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Impact of Positive Learning Environment on Students' Academic Performance in Colleges of Education

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Abstract

This study examines the relationship between the learning environment and student's academic performance in integrated science courses at colleges of education in Ghana's Central Region. The study examines three main environmental factors: physical, social, and psychological surroundings, and their influence on students' academic performance. Data were acquired using a quantitative technique using structured questionnaires administered to 290 students from three colleges of education. Descriptive and regression analyses were used to evaluate the predicted correlations between the identified environmental components and academic performance. The results indicated that the physical (β =.077, p =.308), social (β = -.060, p =.328), and psychological (β =.024, p =.745) settings did not significantly predict the performance of students in college. The study showed that students' average performance in assessment and integrated science courses fell short of expectations, although there was no significant predictive relationship. This shows how complicated academic achievement is and how things outside of the learning environment, like the quality of the teaching and the engagement of the students, can affect it. The study encourages educational institutions to prioritize improving the learning environment through improved lecture room configurations, providing sufficient teaching resources, and cultivating positive connections between students and teachers.

Keywords: Colleges of Education, Curriculum, Science Education, Assessment, Tertiary Students

Introduction

The learning environment shapes students' academic performance, particularly in science education. It provides the space in which knowledge is transferred and influences how effectively it is absorbed. According to Ryan (2015), students spend a substantial portion of their time in educational settings, where they acquire essential skills and knowledge necessary to succeed in society. Therefore, the environment in which this learning takes place is critical, as it affects both students' immediate and long-term academic performance (Dimosthenous et al., 2020). Qaiser and Ishtiaq (2014) indicate that such an environment improves academic performance and promotes students' self-regulated learning and emotional well-being. A positive learning environment becomes even more essential in science education, where inquiry and exploration are fundamental. It allows students to feel safe to express their ideas, ask questions, and engage in collaborative problem-solving. Studies have shown that lecture rooms designed to be inclusive and supportive significantly improve students' academic performance by reducing anxiety and increasing participation (Voltz et al., 2010; Juvonen et al., 2019). Moreover, the presence of strong teacher-student relationships and peer support within a positive learning framework has been linked to higher levels of academic engagement, which is crucial for mastering complex scientific concepts (Li, 2018)

In Ghana, disparities in student performance across different educational

institutions have often been attributed to factors such as student intelligence, socioeconomic background, and teacher quality (Duruji, Azuh, & Oviasogie, 2014). However, the learning environment is a significant yet underexplored factor in this equation. Each college operates under unique conditions, with varying access to physical resources, lecture room facilities, and social environments. These variations could significantly impact student outcomes, including their assessment performance, particularly in challenging subjects such as integrated science. Despite several empirical studies examining academic performance in Ghana, gaps remain in understanding how the learning environment influences student outcomes. Most studies have focused on isolated factors such as student characteristics, teacher motivation, or curriculum design (Amponsah et al., 2018; Esia-Donkoh, 2018; Wahab, 2012; Ofosu-Amaah et al., 2019) without considering the complex interactions between these and the environment in which learning occurs. Furthermore, intangible aspects of the learning environment—such as the lecture room atmosphere, student-teacher relationships, and the overall college culture—have been mainly overlooked in existing research (Baafi, 2020).

This study seeks to address these gaps by investigating if the learning environment impacts students' academic performance in integrated science courses across three colleges of education in the Central Region of Ghana. The objective is to determine whether a relationship exists between the learning environment's physical, social, and psychological aspects and student performance in integrated science courses. Given the increasing importance of science education in modern society, understanding how the learning environment affects student outcomes in this discipline is crucial for improving educational practices and policies in Ghana.

Physical environment means how things are organised and arranged in the school, such as buildings, playgrounds, classrooms, cupboards, notice boards, lighting, temperature, ventilation, etc. The social environment means the relationships and interactions among members of the school community, such as between the staff and management, staff and students, and management and staff. This may also include the dynamics and norms and the school culture and shared values. The psychological environment is how the emotional well-being and climate of members affect the school personnel, which shows empathy and association. This includes stress, anxiety, burnout, security, safety, and morale.

Theoretical Foundation of the Study

Albert Bandura's (1977) Social Learning Theory provides a robust theoretical foundation for this study by emphasizing the critical role of observational learning and social interactions in educational settings. Bandura posits that individuals learn behaviours not only through direct experiences but also by observing the actions of others

within their social environment. This theory highlights four essential processes: attention, retention, reproduction, and motivation, which are integral to effective learning (McLeod, 2016). Students can enhance their academic performance in integrated science courses by observing and imitating their teachers and peers, thereby internalizing successful behaviours and strategies. Numerous studies have supported this theory in educational contexts; for example, research has shown that students who engage in collaborative learning—where they observe and interact with peers—demonstrate improved understanding and retention of scientific concepts (Smith, 1999). Additionally, studies have indicated that teachers who model effective problem-solving techniques can significantly boost students' ability to replicate these skills in assessments (Peter, 2012; Hesse et al., 2015).

Furthermore, Bandura's concept of self-efficacy is particularly relevant to this study as it underscores the importance of student's beliefs in their capabilities to succeed academically. Self-efficacy influences students' motivation and persistence when faced with challenges (Haggbloom et al., 2002). Research has shown that when educators foster a supportive environment that enhances students' self-efficacy through positive reinforcement and constructive feedback, students are more likely to engage deeply with the material and perform better academically (Foster, 2003). For instance, a study by Ayllón et al. (2019) demonstrated that students who received encouragement from teachers were more likely to set higher academic goals and achieve them. By incorporating Bandura's principles into the design of learning environments—emphasizing observation, collaboration, and self-efficacy—educators can create more effective educational experiences that significantly enhance student outcomes in integrated science courses. This alignment with Bandura's theory informs educational practices and provides a framework for improving teaching strategies in Ghana's Colleges of Education.

Methods

The study employed the descriptive survey research design. This design specifies the nature of a given phenomenon, determining and reporting how things are. Descriptive research involves gathering data to answer research questions and test hypotheses on the status of the subject matter. The design was chosen because of the descriptive nature of the study and the use of questionnaires to gather data (Salkind, 2010).

Three colleges were purposively selected as they were the only colleges in the Central Region of Ghana. The study's population was 1,151. The Krejcie and Morgan (1970) table was used to determine the sample size of 290, at a 95% confidence level. The proportionate-stratified sampling technique was further used to select the proportion of students from the colleges (Table 1). Systematic random sampling was lastly used to select

the students from their classes. The sampling processes align with the recommendations by Shahrokh and Dougherty (2014).

Table 1: Sample size calculation

		Sample			
	Population	Male	Female	Total	Percentage
OLACOE	300	-	50	50	17.24
KOMENCOE	345	63	34	97	33.45
FOSCOE	506	95	48	143	49.31
Total	1151	158	132	290	100

Table 1 presents the study population and the sampling procedure to estimate the sample size for the colleges. Male respondents were 158 (54.5%), while female respondents were 132 (45.5%). The respondents selected from the various Colleges: Fosu College of Education (FOSCOE), Komenda College of Education (KOMENCO) and OLA College of Education (OLACOE).

Moreover, the data collection instrument used for the study was a close-ended Learning Environment Inventory (LEI) developed by the researchers. Based on a four-point Likert scale, the questionnaire was structured to collect numerical data and consisted of 48 items. It was divided into sections: Section A measured demographic information, while Sections B, C, and D assessed physical, social, and psychological learning environments, respectively. Section E measured how a positive learning environment could enhance student performance. The performance measures, developed by Integrated Science and Assessment experts, consisted of 30 multiple-choice items each, with an expected average performance of 15 marks. Forty students from the Akrokerri College of Education in the Ashanti Region pilot-tested the questionnaires. It produced a combined Cronbach's Alpha coefficient of .88, which is considered robust and good to use as it has a high internal consistency (McBride et al. 2019). Ethical clearance was obtained from the Institutional Review Board of the University of Cape Coast and permission were obtained from the various colleges of education. The data was collected within a month with a 100% return rate. A written informed consent was obtained from the participants and confidentiality was achieved through pseudo identifiers. The data was analysed using SPSS version 25.0, with research questions answered with means, standard deviations, and hypotheses tested using multiple linear regression.

Results

Learning Environments as Predictors of Academic Performance in Integrated Science

A hypothesis was used to test if colleges' learning environments (physical, social, and psychological) could predict students' academic performance in integrated science courses. Standard multiple regression was deemed appropriate for the analysis. The data met the assumptions of the normality test, linearity, and multicollinearity test (Figure 1.). The data was normally distributed as a diagonal line run through the plot from down-left to up-right. Figure 1(d) showed a linear relationship between the independent and dependent variables, as the scatter plot showed a convergent of cases. This equally cantered for homoscedasticity. Concerning the multicollinearity, the coefficient output of the collinearity statistics produced Variable Index Factors (VIF) of 1.624, 1.088, and 1.58 for the three predictors, falling between 1 and 10. These indicate that there was no multicollinearity observation among the variables.

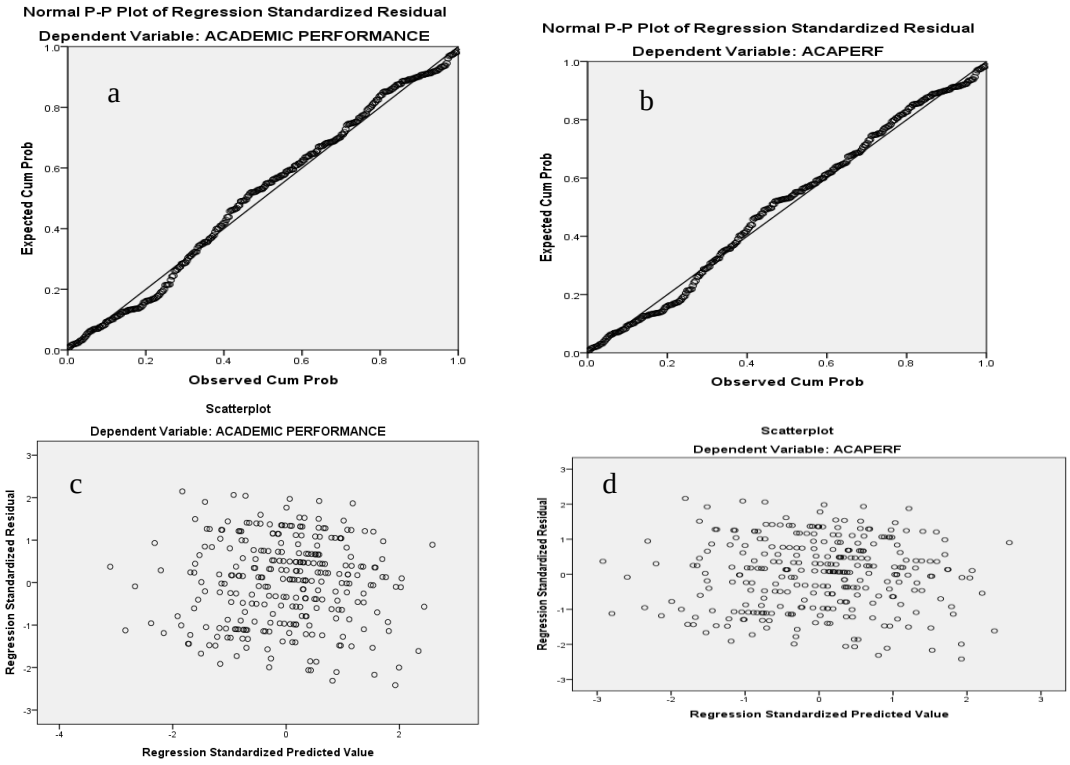

Figure 1: Assumptions test

Table 2: Regression analysis

Test	B	SEB	B	R	T	Sig.	R^2	Ad R^2	F	P
PE	.042	.041	.077	.075	1.022	.308	.009	-.001	.877	.453
SE	-.045	.046	-.060	-.034	-.981	.328				
PE	.019	.057	.024	.057	.325	.745				

*Significant @ 0.05 level

Table 2 indicates the result of regression analysis of colleges' physical environment, social environment, and psychological environment against students' academic performance in integrated science courses. The result showed that the physical environment (r=.075), social environment (-.034), and psychological environment (r=.057) have no relationship with students' academic performance in integrated science courses. The results of the regression revealed that the three predictors (Physical, social, and psychological environments) explained only 0.9% of the variance (R^2=.009, F (3, 286) =.877, p=.453). It was found that physical environment (β = .077, p=.308), social environment (β = -.060, p=.328), and psychological environment (β = .024, p=.745) did not predict students' academic performance in integrated science courses. Considering this, the null hypothesis was not rejected.

Scores in Academic Performance in Assessment and Integrated Science

Table 3 shows how respondents in the sampled colleges faired in the assessment and integrated science courses. It was revealed that the average performance for the two courses was not appreciable. For instance, out of 30 marks for 30 items, respondents performed below average in both assessments (M=14.61, SD=4.75) and integrated science courses (M=14.57, SD=4.73). The below-average performance cannot be attributed to a single factor in the colleges because academic performance occurs because of the constellation of factors that span from teachers to students and the testing situation.

Table 3: Academic performance in assessment and integrated science courses

Average Score=15 marks		
Courses	Mean	SD
Assessment	14.61	4.75
Integrated Science	14.57	4.73

Strategies for Providing a Positive Learning Environment for Improving Student Performance

Table 4 presents student results on how to provide a positive learning environment for the sampled colleges. It was revealed that there was a need for proper furniture arrangement in the lecture rooms (M=3.11, SD=.907), and they also agreed that it was essential to provide teaching and learning materials (M=3.35, SD=.809). Again, it was revealed that teaching and learning materials are made available to both teachers and students for use (M=3.25, SD=.863), and the respondents also affirmed that tutors are equipped with the knowledge and skills in the use of instructional technology (M=2.60, SD=.945).

Table 4. Providing a positive learning environment

	Statement	Mean	SD
1.	There is a need for proper arrangement of furniture in the lecture rooms.	3.11	.907
2.	The provision of teaching and learning materials is very important.	3.35	.809
3.	Making teaching and learning materials available for both teachers and students is essential.	3.25	.863
4.	Equipping tutors with the knowledge and skills to use instructional technology is ensured in my college.	2.60	.945
5.	Solving intra-group conflicts among students and inter-group conflicts between tutors and students is fundamental.	2.86	.894
6.	Improving ventilation and lighting situation in colleges is fundamental.	2.94	.949
7.	The college environment needs to be kept clean all the time.	3.47	.739
8.	Recreational amenities need to be provided and always maintained.	3.52	.752
	Mean of Means	3.012	.857

Furthermore, Table 4 revealed that intra-group conflicts among students and inter-group conflicts between tutors and students were fundamental to providing a positive learning environment (M=2.86, SD=.894), just as improving ventilation and lighting situation in colleges was fundamental to providing a positive learning environment (M=2.94, SD=.949). More so, respondents agreed that college environments need to be kept clean all the time (M=3.47, SD=.739) and recreational amenities need to be provided and always maintained (M=3.52, SD.752). When all these measures are adhered to, the college will look conducive to learning, which could help improve teaching and learning

activities.

Discussion

Influence of Learning Environment on Students' Performance in Assessment Course

The study aimed to test the impact of learning environments, such as physical, social, and psychological environments, on students' academic performance in assessment courses. The study revealed that the physical environment, social environment, and psychological environment had no significant relationship with students' academic performance in assessment courses, and hence, they did not predict students' academic performance in assessment courses. This indicates that their environment did not influence student performance in the colleges. As such, the learning environment cannot be considered a component in assessing college students' performance in the Central Region. This result contradicts the findings of Duruji and Oviasogie (2014), who found that the quality of infrastructure and learning environmental conditions as part of the physical learning environment strongly affect academic performance among students. However, the finding was in line with a statement made by Fuller **(**as cited in UNICEF, 2000), who argued that empirical evidence is inconclusive as to whether the learning environment is related to higher student achievement after considering the student's background.

Moreover, the findings in Table 3 indicate that students in the sampled colleges underperformed in both assessment and integrated science courses, with average scores below the expected pass mark. This suggests that students faced significant challenges in achieving proficiency in these subjects. Such underperformance cannot be attributed to a singular cause but to a complex interplay of factors. Several studies support the notion that academic performance is shaped by a combination of teacher competence, student engagement, and the learning environment (Konold et al., 2018; Amerstorfer & Freiin von Münster-Kistner, 2021; Wang & Hofkens, 2020). Issues such as the availability of instructional materials, teaching methodologies, and student motivation could all contribute to the observed below-average performance. Additionally, the testing conditions themselves may have played a role, as the structure and administration of assessments can influence student outcomes. This multidimensional view is crucial for understanding the underlying reasons for the students' suboptimal results in both courses.

Strategies for Providing a Positive Learning Environment for Improved Student's Performance

Several critical strategies for providing a positive learning environment that could improve student performance are provided in Table 4. One notable suggestion is the

proper arrangement of furniture in lecture rooms, which is essential for creating a conducive environment for learning. A well-organized physical space allows for better student engagement and participation, aligning with the idea that the learning environment significantly impacts academic performance (Barkley & Major, 2020). Additionally, providing teaching and learning materials emerged as a critical factor. When teachers and students have access to essential resources, it promotes active learning and helps students better understand course content (Lombardi et al., 2021). Ensuring these resources are readily accessible can enhance lesson delivery and comprehension, supporting that resource availability is directly linked to student outcomes (Colvard et al., 2018; Adenıran, 2020). The study also pointed out that tutors need to be equipped with knowledge and skills in using instructional technology. Castro (2019) posits that integrating technology in the lecture room increasingly offers more interactive and flexible learning opportunities.

Resolving conflicts within and between student groups and tutors was emphasized as a critical component of a positive learning environment. This aligns with the findings of Putri et al. (2024), which indicate that behaviour management and harmonious relationships are essential for reducing distractions and creating a supportive atmosphere conducive to learning. Improvements in ventilation and lighting were also identified as critical factors, as a comfortable physical environment is closely linked to cognitive performance (Yin et al., 2018; Allen et al., 2016). The study further suggested that cleanliness and maintenance of recreational facilities are essential for fostering a productive learning environment. Ogbeba and Muluku (2016) found that clean college environments influence student achievement in biology courses and performance. A clean and well-maintained environment promotes physical well-being and enhances mental clarity, improving learning outcomes. Providing recreational amenities offers students an outlet for relaxation (Gudaz, 2016; Matsuoka, 2010), helping to reduce stress and promote overall well-being, contributing positively to academic success.

Implications of the Study Results for Special Education

Based on the results of this study, these three implications for special education were drawn:

1. **Limited Influence of Learning Environments**: The results demonstrate that physical, social, and psychological settings do not significantly correlate with students' academic success in integrated scientific courses. To meet the various needs of students with special needs, educators should concentrate on individualized learning strategies and alternative teaching approaches.
2. **Holistic Approach to Learning Improvement**: Given that the performance was below average, it is likely that a variety of interconnected factors, such as

assessment conditions, student motivation, and teacher effectiveness, affect academic outcomes. This emphasizes the significance of a comprehensive strategy for special education that supports learning demands by addressing not only the physical environment but also customized interventions, sufficient teacher preparation, and different assessment methods.

3. **Positive Learning Environment Strategies**: The study results demonstrate the importance of lecture room management styles such as proper lecture room seating arrangement, use of teaching materials, and ensuring a clean and conducive environment. Special educators must create well-resourced learning environment that enhances engagement and accessibility for students with disabilities, to foster better educational achievements. Colleges must provide adequate teaching and learning materials and equipping teachers with the skills to use assistive technologies are essential for addressing the unique needs of their students.

Conclusion And Recommendation

The results of this study show the intricate relationship between the learning environment and student performance in integrated science courses at Colleges of Education in the Central Region. Although the initial hypothesis proposed a considerable influence of physical, social, and psychological environments on academic performance, the findings indicated no meaningful predictive relationship. This suggests that although a supportive learning environment is frequently believed to improve academic performance, its impact may be more complex and interconnected with other elements such as instructional quality, student involvement, and resource accessibility. The subpar performance exhibited by students reinforces the need for a comprehensive strategy for educational enhancement, indicating that environmental factors alone cannot explain academic achievement.

To improve student performance in integrated science education, educational institutions should prioritize establishing a more supportive and resource-abundant learning environment. Essential strategies include the provision of sufficient teaching resources, the optimization of lecture room configurations to enhance engagement, and the equipping of educators with modern instructional resources. Moreover, cultivating constructive relationships among students and between students and educators is essential for mitigating tensions and promoting collaboration. Institutions must prioritize the maintenance of clean and well-ventilated environments to enhance cognitive processes. By adopting these suggestions, institutions can build an environment that supports and actively improves academic outcomes in integrated scientific courses.

Limitations of the Study

A notable limitation of this study is its dependence on a quantitative research approach, which may inadequately cover the intricacies of the learning environment and its influence on student performance. The structured questionnaires enabled systematic data collection but limited the examination of subtle elements such as lecture room dynamics, student-teacher relationships, and individual student experiences. The study's sample was exclusively sourced from three Colleges of Education in the Central Region of Ghana, potentially limiting its representativeness of Ghana's broader educational environment. This geographic constraint limits the generalizability of the findings, as diverse locations may provide distinct educational obstacles and environmental factors that affect academic success.

Author Contributions

Gaisie- Conceptualisation, Data Analysis, Data Collection & Discussion.
Ntoaduro- Analysis & Data Collection
Asamoah-Gyewu- Methods & Analysis
Yeboah- Analysis, Ethics, & Discussion
Inkoom- Data Analysis & Data Collection
Opoku- Literature Review, & Discussion
Attila- Ethics, Literature Review, Visualisation & Principal Investigator
Eshun- Ethics, Literature Review & Visualisation
Mensah- Proofreading, Literature Review, Methods & Principal Investigator
All authors approved the results and contributed to the final manuscript.

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Competing Interest

The authors declare no competing interest in this study and publication.

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Ethics Declaration

The authors of this article declare that this study was conducted following ethical principles of research and that all data collected was used solely for research purposes. Data are available upon reasonable request. Request may be submitted to the corresponding author. The data will not be made publicly available because of privacy and ethical restrictions.

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