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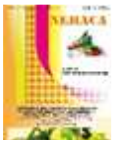

The Law of Nature and Nurture and Its Impact on Education

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ABSTRACT

The debate between nature and nurture is a long-standing and highly deliberated concept in fields ranging from psychology to education. This research therefore sought to determine the effects of nature and nurture on academic performance, learning approaches, behaviours, and educational expectations among students within the context of Ogun State, Nigeria. The study adopted a quantitative research design where data was collected from 240 students and 60 teachers from three local government areas using structured questionnaires. Descriptive statistics, correlation analyses, and independent sample t-tests were used to analyze data. In this context, both direct genetic effects and indirect environmental influences on the investigated educational outcomes were identified. However, the level of using environmental factors including socioeconomic status, family, teaching approaches and resources was higher with significantly more frequency. The correlation analyses and t-tests also corroborated these findings, suggesting a connection between environment and academic performance, learning styles, behavioural patterns and educational achievements. The study adds to the current body of knowledge on the nature-nurture debate within the context of the education system in Nigeria. The findings underscore the role of socioeconomic status in children's achievement and readiness to learn, emphasizing the need for equal opportunities in education and support for their aspirations. In the same respect, the study emphasizes the importance of a bio-psychosocial model that considers both genetic predeterminations and environmental conditions to explain educational processes and performance.
Keywords: Genetic Factors, Environmental Factors, Academic Performance, Learning Styles

ABSTRAK

Perdebatan antara alam dan pengasuhan adalah konsep yang sudah lama ada dan telah dibahas secara mendalam di berbagai bidang mulai dari psikologi hingga pendidikan. Oleh karena itu penelitian ini berupaya untuk mengetahui pengaruh alam dan pengasuhan terhadap kinerja akademik, pendekatan pembelajaran, perilaku, dan harapan pendidikan di kalangan siswa dalam konteks Negara Bagian Ogun, Nigeria. Penelitian ini menggunakan desain penelitian kuantitatif dimana data dikumpulkan dari 240 siswa dan 60 guru dari tiga pemerintah daerah dengan menggunakan kuesioner terstruktur. Statistik deskriptif, analisis korelasi, dan uji t sampel independen digunakan untuk menganalisis data. Dalam konteks ini, baik dampak genetik langsung maupun pengaruh lingkungan tidak langsung terhadap hasil pendidikan yang diselidiki telah diidentifikasi. Namun, tingkat penggunaan faktor lingkungan termasuk status sosial ekonomi, keluarga, pendekatan pengajaran dan sumber daya lebih tinggi dengan frekuensi yang jauh lebih banyak. Analisis korelasi dan uji-t juga menguatkan temuan ini, menunjukkan adanya hubungan antara lingkungan dan kinerja akademik, gaya belajar, pola perilaku dan prestasi pendidikan. Studi ini menambah pengetahuan terkini mengenai perdebatan alam-pengasuhan dalam konteks sistem pendidikan di Nigeria. Temuan ini menggarisbawahi peran status sosial ekonomi terhadap prestasi dan kesiapan belajar anak-anak, serta menekankan perlunya kesempatan yang sama dalam pendidikan dan dukungan terhadap aspirasi mereka. Dalam hal yang sama, penelitian ini menekankan pentingnya model bio-psikososial yang mempertimbangkan penentuan genetik dan kondisi lingkungan untuk menjelaskan proses dan kinerja pendidikan.
Kata Kunci: Faktor Genetik, Faktor Lingkungan, Prestasi Akademik, Gaya Belajar

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INTRODUCTION

The nature versus nurture debate is a significant topic in modern society and is a subject of interest to scholars, researchers, and intellectuals from various fields like psychology, sociology, and education (Levitt, 2013; Plomin et al., 2013). Fundamentally, it seeks to understand whether the process of development, behaviour, and achievement is more determined by genetics (nature) or environmental input (nurture) (Stienstra & Karlson, 2023). This has given rise to a lot of discussions, and what we have is a range from complete endorsement of one side to appreciation of the complexity of the relationship between the two forces. Nature focuses on factors that include genes and other hereditary and biological tendencies that are passed down from one generation to another (Stallings & Neppl, 2021). One can state that this point of view highlights that intelligence, personality, talents, and cognitive abilities are to a great extent genetically determined and relatively immutable by environmental factors (Plomin & Deary, 2015). This perspective means that each person is endowed with a certain capacity at birth, and the achievement of this capacity is influenced by genetics. On the other hand, the nurture perspective holds that environmental influences like family background, school, peers, group, and culture greatly determine the abilities and accomplishments of an individual (Stienstra & Karlson, 2023; Subotnik et al., 2019).

According to this perspective, people are defined by the events, input, and chances that they come across in their life span. The nature-nurture debate highlights the significant impact of factors such as parenting quality, educational resources, socioeconomic status, and cultural environment on cognitive development, personality, and life journey, with its implications, particularly concerning the educational environment (Anderson & Magrath, 2019). The matter of extent to which innate aptitudes and the richness of intellectual environments matter is vital for the formation of particular and generalized educational concepts, measures, and practices (Hanushek & Woessmann, 2011). The nature perspective in education postulates that students' inborn factors which include intelligence, aptitude, and cognitive abilities are key determinants of their performance and learning capacity in academic settings (Deary et al., 2007). They argue that intelligence genes make individuals with certain innate abilities superior academicians, regardless of their environment, and that faculties should solely concentrate on identifying gifted learners and providing them with favourable conditions and resources to enhance their learning capabilities.

In contrast, the nurture perspective in education focuses on the central importance of environmental factors, including economic status, instructional methods, and quality, accessibility to educational materials, and culture, on any given student's learning and academic performance (Reardon, 2018). They say that with positive conditions within the class such as parental support and resources, pupils can overcome their disabilities and succeed academically. From this view, one is informed on the necessity of education changes, support in school facilities, training teachers, and parent and other stakeholders' involvement in ensuring that children are placed in learning structures that will promote academic success (Anderson & Magrath, 2019; Guhn, 2009). From the perspective of the nature-nurture debate and its applicability to education, it has been identified that there is a paucity of detailed knowledge about the distinctions and relationships between factors in various cultural, socioeconomic, and geographical settings (Tucker-Drob & Bates, 2016).

In general, the nature/nurture debate has been described, but understanding its actual instantiation and balance might depend on the locale, culture, or education system. Consequently, within the Nigerian context where there is a paucity of related studies, the study discusses the educational situation from a perspective of its contextual challenges and

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opportunities for development from a nature-nurture standpoint. Besides, another issue that remains questionable within the context of Nigerian schools, is the inequity in the achievement outcomes that is witnessed in schools today (Adanna et al, 2022). Finally, it has been hypothesized that native abilities, which include intelligence, intelligence capacity, and related ability or germane aptitude, are factors determining academic achievement (Martschenko et al., 2019).

Nevertheless, the extremity of this natural birth endowment and how it impacts determining the achievement of education within the Nigerian context is evolving and largely unknown (Alakwe & Ogbu, 2018). Moreover, skills and chances defined by different regions, which means SES, teaching quality, educational resources, and cultural beliefs, might reveal different attitudes in this sphere as well (Shuey & Kankaraš, 2018). Hence, the research seeks to assess the main stakeholders' beliefs and opinions, especially students, teachers, parents, and others, about the nature vs nurture debate in education in Nigeria, Ogun State as a case study and establish how they have been addressed. It is even more critical to examine these ideas as they can be used to develop the right strategies and practices to address the concerns of the educational system in this part of the world.

The debate over nature versus nurture in human growth and behaviour is a contentious topic in psychology, sociology, and education (Barlow, 2019). Heritability issues, such as intelligence, learning capabilities, and personality, influence achievements, learning models, behaviours, and academic goals. On the other hand, nurture perspectives explain the influence of environmental factors like family, financial resources, quality of schooling, methods, and culture on shaping educational outcomes (Asbury & Plomin, 2013). Proponents of the nature view argue that biologically inherited characteristics and dispositions are involved in academic outcomes, approaches to learning, and education processes (Guhn, 2009; Reardon, 2018). Some argue that prior genetic endowment determines basic capacities of learning and thinking, impacting students' achievement and career orientations. Therefore, this perspective suggests that education should focus on finding talents and positively shaping them in young learners.

The nature versus nurture perspective suggests that factors such as family support, socioeconomic status, quality of teaching, and resource availability significantly influence educational performance (Reardon, 2018). Despite theoretical and empirical investigations, the balance between genetic and environmental factors remains a topic of debate. Access to quality education in Nigeria remains a challenge due to poverty and inadequate infrastructure (Angwaomaodoko, 2024). Understanding the relationship between genetic and environmental factors can guide strategies for at-risk students, funding allocations, and education policies that promote positive change in the South African school environment.

As Nigeria aims to achieve the United Nations Specific Sustainable Development Goals related to education quality and inequality, gaining more understanding and specificity on the nature-nurture issue in education is crucial. This study's results will contribute to the existing literature on factors affecting learning, teaching styles, behavioural profiles, academic achievement, and educational expectations while educating policymakers about the findings to enable the formulation of measures in Nigerian schools. This study is based on Ogun State, Nigeria, a state with a diverse population and a rich history of civilization. The nature-nurture debate is a significant area of research, particularly in this region. The study aims to explore the impact of nature and nurture on educational achievement, highlighting the role of sociocultural factors and the need for appropriate strategies and structures in the Nigerian context. This research is particularly relevant to researchers, teachers, and

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policymakers worldwide. The purpose of the study is to empirically investigate the impact of nature and nurture on the educational outcomes of students in selected local governments in Ogun State. The specific objectives are to: 1). Examine the influence of nature (genetic) and nurture (environmental) factors on students' academic achievement. 2). Investigate the relationship between genetic and environmental factors and students' preferred learning styles. 3). Explore the influence of genetic and environmental factors on students' behavioural patterns, such as attention, motivation, and discipline. 4). Assess the impact of genetic and environmental factors on students' educational aspirations and future career goals.

The dichotomy between nature and nurture is a fundamental concept in understanding the impact of heredity and environment on human learning, growth, and development. Nature refers to the genes, traits, and tendencies a person possesses at birth or is predestined to possess (Pleh, 2012). It encompasses physical features, intelligence, temperament, and aptitude towards learning and development. According to the nature perspective, genetic factors significantly influence a person's destiny and academic performance. Plomin and Deary (2015) argue that genetic factors contribute to a significant part of the variance in personal characteristics such as intelligence, cognitive skills, personality, and behavioural traits. This view opposes the idea that one is born with innate capabilities and is immune to environmental influences. This debate has influenced research in psychology, sociology, and education. Nurture refers to the inherent characteristics acquired from birth until death, encompassing factors like diet, social relativity, and history (Allen, 2012). Nurture also encompasses the interactions a child has with their immediate and beyond environment, including family, education, peers, cultural beliefs, and social and economic status. These factors influence an individual's development, behaviour, and learning, shaping their overall well-being and behaviour. From the nurture perspective, people are easily changeable and developed through events, inputs, and chances throughout their lifetime. Peng and Kievet (2020) argue that abilities are developed multiplicatively for early abilities and investments, with factors like parents' resources and limitations influencing later abilities distribution. This view emphasizes the importance of early childrearing environments in predicting intelligence, educational attainment, and life trajectory.

The impact of nature and nurture on learning and educational outcomes is complex. Genetic traits like intelligence, aptitude, and cognitive capacities significantly influence student achievement and learning profile. Students with higher innate cognitive abilities tend to understand complex concepts, process information better, and perform better academically. However, environmental conditions also play a crucial role in the development and exhibiting of these natural skills. Epigenetic mechanisms provide molecular access to environmental control of genes and long-term variations in the brain and behaviour. Care environments can influence genes responsible for cognitive functions and learning, either enhancing or suppressing inherent potentialities.

Studies indicate that extrinsic factors, such as socioeconomic status, teacher quality, access to educational materials, family support, and culture, significantly impact academic performance. Vygotsky's socio-cultural theory suggests that learning and development occur within a cultural context with the support of community members like parents, teachers, or peers. The environment plays a crucial role in fostering cognitive development and knowledge acquisition. White et al. (2017) emphasize that genetic and environmental factors are intertwined, as people choose, transform, and reshape their conditions based on their inherited characteristics. This complex view provides a starting point for understanding the interaction between genetic and environmental factors that affect

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education outcomes. Nature and nurture are two crucial factors that contribute to an individual's learning, development, and academic success. While genetic inclinations and endowments form a person's basic platform, growing conditions are central to nurturing or stunting inherent abilities. Therefore, approaches to learning disorders must consider both genetic and gene-environment interactions and individual learner characteristics. The concept of nature-nurture interdependence enables teachers, policymakers, and researchers to develop effective strategies and interventions that promote student success irrespective of their genetics and environment. This approach can lead to the creation of fair educational structures that enhance learning and academic achievement, addressing the needs of learners.

Theories of Nature and Nurture: Overview of genetic and environmental impacts on learning.

The nature view theory based on the works of Francis Galton and Charles Darwin, suggests that an individual's IQ, character, and potential are predetermined by their genes and cannot be altered by environmental factors. This view posits that an individual's intellectual, psychological, and behavioural characteristics are developed through objectively determined interactions and environments over a life span. This differs from the genetic determinism theory, which believes that an individual's IQ, character, and potential are already inherited and cannot be altered by environmental factors. Both theories emphasize the importance of the environment in an individual's growth and development.

Bronfenbrenner's theories emphasize the role of family, community, and society in a child's development, with recent developments integrating genetic and environmental factors. His bioecological theory (2005) also identifies biology and environment as crucial aspects of the development process. These theories are important in the context of education, as they help study the interaction factors in student learning and performance. The nature perspective posits that inborn attributes, such as intelligence and aptitude, influence students' performance, suggesting that educational centres should invest in policies and provisions to help gifted individuals reach their full potential. The nurture perspective, on the other hand, focuses on the role of the environment in student learning and achievement, including factors like socioeconomic status, teaching quality, resource availability, and culture. They suggest that creating a positive environment with insufficient resources and proper care can help students overcome their natural shortcomings and succeed in school. This perspective calls for education change processes, facility improvements, teacher training, and community support to foster learning and academic success.

Numerous studies have been conducted across various geographical and cultural contexts to investigate the nature-nurture dynamics and their impact on educational outcomes. While the findings are diverse and sometimes contradictory, they offer valuable insights into the complex interplay between these factors. Research in developed countries, particularly in Europe, has explored the impact of nature and nurture on academic performance. Shakeshaft et al. (2013) study on the UK's GCSE scores showed considerable heritability in general GCSE scores and Amount scores for English, mathematics, and science. However, common family and school factors explained 36% of the variance in mean GCSE scores. This suggests that differences in a child's educational achievement at age 16 are more due to genetic factors than environmental factors. The authors propose an "active model of education" where children design their learning experiences based on their genetics, encouraging child-focused learning and contradicting the passive "instruction"-based model. This acknowledges the significant role of genes in the learning process.

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Krapohl et al. (2014) study examined the high heritability of educational achievement by examining factors beyond intelligence. They used data from 13306 UK twins who took the General Certificate of Secondary Education (GCSE) examinations at sixteen years old. The study found that intelligence explained a greater proportion of the variance in GCSE performance than any other domain. However, other domains, when combined, explained roughly a similar proportion of heritability. In combination, these domains accounted for 75% of the heritability of GCSE scores. The study suggests that the high heritability of educational achievement indicates the contribution of numerous genetically determined factors, stressing the genetic influence on achievement in education and promoting a learner-centred approach to education.

Supriyoko et al. (2022) explored the use of a nature-based school curriculum to enhance students' learning and teaching freedom. The curriculum, which combines the national curriculum with a natural curriculum based on morality, scientific logic, leadership, and entrepreneurship, was found to increase students' enthusiasm, happiness, and sense of freedom. This approach fosters the development of independent, meaningful individuals with good character, logical abilities, leadership skills, and an entrepreneurial spirit, thereby promoting their natural inclinations.

Summers et al. (2019) argue that the ecosystem services of natural environments play a crucial role in supporting childhood development. They highlight the impact of children's interaction with nature on their imagination and physical coordination. The authors argue that access to natural ecosystems negatively impacts childhood development and quality of life. They argue that there are numerous links between natural ecosystems and services and children's development, yet the area is often neglected and only understood by child development psychologists. They call for interdisciplinary concern and further research on the role of natural ecosystems in facilitating children's cognitive and motor development, highlighting the importance of understanding the complex relationship between these ecosystem services.

Alakwe and Ogbu (2018) explored the debate on whether human personality is inherent or acquired in street children from Nigeria. They questioned why children differ in temperament, intelligence, and behaviour among siblings and how the environment affects those with varying genetic endowments. The study found that communication plays a crucial role in socialization and personality development. Although nature influences behaviour, Alakwe and Ogbu argue that communication remains the key factor in shaping the personality of street children in Calabar. Rehabilitative communication aimed at changing behaviour may significantly enhance the personality development of these children. The study highlights the importance of understanding and addressing the differences in temperament, intelligence, and behaviour among street children.

Previous research on nature and nurture has been informative, but their real-life characteristics and roles may vary depending on a country, society, or educational system. There is a need for specific research in Ogun State, Nigeria, to understand the peculiarities of the educational system's development. To address this gap, the nature-nurture relationship and its effect on education outcomes were empirically investigated in selected local governments in Ogun State, Nigeria.

METHOD

This study employed a quantitative research design to investigate the impact of nature and nurture on education in Ogun State, Nigeria. The quantitative approach allowed for the collection and analysis of numerical data, enabling statistical analysis and generalization of findings. The target

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population consisted of students and teachers from three local governments: Abeokuta South, Ijebu Ode, and Sagamu. An Amount of 300 respondents were selected, including 240 students and 60 teachers. The student sample was purposively selected for convenience, while the teacher sample consisted of teachers teaching different subjects with varying years of experience and educational qualifications. Data were collected using structured questionnaires specifically designed for students and teachers. The student questionnaire included questions on academic achievement, learning modality, caring and coping behaviours, future goals, and personal details. The teacher questionnaire collected information on students' academic capability, learning preferences, behavioural issues, academic goals, and the teacher's teaching practice and background. The questionnaires were pre-tested and the reliability and validity of the instruments were established before use on the study participants. The collected data were analyzed using appropriate statistical techniques, including descriptive statistics and inferential statistics, to explore the possibility of correlation or divergence between variables associated with genetics and environment and their interconnection with education. The findings were presented in tables and graphs, informed by the research questions and objectives, as well as theoretical and empirical findings from the literature reviewed.

RESULTS AND DISCUSSION

Result

Demographic Data of Respondents

This table presents the analysis of the demographic profile of the respondents, including socioeconomic status, gender, and age.

Table 1. Demographic Characteristics of Students

	Category	Number of Participants	Percentage
Gender	Male	130	54.2%
	Female	110	48.8%
	Amount	**240**	**100.0%**
Age	9-12 years	80	33.3%
	13-15 years	120	50%
	16-20 years	40	16.7%
	Amount	**240**	**100.0%**
Educational Level	Junior Secondary (J.SS.1-3)	80	33.3. %
	Senior Secondary (S.S.1-3)	160	66.7%
	Amount	**240**	**100.0%**
Socioeconomic Status	Low income	80	33.3%
	Middle income	120	50%
	High income	40	16.7%
	Amount	**240**	**100.0%**

The table provides a comprehensive overview of student demographics, revealing that the majority of students are male, with 54.2% being male and 45.8% female. The majority of students are aged 13-15, with 50.0% in the 9-12 age group and 16.7% in the 16-20 age group. The majority of students are in senior secondary grades, with 66.7% in senior secondary and 33.3% in junior secondary.

Table 2. Demographic Characteristics of Teachers

Demographic Variable	Category	Number of Participants	Percentage
Gender	Male	35	58.3%
	Female	25	41.7%
	Amount	**60**	**100.0%**
Age	25-35 years	20	33.3%
	36-45 years	25	41.7%
	46 years and above	15	25%
	Amount	**60**	**100.0%**
Educational Qualification	Bachelor's Degree	40	66.7%
	Master's Degree or Higher	20	33.3%
	Amount	**60**	**100.0%**
Teaching Experience	1-5 years	15	25%
	6-10 years	20	33.3%
	11 years and above	25	41.7%
	Amount	**60**	**100.0%**

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The table provides a comprehensive overview of the demographic profiles of teachers, revealing that the majority are male, with 58.3% being male and 41.7% being female. The majority of teachers are aged 36-45, with 41.7% aged 25-35. The majority of teachers hold a bachelor's degree, while 33.3% hold a master's degree or higher. The majority of teachers have 11 years or more of experience, while 33.3% have 6-10 years of experience and 25% have 1-5 years of experience.

Research Question 1: What is the impact of nature (genetic factors) and nurture (environmental factors) on students' academic performance?

Table 3. Students Responses on the Impact of Nature and Nurture on Academic Performance

S/N	Item	Strongly Agree	Agree	Neutral	Disagree	Strongly Agree
1.	My innate abilities significantly influence my academic performance.	70 (29.2%)	95 (39.6%)	35 (14.6%)	25 (10.4%)	15 (6.3%)
2.	External factors such as family support, school resources, and teaching methods play a crucial role in my academic achievement.	85(35.4%)	110 (45.7%)	25 (10.4%)	15 (6.3%)	5 (2.1%)
3.	I believe my genetic makeup (e.g. learning disabilities, attention issues) affects my academic performance.	60(25%)	80 (33.3%)	50 (20.8%)	35 (14.6%)	15 (6.3%)
4.	The socioeconomic status of my family (e.g. income level, parents' education) impacts my academic success.	75(31.%)	95 (39.6%)	30 (12.5%)	25 (10.4%)	15 (6.3%)
5.	The quality of education and teaching methods used in my school contribute significantly to my academic performance.	90(37.5%)	105 (43.8%)	20 (8.3%)	15 (6.3%)	10 (4.2%)

The majority of students (68.8%) believe that their innate abilities, such as intelligence and aptitude, significantly influence their academic performance. However, 81.2% also believe that external factors, such as family support, school resources, and teaching methods, play a crucial role in their academic achievement. Over half of students (58.3%) believe that their genetic makeup, including potential learning disabilities or attention issues, affects their academic performance. A significant proportion (70.9%) believe that their family's socioeconomic status, including income level and parents' education, also impacts their academic success. The quality of education and teaching methods used in schools also significantly contribute to academic performance, reinforcing the role of educational resources and practices.

Table 4. Teachers Responses on the Impact of Nature and Nurture on Academic Performance

S/N	Item	Strongly Agree	Agree	Neutral	Disagree	Strongly Agree
1.	The academic performance of students is determined by innate abilities and genetic factors.	18 (30%)	25 (41.7%)	8(13.4%)	6 (10%)	3 (5%)
2.	Environmental factors such as impacting academic achievement.	22 (36.7%)	28 (46.7%)	5(8.3%)	4 (6.7%)	1 (1.7%)
3.	Students with learning disabilities or attention issues perform poorly.	20 (33.3%)	27 (45%)	8(13.3%)	4 (6.7%)	1 (1.7%)
4.	Parental involvement and support influence academic performance.	25 (41.7%)	24 (40%)	6(10%)	3 (5%)	2 (3.3%)
5.	Quality of teaching methods and resources contributing to academic success.	28 (46.7%)	22 (36.7%)	5(8.3%)	3 (5%)	2 (3.3%)

The majority of teachers (71.7%) agree that academic performance is determined by innate abilities and genetic factors, while 83.4% agree that nurture, including family background, socioeconomic status, and school facilities, influences a child's academic performance. A significant percentage (78.3%) affirmed or strongly endorsed the statement that students with learning disabilities or attention issues perform poorly academically, supporting genetic factors. 81.7% also believed that parental involvement and support played a significant role in determining student academic performance, arguing for nurture. Most teachers were satisfied with the extent of preparation, with 83% admitting satisfaction. 4% supported the view that teaching methods and educational resources offered in schools are key determinants of students' achievements. The findings suggest that nature (genes, talents, learning disorders, concentration problems) and nurture (family, social status, parents' participation, quality of

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schooling, and teaching strategies) have considerable impacts on students' performance in the educational context.

Research Question 2: How do genetic and environmental factors affect students' learning styles and preferences?

Table 5. Students Responses on the Influence of Nature and Nurture on Learning Styles and Preferences

S/N	Item	Strongly Agree	Agree	Neutral	Disagree	Strongly Agree
1.	I believe my preferred way of learning is primarily influenced by my innate preferences and abilities.	50(20.8%)	90(37.5%)	40 (16.7%)	45 (18.8%)	15 (6.3%)
2.	My learning style is significantly shaped by the teaching methods and learning environments I have been exposed to.	60(25%)	110(45.8%)	30 (12.5%)	30 (12.5%)	10 (4.2%)
3.	Irrespective of the teaching methods used, my natural tendencies and cognitive strengths determine how I learn best.	40(16.7%)	80(33.3%)	50 (20.8%)	55 (22.9%)	15 (6.3%)
4.	External factors such as the availability of educational resources, classroom settings, and cultural influences have a significant impact on my preferred learning style.	70(29.2%)	100(41.7%)	40 (16.7%)	20 (8.3%)	10 (4.2%)
5.	My genetic makeup plays a more significant role in shaping my learning style compared to the learning environments I have experienced.	45(18.8%)	65(27.1%)	60 (25%)	50 (20.8%)	20 (8.3%)

The majority of students (58.3%) believe that their preferred learning style is primarily influenced by their innate preferences and abilities, indicating a belief in the impact of genetic factors on learning styles. However, a majority (70.8%) also believe that their learning style is more shaped by teaching methods and learning environments, emphasizing the importance of environmental factors. A significant proportion (49.2%) disagreed or strongly disagreed with this statement, indicating a divided opinion on the relative impact of nature versus nurture on learning styles. External factors, such as educational resources, classroom settings, and cultural influences, also significantly impact students' preferred learning styles. However, opinions on the stronger influence of genetic makeup versus learning environments on learning styles were divided, with 45.9% agreeing and 49.1% disagreeing, suggesting a lack of consensus on the importance of nature versus nurture.

Table 6. Teachers' Responses on the Influence of Nature and Nurture on Learning Styles and Preferences

S/N	Item	Strongly Agree	Agree	Neutral	Disagree	Strongly Agree
1.	Students' preferred learning styles are primarily influenced by their genetic dispositions and cognitive strengths.	12 (20%)	28 (46.7%)	10 (16.7%)	8 (13.3%)	2 (3.3%)
2.	Environmental factors (e.g. classroom setting and cultural influences) have a greater impact on shaping students' learning styles than their innate preferences.	15 (25%)	25 (41.7%)	10 (16.7%)	8 (13.3%)	2 (3.3%)
3.	Irrespective of the learning environment, students with certain cognitive strengths tend to gravitate towards specific learning styles.	10 (16.7%)	30 (50%)	8 (13.3%)	10 (16.7%)	2 (3.3%)
4.	Effective teaching strategies that cater to different student learning preferences.	20 (33.3%)	30 (50%)	5 (8.3%)	4 (6.7%)	1 (1.7%)
5.	Genetic factors play a more significant role in determining students' preferred learning styles compared to environmental influences.	8 (13.3%)	22 (36.7%)	15 (25%)	10 (16.7%)	5 (8.3%)

The majority of teachers (66.7%) believe that students' preferred learning styles are primarily influenced by their genetic predispositions and cognitive strengths, indicating the impact of nature on learning preferences. Environmental factors, such as teaching methods, classroom settings, and cultural influences, have a greater impact on shaping students' learning styles than innate preferences, recognizing the importance of nurture. Students with certain cognitive strengths tend to gravitate towards specific learning styles, regardless of the learning environment. Effective teaching strategies that cater to different learning preferences can help students learn more effectively, highlighting the potential impact of nurture. However, opinions are divided on whether genetic factors play a more significant role in determining students' preferred learning styles compared to environmental influences. Further statistical analyses are needed to examine the relationships between specific genetic and environmental factors and learning styles, as well as identify significant differences based on demographic variables.

The study found a moderate positive correlation between students' self-reported innate preferences and their preferred learning styles, indicating a relationship

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between genetic factors and learning preferences. Exposure to different teaching methods and learning environments also significantly influenced students' preferred learning styles. Students from different socioeconomic backgrounds showed a preference for more visual and auditory learning styles, suggesting the impact of environmental factors. No significant difference was found between male and female students, suggesting gender may not be a significant factor. Both nature (genetic factors) and nurture (environmental factors) play significant roles in influencing students' preferred learning styles, with a stronger emphasis on the impact of environmental factors such as teaching methods, classroom settings, and cultural influences. It is crucial to consider the interplay between nature and nurture and the potential interactions between genetic and environmental factors in shaping learning preferences.

Research Question 3: What role do genetic and environmental factors play in shaping students' behavioural patterns in an educational setting?

Table 7. Students Responses on the Influence of Genetic and Environmental Factors in Shaping Behavioral Patterns

	Item	Strongly Agree	Agree	Neutral	Disagree	Strongly Agree
1.	My ability to focus and pay attention in class is primarily influenced by my innate traits and tendencies.	55 (22.9%)	75 (31.3%)	50 (20.8%)	45 (18.8%)	15 (6.3%)
2.	External factors, such as the classroom environment and peer influences have a significant impact on my motivation and discipline in learning.	70 (29.2%)	100 (41.7%)	35 (14.6%)	25 (10.4%)	10 (4.2%)
3.	Irrespective of the learning environment, my natural inclinations and personality traits determine my overall behaviour and engagement in the classroom.	70 (29%)	100 (41.7%)	35 (14.6%)	25 (10.4%)	10 (4.2%)
4.	Parental support, school policies and cultural norms play a crucial role in shaping my behavioural patterns.	45 (18.8%)	85 (35.4%)	55 (22.9%)	40 (16.7%)	15 (6.3%)
5.	My genetic makeup has a stronger influence on my behavioural patterns in an educational setting compared to the environmental factors I experience.	65 (27.1%)	110 (45.8%)	30 (12.5%)	25 (10.4%)	10 (4.2%)

The study found that a majority of students (54.2%) believe that their ability to focus and pay attention in class is primarily influenced by their innate traits and tendencies, while a significant majority (70.9%) believe that external factors such as the classroom environment, teaching methods, and peer influences significantly impact their motivation and discipline in learning. However, a significant proportion (45.9%) disagreed or strongly disagreed with this statement, indicating a divided opinion on the relative impact of nature versus nurture on overall classroom behaviour. Additionally, a substantial majority (72.9%) agreed that parental support, school policies, and cultural norms play a crucial role in shaping their behavioural patterns, emphasizing the significance of environmental influences. The study also found a lack of consensus on the stronger influence of genetic makeup versus environmental factors on behavioural patterns in an educational setting, with 50% agreeing and 50% disagreeing.

Table 8. Teachers' Responses on the Influence of Genetic and Environmental Factors in Shaping Behavioral Patterns

S/N	Item	Strongly Agree	Agree	Neutral	Disagree	Strongly Agree
1.	Students' ability to pay attention is determined by their genetic predispositions and cognitive abilities.	10 (16.7%)	25 (41.7%)	15 (25%)	8 (13.3%)	2 (3.3%)
2.	Environmental factors have a greater impact on shaping students' motivation and discipline than their innate traits.	18 (30%)	27 (45%)	8 (13.3%)	5 (8.3%)	2 (3.3%)
3.	Irrespective of the learning environment, students with certain personality traits tend to exhibit specific behavioural patterns in the classroom.	12 (20%)	28 (46.7%)	10 (16.7%)	8 (13.3%)	2 (3.3%)
4.	Effective classroom management improves behaviour irrespective of innate tendencies.	20 (33.3%)	25 (41.7%)	8 (13.3%)	5 (8.3%)	2 (3.3%)
5.	Genetic factors play more significant role than environmental influences in determining students' behavioural patterns.	8 (13.3%)	22 (36.7%)	15 (25%)	10 (16.7%)	5 (8.3%)

The majority of teachers (58.4%) believe that students' attention and focus are primarily determined by their genetic predispositions and cognitive abilities. Environmental factors,

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such as classroom management strategies and teaching approaches, have a greater impact on students' motivation and discipline than innate traits. A substantial majority (66.7%) agree that students with certain personality traits exhibit specific behavioural patterns in the classroom, regardless of the learning environment. Effective classroom management techniques, positive reinforcement, and clear expectations can improve students' attentiveness, motivation, and self-discipline, highlighting the potential impact of nurture. However, opinions are divided on whether genetic factors play a more significant role in determining students' behavioural patterns in an educational setting compared to environmental influences. Further statistical analyses are needed to examine the relationships between specific genetic and environmental factors and behavioral patterns, as well as identify significant differences based on demographic variables.

The study found a moderate positive correlation between students' self-reported innate traits and their attentional behaviours in the classroom, indicating a relationship between genetic factors and attentional patterns. A moderate positive correlation was also observed between the quality of the classroom environment and students' motivation and discipline, indicating a significant influence of environmental factors on these behavioral patterns. Students from different socioeconomic backgrounds exhibited better attention and focus, suggesting the impact of environmental factors. However, no significant difference in motivational levels was found between male and female students, suggesting gender may not be a significant factor. The results suggest that both nature (genetic factors) and nurture (environmental factors) play significant roles in shaping students' behavioral patterns, such as attention, motivation, and discipline, by students and teachers. However, there is a stronger emphasis on the impact of environmental factors, such as classroom management strategies, teaching approaches, and peer influences.

Research Question 4: What is the influence of genetic and environmental factors on students' educational aspirations and career goals?

Table 9. Students Responses on the influence of genetic and environmental factors on students' educational aspirations and career goals

S/N	Item	Strongly Agree	Agree	Neutral	Disagree	Strongly Agree
1.	My educational aspirations are influenced by my innate talents and interests.	55 (22.9%)	95 (39.6%)	40 (16.7%)	35 (14.6%)	15 (6.3%)
2.	External factors shape my educational aspirations and career choices.	65 (27.1%)	115 (47.9%)	30 (12.5%)	20 (8.3%)	10 (4.2%)
3.	Natural inclinations determine my educational path and career.	50 (20.8%)	80 (33.3%)	55 (22.9%)	40 (16.7%)	15 (6.3%)
4.	Family and community values shape my educational aspirations.	70 (29.2%)	110 (45.8%)	35 (14.6%)	15 (6.3%)	10 (4.2%)
5.	My genetic makeup has a stronger influence on my educational aspirations than environmental influences.	40 (16.7%)	65 (27.1%)	60 (25%)	55 (22.9%)	20 (8.3%)

The majority of students (62.5%) believe that their educational aspirations and career goals are primarily influenced by their innate talents, interests, and abilities, while 75% believe that external factors like family expectations, socioeconomic status, and exposure to role models significantly shape their aspirations and future career choices. However, a significant proportion (45.9%) disagreed or strongly disagreed with this statement, indicating a divided opinion on the relative impact of nature versus nurture. Additionally, 75% of students agreed that the values, beliefs, and encouragement they receive from their family and community play a crucial role in shaping their educational aspirations and future career goals. Despite this, opinions on the stronger influence of genetic makeup versus environmental factors on educational aspirations and career goals were divided, with 43.8% agreeing and 51.2% disagreeing,

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suggesting a lack of consensus on the relative importance of nature versus nurture.

Table 10. Teachers' Responses on the influence of genetic and environmental factors on students' educational aspirations and career goals

S/N	Item	Strongly Agree	Agree	Neutral	Disagree	Strongly Agree
1.	Students' educational aspirations and career goals are primarily influenced by their innate talents and interests	12 (20%)	28 (46.7%)	10 (16.7%)	8 (13.3%)	2 (3.3%)
2.	Environmental factors have a greater impact on shaping students' educational aspirations and future career choices.	15 (25%)	30 (50%)	5 (8.3%)	8 (13.3%)	2 (3.3%)
3.	Natural inclinations determine the educational path and career goals of students.	10 (16.7%)	25 (41.7%)	10 (16.7%)	10 (16.7%)	5 (8.3%)
4.	Family and community values shape educational aspirations	20 (33.3%)	25 (41.7%)	10 (16.7%)	4 (6.7%)	1 (1.7%)
5.	Genetic factors play a more significant role than environmental influences in determining students' educational aspirations.	8 (13.3%)	22 (36.7%)	15 (25%)	10 (16.7%)	5 (8.3%)

The table presents data from a survey on factors influencing students' educational aspirations and career goals. The majority of teachers (66.7%) strongly agreed that innate talents and interests play a significant role in shaping students' educational and career aspirations. However, a significant number of respondents (25%) or agreed (50%) that environmental factors have a greater impact on shaping students' educational aspirations and future career choices. Natural inclinations (41.7%) and family and community values (33.3%) strongly agreed, indicating a belief in the role of natural inclinations in shaping students' educational aspirations. Genetic factors play a less significant role than environmental influences, with a smaller proportion of respondents strongly agreeing (13.3%) or agreeing (36.7%). Further statistical analyses were conducted to examine the influence of genetic and environmental factors on students' educational aspirations and career goals.

The study found a moderate positive correlation between students' self-estimated innate talents and interests and their educational expectations and career objectives, suggesting a link between genetic predispositions and expected aspirations. It also showed a positive correlation between family socioeconomic status exposure to role models and students' educational expectations and career choices, indicating a clear role of environmental variables. The study also found a statistically significant difference in students' educational expectations and career plans based on their socioeconomic status (SES), suggesting that students from higher SES are more likely to have higher educational aspirations and a wider variety of career plans. Both endowed and learned factors are considered significant in shaping students' educational expectations and future career plans, with a greater focus on internal factors such as family pressure, socioeconomic status, and culture.

Discussion

This empirical research explores the impact of nature and nurture on educational outcomes, including academic achievement, learning modalities, behaviors, and expectations. It fills a gap in the existing literature by examining these factors in Ogun State, Nigeria, contributing to the growing understanding of how nature and nurture variables influence educational outcomes. The study suggests that both students and teachers believe that genetic factors, such as intelligence and abilities, have a significant impact on academic performance. This aligns with previous studies indicating a strong genetic influence on thinking aptitude and academic achievement (Plomin & Deary, 2015). However, other contextual factors, such as socioeconomic status, quality of education, and facilities, also affect performance. This supports the nurture literature, which emphasizes the role of the environment in determining educational achievement (Heckman, 2006). The study was also supported by other previous studies on the

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significant impact of environmental variables, such as family background and quality of education on academic performance (Sirin, 2005; Reardon, 2018). Correlation analyses and t-tests also show a stronger link between environmental conditions and attainment than genetic factors.

The study suggests that students' preferred learning styles are influenced by both genetic and environmental factors. While both students and teachers agree that learning styles are influenced by their abilities, they also believe that certain aspects are dictated by factors outside the learning environment, such as educational approaches, classroom context, and culture. This aligns with the literature that suggests learning styles depend on gene or inherited traits and life or environmental factors (Pritchard, 2009; Romanelli et al., 2009). However, the study emphasizes the importance of environmental influences, particularly teaching methodologies and learning environments, in shaping learning preferences. This aligns with the nurture theory and encourages teachers to adopt different teaching methods to suit student needs (Dunn et al., 2009).

The research indicates that both natural and environmental factors influence students' behaviors, such as attentiveness, engagement, and obedience. While genetic factors, such as enduring personal dispositions and context, are important, environmental factors, such as classroom management, instructional style, and family involvement, are also significant. These factors, along with motivation and self-discipline, can affect students' participation in school-related activities. This view is in concordance with the available literature that posits that environmental factors, including classroom management, instructional style, and family involvement, could affect students' behavior and participation in school-related activities (Reyes et al., 2012). Correlation analyses show stronger positive correlations between environmental factors and behaviors associated with motivation and self-discipline. Overall, the research highlights the importance of considering both natural and environmental factors in shaping students' behavior.

CONCLUSION

The study explores the influence of nature and nurture on education in Ogun State, Nigeria. It emphasizes the role of environmental factors like socioeconomic status, family background, and access to resources in shaping educational outcomes. The research emphasizes the need to address socioeconomic disparities and provide equitable access to educational resources to promote academic success and nurture students' aspirations. It also calls for a holistic approach that considers both genetic and environmental factors in shaping educational experiences. The study contributes to the ongoing nature-nurture debate in education and offers empirical evidence from Ogun State, Nigeria, providing valuable insights for educational stakeholders, policymakers, and researchers.

This study contributes significantly to understanding the nature-nurture debate in education by examining various aspects such as achievements, learning patterns, and educational expectations. It highlights the role of the environment, including socioeconomic status, family, and resources, in the relationships between teachers and students, the instruction process, and educational outcomes. This highlights the need to target socioeconomic differences and provide equal opportunities for resource utilization in the learning environment and academic achievement. The study also provides new evidence into the nature-nurture debate in Ogun State, Nigeria, enhancing the existing literature on genetic and environmental interactions in various cultural and socioeconomic contexts. The study has policy and practice implications related to education, suggesting that measures and educational initiatives can help overcome obstacles and support students' differences or specific needs. Strategies may include enhancing equal access

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to educational materials, counseling students, training teachers on multicultural sensitivity, and offering career guidance and mentorship services.

RECOMMENDATIONS

1. Policymakers should promote effective education for all children, including early childhood education, to support their development. Investing in pre-service teacher education with culturally responsive teaching practices and developing students' capacity is crucial.
2. Educational institutions should ensure a diverse learning environment, addressing specific requirements for learners with disabilities, learning needs, career prospects, and goals. Personalizing learning interventions and consulting with relevant officials can help students with genetic or environmental difficulties. Involving families and communities can transform learning environments.
3. Future studies on nature-nurture should investigate long-term consequences, factor interactions, and modulators using both qualitative and quantitative research designs. Cultural consciousness can facilitate communication between individuals from different cultural backgrounds and promote equal attention to nature and nurture issues in education.

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