

Predicting Preservice Teachers' Interest in Biology Through Academic Resilience and Its Dimensions

Izunna Shedrack Nwuba*, Josephine Nwanneka Okoli

Department of Science Education, Nnamdi Azikiwe University, Awka, Nigeria.

Abstract: The study examined the predictive influence of academic resilience on preservice teachers' interest in Biology courses, applying a predictive research design. 388 preservice Biology teachers in the Department of Science Education, Nnamdi Azikiwe University, Nigeria, obtained using proportionate stratified random sampling technique were the respondents. Academic Resilience Scale (ARS) and Biology Interest Scale (BIS) were employed for data collection. The adapted instruments (ARS and BIS) yielded reliability coefficient values of 0.74 and 0.89, established using Cronbach alpha. Data collected, and analyzed using regression analyses, revealed that academic resilience and its dimensions positively and significantly contributed to preservice teachers' interest in Biology, individually and jointly, except perseverance which although positively contributed, but the contribution was statistically insignificant. Given the findings, it was suggested that counselling sessions, sensitization and orientation programmes be organized, by university counselling unit, for students to intimate them on techniques that can be adopted to foster academic resilience.

Keywords: Academic Resilience; Biology; Interest; Preservice Biology Teachers.

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***Corresponding Author:** Izunna Shedrack Nwuba (is.nwuba@unizik.edu.ng), Department of Science Education, Nnamdi Azikiwe University, Awka, Nigeria.

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Department of Biology Education, Faculty of Science and Technology, Universitas Islam Negeri Walisongo Semarang, Semarang, Indonesia.
Email: bioeduca@walisongo.ac.id

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Introduction

Resilience, a concept rooted in academics, has been recognized as a psychological construct that influences learning outcomes, at all level of education. Amzil (2022) defined resilience as an individual's ability to recover from hardships and function above the norm, despite stress and adversity. In education, the term academic resilience denotes a students' capacity to endure challenging circumstances, recover from setbacks, surmount obstacles, and effectively adjust to academic stress and requirements (Chakraborty, 2019). As a multivariate construct that influences general wellbeing and development, Ungar (2015) posited that educational resilience is unlimited, but generally constitutes a wide array of individual characteristics, such as optimism, internal affirmation, internal locus of control, intrinsic motivation, assertiveness, the ability to solve problems, perceived social support, and having goals and aspirations. Additionally, Alumulla (2024) asserted that academic resilience consists of elements that inspire students to do better; like drive, self-assurance, the capacity to reach objectives, effective stress management, and a feeling of wellbeing. In efforts to give a more condensed, but general, overview of academic resilience, Cassidy (2016), in his study, classified the concept into three core dimensions of; Perseverance (ability of an individual to endure in the presence of deterrents), reflective and adaptive help-seeking (ability to evaluate ones strengths, difficulties and proactively look for support and encouragement from others in order to adjust to different circumstances), and negative affect and emotional response (ability to the recognize unfavorable situations that people encounter in their lives and manage them effectively), that drive individuals to strive and overcome challenges to achieve their goals.

A deep comprehension of these attributes of resilience, informs one that the concept is a constructive component that helps people, especially students, grow in the midst of challenges, bad situations, and unforeseen circumstances. In the classroom, Rojas and Gallardo (2020) posited that academic resilience helps students be more tolerant, and understanding of what is happening around them, as in the phase of these obstacles' students display abilities in formal thinking, creative thinking, and application, all of which influence their overall quality of life. Similarly, Baluyos et al. (2023) asserted that academic resilience is exceptionally essential in modern education as it enables students face life's challenges, deal with adverse circumstances efficiently as well as handle and manage stress and strain in the classroom. In addition, Geetha and Sunil (2024) opined that students with high levels of academic resilience are better equipped to overcome obstacles, navigate challenges in the educational environment, and ultimately achieve success in their academic pursuits. Summarizing these benefits, Galizty and Sutarnia (2021) concluded that one of the factors that can encourage students to obtain optimal academic achievement is resilience, because high resilience will make students be able to: control and create positive emotions to stay focused on doing tasks (regulation emotion); control attention and never give up when facing problems in learning (Impulse control); stay optimistic and believe hard

work will give success (optimism); identify and find various solutions to solve problems (causal analysis); have a sense of empathy; believe in being able to do many things well and be able to overcome many challenges (self-control and efficacy); like to try out new things and; be responsible and adaptable (reaching out).

Acknowledging the potential roles of academic resilience on students' learning outcomes, numerous empirical studies on the concept have been conducted. In 2019, Habib examined the influence of academic resilience on academic motivation and academic confidence of secondary school students in Kashmir, India, revealing that a positive statistically significant correlation exists between academic resilience and academic motivation as well as between academic resilience and academic confidence of secondary school students. In another study, Ojeleye et. al. (2023) explored the influence of self-esteem and academic resilience on students' academic performance in Federal Polytechnic Kaura-Namoda, Zamfara state, adopting a survey and cross-sectional research design. The study revealed that self-esteem and academic resilience have positive and significant effect on students' academic performance. In his study, Karabiyik (2020) explored the interaction between academic resilience and academic achievement in university students in Ankara, Turkey, adopting a cross-sectional survey research design and revealed that positive correlations existed between students GPA and perseverance as well as with reflecting and adaptive help-seeking, while a negative correlation existed between students' GPA and negative affect and emotional response. The multiple regression analysis's findings also showed that the sole significant predictor of GPA was reflecting and adaptive help-seeking. Anosike and Okigbo (2023), in their study, explored the co-predictive influence of academic resilience and emotional intelligence on secondary school students' performance and attitude in Physics in Enugu State, Nigeria, adopting a predictive correlation research design. The study indicated that academic resilience and emotional intelligence jointly influenced students' attitude towards Physics, but however jointly failed to predict performance of students in Physics among other outcomes. A read through the reviewed empirical reviews affirms the assumption that academic resilience benefits learning outcomes. However, based on available literature, no similar study known to the researcher has been conducted, specifically on preservice Biology teachers' interest in learning Biology courses in Anambra State, Nigeria. Considering these gaps in location, level of participants, and subject matter, the notion for the study was conceived.

Interest, in the instructional process, has been recognized as one of the psychological traits that can influence or be influenced for educational goals. Egolum et al. (2021) defined it as a behavioural tendency to be attracted towards a certain class of activities. Interest, in academics, is a potent motivating factor that propels education, directing academic and professional paths for success (Mbaegbu et al., 2023). As a powerful source of human motivation, Nwuba et al. (2023) noted that interest is capable of arousing and sustaining concentrated effort, lending credence to the reason why education stakeholders have recognized it as a significant driving element, related with the development and control of

behavioral goals, that can influence learning and performance. Interest creates instant awareness, aids focus, curbs disruptions, enhances instructional materials connection, and lowers learning monotony (Triarisanti & Purnawarman, 2019). In learning Biology specifically, interest has been recognized as an important factor that motivates students to learn the subject, taking cognizance of the bulky nature of its curriculum. Obimalume (2021) asserted that interest improves students' involvement in biology lessons and sustain their concentration during classroom teaching, boosting their grasp of the topic and in the long run, enhance academic accomplishment in biology.

Supporting the premise, Awosika and Okoli (2023) stressed that considering the cumbersome nature of biology as well as the abstractness and difficulty in remembering its concepts and terminologies, students' interest in the subject is the strongest strength for predicting their academic performance in the subject as interest keeps learners focused, retentive, purposeful, committed as well as collaborate in the learning process, with their peers and teachers. Concluding, Nwafor and Oka (2018) asserted that sparking students' interest in learning biology, is the only way of getting them eager to learn the subject, master its knowledge and techniques better as well as inculcate and enhance in them the scientific spirits and attitudes. Recognizing the contributory influence of students' interest to the learning of Biology and its complex concepts and difficult terminologies, the researchers' interest was piqued to determine factors that could be influenced to help students sustain their interest in the classroom. In the course of literature review, the researchers identified academic resilience as a student construct that can help them overcome academic stress, surmount academic pressure and navigate the excessive demands of academic life and thus, was motivated to ascertain its predictive influence on interest of students in learning Biology.

Biology, a science subject studied in Nigerian tertiary institutions, has long been identified as a major asset for national development. Anyigor et al. (2025) defined biology as a pure science subject that studies life, its attributes and processes. At the university level in Nigeria, the Biology curriculum encompass a wide array of courses (contents) such as BIO 101 and its prerequisite, BIO 108, BIO 202, BIO 203, BIO 301. BIO 303, BIO 401, BIO 402, among many others, studied by most students in Universities in Nigeria to acquire the scientific skills, knowledge and competence needed to become certified biologists. According to the Core Curriculum and Minimum Academic Standards (CCMAS) used in all tertiary institutions in Nigeria today, the objectives of the Biology courses is to help students: gain enterprise skills as well as skills in industrial applications of biology in areas such as pest and pollution controls, management of public health, zoological gardens and wild life parks, fish and integrated farming, biotechnology centres and laboratories, water and sewage treatment plants; develop scientific literacy, that is, the understanding the nature of science/biology, interaction of science, technology and society and; acquire employability skills that can help students establish and run some agricultural business outfits such as aqua-culture, horticulture, bee farming, flouri-culture, eco-tourism, poultry,

piggery, mushroom culture. In addition to the premise, Nwuba and Okoli (2026) affirmed that Biology, in the 21st century society, has been established as a resource for sustainable development and growth, due to its invaluable relevance to bioengineering, agriculture, disease control and most importantly, living a healthy life, making it a subject and an intellectual enterprise, whose importance to man cannot be overemphasized. In light of these benefits of Biology courses, it has become of utmost importance that students are constantly motivated to pick interest in the subject, as studies have revealed that most students shy away from the subject due to the bulky nature of its curriculum and abstractness of its contents. This ugly trend is more so worsened by the constant demands of university school life often occurring from academic pressure, stress, financial burden, excess workload, high expectations from families, and competition, that influences a student's interest in schooling and Biology courses, in particular.

Considering the premise, the notion to investigate the predictive influence of academic resilience on preservice teachers' Interest in learning biology courses was birthed and guided by two research questions; (1) Does academic resilience predict preservice teachers' interest in learning biology courses? and (2). Do individual dimensions of academic resilience (perseverance (P), reflective and adaptive help-seeking (RAHS), and negative affect and emotional response (NEER)) predict preservice teachers' interest in learning biology courses? Furthermore, two corresponding null hypotheses were tested to confirm the contribution, they are; (1). Academic resilience is not a significant predictor of preservice teachers' interest in learning biology courses? and (2) Individual dimensions of academic resilience (P, RAHS and NEER) are not significant predictors of preservice teachers' interest in learning biology courses?

Methods

The study is a correlational survey study, adopting specifically a predictive research design. A predictive research design, according to Cresswell (2012), is a type of correlational research design that seeks to not only ascertain the relationship, that exists between variables, but also attempts to determine the change in the dependent (criterion) variable that can be attributed to the independent (predictor) variable. The research participants, drawn using proportionate stratified random sampling technique, are 388 100Level to 400Level Preservice Biology teachers, drawn from the 700 Biology Education students in the Department of Science Education, Nnamdi Azikiwe University, enrolled in the 2024/2025 academic session. For data collection, a 30-item Academic Resilience Scale (ARS) adapted from Cassidy's (2016) Academic Resilience Scale (ARS-30) and Biology Interest Scale (BIS) adapted from Luo et al.'s (2019) original Academic Interest Scale for Adolescents (AISA), were employed.

The original Academic Resilience Scale (ARS) developed by Cassidy (2016) is a 30-item scale, with five response options of Strongly Agree (SA), Agree (A), Undecided (UN),

Disagree (D) and Strongly Degree (SD), organized under the 3 core dimensions (P, RAHS and NEER) of academic resilience. In adapting the scale, the 30-items, with their response options were retained. However, a few adjustments were made on some of the sentences. These sentence reconstructions were done, as recommended by the validators to suit the level of the respondents and locality of usage. The original Academic Interest Scale for Adolescents (AISA), on the other hand, is a 29-item scale with clusters designed, by Luo et al. (2019), under five response options of Strongly Agree (SA), Agree (A), Undecided (UN), Disagree (D) and Strongly Disagreed (SD), to ascertain individual responses on their interest and attitude towards learning the Chinese language. In adjusting the AISA, the 29-item statements with their five-point response options were retained. However, the statements in the AISA were modified to ascertain students' interest in biology, and also the clusters were removed. This modification was done since the BIS measured students' interest in Biology and was treated as a single measure (not in clusters).

Considering the adjustments in the ARS and BIS, as recommended by the validators, a trial testing was conducted, using 32 preservice Biology teachers at the University of Nigeria, Nsukka, Nigeria to establish their reliability coefficients. The reliability test, for internal consistency, yielded reliability coefficients values of 0.74 for ARS and 0.89 for BIS, using Cronbach Alpha estimation. To collect data, both online and physical method of administration were employed. For online administration, google forms were created for the adapted instruments and then shared on various Biology Education students WhatsApp platforms while for the physical administration, the instruments were shared during their lecture hours, on six different occasions, and retrieved on the spot, after filling. Data collected were analyzed using regression analyses (simple and multiple regression).

Results & Discussion

Result

RQ1: Does academic resilience predict preservice Biology teachers' Interest in learning biology courses?

Table 1.

Prediction of Preservice Teachers' Interest in Biology by their Academic Resilience.

Model	R	r ²	Adjusted r ²	Unstandardized coefficients (B)	Std. Error
Constant				61.667	
Academic Resilience	0.362 ^a	0.131	0.129	0.271	7.595

a. Predictors: (Constant), Academic Resilience (AR)

b. Dependent: Interest Score in Biology Courses (ISBC)

Table 1 shows an R-value of 0.362 (indicating a moderate positive relationship between AR and IB) and an R² value of 0.131. The coefficient of determination (r²) value obtained reveals that 13.1% variance in Preservice Biology Teachers' Interest scores in

biology is predicted by their academic resilience. Also, the unstandardized coefficient *B* of 0.271 shows that a unit rise in academic resilience, increases Preservice Teachers' interest in biology by 27.1%.

H01: Preservice Biology teachers' academic resilience does not significantly predict their interest in learning biology courses.

Table 2.

Significance of Prediction of Preservice Teachers' Interest in Biology by their Academic Resilience.

Model	Sum of Squares	Df	Mean Square	F	P-value	Decision
1 Regression	3350.811	1	3350.811	58.084	0.000 ^b	Sig.
Residual	22267.869	386	57.689			
Total	25618.680	387				

a. Dependent Variable: Interest Score in Biology Courses (ISBC)

b. Predictors: (Constant), Academic Resilience

Table 2 reveals a p-value of 0.000 at an F-value (Df 1 and 386) of 54.084. Since the p-value is less than 0.05 alpha levels, the null hypothesis is rejected. This indicates that preservice teachers' interest in Biology is significantly predicted by their academic resilience. Since academic resilience is a significant predictor of preservice teachers' interest in Biology courses, the regression model ($Y = a + bx$) for the prediction as obtained in Table 1, where constant is 61.667 and b value is 0.271 is: $ISBC = 61.667 + 0.271 (AR)$

Where, ISBC = Interest Score in Biology Courses and AR = Academic Resilience Score

RQ2: Do individual dimensions of academic resilience (perseverance, reflective and adaptive help-seeking, and negative affect and emotional response) predict preservice teachers' interest in learning biology courses?

Table 3.

Individual Dimensions of Academic Resilience Contributions to Preservice Teachers' Interest in Learning Biology Courses.

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.	Decision
	B	SD. Err.	Beta			
1 (Constant)	62.727	2.128		29.471	.000	
Perseverance (P)	0.105	0.113	0.058	0.931	.352	Not. Sig
Reflective & Adaptive Help Seeking (RAHS)	0.407	0.120	0.228	3.396	.001	Sig
Negative Effect & Emotional Response (NEER)	0.267	0.135	0.125	1.984	.048	Sig

a. Dependent Variable: Interest Score in Biology Courses (ISBC)

Table 3 shows the unstandardized B coefficient values that indicate the relative contributions of each dimension of academic resilience to preservice teachers' interest

score in Biology courses. The table reveals that a unit rise in perseverance increases preservice teachers' interest score by 10.5%, a unit rise in reflective and adaptive help-seeking increases it by 40.7% and finally, a unit rise in negative effect and emotional response increases interest score by 26.7%. Based on the table, the order of contributions of each dimension of academic resilience to preservice teachers' interest score in biology courses from highest to lowest is; Reflective and adaptive help-seeking (40.7%), followed by negative effect and emotional response (26.7%) and lastly, perseverance (10.5%).

H02: The relative contributions of the individual dimensions of academic resilience (P, RAHS and NEER) to preservice teachers' interest in learning biology courses is not significant.

Table 4.

Significance of Prediction of Preservice Teachers' Interest Score in Biology by the Individual Dimensions of Academic Resilience.

Model	Sum of Squares	Df	Mean Square	F	Sig.	Decision
1 Regression	3355.699	3	1118.566	19.293	.000 ^b	Sig.
Residual	22262.982	384	57.977			
Total	25618.680	387				

a. Dependent Variable: Interest Score in Biology Courses (ISBC)

b. Predictors: (Constant), P, RAHS and NEER

Table 4 reveals that when combined together, all the individual dimensions of academic resilience are significant predictors of preservice teachers' interest in biology courses, since the p-value (0.000) obtained is less than 0.05 alpha levels, at an F-value (3 and 384) of 19.293. Further analysis of data, as contained in table 3, however reveals that individually, only reflective and adaptive help-seeking (0.001) and negative effect and emotional response (0.048), on their own, predicted preservice teachers' interest scores in biology courses significantly, since their p-values is less than 0.05 level of significance at t-values (3, 384) of 3.369 and 1.984 respectively, while perseverance did not significantly predict preservice teachers' interest scores in Biology, since the p-value (0.352) obtained at t-value (3,384) of 0.931 is greater than 0.05 alpha levels. Recognizing that all the dimensions of AR, when combined, predicted preservice teachers' interest scores in learning biology courses significantly, the equation for the regression model ($Y = a + bx_1 + cx_2 + dx_3$) derived from table 3 can be written as: $ISBC = 62.727 + 0.105 (P) + 0.407 (RAHS) + 0.267 (NEER)$ Where, ISB = Interest Scores in Biology Courses, P = Perseverance, RAHS = Reflective and Adaptive Help Seeking, and NEER = Negative Effect and Emotional Response

Discussion

The study reported that academic resilience positively and significantly predicted preservice teachers' interest in learning Biology courses. This positive and significant prediction of Biology preservice teachers' interest can be linked to the attributes of

determination, glee, internal recognition and sense of control, self-motivation, self-confidence, problem-solving skills, assistance from others, as well as having aims and aspirations, associated with academic resilience. Marvin (2023) argued that academic resilience is an essential skill that can empower individuals to overcome challenges in the face of school adversities, and teaching it in the classroom through intentional strategies and approaches such as encouraging a growth mindset, promoting problem-solving skills, teaching coping and stress-management as well as celebrating successes and progress, both big and small, encourages students to set goals, practice self-care and prioritize ones well-being. Similarly, Mwangi et al. (2018) reported that academic resilience is a key factor in determining students' success as academic resilient students are intrinsically motivated, optimistic, self-regulated, flexible, show agency toward being solution-focused, exercise reciprocity, have determination, are assertive, and possess good communication skills, that foster interest in learning. The present findings accede to that of Oyoo et al (2018) who reported that academic resilience negatively and significantly predicted students' academic burnout, meaning that as student' resilience increases, their academic burnout decreases. Also supporting the current study, is the findings of Habib (2019) who reported that that academic resilience positively and significantly correlated with students' academic motivation and confidence. Dokobe et al's (2024) findings also agree the current study's findings that academic resilience positively and significantly correlated with students' school satisfaction, but however disagrees that the positive correlation is weak and not moderate as reported in the current study.

On the contributions of individual dimensions of academic resilience to Biology preservice teachers' interest in learning Biology courses, the analyzed results revealed that the three dimensions of academic resilience, when combined, positively contributed to students' interest in Biology, significantly. On individual basis, the findings however revealed that only reflective and adaptive help seeking (RAHS) and negative effect and emotional response (NEER), on their own, were significant predictors, and not perseverance (P). This significant prediction by RAHS and NEER could be linked to their respective attributes of instilling in students the ability to examine their abilities, limitations and actively seek guidance and support from others as well as acknowledging and controlling their feelings of anxiety, negative emotions, and optimism-pessimism, that positively influences their interest. The insignificant prediction by P reaffirms the already stated assertion that students may persevere in Biology because of career goals, not necessarily because of interest. The present findings concur with Chan et al.'s (2022) findings that the dimensions of academic resilience positively and jointly contributed to students' academic motivation. The study however disagrees with Chan et al. on their report that perseverance, individually, also significantly predicted students' academic motivation.

Conclusion & Recommendation

The study examined the predictive influence of academic resilience and its dimensions on preservice teachers' interest in learning biology courses, adopting a predictive correlational research design. Given the findings, the study affirmed that academic resilience and its dimensions are positive and significant contributors to preservice teachers' interest in Biology, except for perseverance which positively predicted preservice teachers' interest in learning Biology although the prediction proved statistically insignificant. The findings of the study theoretically adds to the existing body of knowledge that academic resilience, positively and significantly, contributes to students' learning outcomes. On practical implications, for teacher training institutes, the study highlights the importance of cultivating a positive, friendly and inclusive classroom atmosphere that encourages open dialogues, allowing preservice teachers' interact more, voice their concerns and seek help when necessary. By alleviating stigma and fostering a supportive environment, students are more inclined to collaborate more and feel secure in discussing their challenges in academics, fostering their interest in the subject.

Considering the implications, the following recommendations were made: (1). Counselling sessions, sensitization and orientation programmes should be organized by university counselling unit, for students, to intimate them on techniques that can be adopted to foster academic resilience. (2). Biology course lecturers, during the teaching and learning process, should design classroom instructions to create atmospheres that are collaborative, interactive and friendly enough for students to express their affective learning through healthy emotional expressions. (3). The government, at all levels of education, in conjunction with professional bodies and NGOs should organize workshops, conferences and symposia to intimate Biology lecturers on the contributory influence of academic resilience to students learning outcomes and overall development as well as educate them on strategies that can be employed to foster them in the classroom.

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References

- Almulla, M. O. (2024). Academic resilience and its relationships with academic achievement among students of King Faisal University in Saudi Arabia. *RGSA – Revista de Gestão Social e Ambiental*, 18 (9), 1-17.
- Amzil, A. (2022). Academic resilience and its relation to academic achievement for Moroccan university students during the covid19 pandemic. *International Education Studies*, 16 (1), 1-7. <https://doi.org/10.5539/ies.v16n1p1>
- Anosike, O. C., & Okigbo, E. C. (2023). Academic resilience and emotional intelligence as predictors of secondary school students' performance and attitude towards physics in Enugu State, Nigeria. *UNIZIK Journal of STM Education*, 6(1), 92-98.
- Anyigor, C.P., Nwuba, I.S., & Osuji, C.C. (2025). Self-regulation ability as a correlate of secondary school students' academic achievement in biology in Anambra State. *UNIZIK Journal of STM Education*, 8(1), 86-96.
- Awosika, O. F., & Okoli, J. N. (2023). Nurturing secondary school students' academic interest in biology using mind mapping instructional strategy. *International Journal of Research and Innovation in Social Science (IJRISS)*, 7(10), 848-856.
- Baluyos, G. R., Cabaluna, P. A., & Paragat, J. R. (2023). Students' preference in online learning environment and academic resilience in relation to their academic performance in mathematics. *EduLine: Journal of Education and Learning Innovation*, 3(3), 460-470.
- Chan, S. M., Delatina, A. C., Diego, A. R., Elarmo, F. J., Escollar, P. D. T., Esmeralda, E. Z. D., Esponilla, E. P., Esquilla, M. R. A., & Gamboa, M. S. (2022). *Academic Resilience and Academic Motivation of Senior High School Students*. A Research Paper Presented to the Faculty of Basic Education, Department Senior High School, Colegio San Agustin-Bacolod, Philippines.
- Cassidy, S. (2016). The Academic Resilience Scale (ARS-30): A new multidimensional construct measure. *Frontiers in Psychology*, 7 (1787) 7-21. <http://doi:10.3389/fpsyg.2016.01787>
- Chakraborty, S. A. D. A. R. (2019). Dimensional analysis of the academic resilience construct with respect to gender in secondary school students. *International Journal of Education*, 140-154.
- Creswell, J. W. (2012). *Educational Research: Planning, Conducting, and Evaluating Qualitative and Quantitative Research (4th Ed.)*. Boston, MA: Pearson.
- Dokobe, G., Wawire, C.K., & Olendo, R. A. (2024). Academic resilience and self-concept as correlates of school satisfaction among form two students in the North East Region of Botswana. *International Journal of Research and Innovation in Social Science*, 8(8), 2765-2777.
- Egolum, E. O., Samuel, N. N. C., & Okonkwo, I. G. (2021). Enhancing students' interest in chemistry through inculcation of problem-solving skills. *South Eastern Journal of Research and Sustainable Development (SEJRSD)*, 4(2), 116-128.
- Galizty, R. C. M., & Sutarnia, N. (2021). The effect of student resilience and self-regulated learning on academic achievement. *Pedagonal: Jurnal Ilmiah Pendidikan*, 5(2), 62~69.

- Geetha, N. S., & Kumar, S. (2024). Academic resilience among higher secondary school students of Kozhikode District. *International Journal for Multidisciplinary Research (IJFMR)*, 6(2), 1-8.
- Habib, H. (2019). Academic resilience as a predictor of academic motivation and academic confidence of secondary school students. *Online Journal of Multidisciplinary Subjects (Peer Reviewed)*, 13 (1), 700-706.
- Karabiyik, C. (2020). Interaction between academic resilience and academic achievement of teacher trainees. *International Online Journal of Education and Teaching (IOJET)*, 7(4), 1585-1601.
- Luo, Z. Dang, Y., & Xu, W. (2019). Academic interest scale for adolescents: Development, validation, and measurement invariance with Chinese students. *Frontiers in Psychology*, 10, 1-14.
- Marvin, H. (2023). *Cultivate Resilience in The Classroom: Tips for Teachers and Students*. https://www.google.com/amp/s/blog.teamsatchel.com/pulse/cultivate-resilience-in-the-classroom-tips-for-teachers-and-students%3fhs_amp=true Retrieved on 5/10/2024.
- Mbaegbu, C.S., Nwuba, I.S., & Akachukwu, E.E. (2023). Effect of Ethnobiology Instructional Approach on Secondary School students' Interest in Biology Concepts in Onitsha Education Zone. *Unizik Orient Journal of Education*, 10(1), 177-185.
- Mwangi, C. N., Ireri, A. M., Mwaniki, E. W., & Wambugu, S. K. (2018). Relationship among type of school, academic resilience and academic achievement among secondary school students in Kiambu County, Kenya. *PEOPLE: International Journal of Social Sciences*, 3(3), 1092–1107.
- Nwafor C. E., & Oka, O. O. (2018). Secondary school students' interest inventory in biology. *International Journal of Humanities Social Sciences and Education (IJHSSE)*, 5 (3), 44-59. ISSN 2349-0373 (Print) & ISSN 2349-0381 (Online) <http://dx.doi.org/10.20431/2349-0381.0503005>.
- Nwuba, I. S., Egwu, O. S., Awosika, O. F., & Osuafor, A. M. (2023). Fostering secondary school students' interest in biology using numbered heads together cooperative instructional strategy. *The Universal Academic Research Journal*, 5(2), 48–56. <https://doi.org/10.55236/tuara.1136342>
- Nwuba, I.S., & Okoli, J.N. (2026). Predicting students' academic achievement in biology by their academic resilience and its dimensions. *Multidisciplinarni Pristupi U Edukaciji I Rehabilitaciji*, 8(11), 3-13.
- Obimalume, N. V. (2021). Effect of multiple intelligence-based instructional approach on students' interest in secondary school biology. *Sapientia Foundation Journal of Education, Sciences and Gender Studies (SFJESGS)*, 3(2), 234 – 242. ISSN: 2734-2522 (Print); ISSN: 2734-2514 (Online).
- Ojeleye, C. I., Adegbile, O. N., & Apanpa, T. (2023). Academic resilience and self-esteem as determinant of students' academic performance in Zamfara State. *Milestone: Journal of Strategic Management*, 3(2), 68-78.
- Oyoo, S. A., Mwaura, P.M., & Kinai, T. (2018). academic resilience as a predictor of academic burnout among form four students in Homa-Bay County, Kenya. *International Journal of Education and Research*, 6 (3), 187-200.
- Rojas-Suárez, J.P., M, V. O., & Gallardo Pérez, H. J. (2020). Resilience in successful math and physics students. *Journal of Physics. Conference Series*, 1587(1)

- Triarisan, R., & Purnawarman, P. (2019). Interest and motivation on college students' language and art appreciation learning outcomes. *International Journal of Education*, 11(2), 130-1135.
- Ungar, M. (2015). Practitioner review: Diagnosing childhood resilience—a systemic approach to the diagnosis of adaptation in adverse social and physical ecologies. *Journal of Child Psychology and Psychiatry*, 56(1), 4-17.