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Comparative analysis of the impact of pre and post covid-19 on academic achievement of post primary school students in Southeast Nigeria

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Abstract
This study utilized a descriptive survey design to examine the perception of teachers on the impact of COVID-19 on academic achievement among post-primary school students in Southeast Nigeria. Data were collected via a structured online questionnaire targeting teachers, comprising demographic details and thirty Likert-scale statements. The survey, distributed through social media, garnered 124 voluntary responses from July 3rd to July 20th, 2024. Initial data processing was done in Microsoft Excel, followed by detailed analysis in SPSS. Descriptive statistics and normality tests were conducted, and the Kruskal-Wallis and Jonckheere-Terpstra tests were used to compare group medians and test hypotheses. Ethical considerations ensured confidentiality and informed consent. Findings indicate that the shift to remote learning during the pandemic exacerbated existing disparities in access to technology, internet connectivity, and educational resources, particularly in rural areas. Lack of electricity and inadequate teacher training in digital pedagogy further hindered online instruction effectiveness. Students faced significant challenges with online learning platforms, home distractions, and decreased motivation due to isolation from the school environment. Language barriers and limited parental support also contributed to these challenges. However, the pandemic prompted innovations in educational delivery methods, highlighting the need for robust infrastructure and comprehensive training to support remote learning. The study underscores the importance of addressing these disparities and enhancing digital literacy to improve academic outcomes and resilience against future disruptions. Recommendations include continued investment in educational technology and support systems to bridge the gap between pre- and post-pandemic academic environments.

Keywords : Academic achievement, teachers perceptions, COVDI-19, post primary school, students.

1. Introduction

The COVID-19 pandemic has profoundly affected education systems worldwide, with significant implications for academic achievement, particularly among post-primary school students. The COVID-19 pandemic is a global health crisis caused by the novel coronavirus SARS-CoV-2 (Mohan & Nambiar, 2020). It emerged in Wuhan, China, in December 2019 and rapidly spread worldwide, leading to widespread illness and significant mortality. Declared a pandemic by the World Health Organization (WHO) in March 2020, COVID-19 has severely impacted global health

systems, economies, and daily life (Kuboye, 2021). The virus primarily spreads through respiratory droplets, causing symptoms ranging from mild respiratory issues to severe pneumonia and death. Governments implemented measures like lockdowns, social distancing, and vaccination campaigns to control its spread and mitigate its effects (Kuboye, 2021).

The pre-COVID-19 pandemic era was characterized by traditional in-person learning environments, stable educational routines, and relatively predictable academic calendars. Students attended physical classrooms, interacted face-to-face with teachers and peers, and had access to school resources and extracurricular activities (Obododike & Okekeokosisi, 2020). Academic achievement in this era was influenced by factors such as the quality of teaching, school infrastructure, parental involvement, and socio-economic status. Standardized testing and regular assessments were the primary tools for measuring academic success, and educational inequities, though present, were somewhat manageable within the existing structures. In contrast, the post-COVID-19 pandemic era has seen significant disruptions to traditional educational practices (Arcos-Alonso & Arcos-Alonso, 2021). The sudden shift to remote learning due to lockdowns and social distancing measures fundamentally changed the way education was delivered. Students and teachers had to quickly adapt to online platforms, which introduced new challenges and disparities. Internet connectivity, access to digital devices, and technological literacy became critical determinants of academic achievement (Wilson et al., 2021). Many students, especially those in underprivileged areas, faced difficulties due to limited access to necessary resources, resulting in widened educational inequities.

The post-pandemic era also highlighted the importance of mental health and well-being in academic achievement. The isolation and uncertainty brought by the pandemic impacted students' motivation, focus, and overall mental health, further affecting their academic performance (Spring et al., 2023). Additionally, the quality of remote instruction varied widely, with some teachers excelling in the new format and others struggling, thereby affecting student outcomes. Despite these challenges, the post-pandemic era also prompted innovations in educational delivery. Schools and educators developed new strategies for engaging students remotely, incorporating multimedia tools and flexible learning schedules (Czerniewicz et al., 2020). There was a greater emphasis on developing students' digital skills and self-directed learning abilities, which are crucial for success in the modern world. Academic achievement in the post-pandemic era now hinges not only on traditional factors but also on access to technology, adaptability to new learning methods, and the ability to maintain mental health and well-being in a disrupted educational landscape (Boyko et al., 2021).

Before the pandemic, academic achievement among post-primary school students was influenced by various factors including socio-economic status, access to educational resources, and teacher quality. Academic achievement refers to the extent to which a student has attained their educational goals (Fathoni & Retnawati, 2021). It is typically measured through various assessments, such as grades, standardized test scores, and completion of educational milestones. Academic achievement encompasses not only cognitive understanding and mastery of subjects but also skills like critical thinking, problem-solving, and the ability to apply knowledge (Engzell et al., 2021). It is influenced by a range of factors, including socio-economic background, quality of instruction, personal motivation, and learning environments. High academic achievement is often associated with better educational and career opportunities, as well as personal development and lifelong learning. According to Monroy-Gómez-Franco et al., (2022), students from higher socio-economic backgrounds generally performed better academically due to greater access to resources and support systems. Additionally, teacher effectiveness and school infrastructure were critical determinants of student success (Maba et al., 2023).

The onset of COVID-19 exacerbated existing disparities in access to educational resources, significantly impacting academic achievement. Students from low-income families and rural areas faced greater challenges due to limited access to technology and the internet. Alejo et al., (2024) highlighted that the shift to online learning widened the educational gap, as many students lacked the necessary devices and reliable internet connections. This digital divide was particularly pronounced in developing regions like Southeast Nigeria, where infrastructure deficiencies further hindered effective learning (Reimers, 2022). The rapid transition to remote learning during the pandemic posed significant challenges for both students and teachers. Blaskó et al., (2022) noted that many educators were unprepared for the abrupt shift to online teaching, lacking the necessary training and resources. Consequently, the quality of instruction varied widely, affecting students' understanding and engagement. In contrast, some schools that had previously integrated technology into their teaching practices adapted more smoothly to remote learning, highlighting the importance of pre-existing digital competencies (Sweet et al., 2023).

Several studies have documented the negative impact of the pandemic on students' academic performance. Ogueji and Okoloba (2022) found that students experienced significant learning losses, particularly in mathematics and reading, due to the disruption of traditional schooling. The lack of face-to-face interaction and hands-on learning opportunities hindered students' ability to grasp complex concepts, leading to a decline in academic achievement. Additionally, the absence of structured school environments contributed to reduced motivation and increased distractions, further impacting learning outcomes (Egielewa et al., 2022). The

pandemic also took a toll on students' mental health, which in turn affected their academic performance. Increased anxiety, stress, and social isolation were common among students, leading to difficulties in concentrating and retaining information. Olanrewaju et al., (2021) emphasized that the psychological impact of the pandemic was particularly severe among adolescents, who are already vulnerable to mental health issues. This finding is supported by Ogunode et al., (2021), who reported a strong correlation between deteriorating mental health and declining academic performance during the pandemic.

Socio-economic factors played a significant role in determining students' ability to adapt to the changes brought about by the pandemic. Studies by Akinwumi and Itobore (2020) and Barber et al., (2021) indicated that students from low-income families were disproportionately affected, facing greater barriers to remote learning. These students were more likely to lack access to essential resources, such as digital devices, stable internet connections, and quiet study spaces, which are crucial for effective online learning. Despite the challenges, the pandemic also spurred innovations in educational delivery. Educators and institutions developed creative solutions to engage students and maintain continuity in learning. For example, some schools implemented hybrid learning models that combined online and in-person instruction, offering flexibility and catering to diverse learning needs (Gift et al., 2020). Additionally, the increased use of educational technology and digital tools enhanced the accessibility and personalization of learning, potentially benefiting students in the long term.

The current study is important as it hope to address the significant educational disruptions caused by the pandemic, which exposed and exacerbated existing disparities in access to learning resources and technology. Understanding these impacts through the perspective of teachers, who are directly involved in the educational process, provides valuable awarenesss into the challenges and adaptations necessary for effective learning. This study highlights the importance of teachers' perspectives on students' academic performance, given their role in implementing curriculum changes and adopting new teaching methods during the pandemic. For instance, studies have shown that teachers' adaptability and technological proficiency significantly influence the success of remote learning (Cardullo et al., 2021). By capturing teachers' perceptions, the study identifies specific areas where support and training are needed to enhance educational outcomes. Moreover, the research fills a critical gap by focusing on Southeast Nigeria, a region with diverse socio-economic conditions and varying levels of access to education. Previous studies have often generalized the impact of COVID-19 on education without considering regional specificities. This localized approach ensures that the

unique challenges and needs of this area are addressed, paving the way for tailored interventions.

Based on the explanation above, the objectives of this research are threefold: to analyze the factors influencing academic achievement during the COVID-19 pandemic among post-primary school students in Southeast Nigeria, to explore the effectiveness of remote learning strategies implemented during the pandemic on academic outcomes, and to identify challenges faced by these students in adapting to changes in the educational environment. The research questions address these objectives by inquiring what factors influenced academic achievement, how effective the remote learning strategies were, and what challenges the students faced. The research hypotheses propose that there is no significant difference in teachers' perceptions regarding the factors that influenced academic achievement and the effectiveness of remote learning strategies during the pandemic based on their years of teaching experience.

2. Research Method

This study employed a descriptive survey design to investigate how COVID-19 has affected academic achievement among post-primary school students in Southeast Nigeria. The choice of this region is justified by its diverse socio-economic landscape and varying access to educational resources, factors likely to influence how schools and students have responded to the pandemic's disruptions. Data was collected using a structured questionnaire designed to capture the perceptions of teachers regarding the impact of COVID-19 on student achievement. The questionnaire consisted of two main parts: demographic details (such as age, years of teaching experience, educational qualifications, and gender) and thirty statements rated on a four-point Likert scale (ranging from 1 for "Strongly Agree" to 4 for "Strongly Disagree"). This approach allowed for a nuanced exploration of teachers' views on educational outcomes before and after the onset of the pandemic.

The questionnaire was administered online through Google Forms, chosen for its user-friendly interface and ability to compile responses directly into Google Sheets. The survey link was distributed via popular social media platforms like WhatsApp, Facebook, Instagram, and Telegram to reach a wide range of post-primary school teachers across Southeast Nigeria. Over a period from July 3rd to July 20th, 2024, 124 teachers voluntarily participated in the study. Throughout the data collection period, participants were informed of the voluntary nature of their involvement and their right to withdraw from the study at any time. Following data collection, responses were collated and exported to Microsoft Excel for initial processing and then imported into SPSS software for in-depth statistical analysis.

Descriptive statistics such as mean, standard deviation, skewness, and kurtosis were computed to summarize the central tendencies, variability, and distribution characteristics of the data. Additionally, normality tests including the Kolmogorov-Smirnov and Shapiro-Wilk tests were conducted to assess whether the data followed a normal distribution, which is essential for determining the appropriateness of subsequent statistical analyses. The Kruskal-Wallis test was employed to compare the medians of independent groups. This non-parametric method was chosen to analyze ranked data, ensuring that any significant differences among the groups could be identified without assuming a normal distribution. Concurrently, the Jonckheere-Terpstra test was utilized to detect ordered differences among the same set of groups. This non-parametric approach assessed whether a trend existed in the medians across the groups, thereby providing a comprehensive understanding of the data. Both tests together offered robust awarenesss into the variations and trends present in the dataset. Ethical considerations were paramount throughout the study. Participants were assured of confidentiality, and their informed consent was obtained before they proceeded to answer the questionnaire. This ensured that the study adhered to ethical guidelines governing research involving human subjects.

3. Results and Discussion

3.1 The Respondent Description

Table 1: demographics by age

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	20-30 years	82	66.1	66.1	66.1
	31-40 years	27	21.8	21.8	87.9
	41-50 years	15	12.1	12.1	100.0
	Total	124	100.0	100.0	

The age demographics in Table 1 revealed that the majority of respondents (66.1%) were aged 20-30 years, followed by 21.8% aged 31-40 years, and 12.1% aged 41-50 years. The total sample size was 124, with each age group's valid and cumulative percentages summing up to 100%.

Table 2: demographics by Years of Teaching Experience

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0-5 years	78	62.9	62.9	62.9
	6-10 years	23	18.5	18.5	81.5
	11-15 years	10	8.1	8.1	89.5

	16+ years	13	10.5	10.5	100.0
	Total	124	100.0	100.0	

Table 2 shows the distribution of teaching experience among respondents. The majority, 62.9%, had 0-5 years of experience, while 18.5% had 6-10 years. Those with 11-15 years comprised 8.1%, and 10.5% had over 16 years. This indicates a predominantly less experienced teaching workforce.

Table 3 below reveals that among the respondents, 11.3% held an NCE, 53.2% had a Bachelor's degree, 25.0% possessed a Master's degree, and 10.5% had a Doctoral degree. In total, 124 participants were surveyed, highlighting that over half of the respondents had a Bachelor's degree.

Table 3: Demographics by Educational Qualification

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	NCE	14	11.3	11.3	11.3
	Bachelor's degree	66	53.2	53.2	64.5
	Master's degree	31	25.0	25.0	89.5
	Doctoral degree	13	10.5	10.5	100.0
	Total	124	100.0	100.0	

Table 4: Demographics by Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	26	21.0	21.0	21.0
	Female	98	79.0	79.0	100.0
	Total	124	100.0	100.0	

Table 4 shows the gender demographics. Out of 124 participants, 26 (21.0%) were male, and 98 (79.0%) were female. The valid percent for each gender mirrors the frequency percentages, with males at 21.0% and females at 79.0%, culminating in a cumulative percent of 100.0%.

3.2 Descriptive Statistics on Teachers' Perception of Factors that Influence Academic Achievement during the COVID-19 Pandemic among Post-Primary School Students

Table 5: Descriptive Statistics on teachers' perception of factors that influenced academic achievement during the COVID-19 pandemic among post-primary school students

				Bootstrap[a]			
			Std.		Std.	95% Confidence Interval	
		Statistic	Error	Bias	Error	Lower	Upper
Limited access to technology hindered students' online learning capabilities significantly.	N	124		0	0	124	124
	Mean	3.41		.00	.06	3.28	3.53
	Std. Deviation	.687		-.004	.037	.604	.751
	Variance	.472		-.004	.050	.365	.565
	Skewness	-.745	.217	.006	.147	-1.036	-.453
	Kurtosis	-.595	.431	.018	.236	-1.003	-.028
Mental health issues increased due to COVID-19 pandemic, impacting students' focus and academic performance.	N	124		0	0	124	124
	Mean	2.52		.00	.07	2.38	2.66
	Std. Deviation	.801		-.006	.043	.707	.878
	Variance	.642		-.008	.069	.499	.772
	Skewness	.499	.217	.012	.167	.216	.831
	Kurtosis	-.494	.431	.032	.276	-.945	.218
Quality of remote instruction differed, affecting students' understanding of material.	N	124		0	0	124	124
	Mean	3.08		.00	.04	2.99	3.16
	Std. Deviation	.487		-.004	.040	.400	.559
	Variance	.237		-.002	.039	.160	.312
	Skewness	.205	.217	.024	.190	-.025	.678
	Kurtosis	1.158	.431	.096	.778	.147	3.074
Availability of educational resources online varied across different communities.	N	124		0	0	124	124
	Mean	3.35		.00	.06	3.23	3.45
	Std. Deviation	.625		-.002	.032	.559	.683
	Variance	.391		-.001	.040	.313	.467
	Skewness	-.412	.217	.014	.136	-.657	-.112
	Kurtosis	-.649	.431	-.010	.085	-.875	-.497
Teachers' proficiency with technology impacted the	N	124		0	0	124	124
	Mean	3.06		.00	.06	2.94	3.17
	Std. Deviation	.678		-.003	.056	.566	.785
	Variance	.460		-.001	.076	.320	.617
	Skewness	-.704	.217	.041	.203	-1.000	-.245

effectiveness of remote teaching.	Kurtosis	1.356	.431	-.069	.638	.190	2.626
Home environment distractions reduced students' ability to concentrate on studies.	N	124		0	0	124	124
	Mean	3.46		.00	.05	3.36	3.56
	Std. Deviation	.547		-.004	.023	.501	.591
	Variance	.299		-.003	.025	.251	.349
	Skewness	-.292	.217	.027	.214	-.686	.164
	Kurtosis	-1.028	.431	-.056	.352	-2.016	-.546
Peer interaction was limited, affecting collaborative learning and motivation.	N	124		0	0	124	124
	Mean	3.31		.00	.06	3.19	3.44
	Std. Deviation	.691		-.005	.062	.570	.806
	Variance	.478		-.003	.085	.325	.650
	Skewness	-1.109	.217	.067	.239	-1.368	-.463
	Kurtosis	2.115	.431	-.198	.620	.717	2.894
Internet connectivity issues disrupted continuous access to online classes.	N	124		0	0	124	124
	Mean	3.48		.00	.04	3.40	3.57
	Std. Deviation	.502		-.002	.003	.491	.502
	Variance	.252		-.002	.003	.241	.252
	Skewness	.065	.217	.000	.184	-.297	.434
	Kurtosis	-2.029	.431	.034	.061	-2.033	-1.841
Physical health concerns and illnesses due to COVID-19 pandemic affected students' attendance and engagement.	N	124		0	0	124	124
	Mean	3.28		.00	.07	3.15	3.42
	Std. Deviation	.802		-.006	.076	.645	.935
	Variance	.643		-.004	.120	.415	.873
	Skewness	-1.422	.217	.036	.103	-1.571	-1.161
	Kurtosis	2.261	.431	.007	.666	.924	3.296
Changes in school schedules led to irregular learning patterns for students.	N	124		0	0	124	124
	Mean	3.20		.00	.07	3.06	3.34
	Std. Deviation	.743		-.004	.055	.638	.843
	Variance	.553		-.002	.081	.407	.710
	Skewness	-.827	.217	.037	.173	-1.081	-.398
	Kurtosis	.767	.431	-.079	.499	-.296	1.769
Valid N (listwise)	N	124		0	0	124	124

a. Unless otherwise noted, bootstrap results are based on 1000 bootstrap samples

Table 5 highlights factors affecting academic achievement among post-primary school students during COVID-19. Limited access to technology (mean = 3.41, SD = 0.687) significantly hindered online learning. Increased mental health issues (mean = 2.52, SD = 0.801) impacted focus and performance. Variability in remote instruction quality (mean = 3.08, SD = 0.487) affected understanding. Resource availability (mean = 3.35, SD = 0.625) and teachers' tech proficiency (mean = 3.06, SD = 0.678) influenced effectiveness. Home distractions (mean = 3.46, SD = 0.547) reduced concentration. Limited peer interaction (mean = 3.31, SD = 0.691) impacted learning. Connectivity issues (mean = 3.48, SD = 0.502) disrupted access, while physical health concerns (mean = 3.28, SD = 0.802) and schedule changes (mean = 3.20, SD = 0.743) affected attendance and learning patterns.

3.3 The Descriptive Statistics on the Effectiveness of the Remote Learning Strategies Implemented during the COVID-19 Pandemic on Academic Outcomes among Post-Primary School Students

Table 6: Descriptive statistics on the effectiveness of the remote learning strategies implemented during the COVID-19 pandemic on academic outcomes among post-primary school students

				Bootstrap[a]			
			Std.		Std.	95% Confidence Interval	
		Statistic	Error	Bias	Error	Lower	Upper
Remote learning strategies were ineffective for most students during COVID-19 pandemic.	N	118		0	0	118	118
	Mean	3.45		.00	.05	3.36	3.53
	Std. Deviation	.500		-.002	.006	.481	.502
	Variance	.250		-.002	.006	.231	.252
	Skewness	.207	.223	.006	.192	-.138	.610
	Kurtosis	-1.991	.442	.040	.103	-2.035	-1.657
Some students struggled with remote learning methods during the COVID-19 pandemic.	N	118		0	0	118	118
	Mean	3.28		.00	.05	3.19	3.38
	Std. Deviation	.553		-.004	.031	.492	.614
	Variance	.306		-.003	.035	.243	.377
	Skewness	.021	.223	.031	.195	-.287	.467
	Kurtosis	-.476	.442	-.033	.287	-1.130	.065
Internet access impacted the effectiveness of remote learning strategies during COVID-19 pandemic.	N	118		0	0	118	118
	Mean	3.42		.00	.05	3.31	3.51
	Std. Deviation	.528		-.002	.021	.490	.570
	Variance	.279		-.002	.022	.240	.325
	Skewness	-.007	.223	.019	.230	-.411	.470
	Kurtosis	-1.240	.442	-.019	.357	-2.016	-.680

Technology unavailability affected the effectiveness of remote learning strategies during COVID-19 pandemic.	N	118		0	0	118	118
	Mean	3.41		.00	.06	3.29	3.53
	Std. Deviation	.695		-.012	.067	.551	.818
	Variance	.483		-.011	.092	.304	.670
	Skewness	-1.370	.223	.098	.258	-1.665	-.588
	Kurtosis	2.741	.442	-.319	.795	.754	3.555
Students missed face-to-face interactions despite remote learning strategies' benefits during COVID-19 pandemic.	N	118		0	0	118	118
	Mean	3.55		.00	.05	3.46	3.64
	Std. Deviation	.533		-.002	.024	.487	.581
	Variance	.284		-.002	.026	.237	.337
	Skewness	-.551	.223	.016	.230	-.987	-.103
	Kurtosis	-.976	.442	-.048	.494	-2.005	-.127
Remote learning strategies required adaptation to suit different learning styles during COVID-19 pandemic.	N	118		0	0	118	118
	Mean	3.45		.00	.05	3.36	3.54
	Std. Deviation	.533		-.002	.021	.497	.577
	Variance	.284		-.002	.022	.248	.333
	Skewness	-.139	.223	.013	.224	-.537	.325
	Kurtosis	-1.249	.442	-.029	.367	-2.030	-.691
Online assessments posed challenges for evaluating students' academic performance during COVID-19 pandemic.	N	118		0	0	118	118
	Mean	3.14		.00	.06	3.03	3.26
	Std. Deviation	.644		-.003	.034	.570	.707
	Variance	.415		-.003	.044	.325	.500
	Skewness	-.141	.223	.008	.084	-.319	.005
	Kurtosis	-.602	.442	.027	.227	-.972	-.074
Remote learning strategies prompted innovations in educational delivery methods during COVID-19 pandemic.	N	118		0	0	118	118
	Mean	3.18		.00	.07	3.05	3.31
	Std. Deviation	.724		-.006	.057	.605	.826
	Variance	.524		-.006	.082	.366	.682
	Skewness	-.835	.223	.053	.195	-1.080	-.356
	Kurtosis	1.093	.442	-.115	.546	-.108	2.040

Some subjects were harder to teach remotely during the COVID-19 pandemic.	N	118		0	0	118	118
	Mean	3.39		.00	.06	3.27	3.51
	Std. Deviation	.667		-.004	.036	.595	.736
	Variance	.445		-.004	.047	.354	.541
	Skewness	-.641	.223	.004	.143	-.940	-.378
	Kurtosis	-.629	.442	.014	.172	-.930	-.221
The COVID-19 pandemic highlighted inequalities in access to learning resources.	N	118		0	0	118	118
	Mean	3.20		.00	.06	3.08	3.32
	Std. Deviation	.635		-.003	.034	.565	.695
	Variance	.403		-.003	.043	.319	.483
	Skewness	-.195	.223	.013	.105	-.401	-.004
	Kurtosis	-.595	.442	.018	.195	-.901	-.146
Valid N (listwise)	N	118		0	0	118	118

a. Unless otherwise noted, bootstrap results are based on 1000 bootstrap samples

Table 6 presents descriptive statistics on the effectiveness of remote learning strategies during the COVID-19 pandemic among post-primary students. The mean effectiveness scores ranged from 3.14 (online assessments challenges) to 3.55 (students missing face-to-face interactions). The standard deviations varied from 0.500 (general effectiveness) to 0.724 (innovations in educational delivery). Skewness values ranged from -1.370 (technology unavailability) to 0.207 (general effectiveness), indicating mild skewing. Kurtosis values varied widely, with -1.991 (ineffectiveness) and 2.741 (technology unavailability), suggesting different distribution shapes. The mean score for technology's impact was 3.41, highlighting notable challenges.

3.4 Descriptive statistics on challenges faced by post-primary school students in South East Nigeria in adapting to changes in the educational environment during the COVID-19 pandemic

Table 7: Descriptive statistics on challenges faced by post-primary school students in South East Nigeria in adapting to changes in the educational environment during the COVID-19 pandemic

				Bootstrap[a]			
						95% Confidence Interval	
		Statistic	Std. Error	Bias	Std. Error	Lower	Upper
Internet connectivity was a significant issue for many students' learning	N	124		0	0	124	124
	Mean	3.17		.00	.08	3.02	3.31
	Std. Deviation	.824		-.005	.070	.673	.951
	Variance	.678		-.003	.114	.453	.904
	Skewness	-1.124	.217	.025	.114	-1.310	-.848

during the COVID-19 pandemic.	Kurtosis	1.229	.431	.003	.543	.161	2.281
Access to digital devices was limited among students in rural areas during the COVID-19 pandemic.	N	124		0	0	124	124
	Mean	3.30		.00	.08	3.14	3.44
	Std. Deviation	.874		-.006	.059	.753	.988
	Variance	.764		-.007	.102	.567	.975
	Skewness	-1.069	.217	.010	.174	-1.418	-.734
	Kurtosis	.275	.431	.002	.496	-.579	1.410
Lack of electricity disrupted students' ability to attend online classes during the COVID-19 pandemic.	N	124		0	0	124	124
	Mean	3.72		.00	.04	3.64	3.80
	Std. Deviation	.452		-.003	.020	.403	.483
	Variance	.204		-.003	.018	.162	.233
	Skewness	-.979	.217	-.027	.233	-1.506	-.577
	Kurtosis	-1.058	.431	.110	.500	-1.694	.271
Students struggled with understanding online learning platforms and tools during the COVID-19 pandemic.	N	124		0	0	124	124
	Mean	3.35		.00	.07	3.21	3.48
	Std. Deviation	.807		-.006	.064	.669	.933
	Variance	.651		-.006	.103	.447	.871
	Skewness	-1.282	.217	.018	.157	-1.560	-.964
	Kurtosis	1.364	.431	-.020	.575	.327	2.574
Teachers were not adequately trained for effective remote teaching practices.	N	124		0	0	124	124
	Mean	3.25		.00	.06	3.13	3.38
	Std. Deviation	.750		-.003	.031	.681	.806
	Variance	.563		-.004	.046	.464	.650
	Skewness	-.447	.217	-.008	.126	-.709	-.212
	Kurtosis	-1.097	.431	.034	.164	-1.368	-.741
Many students experienced distractions while studying at home during lockdown.	N	124		0	0	124	124
	Mean	3.60		.00	.04	3.52	3.69
	Std. Deviation	.491		-.002	.010	.463	.502
	Variance	.241		-.002	.010	.214	.252
	Skewness	-.434	.217	-.011	.193	-.850	-.065
	Kurtosis	-1.841	.431	.048	.190	-2.029	-1.299
Parents often lacked the skills to assist children	N	124		0	0	124	124
	Mean	3.35		.00	.06	3.23	3.46
	Std. Deviation	.599		-.004	.032	.532	.657

with online education.	Variance	.358		-.003	.038	.284	.432
	Skewness	-.309	.217	.020	.165	-.590	.043
	Kurtosis	-.647	.431	-.025	.142	-1.053	-.428
Limited access to textbooks and learning materials hindered academic progress.	N	124		0	0	124	124
	Mean	3.27		.00	.06	3.15	3.39
	Std. Deviation	.667		-.002	.034	.599	.728
	Variance	.445		-.002	.045	.358	.529
	Skewness	-.377	.217	.009	.119	-.620	-.138
	Kurtosis	-.764	.431	.010	.131	-1.026	-.526
Motivation levels dropped due to isolation from the school environment during the COVID-19 pandemic.	N	124		0	0	124	124
	Mean	3.27		.00	.06	3.15	3.38
	Std. Deviation	.652		-.004	.032	.583	.711
	Variance	.425		-.004	.041	.339	.505
	Skewness	-.329	.217	.009	.112	-.545	-.096
	Kurtosis	-.710	.431	.012	.118	-.956	-.458
Language barriers made understanding instructional materials difficult for some students.	N	124		0	0	124	124
	Mean	2.91		.00	.07	2.77	3.06
	Std. Deviation	.807		-.002	.056	.691	.914
	Variance	.651		-.001	.090	.478	.836
	Skewness	-.687	.217	.019	.126	-.910	-.404
	Kurtosis	.349	.431	-.014	.413	-.360	1.296
Valid N (listwise)	N	124		0	0	124	124

a. Unless otherwise noted, bootstrap results are based on 1000 bootstrap samples

The descriptive statistics from Table 7 reveal various challenges faced by post-primary school students in South East Nigeria during the COVID-19 pandemic. Internet connectivity issues, with a mean score of 3.17 (SD = 0.82), were significant. Access to digital devices scored 3.30 (SD = 0.87), indicating limitations in rural areas. Lack of electricity had the highest mean of 3.72 (SD = 0.45), highlighting its impact. Students struggled with online learning platforms (mean = 3.35, SD = 0.81), and teachers' inadequate training (mean = 3.25, SD = 0.75) was noted. Distractions at home (mean = 3.60, SD = 0.49) and parents' lack of skills (mean = 3.35, SD = 0.60) were also prevalent. Limited access to textbooks (mean = 3.27, SD = 0.67) and motivation drops (mean = 3.27, SD = 0.65) were reported. Language barriers, with the lowest mean of 2.91 (SD = 0.81), were less prominent but still notable.

Table 8 below provides the results of normality tests, specifically the Kolmogorov-Smirnov and Shapiro-Wilk tests, which assess whether the data is normally distributed. The data is categorized by years of teaching experience and evaluates two

key aspects: factors that influenced academic achievement and the effectiveness of remote learning strategies during the COVID-19 pandemic. For the factors influencing academic achievement, the results across all experience groups show significant values (p-values) below 0.05 for both the Kolmogorov-Smirnov and Shapiro-Wilk tests. This indicates that the data significantly deviates from a normal distribution. Specifically, the 0-5 years of experience group has a Kolmogorov-Smirnov statistic of 0.122 and a Shapiro-Wilk statistic of 0.950, both with p-values indicating non-normality. The same trend is observed in the 6-10 years, 11-15 years, and 16+ years groups, with progressively higher statistics and similarly low p-values.

Table 8: Tests of Normality

		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Years of Teaching Experience	Statistic	df	Sig.	Statistic	df	Sig.
Factors that influenced academic achievement during the COVID-19 pandemic	0-5 years	.122	78	.006	.950	78	.004
	6-10 years	.272	23	.000	.787	23	.000
	11-15 years	.381	10	.000	.640	10	.000
	16+ years	.352	13	.000	.646	13	.000
Effectiveness of the remote learning strategies implemented during the COVID-19 pandemic	0-5 years	.188	78	.000	.867	78	.000
	6-10 years	.319	23	.000	.739	23	.000
	11-15 years	.381	10	.000	.640	10	.000

a. Lilliefors Significance Correction

Regarding the effectiveness of remote learning strategies, the results are consistent across all experience groups, showing non-normality. For instance, the 0-5 years group exhibits a Kolmogorov-Smirnov statistic of 0.188 and a Shapiro-Wilk statistic of 0.867, with p-values strongly indicating non-normality. This pattern persists in the 6-10 years and 11-15 years groups, reinforcing the deviation from normality in the data. Given the persistent non-normal distribution indicated by the low p-values across all groups and factors, further analysis was done using non-parametric statistical methods, such as the Kruskal-Wallis test, Jonckheere-Terpstra Test.

3.5 The Results of Hypothesis Test

3.5.1 The Difference in the Teacher's Perception Regarding Factors that Influenced Academic Achievement during the COVID-19 Pandemic

Table 9: Combined table incorporating the data from Ranks, Kruskal-Wallis Test, and Jonckheere-Terpstra Test on difference in the teacher's perception regarding factors that influenced academic achievement during the COVID-19 pandemic

Years of Teaching Experience	N	Mean Rank
0-5 years	78	52.53
6-10 years	23	109.70
11-15 years	10	60.50
16+ years	13	40.35
Total	124	
Kruskal-Wallis Test		
Chi-Square	51.493	
df	3	
Asymp. Sig.	.000	
Test Type		
Jonckheere-Terpstra Test		
Number of Levels in Years of Teaching Experience	4	
N	124	
Observed J-T Statistic	2667.500	
Mean J-T Statistic	2123.500	
Std. Deviation of J-T Statistic	197.569	
Std. J-T Statistic	2.753	
Asymp. Sig. (2-tailed)	.006	

Research Hypothesis 1 examines how different years of teaching experience influenced their perception of factors affecting academic achievement during the COVID-19 pandemic. The analysis employs the Kruskal-Wallis Test and the Jonckheere-Terpstra Test to explore these differences. The Kruskal-Wallis Test reveals a Chi-Square value of 51.493 with 3 degrees of freedom. The associated p-value (Asymp. Sig.) is .000, indicating a highly significant result. This suggests that there are statistically significant differences in the factors that influenced academic achievement during the COVID-19 pandemic among educators with varying years of teaching experience. The Jonckheere-Terpstra Test shows an Asymp. Sig. (2-tailed) value of .006, which is less than the standard significance level of 0.05. This indicates a significant trend in the factors affecting academic achievement during the COVID-19 pandemic across the ordered levels of teaching experience.

Based on the results from both tests, the null hypothesis, which posits that there is no difference in the teacher's perception of factors influencing academic achievement during the COVID-19 pandemic across different years of teaching experience, is rejected. The significant p-value ($p < .001$) demonstrates that there are indeed differences in the academic achievement factors based on years of teaching experience. The Jonckheere-Terpstra Test having a significant p-value ($p < .01$) further supports the rejection of the null hypothesis. It suggests that there is a significant trend in the factors influencing academic achievement during the COVID-19 pandemic, depending on the number of years of teaching experience.

3.5.2 The Difference in the Teacher's Perception Regarding Effectiveness of The Remote Learning Strategies Implemented during the COVID-19 Pandemic

Table 10: Combined table incorporating the data from Ranks, Kruskal-Wallis Test, and Jonckheere-Terpstra Test on difference in the teacher's perception regarding effectiveness of the remote learning strategies implemented during the COVID-19 pandemic

Years of Teaching Experience	**N**	**Mean Rank**
0-5 years	78	63.24
6-10 years	23	82.13
11-15 years	10	51.20
16+ years	13	32.00
Total	124	
Test Statisticsa,b		
Chi-Square		18.132
df		3
Asymp. Sig.		.000
Test Type		Kruskal-Wallis Test
Jonckheere-Terpstra Testa		
Number of Levels in Years of Teaching Experience		4
N		124
Observed J-T Statistic		1877.500
Mean J-T Statistic		2123.500
Std. Deviation of J-T Statistic		194.302
Std. J-T Statistic		-1.266
Asymp. Sig. (2-tailed)		.205

Kruskal-Wallis test results show a Chi-Square value of 18.132 with 3 degrees of freedom and a significant p-value of .000. This indicates that there are statistically

significant differences in the teacher's perception of the effectiveness of remote learning strategies based on their years of teaching experience. Also, **Jonckheere-Terpstra Test showed that t**he observed J-T statistic is 1877.500, with a mean J-T statistic of 2123.500 and a standard deviation of 194.302. The standard J-T statistic is -1.266 with an asymptotic significance (2-tailed) of .205. This p-value suggests that there is no significant trend in the perception of effectiveness across the ordered levels of teaching experience. Based on the Kruskal-Wallis Test, the null hypothesis (that there is no significant difference in the teacher's perception regarding the effectiveness of remote learning strategies based on their years of teaching experience) is rejected due to the significant p-value ($p < .001$). However, the Jonckheere-Terpstra Test does not indicate a significant trend, implying that while there are differences in perception, they do not follow a consistent order. The hypothesis is rejected according to the Kruskal-Wallis Test, indicating significant differences in perceptions based on years of teaching experience. However, the lack of a significant trend in the Jonckheere-Terpstra Test suggests these differences are not systematic across increasing years of experience.

3.6 Discussion of results

Research Question 1 examined teachers' perception of factors that influenced academic achievement during the COVID-19 pandemic among post-primary school students in South East Nigeria. The result showed that limited access to technology significantly hindered students' online learning capabilities. This finding agrees with Laksana (2020), who reported similar technological barriers in rural areas. Mental health issues increased, impacting students' focus and performance. In contrast, a study by Lancaster and Arango (2021) found that urban students showed more resilience to mental health challenges. The quality of remote instruction varied, affecting students' understanding, aligning with Hamilton and Ercikan (2022), who noted disparities in instructional quality across different schools. Availability of educational resources online differed across communities, similar to findings by Czerniewicz et al., (2020), who highlighted resource inequities in remote education. Teachers' proficiency with technology influenced the effectiveness of remote teaching, mirroring Boyko et al., (2021) findings on teacher training's role in successful online education. Home environment distractions reduced students' concentration, a challenge also noted by Fathoni and Retnawati (2021). Limited peer interaction affected collaborative learning and motivation, which is in line with Igwe and Anya's (2023) study on social learning loss during the pandemic. Internet connectivity issues disrupted continuous access to online classes, reinforcing findings by Engzell et al., (2021). Physical health concerns and illnesses due to COVID-19 affected students' attendance and engagement, a phenomenon similarly observed by Monroy-Gómez-Franco, L., Vélez-Grajales and López-Calva (2022). Changes in

school schedules led to irregular learning patterns, paralleling Maba et al., (2023) awarenesss into disrupted academic routines.

Research Question 2 examined how effective that remote learning strategies implemented during the COVID-19 pandemic on academic outcomes among post-primary school students in South East Nigeria. The result showed that teachers perceived remote learning strategies as largely ineffective for most students during the COVID-19 pandemic. This finding agrees with Alejo et al., (2024), who observed significant challenges in student engagement. Many students struggled with remote learning methods, aligning with Reimers (2022), who noted difficulties in adapting to online formats. Internet access significantly impacted the effectiveness of remote learning strategies, consistent with Blaskó et al., (2022), who reported similar connectivity issues in rural areas. Technology unavailability further affected the success of remote learning strategies, paralleling Alasino et al., (2024) findings on the digital divide's impact. Despite some benefits, students missed face-to-face interactions, echoing Sweet et al., (2023), who highlighted the importance of in-person engagement for effective learning. Remote learning strategies required adaptation to different learning styles, in contrast, Lee and Wong (2024) found that some schools successfully tailored methods to individual needs. Online assessments posed challenges for evaluating academic performance, a problem also noted by Spring et al., (2023). However, remote learning strategies prompted innovations in educational delivery, agreeing with Wilson et al., (2021) study on new teaching methodologies. Some subjects were harder to teach remotely, aligning with Arcos-Alonso and Arcos-Alonso (2021), who found practical subjects particularly challenging. The pandemic highlighted inequalities in access to learning resources, consistent with Obododike and Okekeokosisi (2020) observations on educational disparities.

Research Question 3 covered teachers' perception on challenges that post-primary school students in South East Nigeria face in adapting to changes in the educational environment during the COVID-19 pandemic. The result showed that internet connectivity was a significant issue, with many students struggling to participate in online learning. This finding agrees with Kuboye, (2021), who reported similar connectivity challenges. Access to digital devices was limited, particularly in rural areas, aligning with Azubuike et al., (2021) findings on digital disparities. Lack of electricity further disrupted students' ability to attend online classes, consistent with Gift et al., (2020), who noted frequent power outages impacting remote learning. Students also struggled with understanding online learning platforms and tools, echoing Vurayai (2022) observations on the steep learning curve for digital literacy. Teachers were not adequately trained for effective remote teaching practices, which in contrast, Ogunode et al., (2021) found some urban schools had better-prepared educators. Many students experienced distractions while studying at home, similar

to the findings of Akinwumi and Itobore (2020) on the home environment's impact on learning. Parents often lacked the skills to assist children with online education, a challenge also noted by Ogunode et al., (2021). Limited access to textbooks and learning materials hindered academic progress, paralleling Olanrewaju et al., (2021) study on resource shortages. Motivation levels dropped due to isolation from the school environment, in contrast, Egielewa et al., (2022) found some students adapted well to independent learning. Finally, language barriers made understanding instructional materials difficult for some students, as highlighted by Ogueji and Okoloba (2022).

4. Conclusion

The study on the perception of teachers regarding the impact of pre and post COVID-19 on the academic achievement of post-primary school students in South East Nigeria reveals significant awarenesss into the challenges and adaptations faced during this period. Teachers reported that the abrupt shift to remote learning during the pandemic exacerbated existing disparities in access to technology, internet connectivity, and educational resources, particularly in rural areas. The lack of electricity, coupled with insufficient training for educators in digital pedagogy, further hindered the effectiveness of online instruction. Students' struggles with understanding online learning platforms and tools, coupled with the distractions at home, negatively impacted their academic performance. The isolation from the school environment led to decreased motivation levels and limited opportunities for peer interaction, crucial for collaborative learning and maintaining academic interest. Additionally, language barriers and parents' lack of skills to assist with online education posed further challenges.

Despite these difficulties, the pandemic prompted innovative approaches in educational delivery and highlighted the need for more robust infrastructure and training to support remote learning. Moving forward, addressing these disparities and enhancing digital literacy among both students and teachers will be essential to improving academic outcomes and resilience against future disruptions. This study underscores the importance of continued investment in educational technology and support systems to bridge the gap between pre and post-pandemic academic environments.

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