

Infrastructural Challenges and Student Academic Performance: Evidence from a Developing Nation

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Abstract:- A school's infrastructure reflects its curriculum and co-curricular activities. Using constructivism and production theory, the study examined how school infrastructure affects academic achievement in four Ghanaian senior high schools. The study obtained data using interviews and questionnaires. The survey revealed that schools required sports fields, music rooms, church halls, mosques, and theatres. The study found that schools required additional dorms and bathrooms. The research uncovered that schools require updated classrooms, roomy scientific labs, and more co-curricular activities beyond outdoor games and computer labs. The study also indicated that learning, boarding, and co-curricular infrastructure improved student achievement. The interviews showed that SHS teachers believed school infrastructure improves academic achievement. The study suggests building and positioning school structures well and stocking and expanding school laboratories to serve all pupils to increase academic performance. To facilitate subject instruction, the school's ICT lab needs extra computers and supplies.

Keywords:- *Infrastructural Challenges, Academic Performance, Senior High Schools, Mixed Methodology.*

I. INTRODUCTION

It is generally agreed that education is the essential building block for societal, economic, scientific, and technological progress [1]. Education is a highly important factor that plays a significant role in determining a person's life opportunities, and this factor is present in both developed and developing countries [2]. Schooling is seen as valuable in and of itself, in addition to its economic value, and is considered a fundamental human right concerning the elementary and secondary levels of education [3]. According to [4], in addition to its importance for the country's economic and social growth, education is equally significant. An education of appropriate quality has to be supported by an adequate infrastructure to achieve optimum production. This is necessary to maximize productivity. The most efficient educational environments have full infrastructures [5], which will enable a variety of teachers to deliver efficient instruction while also facilitating the teaching and learning process sufficiently [4]. This has the potential to improve the academic

achievements of the students in every possible way. In addition to the requirement of having an interest in education, one of the variables that can boost school performance is a school infrastructure that is adequately equipped [6]. A considerable number of substandard school infrastructures in rural, urban, and suburban regions constitute a hindrance related to students' academic success [7], [8]. If education changes are to be successful, it is imperative that those with a stake in the field advocate for innovative approaches to both instruction and student engagement. Examples of excellent teaching and learning styles include the provision of well-equipped labs and libraries, as well as effective classroom settings. Also, according to [7], to ensure that children have the best possible academic performance, the infrastructure of schools should be maintained regularly. To provide today's formal education instructions in Africa, there has to be a greater level of school infrastructure. The accessible educational infrastructure at a specific school has a significant impact on the academic success of students enrolled there [5], [9]. This suggests that the school that has complete school infrastructures and is well equipped delivers greater academic performance for its pupils than the school that does not have complete school infrastructures and is well equipped. In addition, factors like furniture, the quality of the air within the building, and the number of students in each class are significant infrastructure-related variables that influence the effectiveness of teaching and learning [5]. To varying degrees, education in Ghana is funded and supplied by the state, local communities, individual families, for-profit businesses, and non-governmental organizations (NGOs). According to Graham (2013), beginning at age six (6), students can enroll in school for a total of twelve (12) years. This breaks down to two (2) years in kindergarten, six (6) years in primary, three (3) years in junior high, three (3) years in senior high, and four (4) years in tertiary (2-6-3-3-4 system). This analysis of the state of education in Ghana aims to fill in some of the gaps in our understanding by illuminating major problems with enrolment, summing up the results of previous studies, and pointing us toward new avenues for investigation [10]. Access to basic education has been catered for by the free SHS (FSHS) policy which was instituted a few years ago. Nevertheless, the infrastructure challenges in SHS in Ghana persist [11]–[13]. The adoption of free secondary education is a step in the right direction, but this good development has to be backed up with additional capital expenditures to meet the

growing number of students. Fundamental school social initiatives such as capitation grants and school nutrition revealed that increased enrolment did not lead to high retention and completion rates, but rather high dropout rates [14]. Even though there were more students at school, these teachings still managed to get through to them. To remedy this, the FSHS strategy should prioritize improving the standard of education offered by SHSs. More infrastructure, textbooks, furnishings, and trained educators can help achieve this goal. [4] note that inputs into higher education and the Ghanaian labor force depend on competent outputs from secondary schools, further demonstrating the importance of secondary education as a sub-sector. With the continued declining performance in secondary schools in Ghana, most educationist and education stakeholders have outlined a vast number of probable causes including inadequate training of teachers, frequent curriculum changes, and inadequacy in the teaching and learning materials including laboratories and poor or inadequate school structures including classrooms and toilets [15]–[18]. Many factors are the due causes of the situation, it is clear that inadequate school infrastructures have been proclaimed one of the major reasons for the declined academic performance in Ghana [14], [15], [19]. Education does not take place in a void but rather in a setting that is composed of physical infrastructure and a collection of material resources that are utilized in the process of teaching and learning [8]. The laws and regulations that control the educational system in the nation prescribe the requirements that must be met for the formation of public secondary schools, as well as the management of those institutions and the provision of material resources. The purpose of the infrastructure system in secondary schools is to raise the number of students who show up to class, boost the morale of teachers and administrators, and improve students' academic performance [20], [21]. There is a connection between the design of a school and the pupils that attend it (students and teachers). A school that is well-planned and provides a learning environment that is clean and safe has been proven to be significant for academic progress [22], [23]. The quality of overall performance on examinations and the achievement of the school's stated goals are directly correlated to the quality of the school's physical facilities [23]. Public secondary schools are frequently characterized by a lack of infrastructural amenities such as suitable classrooms, latrines, hostels, dorms, and labs. This is especially true of public secondary schools in Ghana [24], [25]. While focusing on those common grounds for the prevalence, some educationists have suggested the construction of more classrooms and laboratories as the solution to the problem [25]. However, according to [24] while still very confined to their narrow definition of infrastructures, some have identified a supply of adequate teaching and learning materials as the important solution to the prevailing problem. Yet, besides the plans and strategies identified, the problem has kept escalating. While the problems persist, very little has been done to explore the contribution of school infrastructures to students' academic performance in the country. Therefore, this study is being conducted to explore infrastructural challenges and their impact on Senior High School students' academic performance in Ghana.

II. LITERATURE REVIEW

A. Constructivism theory

John Dewey developed constructivism [26]. Real-world connections in the classroom help students and teachers learn and share. This activity was meant to benefit both parties, according to constructivist psychologists [27]. This study used constructivist theory since it shows how to increase academic achievement by minimizing the impact of several factors. As constructivist viewpoints demonstrate, pupils' interactions with their surroundings generate cognitive structures that form their knowledge. Constructivist ideas suggest that these cognitive frameworks should always be updated and integrated to meet environmental and changing organism demands [28], [29]. Teachers should take steps to help students accept learning circumstances, organize lessons, and become academically self-directed. This will help students develop social skills and self-regulation [30].

B. Production theory

According to production theory, for an organization to effectively operate, it needs the bare minimum of organizational resources invested, which will result in the greatest possible output [31]. As a result, this study was carried out because it demonstrates that the degree of student academic performance can be dependent on the number of suitable school infrastructures. According to [5], the factors that affect educational results include the student attitude, the instructor, and the environment. This suggests that the outcomes of the students, also known as students' academic achievement, are produced owing to the efficient management of the learning environment.

C. School Infrastructure

Buildings, playgrounds, ICT devices, and educational materials assist students and staff achieve their goals [32]. [33] describe infrastructures as buildings that make learning safe. Classrooms, labs, workshops, teacher offices, janitors' closets, reading rooms, dispensaries, libraries, cafeterias, and gymnasiums are covered. Schools' infrastructure is its buildings. The community can utilize all school buildings. "School plants" refers to the institution's physical infrastructures [34]. This shows that the school's physical plants should be carefully assessed, as students lack the basic skills needed to apply what they've learned. The learning environment, especially in terms of students' ages and results, which are the results of their learning, should be linked [35], [36]. The quality of the school buildings and the capacity to give an effective education despite historical changes present unique possibilities for understanding how and why good educational accomplishment and improving school infrastructures should be prioritized [35]. [37] found that poor classrooms, libraries, and labs affect student performance the most. School location, parent participation, and socioeconomic level may also affect these aspects.

D. Importance of school infrastructure in education

Classrooms, libraries, labs, and staff housing increase the physical learning environment in terms of preliminary technical abilities and the development of quality and suitable school elements [33]. Housing instructors and students

according to the school environment would improve student performance by allowing professors to deliver customized courses, such as remedial teaching, as needed [38]. Cleanliness inspires and improves academic performance. Garbage disposal, drainage, appropriate water for personal hygiene, clean restrooms, and other school facilities might impact cleanliness [5]. [8] say a school's physical elements reflect its academic and extracurricular offerings. School infrastructure determines classroom size and shape. The classroom's size, layout, and educational tools determine how students are taught. Science majors cannot take practical classes without scientific laboratories [1]. Parents and other educational stakeholders' opinions on school quality influence school infrastructure and behavior [3]. The quantity and mix of components that make school infrastructure management efficient determines how well school administrators may achieve organizational goals [7].

E. Infrastructure challenges in schools

Technology integration in schools is difficult owing to a shortage of equipment, internet, electricity, and teacher training [39]. Thus, educational institutions must assess current situations and supply technology-related equipment for better instruction. [5] indicate increased secondary school enrollment. Due to inadequate school infrastructure renovations, classrooms with more than 74 students are overcrowded. More kids need materials, informational resources, physical resources, and textbooks because school infrastructure helps pupils learn. [40] report that Sub-Saharan African secondary schools perform poorly and governments cannot reach secondary education targets. The economy is affecting school infrastructure, which is essential to teaching and learning, according to [41]. The quality of the learning environment is a crucial factor in students' performance. Resource management in education improves student performance [25]. Thus, a school administration committed to student success should collaborate with central and local governments to create, remodel, and repair school infrastructure [2].

F. Academic performance of students

Classrooms, libraries, bathrooms, and other school facilities, together with student involvement in class, assignments, and exams, affect academic success [42]. When parents, teachers, and administrators urge a school to boost test results, it adopts more innovative practices like incorporating research on how children learn best into classroom instruction and giving academic rewards. The school also improves academically [42]. In class, lecturers convey various intellectual ideas. Clean and organized classrooms are crucial [43]. A teacher's classroom management depends on how well they organize, deliver, and assess lessons, instructional methods, and course material. This helps kids learn more and achieve better in school and keeps the classroom operating smoothly and successfully [44]. To boost academic performance, school books should be updated, learning materials, handouts, and technology should be readily available, and well-organized library and laboratory facilities, especially in science, should be present [44]. Students use libraries for textbooks, reference materials, and contemporary labs. The goal of elementary and secondary school is to lay the

groundwork for higher education, and if a solid foundation is laid, there should be no problems in higher education [42], [45]. According to [25], kids' poor performance in senior high school has been blamed on them owing to low retention rates, parental situations, bad friends, and low achievement. [46] defines poor academic performance as below standard. Include other key aspects. According to [25], academic failure not only depresses students and their parents but also harms society as a whole by reducing the number of individuals in business and government. Academic failure may be caused by internal and external causes. Social contact, teachers, and educational techniques are external variables [45]. The child's mental health and development may also contribute to problems at home.

G. Empirical review

[47] studied Latin American "school infrastructures and education results." Data was collected using questionnaires and an interview guide. Paul found that school libraries and new schools increased learning and enrollment. After showing that hygienic facilities boost students' capacity to study to suit their demands, he proposed that labs and potable water promote enrollment. [48] studied school physical plants in Africa. The researcher used descriptive survey research to acquire data. The researcher also used a systematic questionnaire and an interview schedule. The study found that acceptable school physical plants include well-structured playgrounds, equipped classrooms, and school administration and instructional staff. Schools have well-equipped libraries and labs. However, the study found school plants inadequate. [42] studied academic performance determinants in South Africa. Data was collected via a guided interview and instructional documents. The study found that school atmosphere, location, and amenities affected pupils' academic performance. [49] used a Nigerian case study to evaluate how school infrastructure affects student success. The study indicated that school amenities support secondary education but did not improve students' academic achievement, particularly in classrooms. [50] evaluated Pakistani elementary school headmasters' infrastructure optimization and teaching methods. Qualitative research was descriptive. Interviews, observation, and document analysis acquired data. Due to a paucity of classrooms, headmasters split classes into morning and evening sessions to improve teaching and learning. The study suggested that teachers and stakeholders work together to improve school facilities to improve learning. If infrastructure isn't maintained, free education can overcrowd classrooms. Students need more classrooms to reduce congestion. [51] examined the costs of rebuilding school infrastructure owing to free education, which boosted enrollment. Schools needed infrastructure financing from parents. Massive enrolment will pressure a country with limited resources, decreasing education quality. The government and stakeholders should improve educational infrastructure, especially classrooms, to accommodate increased enrollment. Buildings aid academic performance. [52] examined Kenyan secondary school project managers. The poll found school leaders overloaded by poor initiatives and resource exploitation. The Teachers' Service Commission has serious concerns (TSC). The research recommended that the ministry of education train school leaders in project,

finance, evaluation, and monitoring. [53] insisted that Kenyan secondary schools lack facilities. Most secondary schools lacked infrastructure and instructional facilities, affecting education quality. Government facilities should boost public school education. [54] studied Kenyan public school head teachers. The descriptive study included questionnaires and scheduled interviews. Insufficient infrastructure impacted the academic progress of school leaders. Headteachers battled to improve academic success and discipline management practices. By providing proper school facilities, stakeholders may improve public secondary school performance without relying on government money. [55] investigated community secondary school access and quality in Kilolo District, Iringa Region, Tanzania. The findings indicated that community school heads lack teaching and learning materials and school infrastructure. Learning resources and teacher-student ratio affect secondary school academic achievement. Thus, secondary schools need labs, libraries, and classrooms for effective learning. Such amenities would boost student performance.

III. METHODOLOGY

A pragmatic paradigm was adopted for this study. Within this paradigm, the results and questions of the study are prioritized over the procedures used to obtain those results [56], [57]. The concept that knowledge must always be founded on experience and that one's views of the world are shaped by one's social experiences is one of the tenets of pragmatic philosophy. Relying on the pragmatic paradigm led to the usage of the mixed methods research design. According to [57], mixed methods can blend data sets to improve issue understanding and evidence. Students and teachers of Senior High Schools in four Senior High Schools in Ghana served as the population of the study. Qualitatively, the researcher needed instructors as respondents, hence purposive sampling was used [58]. This selection process ensures that the sample units are representative of the population being studied [59]. Quantitatively, the selection of respondents was done using the convenience sampling technique. This method of sampling is easy to use and doesn't introduce any bias in the results [60]. Also, students who were ready to partake in the study were contacted. The study sampled 1580 students from Senior High Schools in the southern belt of Ghana. This study relied on primary sources for its data collection. The research topics are kept in mind while collecting primary data, and it was done directly from the persons being studied. In data collection, teachers were interviewed about infrastructure issues and how they affect student performance. The interview guide was structured in three headings. The first is the probe questions where teachers were asked questions to set the grounds for the main interview to begin. Questions like the age of the teacher, educational qualification, and teaching experience were asked. The next heading is the follow-up questions. These questions were based on the objectives of the study. Finally, the exit questions were asked to ensure that nothing was missed during

the interview [58]. As the interviews were utilized for the collection of qualitative data, time was set out in the timetable to conduct the interviews. Interviews were conducted with a subset of the various school faculty members who had participated in the survey. The interview lasted between 30 minutes to an hour in total. After being taped, the interviewees' comments were then transcribed. Quantitatively, students completed a standardized questionnaire. These questions are, by their very nature, limiting, and each one may be responded to in just a few words. The questionnaire has five components (A – E). The first section included respondent demographics. Learning, boarding, and co-curricular infrastructure were the second, third, and fourth sections, respectively. Students' academic performance related to school infrastructure is covered in the fifth part. The questionnaire asked students how infrastructure affected their academic performance. Students were sampled to answer the questionnaire that was structured. The researchers went to their classes and personally administered the questionnaire to the students. The students were chosen at random from the two class groups in each school to respond to the questionnaire. The responses took about 15-20 minutes. The researchers collected the questionnaires from the student's right after they finished answering. The interviews were transcribed word for word, including all of the specifics. Following the process of editing, coding, and categorizing the obtained data into themes, distinct replies were assigned different colors and highlighters. The data from the interviews were analyzed using the thematic framework developed by [61]. Quantitative data were analyzed using SPSS version 23. Data analysis employed descriptive statistics and other inferential statistical methods. Pearson's correlation analysis and regression analysis examined the association between infrastructural issues and students' academic achievement. The researchers conducted themselves in a highly professional manner when interacting with the people who took part in the study. The participants were received on time for the data collection, and they were respectfully reminded during the interview sessions when they were straying from the subject that was being asked, among other things. They were told that their involvement would be a significant asset to the research effort, and they agreed to take part. The participants were fully informed of their role in the study before choosing to participate. Participants in the study were not identified by name at any point during the course of the research.

IV. DATA PRESENTATION AND ANALYSIS

This section presents the data collected from teachers and students from the southern belt of Ghana. This section is presented quantitatively and qualitatively.

A. Quantitative presentation of data

Reliability, descriptive and inferential statistics of the data collected from students are presented in this section.

TABLE I. RELIABILITY STATISTICS

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.994	.993	37

Source: Field study (2022)

Table I shows that the data's Cronbach Alpha value is 0.993, higher than the allowable 0.7. The research instrument is dependable, accurate, and suitable for further study.

TABLE II. STATUS OF LEARNING INFRASTRUCTURE

	N	Min	Max	Mean	Std. Deviation
Classrooms	1580	1	5	3.03	1.432
Laboratories	1580	1	5	3.44	1.306
Libraries	1580	1	5	3.28	1.159
Pre-tutorials rooms	1580	1	5	3.25	1.422
Home-science rooms	1580	1	5	3.16	1.183
ICT Lab	1580	1	5	3.32	1.387

Source: Field study (2022)

Table II summarizes the respondents' school infrastructure data. The majority of respondents said the learning infrastructure is acceptable and extremely adequate since all statement mean values were more than 3.0. They were unavailable and extremely insufficient for a minority of respondents.

TABLE III. AVAILABILITY OF LEARNING INFRASTRUCTURE IN THE SCHOOL TO STUDENTS

	N	Min	Max	Mean	Std. Deviation
Our learning classrooms are spacious enough	1580	1	5	3.28	1.212
We perform science practical in our lab often	1580	1	5	3.32	1.432
The school library is always available to students	1580	1	5	3.16	1.183
We can have computer classes in our lab	1580	1	5	3.25	1.422
Our school library is equipped with all kinds of books	1580	1	5	3.35	1.170
We have enough classrooms	1580	1	5	3.09	1.266
Our ICT lab is well equipped and available to us always	1580	1	5	2.97	1.318

Source: Field study (2022)

Table III summarizes respondents' school learning infrastructure data. The mean values of all items except one were larger than 3.0, indicating that most respondents agreed and strongly agreed with the questionnaire questions about student access to learning infrastructure. This reveals that highly agree and agree replies outnumbered strongly disagree and disagree ones.

TABLE IV. STATUS OF BOARDING INFRASTRUCTURE

	N	Min	Max	Mean	Std. Deviation
Dormitories	1580	1	5	3.25	1.508
Dining halls	1580	1	5	3.28	1.263
Sanitation blocks	1580	1	5	3.09	1.451
Water facility	1580	1	5	3.25	1.508
Quality beds in dormitories	1580	1	5	3.32	1.432
Bed spacing in dormitories	1580	1	5	3.38	1.349

Source: Field study (2022)

Table IV summarizes respondents' data about the school's boarding infrastructure. Most items had mean values above 3.0, indicating that most respondents thought the boarding infrastructure was good and extremely adequate. They were unavailable and extremely insufficient for a minority of responders.

TABLE V. BOARDING INFRASTRUCTURE IN THE SCHOOL

	N	Min	Max	Mean	Std. Deviation
We have well-structured dormitories	1580	1	5	3.22	1.522
Our dining hall is located in a good spot on campus	1580	1	5	3.16	1.284
Our toilet and bathrooms are well-structured and neat	1580	1	5	3.31	1.518
We have adequate dustbins on campus	1580	1	5	3.03	1.432
We have a good flow of water on campus	1580	1	5	3.51	1.400
The bed system and spacing in our dorms are good	1580	1	5	3.44	1.353

Source: Field study (2022)

Table V summarizes student responses on the school's boarding facilities. The mean values of all items were larger than 3.0, indicating that most respondents agreed and strongly agreed with the questionnaire questions about student boarding infrastructure availability.

TABLE VI. CO-CURRICULAR INFRASTRUCTURE

	N	Min	Max	Mean	Std. Deviation
School field	1580	1	5	2.87	1.370
Music rooms	1580	1	4	2.21	.942
Assembly hall for church services and space for mosque	1580	1	5	2.72	1.403
Theatre rooms	1580	1	4	2.08	1.024
Physical education infrastructure	1580	1	5	2.84	1.284

Source: Field study (2022)

Table VI summarizes respondent data on school co-curricular infrastructure. Most statements had mean values below 3.0, indicating that the schools lacked co-curricular infrastructure. They were available and extremely adequate for a minority of the students.

TABLE VII. STATUS OF CO-CURRICULAR INFRASTRUCTURE

	N	Min	Max	Mean	Std. Deviation
I read textbooks from library while preparing for my examinations.	1580	1	5	2.81	1.385
My performance in last term examinations has been improved due to the use of school laboratories which is well stocked.	1580	1	5	2.81	1.292
I performed well in class assignments because I read books from my school library	1580	1	5	2.75	1.352
Dining hall well cleaned in my school influence students' participation.	1580	1	5	2.87	1.323
Improved class participation in my school is due to the available adequate sanitation facilities.	1580	1	5	2.75	1.352
Adequate playgrounds in my school influence students' class participation.	1580	1	5	2.97	1.364
Adequate ICT facilities in my school influence students' class participation and performance.	1580	1	5	2.91	1.429

Source: Field study (2022)

Table VII summarizes student responses on how infrastructure affects academic success. The mean values of all assertions were less than 3.0, indicating that most respondents disagreed and strongly disagreed with the questionnaire's statements about infrastructure's effects on kids' academic achievement.

TABLE VIII. PEARSON'S CORRELATION

		LI	BI	CI	SP
LI	Pearson Correlation	1	.982**	.754**	.855**
	Sig. (2-tailed)		0.000	.000	0.000
	N	1580	1580	1580	1580
BI	Pearson Correlation	.982**	1	.824**	.866**
	Sig. (2-tailed)	0.000		0.000	0.000
	N	1580	1580	1580	1580
CI	Pearson Correlation	.754**	.824**	1	.877**
	Sig. (2-tailed)	.000	0.000		0.000
	N	1580	1580	1580	1580
SP	Pearson Correlation	.855**	.866**	.877**	1
	Sig. (2-tailed)	0.000	0.000	0.000	
	N	1580	1580	1580	1580

** . Correlation is significant at the 0.01 level (2-tailed).

Source: Field study (2022)

NOTE: LI = Learning Infrastructure, BI = Boarding Infrastructure, CI = Co-curricular Infrastructure, SP = Students' academic performance.

From Table VIII above, the correlation results show that all the independent variables in the study have a strong significant positive relationship with the dependent variable. The relationship between LI and SP showed a positive relationship coefficient of 0.856 with a p-value of 0.000 significant at the 1% significance level. This shows that learning infrastructure has a strong positive relationship with students' academic performance. Moreover, the relationship between BI and SP showed a positive relationship coefficient of 0.866 with a p-value of 0.000 significant at the 1% significance level. This shows that boarding infrastructure has a strong positive relationship with students' academic performance. Finally, the relationship between CI and SP showed a positive relationship coefficient of 0.877 with a p-value of 0.000 significant at the 1% significance level. This shows that co-curricular infrastructure has a strong positive relationship with students' academic performance. Therefore, it can be agreed that all three types of school infrastructure being used in this study have a strong positive relationship with students' academic performance.

TABLE IX. MODEL SUMMARY

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.935 ^a	.874	.874	.47466

a. Predictors: (Constant), CI, LI, BI

Source: Field study (2022)

It could be found in Table IX that the coefficient of determination (adjusted R²) for the dependent variable SP is 0.874, which means that about 87.4% of the variation in the SP variable is explained by the three independent variables capable LI, BI and CI simultaneously. While the remaining 12.6% is explained by other variables outside the model.

TABLE X. ANOVA^A

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	2468.453	3	822.818	3652.090	.000 ^b
Residual	355.074	1576	.225		
Total	2823.527	1579			

a. Dependent Variable: SP

b. Predictors: (Constant), CI, LI, BI

Source: Field study (2022)

F-tests concurrently assess the impact of independent factors on the dependent variable. According to the table, the effect significance test of LI, CI, and BI concurrently on SP yielded Fcount 989.262 and p = 0.000. The p-value (0.000) is smaller than the significance threshold (0.01), thus LI, CI, and BI jointly affected SP.

TABLE XI. COEFFICIENTS^A

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-1.214	.047		-25.669	.000
	LI	1.330	.059	1.241	22.640	.000
	BI	-.916	.062	-.946	-14.893	.000
	CI	1.086	.028	.721	39.324	.000

a. Dependent Variable: SP

Source: Field study (2022)

From Table 11, it can be observed that the regression co-efficient of learning infrastructure is 1.334 and coefficient significance test with the t statistic is t_{count} equal to 11.379 with an error probability of (p) = 0.000 at the significance level of 0.01. It shows that the p value (0.001) less than significance level (0.01). So, it can be concluded that partially, LI variable positively affects the SP variable significantly. Also, it can be observed that the regression co-efficient of boarding infrastructure is 0.921 and coefficient significance test with the t statistic is t_{count} equal to -7.776 with an error probability of (p) = 0.000, at the significance level of 0.01. It shows that the p value (0.000) less than significance level (0.01). So, it can be concluded that partially, BI variable positively and significantly affects the SP variable. Also, it can be observed that the regression co-efficient of co-curricular infrastructure is 1.088 and coefficient significance test with the t statistic is t_{count} equal to 20.439 with an error probability of (p) = 0.000, at the significance level of 0.01. It shows that the p value (0.000) less than significance level (0.01). So, it can be concluded that partially, CS variable positively affects the SP variable and significantly.

B. Qualitative presentation of data

TABLE XII. BACKGROUND INFORMATION OF INTERVIEW RESPONDENTS

Codes	Age (years)	Class	Department	Educational qualification	Working experience	Working experience in school
T1	34	2	Science	Degree	6 years	3 years
T2	37	1,3	Science (ICT)	Degree	7 years	2 years
T3	42	3	Home Economics	Masters	11 years	6 years
T4	29	2	Mathematics	Masters	5 years	3 years
T5	36	2,3	Physical Education	Masters	9 years	5 years
T6	25	2	Business	Degree	2 years	2 years
T7	39	3	History	Degree	5 years	2 years
T8	31	1	Geography	Degree	5 years	1 year
T9	23	1	French	Degree	1 year	Less than a year

Source: Field study (2022)

Table XII above presents the background information of respondents that took part in the study. The Table 13 indicates the teachers in codes (T1 to T9) and it also shows that the respondents were between the ages of 25 and 42 years. The teachers interviewed were all teachers of the Form 1, 2 and 3 classes. The teachers interviewed thought science, ICT, Home Economics, Mathematics, Physical Education and Business, history, geography and French. They all have either a Bachelor's degree or a Master's degree. The teachers interviewed also indicated that they have from a year to 11 years' experience in the teaching field and also less than a year to 6 years teaching experience in the school.

- *Infrastructural challenges in the school*

In the quest to find out the infrastructural challenges facing the school, the researcher asked the teachers some questions. The interview showed that the school lacked modern classrooms, spacious classrooms to contain a large class, a modern spacious science laboratory which is well stocked, extra co-curricular activities other than outdoor games, computer labs, etc. Even though the school faced these infrastructural challenges, the respondents indicated that the school had a serene environment which was situated well and helped students. Some respondents indicated that

"...classrooms are situated in a shady environment where there are lots of trees on the campus and it's very serene for learning..." (T1, T6)

"...classrooms are situated in a cool and serene environment..." (T5, T2)

Other respondents indicated that the classrooms were not situated well and needed a better layout.

"...in my opinion, I think the classrooms are not well situated because the general layout was not well planned from the beginning. It is only the new buildings that have been well situated and conducive for student learning..." (T3, T9)

"...Classroom positions in the school are situated okay in my opinion. I think it can be done well if more structures are built to fill the empty spaces left. But at the moment, I will like to say they are situated okay..." (T4, T7)

Moreover, respondents indicated the infrastructural challenges according to the class size and space in the classrooms.

"...the classrooms are too small and lack good ventilation..." (T3, T6)

"...I believe with the large number of students we have, the classrooms are small..." (T4, T8)

"...Not so okay, classrooms are mostly large sizes since there are not enough classrooms to split the huge number of students..." (T2)

"...each classroom takes about 60 – 80 students. Meanwhile the classrooms were not originally designed for such a huge number but due to the increasing population each year, it has been utilized as such..." (T1)

Also, respondents indicated the infrastructural challenges according to the specific department's needs.

"...The science laboratory lacks so many apparatus and even chemicals. I can state clearly that learners are even most times shared into groups when performing titrations and other practical. The apparatus available have also worn out and others have been broken. In fact, the chemistry, physics and biology laboratories are not in a good condition to serve learners' interest at all..." (T1)

"...The ICT laboratory lacks enough computers. Sometimes learners in a class are shared into groups in order to access the lab. Most of the computers have been damaged. The laboratory has poor ventilation..." (T2, T8)

"...We do not have a school kitchen for Home economics practical but we have an improvised space for practical which contain few gadgets for learning. Due to this I can say that our school laboratories are not very adequate to serve learners' interest..." (T3)

"...I will say no. This is because students though have a lab they study their practical in, but it's not enough..." (T5, T4)

Also, respondents indicated the infrastructural challenges according to the co-curricular infrastructure.

"...Not adequate co-curricular activities. I mean we need more clubs in the school and other co-curricular

activities to help students relax and learn at the same time...” (T6)

“...Well there are not so much variety of co-curricular activities, hence it does serve only a portion of the students’ interest...” (T3)

“...There are a few ones but not too adequate to meet all students’ interest...” (T2, T4)

“...Not fully because the co-curricular activities in the school are few, mostly limited to sports and games. Some students might be interested in other things like music, dance, swimming amidst debates and other fun activities which the school does not provide due to lack of adequate facilities...” (T1)

Finally, the infrastructural challenges were given in general.

“...Boarding facilities are not enough to meet students’ needs, lack of enough computers for studying ICT, inadequate apparatus in the science laboratory, lack of enough classrooms to ensure lesser classroom size and others...” (T2, T8)

“...Insufficient computers in the ICT laboratory, lack of teaching aids such as projectors, inadequate rooms for boarding facility, insufficient classrooms for students, well, that’s a few I can pin point...” (T4, T6)

“...Lack of home economics kitchen or practice lab, insufficient computers in the ICT laboratory, lack of teaching aids such as projectors, inadequate rooms for boarding facility and insufficient classrooms for students...” (T7, T9)

“...Well-equipped science laboratory, Well-equipped ICT lab, New Library books...” (T3, T4)

This study agrees with [40] and [33]) that learning environment quality affects student results. [8] also recommends that school administration work with central and local governments to build, renovate, and repair school buildings to assist students accomplish their goals.

- *Relationship and implications of infrastructural challenges on students’ performance*

To access the relationships and implications of infrastructural challenges on students’ performance, the respondents were asked questions that will lead them to answer in such a theme. The respondents indicated that infrastructural challenges do have a relationship with student’s performance and also it has an impact on the students’ performance.

“...Yes, the truth is since the students do not have access to the apparatus individually, concepts taught do not sync too well with them and these affect their academic performance because I believe that students get to fully understand a concept taught when they are involved in the lesson through these practical sessions. Inadequate apparatus prevents this

phenomenon from occurring in the lives of these students and it causes a great deal to their academic performance...” (T5, T9)

“...Yes, in a positive way, students are able to report to school on and in time in order to participate fully in lessons...” (T7)

“...Well, some sport students are mostly required to be of high academic performance in order to qualify to participate since some of them mostly miss lessons. And so it serves as a motivating factor to students who have interest in such an area to study. Nonetheless, some of these students slack due to just focusing on the co-curricular activity and forgetting their academic work...” (T3)

“...In general, I believe that students in very equipped schools with adequate infrastructure not limited to spacious classrooms with good ventilation, adequate learning materials, conducive boarding facility and other infrastructure perform well in academics. For example, most private schools who invest much in infrastructure not neglecting human resource produce very good and brilliant students. And so I believe that school infrastructure either adequate or inadequate has a significant effect on students’ academic performance...” (T2)

“...Yes, since students do not have access to the computers individually, most of them lose interest in the subject. Mostly, some do not even come for lessons and this affects their academic performance. ICT is a practical subject and so must be taught with adequate equipment and learning aids...” (T2)

“...Yeah, in a way it does. Some students perform well due to stress release activities which are involved in these co-curricular activities...” (T3)

“...I strongly believe that good and useful infrastructure directly affects students’ academic performance because these infrastructure aid in teaching and learning and also promotes students participation in lessons as well as motivate them to study personally...” (T5)

“...The schools infrastructure do affect the academic performance of students. Students when faced with better infrastructure do well in exams and tests but poor infrastructure results in poor performance...” (T4)

The findings from the interview also support the findings from the questionnaire as teachers were particular about the impact school infrastructure has on the academic performance of students. The findings of this study is supported by studies such as [41] and [25] who finds a positive significant impact of school infrastructure on students’ academic performance.

- *Strategies that can be put in place to improve infrastructural challenges*

From the interview conducted, the respondents indicated that the school needed more infrastructure like

classrooms and such classrooms should be laid out well to help improve students' academic performance. Some other recommendations from the respondents includes;

"...I will recommend that more classrooms are built or if possible the layout should be well planned for future occurrences such as increase in students' population over time. Infrastructure should be the next focus after human resource recruitment since these are very much needed to ensure a conducive learning and teaching environment in order to promote students better academic performance..." (T1)

"...I'll suggest that more classrooms be erected or, if possible, that the layout be carefully prepared for future events, such as an increase in the number of pupils over time. Following the recruitment of human resources, the focus should shift to infrastructure because these resources are critical to ensuring a positive learning and teaching environment that will support students' improved academic achievement..." (T2)

"...I will suggest that the school infrastructure be re-accessed and improvement should be made to the existing structures and also new ones should be built in order to enhance and improve students overall performance in the school..." (T3)

"...The infrastructure in the school must be improved. Most of them are old and need refurbishments..." (T4, T6)

V. CONCLUSION

The characteristics of a school's infrastructure depict the actual current amount, variety, and quality of curricular and co-curricular activities that are given in that school. The form and dimensions of classrooms are determined by the nature and capacity of the school's physical infrastructure. Also, learners are led and structured differently for teaching depending on the classroom's dimensions, layout, and the educational resources that are made available to them. The look of school infrastructures and other aspects of school conduct are noticeable because of the contributions made by parents and other educational stakeholders who share their perspectives on the level of quality that is present in the school. This study concludes that infrastructures in schools have a relationship with the academic performance of students as well as an impact on the performance of students. Therefore, schools must pay attention to such infrastructural challenges and provide solutions to them.

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