Social Intelligence as a Predictor of Colleges of Education Students' Achievement in Biology in Anambra State

Okoye, Paschal Olisaeloka[1] & Okoli, Josephine Nwanneka[2]
Department of Biology
Nwafor Orizu College of Education
okoyepaschalo@yahoo.com
1- Department of Science Education
Nnamdi Azikiwe University, Awka
jn.okoli@unizik.edu.ng
DOI: 10.56201/ijssmr.vol.11no9.2025.pg440.449

Abstract
The study investigated social intelligence as a predictor of College of Education students' academic achievement in Biology in Anambra State. Two research questions and two null hypotheses guided the study. The study adopted the predictive correlation research. The population of the study cwas 283 year three (300 level) Biology students in Colleges of Education in Anambra State, Nigeria, which also constituted the sample for the study. The instrument for data collection was the Tromso Social Intelligence Scale (TSIS), validated by three experts. The reliability the instrument was established using Cronbach Alpha with coefficient of internal consistency of 0.73. The students' CGPA in Biology were obtained from Course adviser folder whereas for TSIS was administered to the students with the help of the research assistants. The data obtained was analyzed using simple and multiple linear regressions. The findings of the study revealed among others that 3.1 percent of the variance in Biology achievement was predicted by students' social intelligence. Furthermore, achievement in biology were significantly predicted by College of Education students' social intelligence. It was recommended among others that, biology teachers should incorporate cooperative learning strategies, peer-assisted instruction, and group-based laboratory activities to enhance students' social intelligence and collaborative skills, leading to improved academic achievement.

Keyword: *Social, Intelligence, College, Achievement, Biology*

Introduction

Academic achievement encompasses various aspects of learning and performance, including: grades and examination scores, which are the most traditional measure of academic achievement. It may include acquiring knowledge, developing skills, and demonstrating competencies in specific subjects or disciplines. Academic achievement may also imply educational attainment, which extends to the successful completion of educational milestones such as degrees, diplomas, certificates, or other credentials that signify the completion of a program of study; class rank and standing.

Academic achievement may involve comparisons of a student's performance relative to their peers within a class or school, often represented by class rank or percentile; and non-cognitive factors, focused on cognitive aspects like knowledge acquisition and problem-solving skills. It also acknowledges the role of non-cognitive factors such as motivation, persistence, and engagement in learning. Academic achievement is therefore a multifaceted concept that reflects a student's academic success and proficiency across different dimensions

of their educational journey often measured as grades in examinations and academic degrees. Academic achievement especially in science subjects like in Biology is critical for students in Colleges of Education in Anambra state, Nigeria, as it forms the foundation for future educators who will teach the subject at various educational levels. This is because the importance of Biology in understanding life processes and addressing health and environmental challenges makes it a cornerstone of scientific education.

Despite the emphasis on improving academic achievement in Biology, a significant number of College students' academic achievement, particularly in remains unsatisfactorily poor. Although, a lot of factors such as poorly equipped laboratory, lack of qualified teachers and over-reliance on traditional lecture method has been implicated, understanding the psychological and social determinants of academic achievement such as social intelligence is essential for addressing these educational challenges.

Social intelligence is the ability to understand and manage social interactions effectively (Riggio and Reichard, 2023). It encompasses skills such as empathy, social awareness, and relationship management, which are essential for navigating the social aspects of the educational environment (Goleman, and Martinez, 2023). Social intelligence, understood as the capacity to effectively navigate and negotiate complex social relationships and environments, plays a significant role in the academic performance of students, particularly in subjects such as Biology. Measures of social intelligence such as the Tromso social intelligence scale by Silvera, Martinussen and Dahl (2002) covers several dimensions such as social information processing, social skills and social awareness. Social information processing evaluates the capacity to comprehend verbal and nonverbal cues related to human interactions, including both implicit and explicit messages. Social skill emphasizes the behavioural components by gauging the ability to navigate new social situations. Social awareness assesses the ability to act appropriately based on the context, location, and timing.

In colleges of education, where future educators are trained, social intelligence can impact students' ability to collaborate, communicate, and engage with their peers and instructors, ultimately influencing their academic success in Biology. High social intelligence can enhance academic achievement by improving communication with peers and instructors, and creating a supportive academic environment. High social intelligence enables students to navigate social complexities in the classroom, collaborate with peers, and seek help when needed especially when suffering high levels of cognitive distortions and interference. Kumar and Verma (2021) indicated that students with high social intelligence tend to have better academic outcomes due to their ability to engage positively with the learning community and utilize social resources effectively. In the context of Biology education, social intelligence can enhance learning by facilitating group study, encouraging participation in discussions, and improving relationships with instructors and classmates. These interactions can lead to a deeper understanding of the material, increased engagement, and better academic outcomes (Riggio and Reichard, 2023), thereby reducing distorted thought or focus on irrelevant worries.

One of the primary ways social intelligence impacts academic achievements in Biology is through enhanced collaboration. Biology often involves group work, such as laboratory experiments, research projects, and study groups. Students with high social intelligence are better equipped to work effectively in teams, share responsibilities, and support their peers. These collaborative skills not only facilitate a deeper understanding of biological concepts but also foster a supportive learning environment that can enhance overall academic achievement (Smith and Davies, 2023). Students who can articulate their ideas clearly, ask insightful questions, and engage in meaningful discussions are more likely to grasp complex biological concepts and retain information. Effective communication also

extends to interactions with lecturers, where socially intelligent students are more likely to seek help, clarify doubts, and receive feedback, thereby improving their understanding and performance (Johnson, Smith and Davies, 2023).

Another significant aspect is the role of social intelligence in managing academic stress and anxiety. Biology, with its extensive terminology and challenging concepts, can be a source of stress for many students. Those with high social intelligence can better manage their emotions, seek support from peers, and utilize coping strategies to reduce anxiety. This emotional regulation contributes to a more positive academic experience and better academic achievement in Biology courses (Miller and Brown, 2022). Unfortunately, in Nigeria, the educational system in Colleges of Education faces unique challenges, including limited resources, large class sizes, and socio-economic disparities (Adebayo and Adeola, 2023). These challenges can cause and increase other psychological challenges, making it even more important to understand and address these factors. Understanding the predictive effect of social intelligence is therefore essential for developing comprehensive strategies to improve academic achievement.

Purpose of the Study

The purpose of the study is to investigate social intelligence as a predictor of Colleges of Education students' academic achievement in Biology in Anambra state. The study specifically seeks to investigate the;

1. Prediction of Colleges of Education students' academic achievement in Biology by social intelligence.
2. Relative contribution of the dimensions of social intelligence (social information processing, social skill, and social awareness) to prediction of Colleges of Education students' academic achievement in Biology.

Research Questions

The following research questions guided the study:

1. What is the predictive value of social intelligence on Colleges of Education students' academic achievement in Biology?
2. What are the relative contributions of the dimensions of social intelligence (social information processing, social skill, and social awareness) to prediction of Colleges of Education students' academic achievement in Biology?

Hypotheses

The following null hypotheses were tested at 0.05 level of significance:

1. Social intelligence is not a significant predictor of Colleges of Education students' academic achievement in Biology.
2. The relative contributions of the dimensions of social intelligence (social information processing, social skill, and social awareness) to prediction of Colleges of Education students' academic achievement in Biology is not significant.

Method

The design adopted for the study was predictive correlation design. Correlational studies according Nworgu (2015) are those studies that establish the associations that exist between two or more variables of interest to a researcher or group of researchers. The study therefore adopted the predictive correlational research design on the basis the it sought to determine not only whether any correlation exist between the predictor variable (and the target variable (academic achievement), but also the variance in academic achievement that is

explained or predicted by the predictor variable, the increase or decrease in academic achievement given every unit rise in the predictor variables and the model by which academic achievement can be predicted by the predictor variable.

The study was carried out in Colleges of Education in Anambra state, Nigeria. The state is organised into 21 Local Government Areas located between latitudes 5˚ 42' N and 6˚ 47' N and longitudes 6˚ 37' E and 7˚ 23' E. The state is primarily populated by Igbo speakers and is a major commercial hub in the South-Eastern region of Nigeria and throughout the country. The population of the study comprised 283 year three (300 level) Biology students in the two public Colleges of Education in Anambra State, Nigeria.

The instruments for data collection was Tromso Social Intelligence Scale (TSIS). The TSIS was adapted from Silvera, Martinussen and Dahl (2002) as a multi-faceted measure of social intelligence. The scale consists of 21-tems measure for social intelligence with three sub-factors or dimensions: social information processing (1, 2, 6, 9, 14, 17, and 19), social skill (items: 4, 7, 10, 12, 15, 18, and 20), and social awareness (items: 2, 5, 8, 11, 13, 16, and 21). Social information processing measures the ability to understand verbal or nonverbal messages regarding human relations, that is, both implicit and explicit messages. Social skill stresses the behavioural aspects of the construct by assessing the ability to enter into a new social situation. Social awareness measures the ability to behave in accordance with situation, place, and time. TSIS was structured on a 7-point scale randing from 1 (describes me extremely poorly to 7 (describes me extremely well). The scores of the 300 level students in Biology from 2023/2024 to 2024/2025 academic sessions was collected using a profoma. The students' Cumulative Grade Point Average (CGPA) for the last academic session was collected and used as the students' academic achievement.

The instrument was validated by lecturers from Department of Science Education, Nnamdi Azikiwe University, Awka, one from Nwafor Orizu College of Education, Nsugbe and one other from Chukwuemeka Odumegwu Ojukwu University, Uli. The reliability of instruments were determined using Cronbach Alpha as the instruments are polytomously scored. The coefficient of internal consistency obtained was 0.73. The instruments were administered with the aid of two research assistants who are the colleagues of the research and who will work closely with the Biology lecturers in the Colleges of education for the study. The research assistants after they have been briefed by the researchers on the objectives of the study and method of data collection visited each school with the research. They first obtained permission from the appropriate Head of Department and thereafter obtained the students' Commulative Grade Point Average in Biology for 200 level academic sessions. The scores were arranged according to the orderly sequence of the arrangement approved result sheets. Then the last three digits of the students' registration numbers was the instruments to ensure that after administration, each students' score is registered against his or her CGPA. The research with the aid of the research assistants and the Biology lecturers administered the instrument on the students and collected them on the spot to ensure high return. The instruments after collection were scored by the researcher and record the students' score together with their academic achievement scores according to the last three digits of the registration numbers. The data obtained from the field was recorded by the researcher and collated for data analysis.

Data generated from the study were analysed using simple linear and multiple regressions. The r-value was used to determine the degree and direction of the correlation between the variable, whilst the r-squared value was used to indicate the variance in Biology score that was explained by the predictor variables. The unstandardised B coefficients were used to establish the prediction powers and relative contribution. The significance of the predictor variables' predictive powers was assessed using regression Analysis of Variance

(ANOVA), while the significance of the predictive powers of each predictor variable's dimensions were tested using the t-values and their associated P-values. All null hypotheses were evaluated at the 0.05 level of significance and were rejected if the P-value is less than or equal to 0.05 (P≤0.05), and not rejected if it is greater than 0.05 (P>0.05).

Results

Research Question 1: What is the predictive value of social intelligence on Colleges of Education students' academic achievement in Biology?

Table 1: Prediction of Students' Achievement score in Biology by Social Intelligence

Model	R	R^2	Adjusted R^2	Unstandardized coefficients (B)	Std. Error
Constant	.177[a]	.031	.027	78.668	10.778
Social Int.				.082	

a. Predictors: (Constant), Social Intelligence

Table 1 shows that the R-Square value of 0.031 indicates that 3.1percent of the variance in Biology scores is predicted by social intelligence. The unstandardized coefficient of 0.082 shows that a unit rise in social intelligence increases academic achievement score in Biology by 8.2%.

Research Question 2: What are the relative contributions of the dimensions of social intelligence (social information processing, social skill, and social awareness) to prediction of Colleges of Education students' academic achievement in Biology?

Table 2: Contributions of the Dimensions of Social Intelligence in the Prediction of Achievement scores in Biology

Model		Unstandardized Coefficients		Standardized Coefficients	T	Pvalue
			Std. Error			
1	(Constant)	65.487	7.172		9.131	.000
	Social Information Processing	.123	.128	.063	.960	.338
	Social Skills	.269	.094	.187	2.855	.005
	Social Awareness	.296	.139	.140	2.134	.034

a. Dependent Variable: Biology Achievement score

Table 2 shows that, a unit rise in social information processing increase academic achievement score in Biology by 12.3% and a unit rise in social skills increase academic achievement score in Biology by 26.9% whereas a unit rise in social awareness increases academic achievement in Biology by 29.6%. The order of relative contribution to achievement score in Biology from the highest to lowest by each dimension of social intelligence therefore is; social awareness (29.6%), social skills (26.9%) and then social information processing (12.3%).

Hypothesis 1: Social intelligence is not a significant predictor of Colleges of Education students' academic achievement in Biology.

Table 3: Significance of Prediction of Achievement score in Biology by Social Intelligence

Model		Sum of Squares	df	Mean Square	F	Pvalue
1	Regression	846.598	1	846.598	7.288	.007[b]
	Residual	26135.464	225	116.158		
	Total	26982.062	226			

a. Dependent Variable: Achievement

b. Predictors: (Constant), Social Intelligence

Table 3 shows that the dimensions of social intelligence significantly predicts achievement scores in Biology, F (1, 225) = 7.288, p < .05. The null hypothesis was therefore rejected meaning that the social intelligence significantly predicts of Colleges of Education students' academic achievement in Biology. Since social intelligence significantly predicts of achievement scores in Biology, the regression model (Y= a + bX) for the prediction of achievement score in Biology as derived from Table 1, where constant = 78.668, a value = .082 is:

ASB = 78.668 + 0.082 (SI)

Where, ASB = Achievement score in Biology and SI = Social Intelligence

Hypothesis 2: The relative contributions of the dimensions of social intelligence (social information processing, social skill, and social awareness) to prediction of Colleges of Education students' academic achievement in Biology is not significant.

Table 4: Significance of Prediction of Achievement score in Biology by Dimensions of Social Intelligence

Model		Sum of Squares	df	Mean Square	F	Pvalue
1	Regression	1571.713	3	523.904	4.598	.004[b]
	Residual	25410.348	223	113.948		
	Total	26982.062	226			

a. Dependent Variable: Achievement

b. Predictors: (Constant), Social Intelligence

Table 4 shows that the dimensions of social intelligence significantly predicts achievement scores in Biology, F (3, 223) = 4.598, p < .05. The null hypothesis was therefore rejected meaning that the dimensions of social intelligence significantly predicts of Colleges of Education students' academic achievement in Biology.

However, data contained in Table 4 shows the significance of the contributions of the individual dimensions to the prediction of achievement scores in Biology. Table 6 shows that social information processing is not a significant predictor of achievement scores in Biology, t(3, 223) = .960, p > 0.05, social skills is a significant predictor of achievement scores in Biology, (3, 223) = 2.855, p < 0.05 and social awareness is a significant predictor of achievement scores in Biology, (3, 223) = 2.134, p < 0.05. Since the dimensions of social intelligence are significant predictors of achievement scores in Biology, the regression model ($Y= a + bX_1 + cX_2 + dX_3$) for the prediction of achievement score in Biology as derived from Table 2, where constant = 65.487, a value = .123, b value = .269 and c value = .296 is:

ASB = 65.487 + 0.123 (SIP) + 0.269 (SS) + 0.296 (SA)

Where, ASB = Achievement score in Biology and SI = Social information processing, SS = Social skills and SA = Social Awareness

Discussion

The study found that social intelligence is a significant predictor of students' achievement scores in Biology, suggesting that students' ability to understand, navigate, and manage social interactions plays a crucial role in their academic performance. Social intelligence encompasses skills such as communication, teamwork, empathy, and adaptability, all of which are essential for effective learning, collaboration, and problem-solving. Given that Biology often involves group discussions, laboratory experiments, and cooperative learning activities, students with high social intelligence are more likely to engage actively, share ideas, and seek clarification, leading to better comprehension and academic success.

Social intelligence enables students to effectively interact with peers, teachers, and learning resources, facilitating deeper engagement with academic content. Students with strong social intelligence can easily communicate their ideas, ask relevant questions, and work collaboratively on Biology-related tasks such as practical experiments and project-based learning. Furthermore, social intelligence enhances students' ability to manage academic stress, resolve conflicts, and develop positive relationships with educators, which can contribute to a more supportive learning environment. Conversely, students with low social intelligence may struggle with group work, hesitate to seek help when needed, and experience social anxiety, all of which can hinder their academic progress in Biology.

The predictive role of social intelligence in Biology achievement may also be linked to peer-assisted learning and cooperative learning strategies, where students explain concepts to one another, reinforcing their understanding. Additionally, self-confidence in social interactions allows students to actively participate in classroom discussions, make meaningful contributions, and develop critical thinking skills, which are essential for mastering Biology concepts. Thus, students with high social intelligence are better equipped to leverage social interactions as a means of enhancing their academic performance.

This finding is consistent with previous research that has established a positive relationship between social intelligence and academic success. Ogunleye and Nwachukwu (2020) found that students with high social intelligence performed significantly better in science subjects, including Biology, due to their ability to collaborate effectively and engage in meaningful discussions. Similarly, Okoro and Eze (2021) highlighted that social intelligence enhances communication skills and teamwork, which are essential for practical-based learning in Biology. Furthermore, Thorndike's (1920) Social Intelligence Theory posits that individuals who can effectively navigate social environments tend to perform better academically, as they can utilize social cues to enhance learning, motivation, and problem-solving skills.

The study found that social skill and social awareness, as dimensions of social intelligence, are the only significant contributors to students' achievement in Biology. This finding suggests that students' ability to interact effectively with others and their awareness of social cues play a crucial role in their academic success in Biology. Biology, as a subject that involves group discussions, laboratory experiments, and collaborative problem-solving, requires students to engage in effective communication and teamwork. Students with high social skills can easily express their thoughts, seek clarification when necessary, and

collaborate with peers in learning activities, leading to better understanding and improved achievement. Similarly, social awareness enables students to recognize and respond appropriately to the emotions and behaviours of their peers and teachers, fostering a positive learning environment that supports academic growth.

Social skill, a key dimension of social intelligence, refers to students' ability to interact, communicate, and build relationships with others. In the context of Biology learning, social skill helps students participate actively in group discussions, work effectively with peers on laboratory assignments, and seek guidance from teachers when facing academic challenges. Students who possess strong social skills are more likely to engage in meaningful academic discussions, share ideas, and learn collaboratively, which enhances their overall comprehension and retention of Biology concepts. On the other hand, students with poor social skills may struggle with peer interactions, hesitate to ask questions, and disengage from group-based learning, ultimately affecting their academic performance.

Social awareness, another critical dimension of social intelligence, involves the ability to recognize and understand social situations, emotions, and interpersonal dynamics. In the Biology classroom, students with high social awareness can interpret verbal and non-verbal cues from their teachers and peers, allowing them to adjust their learning strategies accordingly. For instance, a socially aware student can recognize when a teacher provides hints during instruction or when a peer struggles with a concept, fostering an environment of mutual support and academic collaboration. This ability to perceive and respond to social dynamics enhances learning engagement, motivation, and overall achievement in Biology.

The findings of this study align with previous research emphasizing the impact of social intelligence on academic success. Ogunyemi and Adewale (2021) found that students with strong social skills performed better in science subjects due to their ability to collaborate effectively and participate in hands-on learning activities. Similarly, Eze and Okonkwo (2020) reported that social awareness plays a critical role in students' ability to seek help, engage in group discussions, and adapt to learning environments, ultimately improving their academic performance. These findings also align with Thorndike's (1920) Social Intelligence Theory, which suggests that individuals who effectively navigate social interactions tend to perform better academically because they can utilize social cues to enhance their learning experiences.

Conclusion

The finding that social intelligence is a significant predictor of students' achievement scores in Biology highlights the crucial role of interpersonal skills, communication, and collaboration in academic success. Students with high social intelligence are better equipped to engage in group learning, seek help when needed, and participate actively in discussions, all of which enhance their understanding of Biology concepts. Therefore, fostering social intelligence through interactive and cooperative learning strategies can significantly improve students' academic performance in Biology.

Recommendations

The following recommendations are made based on the findings of the study:

1. Workshops on communication skills, leadership training, and conflict resolution techniques should also be integrated into the curriculum to help students strengthen their social intelligence and improve their academic performance.
2. Biology teachers should incorporate cooperative learning strategies, peer-assisted instruction, and group-based laboratory activities to enhance students' social intelligence

and collaborative skills, leading to improved academic achievement.

3. Educational institutions should provide training programs and workshops on social intelligence, including communication skills, teamwork, and leadership development, to help students improve their social interactions and academic performance.

References

Adebayo, T. and Adeola, O. (2023). Challenges in the Nigerian educational system: Implications for Biology education. *Journal of Educational Development, 30*(2), 145-160.

Eze, P., Okonkwo, I. (2020). The role of social awareness in academic performance among secondary school students. *Journal of Educational Psychology, 45*(3), 112-125.

Gomez, R. & Martinez, A. (2023). The effect of teaching practices on student outcomes: A social intelligence perspective. *Teaching and Learning Journal, 22*(4), 310-327.

Johnson, R., Smith, L. & Davies, P. (2023). The impact of social intelligence on academic performance in higher education. *Journal of Educational Psychology, 115*(2), 145-160.

Kumar, R. & Verma, A. (2021). Social intelligence and academic achievement: An empirical study. *Journal of Educational Psychology, 113*(2), 234-248.

Miller, A. & Brown, T. (2022). Stress management and academic success: The role of emotional intelligence. *Psychology in Education Review, 29*(3), 78-90.

Nworgu, B. G. (2015). *Educational research; Basic issues and methodology*. Enugu: University Trust Publishers.

Ogunyemi, A., & Adewale, B. (2021). The impact of social skills on science achievement in collaborative learning environments. *International Journal of Science Education, 39*(2), 78-94.

Silvera, D., Martinussen, M. & Dahl, T. (2002). The Tromso social intelligence scale, a self-report measure of social intelligence. *Scandinavian Journal of Psychology, 42*(4), 313 – 319.

Smith, J. and Davies, K. (2023). Collaborative learning and its effects on student performance in science education. *Journal of Biological Education, 57*(1), 24-35.

Thorndike, E. L. (1920). Intelligence and its uses. *Harper's Magazine, 140*, 227-235.