

The impact of school learning environment on students' academic performance in senior high schools in the Greater Accra Region, Ghana

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Background of the study

Regardless of geography and time, academic performance is usually construed as one of the main determinants of school and educational success. However, since the advent of education reforms in 1987, there has been a decline in Ghanaian students' performance in senior high schools (SHS). The massive failure has become one of the top challenges in the education system in Ghana. The problem is further compounded by the high number of unemployed SHS graduates due to poor performance in the West African Senior School Certificate Examination (WASSCE). The challenge has generated national debates with calls from government and stakeholders on the need for empirical studies by scholars to provide solutions. However, there are no reported studies on the impact of indicators of school learning environment on students' academic performance. This gap in theory and literature is one of the reasons for this undertaking. The indicators of school learning environment investigated were student-teacher relationships, academic support, school physical and teaching environment. This study also aimed to establish a predictive model about school learning environment indicators on students' academic performance.

The study was done in the Greater Accra Region. The reason for selecting this region was based on the education ministry's report that the Greater Accra Region (GAR) has the highest number of senior high schools in the country (MoE, 2015). Likewise, GAR is the regional and national capital and controls national, social, and economic activities, including education. It is also reported that SHS in the region have better facilities and attract students from all parts of the country with different demographic characteristics (Addae & Oppelt, 2019). Past results in WASSCE also showed that senior high schools in the region performed better than schools in other regions (MoE, 2017; The World Bank, 2017a). This study, therefore, aimed to investigate factors

of school learning environment that influence students' academic performance in senior high schools in the Greater Accra Region, Ghana. The research was also to establish the relationship between various indicators of the school learning environment and students' academic performance and develop a predictive model of students' academic performance using indicators of the school learning environment.

Research objectives

The objectives of the investigation were:

1. To determine the influence of student-teacher relationships on students' academic performance.
2. To establish the influence of academic support on students' academic performance
3. To establish the relationship between school physical environment and students' academic performance.
4. To determine the relationship between the school teaching environment and students' academic performance.
5. To establish the extent to which school learning environment can predict students' academic performance.

Research questions

The following research questions were formulated in line with the objectives:

1. How do student-teacher relationships influence students' academic performance?
2. How does academic support influence students' academic performance?
3. How does the school physical environment influence students' academic performance?
4. How does the school teaching environment influence students' academic performance?
5. To what extent does the school learning environment predict students' academic performance?

Hypotheses

Based on the literature review, the following hypotheses were formulated to be directly and objectively tested:

H1: There is no statistically significant influence of student-teacher relationships on students' academic performance.

H2: There is no statistically significant influence of academic support on students' academic performance.

H3: There is no statistically significant influence of school physical environment on students' academic performance.

H4: There is no statistically significant influence of school teaching environment on students' academic performance.

Methods

The study was quantitative research and used a questionnaire for data collection. This approach was used in this study because it is reliable, objective, and data can be obtained within a short time from a large group of respondents (Choy, 2014). In addition, a questionnaire was used because it was convenient and enabled students to answer multiple questions (Roopa & Rani, 2012). The survey design was adopted to establish how indicators of school learning environment influence students' academic performance. The indicators investigated were student-teacher relationships, academic support, school physical environment, and school teaching environment.

The population of this study was public SHS and students in the Greater Accra Region. The schools were categorised into metropolitan or municipal, while students were grouped into boarders and day based on their residential status. Stratified random sampling was used to obtain a representation of the study population. This technique was used to select the schools. This was done to ensure that participating schools proportionately represented SHS in the region. The first selection grouped all senior high schools in GAMA in four strata. The strata consisted of metropolitan-boarding schools, metropolitan-day schools, municipal-boarding schools and municipal-day schools. The second level was random sampling to select one school from each stratum. This was to enable all senior high schools in the population to have equal opportunity to

be sampled. Schools in each stratum were assigned a number, and the computer-based random number generator programme was used to select a number randomly. Each time a randomly sampled school declined participation, it was taken out and the procedure repeated for a replacement. At the end of the selection process, one from every stratum was selected. Thus, four schools with a population of 3800 students were sampled to participate in the study.

Instrument

A stratified sampling technique was used to select students based on school location, residential status, and year of study. The school location categorised students into metropolitan or municipal while residential status was defined as boarders and day students. The year of study was grouped into one, two and three. Students' selection involved four clusters made up of metropolitan-boarding students, metropolitan-day students, municipal-boarding students and municipal-day students. Each cluster was subdivided into three encompassing metropolitan-boarding students in year one, two, and three; metropolitan-day students in year one, two, and three; municipal-boarding students in year one, two, and three; and municipal-day students in year one, two, and three. The selection generated 12 groups for sampling, and students were assigned numbers in each cluster to enable a computer-based random number generator programme to select participants randomly. A total of 400 students were randomly selected from four senior high schools in GAMA to participate in this research.

Data collection was done using a self-reported questionnaire. This study adapted School Climate Measure (SCM) instrument developed and validated by Zullig et al. (2014). This tool was used to investigate how individual students perceived their school environment in Arizona public schools. The instrument was adapted for this inquiry because it was relevant to my research context. Furthermore, the SCM tool had items that made the self-reporting questionnaire feasible. SCM comprised of positive student-teacher relationships, academic support, order and discipline, and physical environment constructs. The 5-Likert scale of the constructs included strongly disagree (1), disagree (2), neither (3), agree (4), and strongly agree (5). Every construct in the tool consisted of items that it sought to explore. Thus, positive student-teacher relationships focused on teachers' understanding of students' problems, teachers' and staff's interest in students' future, and teachers' availability to attend to students' needs. Academic support constructs centred on

teachers' expectation of students' academic work and the students' confidence in their school. Order and discipline construct looked at school rules and fairness in their application. Physical environment construct focused on school cleanliness and its friendly set-up. The SCM measured a diversely larger population of adolescent in Arizona public schools and was deemed useful to investigate SHS students involved in this research. Hence, the tool was modified to fit the context and objectives of this study.

Students' academic performance was self-reported based on the WAEC grading system. The 9-Likert scale involved the grading system used by the West African Examination Council (WAEC) in WASSCE. SHS in Ghana has adopted the WAEC grading scale to assess students' academic performance. The system consists of grades ranging from A1 for the highest score representing excellent to F9 for the lowest grade. The scale measured performance in core subjects consisting of English language, mathematics, integrated science and social studies. The instrument further described the demographic characteristics of students in section E. Other items in the tool included study programme like general arts, science, home economics, business, visual art, technical and vocational, and year of study as SHS1, SHS2 and SHS3. In addition, data on students' residential status, whether boarding or day, and parents' level of education were collected. Piloting was done in June 2018 involving 50 SHS students in Accra to test the instrument's reliability and assess students' interpretation of items.

The data from this study was carefully recoded to preserve vital details. The anonymity of participants was enhanced to adhere to principles of confidentiality. The study referred to the schools by letters A, B, C, and D. The dependent variable was students' academic performance, which was the average of students' scores in the four core subjects. This was in line with multiple regression requirements where only one continuous dependent variable can be regressed on several independent variables (Wampold & Freund, 1987). The analysis of data was at a 95% confidence level ($\alpha = 0.05$). Adequacy of the sample for principal component analysis was determined using the Kaiser-Meyer-Olkin Measure (KMO) and Bartlett's Test of Sphericity (Maskey et al., 2018). The principal component analysis was used to reduce the number of items of the various constructs and retain only those responsible for the highest variation. The objective of factor analysis is to regroup data into non-overlapping clusters for the sole purposes of understanding and interpreting relationships and patterns easily (Yong & Pearce, 2013). Only those components with eigenvalues

greater than 1 in the total variance explained were retained for further analysis. Factor analysis dropped constructs that were found to have no significant influence on indicator variables.

The data was also subjected to the requirements of linear regression. This was the final stage of data preparation and evaluation, without which the validity of the results would be compromised. Kolmogorov-Smirnov test of normality was conducted. Autocorrelation determined the degree of correlation between the same variables' values across different observations in the data. Durbin-Watson test statistics was used to test for the absence of auto-correlation. Variance inflation factor (VIF) analysis was used to test for multicollinearity. Pearson correlation coefficient was used to establish relationships among the variables. A multiple linear regression model was fitted between the independent variables (school learning environment indicators) and the dependent variable (student academic performance). A normality test was done to confirm the suitability of the data for multiple regression analysis. The analysis of variance (ANOVA) was done to test the hypothesis. The null hypothesis was rejected for all the indicators of school learning environment whose p -values of the test were less than 0.05. The regression coefficient analysis was done, and unstandardised coefficients were used to develop the predictive linear regression model. Statistical Package for Social Sciences (SPSS) version 26 was used for data analysis.

Results

This study assessed how indicators of school learning environment influenced SHS students' academic performance in the Greater Accra Region. The indicators that predicted students' academic performance included student-teacher relationships, academic support, school physical environment and school teaching environment. Pearson product-moment correlation analysis provided evidence of relationships between the predictor variables and the dependent variable. The study showed strong positive relationships between indicators of the school learning environment and students' academic performance.

The analysis of variance (ANOVA) tested the null hypothesis that school learning environment indicators had no significant influence on students' academic performance. The results showed that the p -value of indicators of school learning environment was less than 0.05.

Based on the result, the null hypothesis was rejected. This implies that school learning environment indicators had a significant influence on students' academic performance.

The multiple linear regression analysis established a predictive model of students' academic performance. The finding showed that the multiple regression correlation coefficient was 0.845. This coefficient confirmed a strong positive correlation between the school learning environment (predictor variables) and students' academic performance (independent variable). The R^2 showed that 71.5% of variations in the regression model were accounted for by indicators of the school learning environment. The values of R^2 (0.715) and adjusted R^2 (0.711) demonstrated that indicators of school learning environment accounted for significant variations in students' academic performance. Other factors that affect performance but were not incorporated in this model accounted for 28.9% of students' academic performance variations. Therefore, students' academic performance in SHS can improve when the school learning environment indicators are enhanced.

Linear regression modelling coefficients of school learning environment indicators were used to predict students' academic performance. Unstandardised coefficients of school learning environment indicators were used to formulate the linear regression model while retaining the measurement for predictor and dependent variables. A unit increase in any of the indicators holding other independent variables constant had a unit increase on the dependent variable. The results showed that the constant term or Y -intercept was 0.35. This model's contribution to the dependent variable is 0.35 when all predictor variables are zero. All indicators of school learning environment were positively correlated with students' academic performance. This implies that a unit increase in any of the indicators of the school learning environment increases students' academic performance.

The study also found that the school teaching environment accounted for 34.8% of the regression model. Similarly, the school physical environment contributed 18.5% to the regression model, while 17.4% of the regression variance was attributed to academic support. Finally, student-teacher relationships contributed 15.9% to the regression model. Therefore, the linear regression was used to develop a model for predicting students' academic performance in senior high schools in the Greater Accra Region.

$$Y_i = 0.350 + 0.159X_1 + 0.174X_2 + 0.185X_3 + 0.348X_4 + \varepsilon_i$$

Where Y_i is academic performance, X_1 is student – teacher relationships,

X₂ is academic support,

X₃ is school physical environment and X₄ is school teaching environment.

This model can predict students' academic performance based on indicators of the school learning environment. The equation implies that when other factors are constant, every unit change in student-teacher relationships, students' academic performance increases by 15.9%; likewise, for every unit change in academic support, students' academic performance is enhanced by 17.4%; for every unit change in school physical environment, students' academic performance improves by 18.5%; and for every unit change in the school teaching environment, students' academic performance increases by 34.8%. The model demonstrated that the school teaching environment accounts for the highest contribution in students' academic performance among all indicators of the school learning environment.

Conclusions

This study investigated how student-teacher relationships influence students' academic performance. The null hypothesis that there was no statistically significant association between student-teacher relationships and students' academic performance was rejected. The findings showed that student-teacher relationships significantly influence students' academic performance in senior high school (SHS). The study found that teachers who took time and listened to challenges that students encountered beyond the coursework impacted students' performance positively. This study also extrapolated that positive student-teacher interactions are developed when teachers are interested in students' future aspirations. Students are motivated to study when teachers exhibit good interpersonal relationships with them. For a positive relationship to exist, teachers have a vital role to play by showing concern for students' work and being available to assist. Student-teacher relationships, therefore, represent the social context where learning occurs and is an essential factor for improving students' academic performance, as reported by Spilt et al. (2011).

This research also explored how academic support influenced students' academic performance and hypothesised no statistically significant relationship between academic support and students' academic performance in SHS. The results showed that academic support substantially influenced students' academic performance. The hypothesis was therefore rejected.

This study found that academic support provided by teachers and parents influenced students' academic performance significantly. This research also demonstrated that teachers promote students' academic independence and learning culture through assignments and homework. Homework improves retention and problem-solving skills, including learning habits that promote academic performance, as reported by Bempechat (2004). The study demonstrated that when parents are involved in children's academic progress, it motivates them to improve their academic performance.

This investigation was to establish how the school physical environment influence students' academic performance. The null hypothesis is that no statistically significant relationship between school physical environment and students' academic performance was rejected. The research found that the school physical environment impacts students' academic performance in SHS positively. Findings also showed that school furniture and school safety were aspects of the school physical environment that significantly influenced students' academic performance. The inquiry found that school infrastructure provides a favourable atmosphere for learning and enables students to focus on learning activities. This finding supports Alimi et al. (2012), who found that the quality of school facilities positively influenced students' academic performance. This investigation, therefore, demonstrated that school infrastructure and safety are essential dimensions of the school learning environment. The findings showed that when students learn in a safe school environment, they are motivated to attend school and regularly participate in learning activities. Thus, school safety promotes effective learning while a well-organised school physical environment facilitates effective teaching and learning that enhances students' academic performance.

The study also investigated how the school teaching environment influences students' academic performance. The research rejected the null hypothesis that there is no statistically significant relationship between school teaching environment and students' academic performance. The study found that the school teaching environment was the most significant factor influencing students' academic performance in SHS. School teaching environment consisted of school technical and instructional environment. This inquiry established that integrating information and communication technology in teaching and learning is vital for quality learning outcomes. The study found that e-learning facilities enhanced students' academic performance. This research also established that instructional approaches impact significantly on students'

academic performance. The study showed that teaching methods enable teachers to engage and sustain students' interest in learning.

Additionally, this investigation explored the extent to which the school learning environment could predict students' academic performance. This study found that school learning environment factors cumulatively contributed 71.1% of variations in students' academic performance. The finding implies that students' academic performance in senior high schools in Ghana could be improved by enhancing the school learning environment. This study showed that decline in students' academic performance in SHS could be attributed to student-teacher relationships, academic support, school physical environment, and school teaching environment. The findings provide insight into the overarching challenges of students' poor academic performance.

Implication and suggestion

This study showed that the school learning environment indicators influenced students' academic performance significantly. The predictive model of the school learning environment also found that with other factors constant, every unit change in the school teaching environment causes the highest increase in students' academic performance. Thus, the school teaching environment has the most significant influence on students' learning. The model also demonstrated that a unit change in any of the indicators causes an increase in students' academic performance. The study found that the school learning environment indicators cumulatively affected students' academic performance by 71.1%. By implication, this study concludes that current trends of decline in students' academic performance in the West African Senior School Certificate Examination is caused by the poor quality of the school learning environment.

The findings of this research provide evidence-based solutions to stakeholders in education and the research community in addressing the decline in Ghanaian students' academic performance in SHS. Given the empirical evidence shown by this study, some proposals to inform policy and education practices are suggested. These include:

1. Ministry of Education should consider appointing academic advisors in senior high schools. The academic advisors are to support students' learning needs and collaborate with teachers and parents to improve the school learning environment. This study

demonstrated the central role of the school learning environment in improving students' academic performance. Therefore, academic advisors can be teachers assigned to individual students or a group of students to promote positive student-teacher relationships. The position of an academic advisor should be anchored in the management structure of senior high school. Ghana Education Service may have a supervisory role over the activities of academic advisors. The policy should also incorporate systems and procedures that facilitate mutual interactions between parents and school academic advisors to encourage effective parental involvement in PTA activities.

2. This study recommends the establishment of a national education infrastructure policy for senior high schools in Ghana. The policy aims to address current inequalities in school infrastructures. The government of Ghana should allocate more resources to finance senior high schools' infrastructural development. For effective implementation, the policy should clearly state the government's commitment to providing appropriate school physical infrastructures such as classrooms, furniture, sanitation, and ICT facilities to improve teaching and learning processes. An independent body should manage the policy to ensure equity, fairness, accountability, and probity.
3. A policy that mandates Ghana Education Service to undertake a structured professional development programme for senior high school teachers should be instituted. This programme will ensure continuous professional training for teachers to update their pedagogical skills on various subject areas and issues affecting students' academic performance. The training should include effective teaching approaches that can enhance the school teaching environment and students' academic performance. The continuous professional teacher training programme can be placed under the University of Cape Coast and University of Education, Winneba. These two universities are primarily institutions of teacher education and can use evidence-based research findings to guide teachers' professional development in Ghana.

The various policy recommendations are drawn from the findings of this study. Implementing these policies can significantly improve the school learning environment, teaching and learning in SHS, including academic performance.

Limitations

This study did not include parents due to financial constraints. The students involved in this study were admitted to the various senior high schools through the Computerised School Selection and Placement System (CSSPS). CSSPS selects students on merit across all geographical regions of the country. Therefore, it required enormous financial resources to collect data from parents. Greater Accra Region comprises two metropolitan areas, Greater Accra Metropolitan Area (GAMA) and Tema Metropolitan Area (TMA). The study was conducted in GAMA. TMA was not included in this investigation due to time limitation. Time challenges comprised of university academic schedule and vastness of study setting. The two metropolitan areas that constitute the Greater Accra Region cover a vast landmark that requires time.

School administrative bureaucracy impeded the inclusion of senior high school teachers in this study. The bureaucracy was as a result of complex organisational protocols. Teachers' apprehension further compounded the challenge about the study findings and implication for their job security. This made it challenging to recruit teachers to participate in the study. Also, in some cases, school authorities were suspicious of the research purpose and became uncooperative.

Future research direction

This study explored the influence of indicators of the school learning environment on students' academic performance to provide solutions to the current trend of low academic performance in Ghana. The model showed the contributions of the various indicators to academic performance and formed the basis for the following suggestions on future research direction.

- I. The highest variation in students' academic performance in senior high school is accounted for by the school teaching environment, as shown by the linear regression model's coefficients in this study. Teachers play a crucial role in a school teaching environment. Chetty et al. (2014) found that teachers contribute substantially to students' academic performance in secondary school. Teacher training processes are essential for quality learning outcomes. Therefore, future research can investigate the effect of senior high school teacher training practices on students' academic performance.

- II. Academic support contributes significantly to students' academic performance in senior high school. This study highlighted parental participation in learning activities as a significant component of academic support. The 2002 education review in Ghana established a legal framework for *parent-teacher-association* to enable effective parental involvement in students' learning activities, including school management (MoE, 2003). However, Chowa et al. (2013) reported that parental involvement in students' academic activities in Ghana is low. Therefore, there is a need to investigate factors that impede parental participation and develop a model for effective parental participation in senior high school.
- III. Information communication technology (ICT) is vital in the school teaching environment, as demonstrated by this study. The factor analysis of the school teaching environment illustrated the role of ICT in the school teaching environment. For instance, ICT related items had a cumulative variance of 42.4% in this construct. Pradeep et al. (2016) posited that ICT integration in teaching approaches enhances learning outcomes. However, Agyei (2013) postulated inadequate integration of ICT in secondary school teaching and learning. Difficulties associated with ICT implementation in education in Ghana may evolve from complex factors that require empirical evidence. Thus, future studies can consider the complexities of the effective inclusion of ICT in the secondary education system in Ghana.

List of publications connected to the dissertation

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