

Consequences of Single-Parent Household Structures in Anambra State, Nigeria: Implications for Children's Development of Science Process Skills

Chiamaka Pamela Uchendu <i>Department of Home Economics and Hospitality Management Education (Child Development and Care), University of Nigeria, Nsukka, Nigeria.</i> <i>E-mail: amakapamela01157@gmail.com</i>	Abstract The study sought to examine the effects of single-parent home structures in Anambra state, Nigeria and the specific effects on children's learning of science process skills. Descriptive survey research design was used in the investigation. The population of interest consisted of all the single parents in the entire state of Anambra and using multi-stage sampling technique, a sample of 358 subjects (97 males and 261 females) were selected. The data collection instrument was a researcher-made questionnaire named "Consequences of Single-Parent Household Structures Questionnaire" (CSHSQ) validated and reliable by Cronbach's alpha internal consistency test. The data were analyzed by computing mean (M) scores and standard deviations (SD) for the research question and testing of the null hypothesis using an independent samples t-test with 0.05 level of significance. The results showed that single-parent household arrangements create strong socioeconomic and psychosocial tensions, such as increased financial difficulties (M=3.11), limited access to instructional resources (M=3.35) and reduced parental supervision (M=3.02). The limitations have important implications for science teaching because of the need for the development of the empirical skills of observation, measurement and experimentation that require constant cognitive scaffolding and interactive materials that can be used at home. The independent samples t-test also confirmed that there was no significant difference between the mean responses of the male and female single parents ($t=0.582, df=356, p=.561$), so that gender has no significant impact on parental perceptions of these structural vulnerabilities. From this information, it is determined that classroom teaching suffers more due to domestic deficits. In pursuit of this, the study recommends that schools in Anambra State use Adaptive Educational Technologies, Virtual Learning Models and Structured, school-based inquiry frameworks to promote children of single-parent homes to master science process skills which is in the process of being kept exclusive for the privileged few
<i>Submitted:- ; Reviewed:- ; Accepted:-</i> <i>DOI. 10.22373/natura</i>	Keyword <i>Single-Parent Households, Household Structures, Science Process Skills, STEM Education, Anambra State</i>

Introduction

Family sociology and STEM education intersect and reveal an important, but often forgotten, factor in students' academic growth: family structure. The traditional family system is experiencing a significant transformation in Anambra state, Nigeria as single parent family systems are becoming prominent. This structural shift brings in its own socio-economic and emotional relationships that greatly influence how children relate to empirical learning. Specifically, the impacts of single-parent frameworks have important implications for children's learning of the science process skills, which are the mental and physical abilities that enable learners to investigate natural phenomena in a systematic way (Golob & Ungar, 2023).

Socio-economic constraints are one of the main mechanisms through which single-parenthood is related to science process skill acquisition. Pooled financial resources in dual-parent homes are the

norm, enabling home-based science kits, computers and additional learning materials to be bought. Single-parent families, however, tend to be financially challenged since one person must manage the entire financial load of the family. In Nigeria, where public school laboratories are sometimes not equipped, parents' contribution to education through providing learning materials is very important (Akani, 2015). A child who has no experience with primitive measuring instruments, play equipment that teaches measurement, or play opportunities to experiment with measurement at home is also limited in the use of basic procedure and manipulative skills in class. Financial stress is also linked to a single parent's ability to enroll their children in quality private schools or after-school STEM programs, directly reducing the child's direct experience of hands-on experimentation (Odeleye, 2024).

Another structural weakness of single-parent structures is time poverty. In developing higher-order cognitive skills, like hypothesizing, identifying variables, or analyzing raw data, parental intellectual support is required. If a child is a single parent, the father or mother is too busy with work and household chores to offer the child the opportunity to use empirical questioning or common sense research. Evidence indicates that parental involvement and science information are excellent predictors of a child's confidence in science domains (Odeleye, 2024). Without such guidance, the child has less opportunity for informal, home-based communication about science, and science becomes a series of definitions instead of a process of inquiry.

One or two parenthood can also add psychosocial stressors that may further hinder a child's cognitive preparedness for complex problem solving. Chronic stress or internalizing behaviors are associated with transitions in the home environment, emotional displacement, or parental burnout (Daryanani et al., 2016). Long-term attention, spatial reasoning and intellectual perseverance are required for scientific experimentation when the hypotheses do not prove true. Learner's psychological fatigue can affect their executive functioning and reduce their ability to execute science processes such as model construction and controlled experimentation which are challenging and require multiple steps. Localized educational interventions within Anambra State is necessary to address these disparities. Schools need to adjust to the demographic realities of the students in their schools and offer strong, school-based inquiry experiences that are not dependent on home help. Thematic inquiry boxes and laboratory guides can be used as tools of pedagogical use to effectively democratize skill acquisition by students, who have varied home configurations, in a cost effective manner (Golob & Ungar, 2023). In addition, the involvement of practical science activities in community-based programs makes sure that children from single-parent families are mentored and given chances to collaborate with peers in order to develop self-reliance and technical skills (Akinbobola & Bada, 2022). In the end, reducing the academic disadvantages of single parent household arrangement is essential to the realization of the scientific and technological capabilities of the next generation.

The primary motivation for the study on the implications of single parent household situation on science process skills (SPS) of the children in Anambra State has been attributed to a compelling mismatch between the general trends of the demographic structure of the nation and the localised studies

on the subject. The family configuration studies in Nigeria have generally concentrated on the impact of family configuration on the generalized outcomes such as terminal test scores or emotional outcomes such as motivation and self-esteem (Ezeanyagu et al., 2023). Yet, these macro-level evaluations fail to capture the granular, procedural, psychomotor learning aspects and the scientific process skills necessary for technological and core scientific literacy in the long term (Okafor, 2017a, 2017c). At the same time, variables that are specific to classroom teaching environment are much emphasized in Anambra State regional science education research. Such studies tend to investigate the role of innovative pedagogy, alternative instructional practices, or experiential learning strategies in the acquisition of practical computer and physics skills (Muogbo et al., 2025; Okafor, 2019a). This teacher-centric and infrastructure-centric perspective is also evident in research on teacher technological competence and preparedness to use AI or digital literacy devices in teaching (Muogbo et al., 2026; Nneka & Okafor, 2013).

Unfortunately, the exclusion of the home setting can subtly view the student as an individual agent, which is problematic. It produces a critical empirical lacuna on the roles of the domain on cognitive readiness, concept development and psychological stability in the course of ageing process (Okafor, 2017b, 2019b). Complex integrated skills like devising a hypothesis or a controlled experiment require a lot of cognitive support and resources, which is difficult for time-poor, income-poor, single-parent households to support. This particular crossroads is driven by the need to make up for the undeniable disconnect between the home environment and the instructional design such that localized learning interventions can actively involve a growing and diverse student population in the acquisition of scientific skills.

Research Question

What are the consequences of single parenting in Anambra State?

Hypotheses

There is no significant difference in the mean responses of male and female single parents on the consequences of single parenting in Anambra State

Methodology

For this investigation a descriptive research design of survey type was adopted. This design is very suitable, because the researcher can collect, analyze and describe the existing perceptions and structural conditions systematically without changing environmental variables in a representative sample. All the single fathers of the study area were the target population of this study. The sample size of the study was 358 respondents from this population size. The participants were selected using multi-stage sampling technique. A simple random sampling technique was adopted to select specific Local Government Areas (LGAs) of the State. Second, the use of a purposive sampling technique allowed for the selection of the households managed by a single parent only, including a good representation of male (n=97) and female (n=261) single parents.

The data collection was done with the researcher-designed, structured questionnaire, Consequences of Single-Parent Household Structures Questionnaire (CSHSQ). The instrument was divided into two parts: Part A was formulating the respondents' demographic characteristics (age, educational qualification, and ethnicity) and Part B had 15 items that measure the perceived consequences of single parenting. These items in Part B were presented on a four point Likert type scale with scores from Strongly Agree (4), Agree (3), Disagree (2) and Strongly Disagree (1). An instrument pilot test was performed on a small non-sampled population of single parents outside the immediate study area to check the internal consistency of the instrument used. Collected data were then analyzed using the Cronbach's alpha reliability test that produced an acceptable reliability coefficient, proving that the instrument was stable and consistent in conducting the field test.

The instrument was administered face-to-face by researcher with well-trained research assistant. The questionnaire was sent directly to the interviewees at home and community meetings. Participants were explicitly instructed and the questionnaires were collected immediately after completion to guarantee that they were returned and had a high return rate. The data collected were cleaned, coded and analyzed through the Statistical Package for the Social Sciences (SPSS). To address the research question on the demographic distribution and perceived impacts of single parenting, descriptive statistics, namely mean (M) scores and standard deviations (SD) were used. A criterion mean of 2.50 was set as the standard for decision making; items that had a mean score of 2.50 or higher were considered "Agreed" and items that had a mean score below 2.50 were considered "Disagreed. An independent samples t-test was performed to assess whether or not there was a statistically significant difference between the mean responses of male and female single parents for the null hypothesis. The hypothesis was tested at 0.05 ($p < 0.05$) level of significance

Results and Discussion

Table 1: *Distribution of Respondents by Age (N=358)*

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	18-28	130	36.3	36.3	36.3
	29-39	112	31.3	31.3	67.6
	40-50	82	22.9	22.9	90.5
	Above 50	34	9.5	9.5	100.0
	Total	358	100.0	100.0	

The demographic data presented in Table 1 outlines the age distribution of the 358 respondents surveyed in the study. The data reveals that the largest cohort falls within the young adult range of 18–28 years, accounting for 36.3% ($n=130$) of the total sample, closely followed by the 29–39 age bracket at 31.3% ($n=112$). Cumulatively, more than two-thirds (67.6%) of the participants are under the age of 40. Conversely, older demographics are less represented, with individuals aged 40–50 making up 22.9%

(n=82) and those above 50 constituting the smallest group at 9.5% (n=34). This indicates a relatively young respondent base within the study area.

Table 2: *Distribution of Respondents by Educational Qualification (N=358)*

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Primary	51	14.2	14.2	14.2
	Secondary	88	24.6	24.6	38.8
	Tertiary	180	50.3	50.3	89.1
	Non formal	39	10.9	10.9	100.0
	Total	358	100.0	100.0	

The academic qualifications of the sampled population are illustrated in Table 2. The data demonstrates that a narrow majority of the respondents possess a tertiary education, representing 50.3% (n=180) of the entire sample group. Secondary school graduates form the second largest category with 24.6% (n=88), while participants with only primary education constitute 14.2% (n=51) of the cohort. Individuals who obtained non formal literacy or alternative training options account for the smallest portion at 10.9% (n=39). Overall, the findings show that most of the sampled individuals have attained a formal high school or advanced degree level.

Table 3: *Distribution of Respondents by Ethnicity (N = 358)*

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Hausa	2	.6	.6	.6
	Yoruba	60	16.8	16.8	17.3
	Igbo	296	82.7	82.7	100.0
	Total	358	100.0	100.0	

The ethnic configuration of the 358 surveyed participants is shown in Table 3. The dataset establishes that the vast majority of the respondents belong to the Igbo ethnic group, representing 82.7% (n=296) of the entire sample distribution. Yoruba participants comprise the second largest category, capturing 16.8% (n=60) of the total population, whereas individuals of Hausa origin represent a marginal fraction at 0.6% (n=2). The overwhelming concentration of the dominant cultural demographic reflects the geographical context and indigenous population density of the study setting.

Research Question: What are the consequences of single parenting in Anambra State?

Table 4: **Mean ratings and standard deviation of respondents on the consequences of single parenting in Anambra State (N=358)**

S/N	Consequences of Single Parenting	$\bar{x}$	SD	Dec.
1	Increased risk of poverty due to financial strain.	3.11	.92	A
2	Impact on child's emotional and psychological well-being.	3.43	.76	A
3	Potential academic underachievement due to lack of support.	3.21	.78	A

4	Higher likelihood of behavioral problems and delinquency.	3.03	.84	A
5	Reduced time for parental supervision and guidance.	3.02	.95	A
6	Greater vulnerability to social and environmental stressors.	2.98	.76	A
7	Strained relationships between parent and child.	3.25	.89	A
8	Limited access to resources and support networks.	3.35	.91	A
9	Potential feelings of isolation and loneliness for parent.	3.35	.91	A
10	Increased burden of household responsibilities on single parent.	3.42	.89	A
11	Negative impact on parent's mental health and well-being.	3.44	1.02	A
12	Higher risk of health problems for both parent and child.	3.01	1.00	A
13	Challenges in maintaining work-life balance for parents	2.86	.98	A
14	Impact on child's social development and peer relationships.	3.22	.84	A
15	Potential stigma and discrimination faced by single-parent families.	3.26	.90	A
Cluster/Grand Mean		3.19	0.89	A

Note: N= Number of respondents, SD = Standard Deviation, Dec.=Decision, A = Agreed, D = Disagreed

The data in Table 4 presents the mean ratings and standard deviations of respondents regarding the consequences of single parenting in Anambra State. All item statements, except one, were agreed upon by the respondents, as their mean ratings exceeded the criterion mean of 2.50. Respondents agreed that single parenting increases the risk of poverty due to financial strain ($M = 3.11$, $SD = .923$) and negatively affects the child's emotional and psychological well-being ($M = 3.43$, $SD = .763$). There was also agreement that single parenting can lead to academic underachievement ($M = 3.21$, $SD = .788$) and behavioral issues ($M = 3.03$, $SD = .845$). Additionally, respondents noted challenges such as reduced parental supervision ($M = 3.02$, $SD = .955$) and strained parent-child relationships ($M = 3.25$, $SD = .894$). One item—"Increased burden of household responsibilities on the single parent"—was disagreed upon ($M = 3.42$, $SD = .891$). The cluster mean of 3.19 ($SD = .89$) suggests that respondents generally agreed with the identified consequences. The standard deviations, ranging from .763 to 1.021, show some variability in responses, but overall, they indicate relative consistency in how respondents perceived the impacts of single parenting.

Hypothesis: There is no significant difference in the mean responses of male and female single parents on the consequences of single parenting in Anambra State.

Table 5: t-test analysis of the difference in the mean responses of male and female single parents on the consequences of single parenting in Anambra State.

Gender	N	Mean	SD	t-value	df	Sig.	Dec.
Male	97	3.24	0.85	0.582	356	.561	NS
Female	261	3.18	0.911				

Note: N= Number of respondents, SD = Standard Deviation, t-value = t-test statistical value, df=degree of freedom; Dec.=Decision, Sig. = Exact or associated probability, NS = Not Significant

The hypothesis posits that there is no significant difference in the mean responses of male and female single parents regarding the consequences of single parenting in Anambra State. The analysis in Table 5 shows that male respondents (N = 97) have a mean score of 3.24 (SD = 0.85), while female respondents (N = 261) have a mean score of 3.18 (SD = 0.911). The t-value is 0.582 with a degree of freedom (df) of 356 and a significance (Sig.) value of .561. Since the significance value of .561 exceeds the 0.05 level of significance ($p < .05$), the null hypothesis is accepted. This indicates that there is no significant difference in the mean responses between male and female single parents regarding the consequences of single parenting in Anambra State. Therefore, gender does not influence perceptions of the consequences of single parenting among the respondents.

The effects of single parenting on the parents and children in Anambra State can be identified. Financial pressures can make poor families even poorer while single parents lack the resources to support their families. Additionally, children's emotional or psychological health is impacted as they can feel abandoned or insecure. Another risk factor is academic under achievement - children may not be well supported at home. This is associated with increased likelihood of behavioral issues and delinquency, which is frequently due to decreased parental supervision and guidance. Single parent families have higher risk of social and environmental factors and thus of poor parent-child relationships.

The results of this study corroborate those of Obimakinde et al (2020) that showed financial problems as one of the primary causes of poverty in single-parent households. Na-Allah and Obafemi (2023), however, highlighted the emotional toll on children, stating that many experience emotional distress. The findings were corroborated by a related study by Mann et al (2022) which reported that children in single parent families had higher rates of academic underachievement, while Lasisi et al (2024) found that they were more likely to experience high rates of delinquency and behavioural problems. Further, Ihunwo (2022), pointed out the limited time available for parental supervision as one of the major factors that cause these problems. As highlighted by Hiekel and Kühn (2022), limited access to support networks and resources can also place a strain on both the parent and the child, as can social stigma faced by single-parent families. In summary, the overall picture of both types of single parents

(males and females) is similar and gender was not a significant predictor in terms of perceptions of challenges.

Implications for Children's Development of Science Process Skills

The empirical results of Table 4 and Table 5 confirm that the structures of single parenting create different and unique socioeconomic and psychosocial issues which directly affect a child's ability to acquire science process skills (SPS). The single parenting respondents strongly agreed that it is a challenge to single parents financially and that they have less access to resources. Science education requires more than text reading; learners must be given access to resources to foster the acquisition of key scientific skills, such as observation, measurement and experimentation. If a family has economic hardship, the lack of materials will greatly restrict extra-curricular investigations.

The domestic deficit increases the weight on classroom teaching. It is important that teacher awareness and using innovative strategies play a major role in bridging these gaps (Christian-Ike et al., 2024). Without home support, advanced digital interventions fill the gap. For example, computer animation can be used to enhance interest and visual processing in concepts of biology for instance (Nnalue et al., 2023, 2024). Likewise, teachers of basic science need to seek alternative teaching methods like virtual classroom and blended learning model to overcome the limitations of physical resources (Christian-Ike et al., 2025a; Okelue et al., 2025).

In addition, Table 4 shows marked lack of parent supervision and adverse effects on the child's emotional health. The implications of these findings are concerning because positive parental attitudes and continued emotional support are key factors in the motivation to engage in basic science and academic achievement (Christian-Ike et al., 2025b). If parents are not scaffolding, students must use their internal behavioral mechanisms to a great degree. Self-regulatory skills are a critical skill that must be developed for systematic data organization and independent scientific investigations (Rita & Henrieta, 2025).

SPS is a proven critical predictor of academic success in senior secondary and undergraduate studies in STEM fields (Chukwunazo et al., 2025; Obikezie et al., 2025). These skills, however, cannot be taken for granted because of single-parent structural vulnerabilities. Schools in Anambra State need to adopt adaptive educational leadership and integrate artificial intelligence to ensure that their learning outcomes are personalized and adaptive to prevent academic underachievement (Ofozoba et al., 2024). Vulnerable populations can be impacted by changes in science pedagogy using modern pedagogical frameworks. AI-driven service-learning projects in the field of green nanomaterials and nanotechnology-based sustainability education can be integrated into schools to offer hands-on learning experiences that focus on community problems (Anakpua et al., 2025; Ofozoba et al., 2025). These school based structured interventions effectively provide an equal opportunity for the mastery of science process skills and enable children from single-parent families to develop empirical competency, even though they may face disadvantages in the home

Conclusion

This study has established that the single parent household structure in Anambra State creates some socioeconomic and psychosocial negative challenges which negatively affect children's learning of science process skills. The data shows that the single-parent family is consistently associated with higher financial stress, less access to resources and less time for parental monitoring. These domestic pressures are not gender specific in that the male and female single parent each exhibit the same view on the difficulties that their household situation poses. These home constraints are significant challenges for students learning STEM and mastering the following empirical skills: observing, measuring, and experimenting, which requires continuous cognitive scaffolding and rich interactive environments.

A child who is not exposed to investigative materials and parental guidance at home, due to financial and/or time poverty, is at an increased risk for academic underachievement in the sciences. Finally, these results show that the home lives of single-parent structures are inseparable from teaching results. The educational system in Anambra State should move from compensation to classroom system to avoid this negative structural disadvantage from hampering student progress and achievement. Therefore, it is important for schools to be proactive in using innovative approaches, adaptive technologies, and a structured and rich series of inquiry experiences to help address these household vulnerabilities. In the school environment, robust and independent learning pathways will allow children in single-parent households to effectively develop the critical science process skills necessary to be able to compete more equally in a technologically oriented world.

References

- Akani, O. (2015). Levels of Possession of Science Process Skills by Final Year Students of Colleges of Education in South-Eastern States of Nigeria. *Journal of Education and Practice*, 6(27), 94-101.
- Akinbobola, A. O., & Bada, A. A. (2022). The acquisition of science process skills through entrepreneurial physics education in senior secondary schools. *REID (Research and Evaluation in Education)*, 8(2), 181-192.
- Anakpua, B. C., Onyemauche C. Inweregbuh, C. O. Odimkpa, Chinwe J. Enemuo, C. A. Ofozoba, P. A. Isidi, Uchenna F. Muogbo, Obioma H. Nnalue, Regina E. Obiadazie, and O. C. Okudo. (2025). "Enhancing STEM Education Through AI-Driven Service-Learning: Fostering Student Understanding of Nanotechnology-Based Green Materials For Sustainability." *International Journal of Environmental Sciences*, 11(20s),
- Christian-Ike, N. O., Chukwuemenam, J. P., Nnalue, H. O., & Ibeh, J. (2025b). Influence of parental attitudes towards basic education students academic achievements and

- motivation in basic science in Anambra state. *JISTECH: Journal of Information Science and Technology*, 5(2), 629-639.
- Christian-Ike, N. O., Nnalue, O. H., & Nwuba, I. S. (2024). The teachers' awareness and utilisation of innovative strategies for teaching and learning in Awka South. *Inornatus: Biology Education Journal*, 4(1), 36-45.
- Christian-Ike, N. O., Nnalue, O. H., & Obili, M. O. (2025a). Perception and attitudes of basic science teachers towards the use of virtual classroom in Awka education zone. *Journal of science education and research*, 3(1), 45-60.
- Chukwunazo, O. M., Ebele, A. E., Obioma, N. H., Amobi, U. V., & Uche, E. D. (2025). Undergraduate students' science process skills as predictor of academic achievement in science education courses: . *Journal Plus Education*, 38(Special Issue), 371-384.
- Daryanani, I., Hamilton, J. L., Abramson, L. Y., & Alloy, L. B. (2016). Single mother parenting and adolescent psychopathology. *Journal of abnormal child psychology*, 44(7), 1411-1423.
- Ezeanyagu, N. D., Opara, F. M., & Okafor, T. U. (2023). Motivation and self-esteem as predictors of secondary school students' achievement in biology in Awka educational zone of Anambra state. *UNIZIK Journal of Educational Research and Policy Studies*, 16(2), 219-228.
- Golob, N., & Ungar, V. (2025). The Development of Science Process Skills and Content Knowledge with Inquiry Boxes in Early Childhood Education. *Center for Educational Policy Studies Journal*, 15(2), 249-279.
- Hiekel, N., & Kühn, M. (2022). Mental health before and during the COVID-19 pandemic: The role of partnership and parenthood status in growing disparities between types of families. *Journal of Health and Social Behavior*, 63(4), 594-609.
- Ihunwo, E. A. (2022). Parenting styles and tendency to abuse drugs among secondary school students in Obio/Akpor Local Government Area of Rivers State. *International Journal of Innovative Social & Science Education Research*, 10(1), 87-97.
- Lasisi, A. K., Hassan, A. A., & Abdulkareem, H. B. (2024). Impact of single parenting on academic performance of junior secondary school students in mathematics. *ASEAN Journal for Science Education*, 3(2), 129-138.
- Mann, C., Süß, A., von Podewils, F., Zahnert, F., Langenbruch, L., Bierhansl, L., Menzler, K., Schulz, J., Gaida, B., Rosenow, F. and Strzelczyk, A., 2022. Gender differences in concerns about planning to have children and child-rearing among patients with

- epilepsy: A prospective, multicenter study with 477 patients from Germany. *Epilepsy & Behavior*, 129, p.108650.
- Muogbo, U. F., Okafor, T. U., & Umezulike, F. M. (2026). Teachers' readiness and competence in integrating ai-based educational tools in computer studies classrooms in Nnewi education zone, Anambra state, Nigeria. *STEM journal of Anambra STAN*, 6(2), 72–81.
- Muogbo, U. F., Orafor, U. T., & Okafor, C. F. (2025). Impact of experiential learning strategy on secondary school students' academic achievement in computer studies in Nnewi Education Zone, Anambra State. *Indonesian Journal of Innovative Teaching and Learning*, 2(2).
- Na-Allah, R. T., & Obafemi, K. E. (2023). Influence of Parental Factors on Child-Rearing Practices in Badagry Local Government Area of Lagos State (Doctoral dissertation, Kwara State University (Nigeria)).
- Nnalue, O. H., Christian-Ike, N. O., & Orafu, G. T. C. (2023). Effect of computer animation on secondary school students' interest in biology in Anambra State. *African Journal of Educational Management, Teaching and Entrepreneurship Studies*, 10(1), 127-137.
- Nnalue, O. H., Nnorom, R. N., & Christian-Ike, N. O. (2024). Computer animation as vehicle for enhancing secondary school students' academic achievement in biology. *UNIZIK Journal of Educational Research and Policy Studies*, 17(1), 92-102.
- Nneka, R. N., & Okafor, T. U. (2013). Assessment of Science Teachers' Level of Computer Literacy and Usage in Colleges of Education: Implication for Global Competitiveness. *African Journal of Education, Science and Technology (AJEST)*, 1(1), 250–258.
- Obikezie, M. C., Onyebuch, E. D., Akachukwu, E. E., & Nnalue, H. O. (2025). School locations and gender variables on students' science process skills as a predictor of academic achievement in senior secondary school. *Eureka: Journal of Educational Research*, 4(1), 1-7.
- Obimakinde, A. M., Omigbodun, O., Adejumo, O., & Adedokun, B. (2020). Perception of parenting styles by in-school adolescents in South-West Nigeria. *International journal of adolescent medicine and health*, 32(6).
- Odeleye, F. A., & Oluwole, D. O. (2025). Parenting education for career development and entrepreneurship in science education. *Lagos Education Review*, 20(2), 70-79.
- Ofozoba, C. A., Henry, E. U. M., Henrietta, N. O., Oguechuo, G. A., & Ofozoba, O. P. (2024). Education Leadership and Artificial Intelligence: Implications for Adaptive Learning Outcomes. *AJSTME*, Volume. 10, Issue 6. 1086-1094,

- Ofozoba, C.A., Okafor, P.C., Ikegbusi, N.G., Manafa, F.U., Egwu, J.U., Nwobu, C.M., Okafor, S.O., Onafowope, M.A., Olofinkua, V.K., Adeagbo, J.O. and Gbaeprekumo, O.V., 2025. AI-driven service-learning to enhance students' understanding of green nanomaterials in sustainability education. *Multidisciplinary Reviews*, 8(12), p.2025429.
- Okafor, T. U. (2017a). Physics process skills and its acquisition on secondary school physics students in Aguata and Nnewi Education Zones of Anambra state. *American Academic & Scholarly Research Journal*, 9(3).
- Okafor, T. U. (2017b, October). Sources of Stressors Among Physics Education Undergraduates of Chukwuemeka Odumegwu Ojukwu University, Nigeria. In *The World Congress on Engineering and Computer Science* (pp. 195–205). Singapore: Springer Singapore.
- Okafor, T. U. (2017c). The Effect of Scientific Literacy An Approach to Technological Achievement in Physics Education among Students in Aguata/Nnewi Educational Zone, Anambra State. *American Academic & Scholarly Research Journal*, 9(2).
- Okafor, T. U. (2019a). Effect of Polya's Problem Solving Technique on the Academic Achievement of Senior Secondary School Student in Physics. *European Journal of Physics Education*, 10(1), 38–48.
- Okafor, T. U. (2019b). Influence of Age on Students' Alternative Conceptions of Scientific Phenomena. *Journal of Education and Practice*, 10(9), 190–204.
- Okelue, C., Henrietta, N. O., & Alado, M. I. (2025). Gender Dynamics and Infrastructural Challenges on the Implementation of Blended Learning in Higher Education. *International journal of research and innovation in social science*. IX (III). 2276- 2284
- Rita, N. N., & Henrieta, N. O. (2025). Student's self-regulatory skills as correlate of their academic achievement in biology in public secondary schools in Anambra state. *UNIZIK Journal of STM Education*, 8(2), 180-191.
- Unamba, E., Okwara-Kalu, C. E., & Georgeline, I. (2020). Comparative Study of Levels of Academic Self Esteem and Academic Achievement in Mathematics among Pupils of Two and Single Parent Families. *Malikussaleh Journal of Mathematics Learning*, 3(2), 70-75.