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Impact of the Transit School Initiative on Basic Science Students' Academic Achievements in Northern Nigeria

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ABSTRACT

This study assesses the impact of the Transit School Initiative (TSI) on the academic achievement of basic science students in Northern Nigeria. The TSI is an education intervention programme aims to offer educational opportunities to underserved students who have dropped out of school due to security, socio-economic, and cultural challenges. Adopting a descriptive research approach, the study collected quantitative data from academic records of selected schools across the northern region. A sample t-test was employed to test the hypothesis. The results revealed significant differences in academic performance between JSS 1 basic science students who participated in TSI intervention programs and those who did not. These findings provide valuable insights into effective strategies for enhancing the academic performance of basic science students in the region.

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1. INTRODUCTION

Education is universally acknowledged as a cornerstone of personal and societal development. It catalyses economic growth, social progress, and the reduction of inequality. Access to quality education equips individuals with the knowledge and skills necessary for productive lives, contributing to national development and societal growth [1],[2]. Science education is crucial for developing critical thinking, problem-solving skills, and a deeper understanding of the natural world, which are essential for students' personal and professional growth. Research highlights that integrating scientific reasoning and inquiry-based learning significantly enhances students' cognitive abilities, promoting higher levels of problem-solving and decision-making skills [3],[4].

Science education benefits greatly from practical, hands-on learning, which is crucial for deep understanding and retention of material. Engaging in laboratory experiments and practical applications allows students to directly interact with scientific concepts, enhancing their comprehension and ability to apply theoretical knowledge in real-world scenarios. Recent studies corroborate this view, indicating that students who participate in hands-on activities and experiential learning demonstrate improved problem-solving skills and higher academic achievement in science subjects [5],[6]. Furthermore, hands-on learning fosters greater engagement and interest in science, encouraging students to pursue further studies and careers in STEM fields [7]. The absence of such practical experiences can lead to superficial understanding and difficulty in grasping complex scientific principles, thereby underscoring the necessity of integrating laboratory work and real-world applications into science curricula [8],[9].

However, Socio-economic conditions significantly affect the performance of science students by limiting the time and resources they can dedicate to their studies. Sirin (2005) revealed that students from lower socio-economic backgrounds often face additional responsibilities, such as child labour and family duties, which can detract from the time available for academic pursuits [10]. This lack of time can impede their ability to engage in thorough study sessions, participate in extracurricular learning opportunities, and complete assignments on time, thereby affecting their academic performance. Furthermore, financial constraints may restrict access to essential educational resources like textbooks, laboratory equipment, and tutoring services, which are crucial for mastering scientific concepts. The stress associated with managing these external responsibilities can also exacerbate feelings of anxiety and decrease overall academic motivation, further contributing to poorer performance in science subjects. This relationship between socio-economic status and academic achievement underscores the need for targeted support systems and interventions to help students from disadvantaged backgrounds succeed in their studies [10],[11],[8]. Science education in Nigeria has experienced a notable increase in interest and support for the professional development of science teachers. The Government of Nigeria has actively collaborated with international development partners such as the British Council, UNICEF, DFID, UNESCO, USAID, JICA, KOICA, CGC, World Bank, as well as civil societies and NGOs to work towards the Education for All and Universal Basic Education goals. These collaborative efforts signify the commitment to enhance science education and improve the quality of teaching in Nigeria [12].

Problem Statement: Northern Nigeria faces a significant educational crisis, with millions of students dropped out of school due to poverty, insurgency, and other socio-economic issues. This dire situation requires urgent and effective intervention programs like the Transit School Initiative, which aims to improve educational access and quality by providing transitional and adaptable educational settings for displaced and marginalized students including basic science students who couldn’t make transition to secondary schools across the northern region. By addressing barriers such as cost, safety and enhancing the standard of education through trained teachers and adequate resources, such transitional programs ensure that students continue to receive meaningful education despite the challenges, thereby fostering better individual and societal outcomes while transitioning to formal education.

This study aims to assess the impact of the Transit School Initiative (TSI) on the academic achievement of basic science students among out-of-school children in Northern Nigeria. It seeks to provide insights into effective strategies for improving science students’ academic performance and addressing the rate out-of-school children crisis in northern Nigeria.

Research Questions: What is the impact of the Transit School Initiative on the academic achievement of basic science students who benefited from TSI intervention programme?

Hypotheses: H_{01}: There is no significant difference in the overall academic achievement between JSS 1 basic science students who participated in TSI programmes and those who did not, throughout the academic years of 2021/2022, 2022/2023, and 2023/2024.

Significance of the Study: The findings will contribute to developing more effective educational policies and interventions, ensuring universal access to quality science education in northern Nigeria.

Literature Review

Educational Challenges in Northern Nigeria

Northern Nigeria's educational challenges are deeply intertwined with issues of poverty, insurgency, and socio-economic disparities. The region has one of the highest numbers of out-of-school children in Nigeria, a situation exacerbated by persistent poverty and economic hardship. Many families are unable to afford basic educational materials, such as uniforms, school fees, which forces children to abandon their education to work and support their households. This dire economic situation is highlighted by the high rates of poverty in the region, where children are often seen as economic assets rather than individuals in need of education [13].

Insecurity in Northern Nigeria, particularly due to insurgent activities by groups like Boko Haram, significantly disrupts educational access and quality. A notable example is the kidnapping of over 200 schoolgirls from Chibok in 2014, which drew international attention and highlighted the severe risks faced by students. Such attacks lead to the destruction of educational infrastructure and create a climate of fear that discourages attendance. The constant threat of violence has led to the closure of many schools, and in some areas, children and teachers are kidnapped, killed, or forced to flee. This pervasive insecurity not only keeps children out of school but also contributes to a broader societal instability that undermines long-term educational and developmental goals [14].

Socio-economic disparities further compound the educational crisis in Northern Nigeria. Gender disparities are particularly pronounced, with girls often receiving less educational support than boys due to cultural and economic factors. Practices such as early marriage and gender-based violence limit girls' educational opportunities and reinforce a cycle of poverty and dependence. Additionally, the Almajiri system, which focuses primarily on Quranic education without integrating essential skills like literacy and numeracy, leaves many children unprepared for modern socio-economic challenges. These socio-economic and cultural barriers must be addressed through targeted policies and intervention programs to improve educational outcomes and reduce inequality in the region.

International organizations have made significant efforts to address the out-of-school children crisis in Nigeria. UNESCO, for instance, has launched various initiatives aimed at improving access to quality education, including the Global Partnership for Education (GPE), which funds educational programs targeting the most disadvantaged regions. UNICEF has also been actively involved, providing emergency education services, rebuilding schools damaged by insurgent activities, and offering psychosocial support to affected children. Additionally, the World Bank has contributed through its projects focusing on enhancing educational infrastructure and teacher training, thereby improving the overall learning environment. These efforts collectively aim to reduce the number of out-of-school children by tackling the root causes of educational disparities, such as poverty, insecurity, and socio-economic barriers.

Various programs have been established to enhance science education around the world, and one notable initiative is the Science, Mathematics, and Technology Education (SMASE) program implemented by the Japan International Cooperation Agency (JICA) in Nigeria. SMASE focuses on improving the quality of science education in Nigeria through a range of targeted interventions.

Transit School Initiative

The Transit School Initiative is a non-governmental program aimed at providing educational opportunities to underserved children. It focuses on reducing the number of out-of-school children by offering scholarships and support services.

The Transit School Initiative (TSI) in Northern Nigeria is a proactive response to the out-of-school children crisis exacerbated by socio-economic and socio-cultural factors, including poverty and insurgency. TSI provides innovative educational interventions, such as mobile classrooms, scholarships, and partnerships with relevant stakeholders, targeting basic science students who have dropped out of school. This program aims to reintegrate these students into the formal education system, offering them essential knowledge and skills for their academic and professional futures. TSI's strategies have proven effective in addressing the educational needs of out-of-school children, particularly in regions heavily impacted by insurgency and socio-economic disparities. The initiative's efforts include creating awareness about the importance of education, providing scholarships, and supporting vulnerable students. These measures have shown positive outcomes, improved the academic achievements of participants and reduced the number of out-of-school children. Furthermore, TSI emphasizes the importance of girl child education, offering targeted support to overcome barriers faced by girls in accessing education.

Despite these efforts, the educational crisis in Northern Nigeria remains significant, necessitating continuous support and innovation. International organizations are encouraged to incorporate successful strategies from programs like TSI into their educational initiatives. By advocating for increased funding, policy support, and community involvement, stakeholders can enhance the sustainability and scalability of such interventions, ultimately contributing to achieving Universal Basic Education and Sustainable Development Goals in the region.

Impact of Educational Interventions

Educational interventions have significantly impacted the students, both in Nigeria and globally. In Northern Nigeria, initiatives like the Transit School Initiative (TSI) have been particularly effective. TSI has provided mobile classrooms, scholarships, and community partnerships to reintegrate out-of-school children, especially those affected by poverty and insurgency, back into the educational system. This program has not only improved attendance rates but also enhanced academic performance and reduced dropout rates. Furthermore, initiatives by international organizations such as UNICEF's Emergency Education Program have rebuilt schools, provided educational materials, and offered psychosocial support, thereby creating a more conducive learning environment for children who have been displaced or traumatized by conflict. Most studies measured immediate outcomes of educational interventions, showing improved knowledge and skills compared to controls, though effects on secondary outcomes were inconsistent [15].

Outside Nigeria, similar successful educational interventions have been implemented. For example, in Kenya, the "Education for All" campaign, supported by UNESCO and other international partners, has significantly reduced the number of out-of-school children. This program focused on eliminating school fees, improving school infrastructure, and providing targeted support for marginalized communities. Additionally, in India, the "Sarva Shiksha Abhiyan" (Education for All Movement) has been instrumental in increasing enrollment and retention rates by providing free and compulsory education for children aged 6 to 14 years. These programs highlight the importance of comprehensive strategies that address financial barriers, improve educational infrastructure, and support vulnerable populations. By adopting similar approaches, educational interventions can effectively mitigate the out-of-school children crisis and promote inclusive and equitable education worldwide.

2. METHOD

A quantitative data from a quasi-experimental design was employed in the study to collect data from JSS 1 basic science students. The study involved basic science students from junior secondary schools across the Northern Nigeria, selected through purposive sampling technique.Quantitative data were collected over three academic years (2021-2024) and analysed using descriptive statistics and independent sample t-tests.

3. RESULTS AND DISCUSSION

3.1 Research Question One

The impact of the Transit School Initiative on the academic achievement of basic science students across the 2021-2024 academic sessions in northern Nigeria.

Table 1: Academic Achievement of JSS 1 Basic Science Students Across the 2021-2024 Academic Sessions

Group	N	$\bar{x}$	Median	Std
Experimental	173	669.3	666.00	80.42
Control	173	598.9	595.00	85.12

Hypotheses: There is no significant difference in the overall academic achievement between JSS 1 basic science students who participated in TSI programmes and those who did not, throughout the academic years of 2021/2022, 2022/2023, and 2023/2024.

Table 2: T-test of the Academic Achievement of Basic Science Students

Group	N	$\bar{x}$	Std	Df	t-stat	Sig. (p)	Decision
Expt.	173	669.29	80.42	343	7.836	0.001	Rejected
Control	173	599.52	84.90				

3.2 Discussion

Based on the provided findings, the study conducted a comparison between two groups: the experimental group, consisting of basic science students who benefited from TSI intervention programs, and the control group, comprising basic science students who did not attend TSI intervention programs. Both groups had an equal sample size of 173, ensuring a fair comparison. The statistics revealed that the experimental group had higher mean and median scores compared to the control group, indicating that, on average, students who attended TSI intervention programs performed better academically. The standard deviation was slightly lower in the experimental group, suggesting less variability in scores compared to the control group. Overall, these findings suggest a potential positive impact of TSI intervention programs on the academic achievement of basic science students in northern Nigeria.

The study utilized an independent t-test to analyze the academic achievement scores of the two groups. The null hypothesis (Ho1) stated that there was no significant difference in academic achievement. However, the obtained p-value from the t-test was 0.001, which was below the significance level of 0.05. This indicated strong evidence to reject the null hypothesis, supporting the existence of a significant difference between the two groups.

The experimental group, which participated in the TSI intervention program, exhibited a higher mean academic achievement score of 669.29, with a standard deviation of 80.42. In contrast, the control group, which did not participate in the program, had a lower mean score of 599.52, with a standard deviation of 84.90. The t-statistic of 7.836 indicated a substantial difference in academic achievement between the two groups. Additionally, the

low p-value of 0.001 suggested a minimal probability of obtaining such a significant difference by chance alone.

In conclusion, based on these findings, it can be inferred that the TSI intervention program had a positive impact on the academic achievement of JSS-1 basic science students. The experimental group, which received the intervention, consistently outperformed the control group in terms of academic achievement across the academic years of 2021/2022, 2022/2023, and 2023/2024.

3.3 Implications for Policy and Practice

The study highlights the importance of Transit school targeted educational interventions in improving academic outcomes of basic science students. Policymakers should focus on scaling successful initiatives and addressing security and socio-economic barriers to education.

4. CONCLUSION

This study underscores the critical role of the Transit School Initiative in enhancing the academic achievement of basic science students who benefited from TSI intervention programs. The findings contribute to developing effective educational policies and practices, ensuring universal access to quality science education in Nigeria. Based on the findings, the following recommendations were made:

a. The Government of Nigeria, through the Universal Basic Education Commission, should officially adopt the Transit School Strategies and integrate them into the national education framework. This would ensure the sustainability and scalability of the programmes, making it accessible to a larger number of out-of-school children across the country.
b. International development partners operating in Nigeria, such as USAID, UNESCO, and UNICEF, should recognize the effectiveness of the Transit School approaches and consider incorporating them into their current and future educational programmes. This would involve redirecting resources and efforts towards initiatives that directly address the out-of-school children crisis, leveraging the successful strategies employed by the Transit School Initiative.

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