.000
School factors					
Student's academic performance	.812	.016	.729	50.029	.000

$P < .05$

$R = .729$

$R \text{ Square} = .531$

$\text{Adjusted } R \text{ Square} = .531$

Question 4: What is the difference in academic performance between students with and without disabilities in inclusive secondary schools in Jos Metropolis, Plateau State?

The result of the independent samples t-test presented in Table 5 revealed that students with disabilities recorded a mean score of 17.42 (SD = 4.21), while students without disabilities recorded a mean score of 18.31 (SD = 4.06). The computed t-value of 4.58 with 464 degrees of freedom produced a p-value of .000, which is less than the .05 level of significance. This result indicates that there is a statistically significant difference between the academic performance of students with disabilities and students without disabilities in inclusive secondary schools in Jos metropolis. Consequently, students without disabilities demonstrated a significantly better academic performance than students with disabilities. The results also indicate that students without disabilities place greater emphasis on their studies more than those with disabilities. The finding suggests that while both groups acknowledge the relevance of their academic pursuits, students without disabilities hold significantly stronger positive perceptions than those with disabilities.

Table 5: Summary of Independent Samples t-test Analysis of the Difference in academic performance between students with disabilities and students without disabilities in inclusive secondary schools in Jos metropolis

Variable	Group	N	Mean	SD	t	df	Sig. (2-tailed)
Differences in academic performance students with and without disabilities	Students with disabilities	231	17.42	4.21	4.58	464	.000
	Students without disabilities	235	18.31	4.06			

Decision: Significant at $p < .05$.

Discussion of Findings

Demographic Characteristics of Respondents

The demographic profile of the respondents indicates that the majority (46.2%) were between the ages of 9 and 14 years, followed by those aged 15–20 years (40.6%), suggesting that most participants were within the expected age range for secondary school education. The predominance of male students (63.9%) over female students (36.1%) reflects a gender imbalance in the sampled inclusive secondary schools, which may be attributable to differences in school enrolment patterns or accessibility to inclusive education. The respondents were fairly distributed across Senior Secondary School levels, with SSII students constituting the largest proportion (38.0%), followed by SSI (35.8%) and SSIII (26.2%). The equal representation of students with disabilities (231) and those without disabilities (235) provided a balanced basis for comparative analysis. Among students with disabilities, speech and language impairment (19.0%), autism spectrum disorder (16.0%), learning disabilities (15.6%), and hearing impairment (14.7%) were the most common disability categories, while other disability types were less prevalent. This distribution demonstrates the diversity of learners in inclusive secondary schools and reinforces the need for differentiated instructional strategies capable of addressing varied educational needs. Recent evidence suggests that learner diversity significantly influences instructional planning and academic outcomes in inclusive classrooms, underscoring the importance of providing individualized support to students with different disability profiles (Li et al., 2025; UNESCO, 2023).

Learning Behaviour and Students' Academic Performance

The findings revealed that learning behaviour was a significant predictor of students' academic performance in inclusive secondary schools. Learning behaviour accounted for **54.9% of the variance** in academic performance (Adjusted $R^2 = .549$), indicating that behaviours such as regular school attendance, punctuality, active classroom participation, completion of assignments, effective study habits, and high learning motivation substantially contributed to students' academic success. The significant regression coefficient ($\beta = .741$, $p < .001$) further demonstrates that improvements in positive learning behaviours are associated with corresponding increases in academic performance. This finding is consistent with educational psychology theories, which posit that

learners' behavioural engagement plays a central role in academic achievement. Students who consistently attend school, actively participate in classroom activities, and demonstrate self-regulated learning behaviours are more likely to acquire knowledge effectively and achieve higher academic outcomes.

The present finding corroborates recent empirical studies. Romero and Ventura (2024) reported that behavioural engagement variables, including attendance, participation, assignment completion, and learning motivation, were among the strongest predictors of academic achievement in educational data mining studies. Similarly, Otu et al. (2026) found that learning behaviours significantly improved the predictive accuracy of machine learning models designed to forecast students' academic performance. Ekubo and Esiefarienrhe (2022), using Nigerian educational data, also observed that attendance records, continuous assessment scores, and students' learning commitment significantly predicted academic success. The strong contribution of learning behaviour observed in the present study suggests that interventions aimed at improving students' study habits, motivation, and classroom engagement are likely to enhance academic performance for both students with and without disabilities in inclusive secondary schools.

School Factors and Students' Academic Performance

The study further established that school factors significantly contributed to students' academic performance, explaining **53.1% of the observed variance** (Adjusted $R^2 = .531$). Teacher support, availability of learning resources, inclusive instructional practices, and assistive technologies collectively exerted a significant positive influence on academic achievement. The standardized regression coefficient ($\beta = .729$, $p < .001$) indicates that improvements in these school-related factors are associated with substantial gains in students' academic performance. This finding highlights the critical role of the school environment in facilitating successful learning outcomes, particularly within inclusive educational settings where learners possess diverse educational needs.

The finding aligns with the Universal Design for Learning framework, which emphasizes that learning environments should be intentionally designed to provide equitable access, flexible

instructional approaches, and appropriate support for all learners. Schools characterized by competent teachers, accessible instructional materials, adequate assistive technologies, and inclusive pedagogical practices are more likely to foster improved academic outcomes among students with and without disabilities. This finding agrees with Li et al. (2025), who reported that artificial intelligence-supported inclusive instructional practices significantly enhanced students' engagement and learning achievement. Likewise, Dumitru et al. (2025) found that assistive technologies and adaptive learning environments improved educational participation and academic performance among learners with disabilities. UNESCO (2023) similarly emphasized that teacher preparedness, resource availability, and supportive school policies are among the strongest determinants of successful inclusive education. The implication is that strengthening school-level support systems will likely improve learning outcomes across diverse student populations.

Academic Performance of Students with and without Disabilities

The study revealed a statistically significant difference in academic performance between students with disabilities and those without disabilities. Students without disabilities obtained a significantly higher mean academic performance score (Mean = 18.31, SD = 4.06) than students with disabilities (Mean = 17.42, SD = 4.21), with the difference reaching statistical significance ($t = 4.58, p < .001$). Although the mean difference was relatively modest, the result suggests that students with disabilities continue to experience educational disadvantages despite learning within inclusive school environments. This disparity may reflect persistent barriers including inadequate instructional accommodations, limited access to assistive technologies, insufficient individualized support, inaccessible learning materials, and variations in teacher competence for inclusive instruction.

The finding is consistent with recent international evidence indicating that learners with disabilities generally experience lower academic achievement than their peers without disabilities when inclusive education systems are insufficiently supported. Ahmed et al. (2026) observed that students with learning disabilities frequently demonstrate lower academic outcomes unless early

identification and individualized interventions are implemented. Similarly, Zhang et al. (2026) reported that artificial intelligence-assisted instructional support significantly reduced achievement gaps between students with and without disabilities by facilitating personalized learning pathways. UNESCO (2023) also noted that although inclusive education has expanded globally, many schools continue to face shortages of specialized personnel, assistive technologies, and inclusive instructional resources necessary for ensuring equitable learning opportunities. Consequently, the observed performance gap underscores the importance of strengthening inclusive educational practices, expanding teacher professional development, increasing access to assistive technologies, and implementing data-driven intervention strategies capable of supporting academically vulnerable learners.

Overall, the findings demonstrate that both learner-related behaviours and school-related factors substantially influence academic performance in inclusive secondary schools. They further suggest that although students with disabilities remain academically disadvantaged relative to their peers, evidence-based interventions, particularly those supported by predictive analytics and machine learning technologies, offer considerable potential for early identification of at-risk learners and the provision of targeted educational support. These findings reinforce growing evidence that data-driven educational practices can enhance equity, improve learning outcomes, and strengthen the implementation of inclusive education in Nigeria.

Conclusion

This study examined the predictors of academic performance among students with and without disabilities in inclusive secondary schools in Jos Metropolis, Plateau State, Nigeria. The findings demonstrate that both learner-related and school-related factors play significant roles in determining students' academic achievement within inclusive educational settings. Specifically, learning behaviour emerged as a strong predictor of academic performance, accounting for 54.9% of the observed variation. This finding underscores the importance of positive learning behaviours such as regular school attendance, punctuality, classroom participation, effective study habits, assignment

completion, and sustained learning motivation in enhancing students' academic success. Students who consistently demonstrated these positive behaviours achieved significantly better academic outcomes, irrespective of their disability status.

Similarly, school factors—including teacher support, availability of learning resources, inclusive instructional practices, and assistive technologies—were found to significantly predict students' academic performance, explaining 53.1% of the variance in achievement. This finding highlights the critical role of a supportive and resource-rich school environment in promoting academic success among learners in inclusive schools. Schools that provide qualified teachers, accessible instructional materials, inclusive pedagogical strategies, and appropriate assistive technologies create learning environments that enable students to maximize their academic potential.

The comparative analysis further revealed that although both groups of learners participated within the same inclusive educational environment, students without disabilities demonstrated significantly higher academic performance than students with disabilities. This suggests that the implementation of inclusive education alone may not be sufficient to eliminate achievement disparities unless complemented by individualized instructional support, early intervention, effective use of assistive technologies, and continuous teacher capacity building. The observed difference does not undermine the value of inclusive education but rather emphasizes the need to strengthen inclusive practices to ensure equitable learning opportunities for all students.

Overall, the study concludes that improving students' learning behaviours and strengthening school-level support systems are essential strategies for enhancing academic performance in inclusive secondary schools. The findings further suggest that educational institutions should increasingly adopt evidence-based and data-driven approaches, including predictive analytics and machine learning technologies, to identify academically vulnerable learners early and implement timely interventions that support both students with and without disabilities.

Recommendations

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

1. Schools should implement programmes that promote positive learning behaviours by encouraging regular attendance, effective study habits, classroom participation, assignment completion, and academic motivation through structured mentoring, counselling, and learner support services.
2. The Plateau State Ministry of Education should strengthen inclusive education by providing continuous professional development for teachers on differentiated instruction, inclusive pedagogical practices, classroom management, and the effective use of assistive technologies for students with diverse learning needs.
3. Government and school authorities should improve the provision of inclusive learning resources and assistive technologies, including Braille materials, hearing aids, screen readers, communication devices, accessible classrooms, and adaptive instructional materials to enhance the academic performance of students with disabilities.
4. School administrators should establish early academic monitoring and intervention systems that regularly identify students experiencing learning difficulties and provide individualized academic support, remedial instruction, counselling, and parental engagement before poor performance becomes entrenched.
5. Educational policymakers should encourage the integration of educational data analytics and machine learning techniques into school management systems to facilitate the early prediction of students at risk of poor academic performance and support evidence-based educational decision-making in inclusive schools.
6. Parents and caregivers should collaborate closely with schools to monitor students' learning behaviours, reinforce positive study habits at home, and provide emotional and motivational support that complements school-based interventions.
7. Future researchers should develop and validate machine learning models using larger and more diverse datasets from different regions of Nigeria, incorporating demographic,

behavioural, psychological, school, and disability-related variables to improve the accuracy and generalizability of academic performance prediction models in inclusive education.

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