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RESEARCH ARTICLE

EFFECT OF LEARNING ENVIRONMENT ON STUDENTS' ACADEMIC PERFORMANCE IN GEOGRAPHY IN PUBLIC DAY ADVANCED SECONDARY SCHOOLS IN RWANDAA CASE OF NYARUGURUDISTRICT

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Abstract

The study aims to explore the effect of learning environment on students' academic performance in geography in public day A' Level secondary schools in Rwanda, specifically the case of Nyaruguru district. The study has three specific objectives which are the following: To identify factors of the learning environment that influence students' academic performance in geography in public day advanced level secondary schools in Nyaruguru district, Rwanda, to determine the influence Classroom seating arrangement on students' academic performance in geography in public day advanced level secondary schools in Nyaruguru district, Rwanda, to determine the relationship between the school teaching environment and students 'academic performance in geography in public day advanced secondary schools in Nyaruguru district, Rwanda.This research was grounded on environmental psychology theory.The researcher employed a descriptive survey design for this study to collect numerical and correlational research design for evaluating the relationship between variables.The respondents of this study were consisted of 401 participants including 375 students, 10 headteachers, and 15 teachers selected from various day public advanced secondary schools in Nyaruguru district.Data was collected through questionnaires and structured interview guide. Questionnaires were used to collect date from students and teachers, while interview protocols were used to get qualitative information from school Headteachers.The findings reveal mixed perceptions regarding factors affecting students' academic performance in geography. While 41.7% of students find the classroom environment conducive, 48.1% disagree. Resource availability is a concern, with 52.4% reporting inadequacy in geography materials like textbooks and maps, and 59.9% strongly disagreeing about practical learning opportunities like field trips. However, seating arrangements are viewed positively, with 66.3% strongly agreeing they enhance visibility and 48.7% supporting peer collaboration. Strong teacher support is evident of teaching environment and performance, but concerns about infrastructure and discipline remain, with 57.8% finding infrastructure inadequate. Finaly, the study recommended that educational planners should enhance school infrastructure and integrate

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technology, especially in rural areas. Policymakers should ensure equitable resource allocation and support teacher development. School leaders, teachers, and stakeholders must collaborate to create engaging, student-centered learning environments.

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Introduction:

The learning environment significantly impacts students' academic performance, a relationship that has been widely studied globally, regionally, and locally. At the global level, numerous studies have demonstrated that a conducive learning environment enhances students' academic outcomes. As an example, the OECD discovered that students achieve better results in environments that are well-maintained and have ample resources (OECD, 2018). This underscores the universal recognition of the learning environment as a crucial factor in educational success. Earthman (2014) found that students in modern, well-equipped schools performed better academically than those in older, poorly maintained buildings. Similarly, in Europe, Barrett et al. (2015) demonstrated that the design of learning spaces significantly influences student learning, highlighting the importance of environmental quality in educational settings. These studies underscore a global consensus on the necessity of a conducive learning environment for optimal student performance.

Various African countries indicates that inadequate infrastructure, lack of teaching resources, and overcrowded classrooms adversely affect students' academic achievements (Mugisha, 2019). In East African countries (EAC) such as Kenya, Uganda, and Tanzania, similar challenges persist. According to a report from UNESCO, educational institutions in these nations frequently face challenges due to a lack of adequate resources and teaching materials, leading to lower academic achievement among students (UNESCO, 2017). In Rwanda, the influence of the learning setting on students' academic achievement, particularly in geography, is highly significant. Rwanda has made notable progress in increasing educational opportunities, but the quality of education available is still a major issue. The Rwanda Education Board (REB) has identified several factors affecting student performance, including classroom conditions, the availability of learning materials, and teacher-student ratios (REB, 2020).Ndayambaje and Nkurunziza (2021) found in their study that students in schools with better facilities, such as adequate classrooms, sufficient learning materials, and well-trained teachers, consistently outperformed their peers in less favorable environments.Inadequate classroom conditions, lack of essential learning materials, and high student-to-teacher ratios significantly hamper students' academic success in geography. The Ministry of Education (2019) has noted widespread challenges in schools, especially in rural areas, including overcrowded classrooms and inadequate infrastructure, which impede effective teaching and learning. These circumstances create an unsupportive setting for learning geography, a subject that often requires practical resources and interactive teaching methods to comprehend complex concepts.

Many Rwandan schools, especially in rural areas, still face significant infrastructure deficits. Classrooms are often overcrowded, and essential learning materials are lacking. A report by the Ministry of Education (2019) highlighted that these conditions hamper effective teaching and learning, ultimately affecting student performance in geography and other subjects. Besides the physical infrastructure, the psychological and social factors in the learning environment are also crucial for student performance. Mwesigye and Ngiruwonsanga (2020) emphasize the importance of a positive school environment with strong teacher-student bonds and a welcoming atmosphere in promoting academic achievement.

Low performance in rural schools was highly mentioned than urban schools (NESA, 2021). This underperformance of government-aided and public schools has been attributed to several factors related to learning environment including inadequate learning resources, overcrowded classrooms, and insufficient teacher training, poor infrastructure, low student motivation due to socio-economic challenges, and inconsistent assessment practices further hinder effective learning and academic outcomes. Therefore, there is a critical need for further investigation into the specific environmental factors that influence academic performance in geography among students of public day advanced secondary schools especially in Nyaruguru district, Rwanda.

The general objective of the study was the examination of how learning environment affects students' academic achievement in geography in public day advanced level secondary schools in Rwanda, focusing on Nyaruguru district. The specific objectives that guided the study were:

i) To access learning environment factors that influence students' academic performance in geography in public day A' Level secondary schools in Nyaruguru district, Rwanda
ii) To determine the influence of classroom seating arrangement on students' academic performance in geography in public day A' Level secondary schools in Nyaruguru district, Rwanda.
iii) To explore the correlation between the teaching environment at schools and the academic performance of students studying geography in public day advanced secondary schools in Nyaruguru district, Rwanda.

Theoretical literature
The study managed all ideas related to learning environment and students' academic performance in geography subject.

Learning Environment
Learning environments play an important role in shaping students' educational outcomes and experiences in different contexts. Defined broadly, the learning environment encompasses physical, social, and psychological factors that influence how individuals learn and engage with educational content (Fisher & Fraser, 2021).

The layout of the classroom is one of the physical features of the learning environment, seating arrangement, lighting, temperature, and resources available, significantly influence student behavior and learning outcomes (Barrett, Zhang, Moffat, &Kobbacy, 2023). According to environmental psychology theories, a well-designed physical environment can enhance concentration, promote collaboration, and reduce distractions, thereby fostering a positive learning atmosphere conducive to cognitive engagement (Tanner, 2019).

Classroom Space and Academic Performance
Classroom space, encompassing its physical layout, design, and environmental attributes, highly influence students' academic achievement and overall educational experience.

The physical layout of classrooms, including factors such as seating arrangements, desk organization, lighting, acoustics, and ventilation, significantly affects student behavior and learning experiences (Barrett, Zhang, Moffat, &Kobbacy, 2013). Environmental psychology theories suggest that well-designed classrooms can enhance concentration, reduce distractions, and create a conducive atmosphere for effective teaching and learning (Tanner, 2019). For instance, classrooms with flexible seating arrangements that accommodate different learning styles and promote collaboration have been associated with increased student participation and academic engagement (Baepler, Walker, & Driessen, 2014).Studies have found that factors such as classroom size, layout, natural lighting, and ergonomic furniture can positively influence academic performance by creating an environment conducive to concentration and learning (Barrett et al., 2013; Baepler et al., 2014). Furthermore, learning environments that prioritize comfort, accessibility, and inclusivity contribute to reducing academic disparities and enhancing overall educational equity (Leithwood& Jantzi, 2016).

Teaching Aids and Academic Performance
Teaching aids, encompassing a wide array of instructional materials and resources, are integral components of effective pedagogy in educational settings.

Teaching aids include visual, auditory, tactile, and interactive resources used by educators to enhance the delivery of instructional content (Mayer, 2021). Visual aids such as charts, diagrams, and multimedia presentations help clarify complex concepts, stimulate interest, and improve comprehension among students (Larkin & Simon, 1987). Auditory aids, such as recorded lectures or podcasts, cater to auditory learners and reinforce verbal instructions and explanations (Duffy & Jonassen, 2022). Tactile aids, including manipulatives and hands-on activities, promote experiential learning and enhance conceptual understanding through tactile interaction (Savery & Duffy, 2015).

Standard Classroom and Academic Performance
Traditional classrooms with basic resources have been the main setting for education in schools for a long time. Standard classrooms have a physical layout that consists of desks, chairs, chalkboards or whiteboards, and basic lighting and ventilation systems.

Environmental psychology theories suggest that the physical layout and design of classrooms can influence student behavior, attention span, and overall learning outcomes (Tanner, 2019). For instance, well-arranged seating

arrangements that facilitate visibility and interaction with instructional materials can enhance student engagement and participation in classroom activities (Fisher & Fraser, 2021).

In standard classrooms, the effectiveness of teaching practices and instructional strategies employed by educators significantly impacts academic performance. Research indicates that instructional clarity, teacher-student rapport, and effective classroom management are critical factors influencing student achievement (Marzano, Marzano, & Pickering, 2013). Constructivist learning theories emphasize the importance of active learning experiences and student-centered instruction in standard classroom settings, where students construct knowledge through hands-on activities and collaborative problem-solving (Brooks & Brooks, 2018).Meta-analyses of educational interventions suggest that standard classrooms can facilitate basic skill acquisition and content mastery but may require adaptations to promote higher-order thinking skills and creativity among students (Higgins et al., 2018).

School Geographical Environment and Performance in Geography

The geographical environment of schools encompasses various spatial and locational factors that may influence students' learning experiences and academic performance in geography.

The physical location of schools within different geographical contexts, such as urban, suburban, rural, or coastal areas, can influence students' exposure to diverse geographical features and landscapes (Hayward, 2014). Urban schools, for example, may have greater access to cultural institutions, urban planning sites, and diverse populations, which can enrich students' understanding of human geography and urbanization processes (Knigge & Cope, 2016). In contrast, rural schools situated in agricultural or natural landscapes may focus more on environmental geography and rural development issues (Carter, 2015).

Field trips to local geographical landmarks, ecosystems, and geological formations provide firsthand experiences that deepen students' understanding of physical geography concepts (Preston & Campbell, 2019). Environmental education initiatives integrated into school curricula emphasize the importance of sustainability, conservation, and ecological literacy, fostering a holistic approach to geographical learning (Tilbury et al., 2015).

Effective pedagogical approaches and curriculum design tailored to the geographical environment can optimize learning outcomes in geography. Place-based education strategies emphasize connections between local landscapes and global issues, encouraging students to investigate geographical phenomena within their immediate surroundings (Smith, 2018). Inquiry-based learning methods that encourage exploration, critical thinking, and problem-solving skills are particularly effective in geography classrooms situated in diverse geographical environments (Maude & Davis, 2021).

Environmental Psychology Theory

Environmental Psychology Theory, developed by Harold M. Proshansky and colleagues, provides a robust framework for studying how physical environments influence human behavior and performance, particularly in educational settings. This theory is especially important when evaluating how learning environments impact students' academic performance in Geography. According to Environmental Psychology Theory, the physical attributes of classrooms, such as design, layout, lighting, temperature, and noise levels, significantly impact cognitive processes and learning outcomes (Proshansky, 2018).

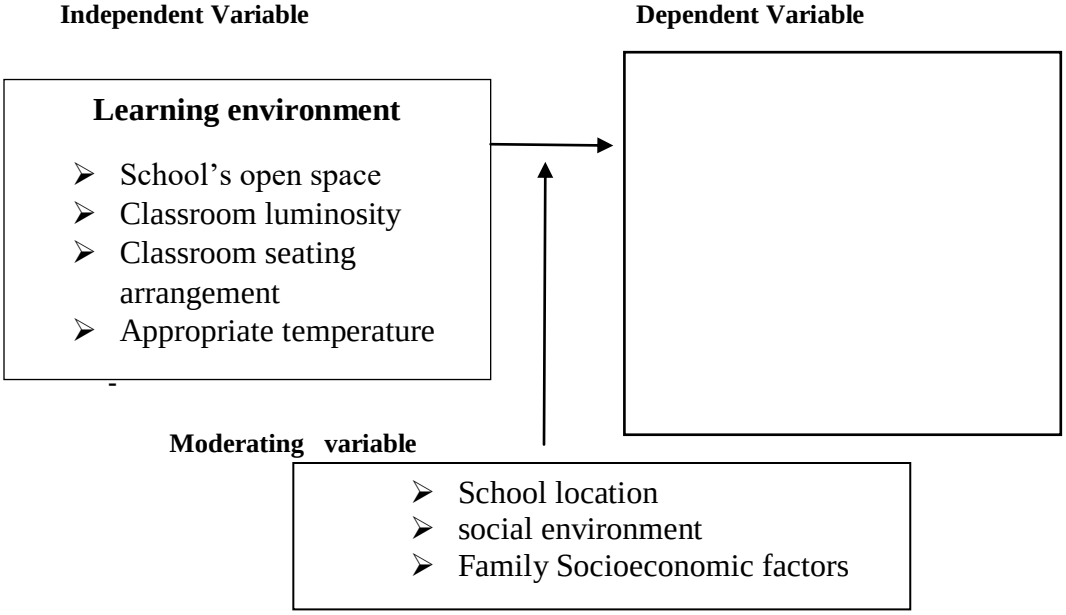
Environmental Psychology Theory highlights the psychosocial aspects of the learning environment, including teacher-student relationships and overall school climate. Positive interpersonal dynamics and supportive teaching practices have been shown to enhance students' motivation and engagement in learning (Wubbels & Levy, 2013).

Conceptual Framework

The conceptual framework for analyzing the effects of learning environments on students' academic achievements in geography in Rwandan public secondary schools consists of various interconnected components. It encompasses the physical infrastructure and resources available within schools, such as classrooms, libraries, and technological facilities, which directly impact students' access to learning materials and their overall educational experience. Additionally, the framework considers the pedagogical practices employed by teachers, including teaching methods, curriculum delivery, and classroom management strategies.

The conceptual model depicts a fluid connection among the learning setting, students' academic achievements, and

elements like school location, social atmosphere, and family economic status. The framework acknowledges the importance of various aspects within the learning environment, including school's open space, proper lighting, crowded classrooms, seating layout, and suitable temperature, to ensure a comprehensive education. The dependent variable, students' academic performance, is clearly defined with criteria that cover different aspects such as attendance, completion rate of work, higher grades, improved behavior, and positive attitude within a set time period. Recognizing intervening variables acknowledges the various factors that affect the learning environment and its link to academic performance, especially within the geography discipline.



Source: Researcher (2024)

Figure 2. 1:- Conceptual Framework.

Methodology:

Research Design

The researcher employed a descriptive survey design for this study to collect numerical and descriptive data for evaluating the correlation between variables. This allowed the researcher to produce statistical information on how the learning environment affects geography students' academic performance in Nyaruguru district. This research also used a correlational approach to collect data to ascertain the presence and strength of an association of learning environment and academic performance in geography among students in public day advanced secondary schools in Nyaruguru district.

Target Population

In order to achieve the goals of this study the target population area is 10 public day secondary schools with geography option of Nyaruguru district. The total population of this research is made of 401 participants composed of 375 students, 10 headteachers, and 15 geography teachers from public day advanced secondary schools in Nyaruguru district.

The sample size of 200 was determined by the researcher using the Yamane formula (Yamane, 1970) from a population of 401. The simplified formula for determining sample size, according to Taro Yamane, is as follows:

$$\mathbf{n = \frac{N}{1+N(e^2)}}$$

Where n represents sample size, N represents target population of the study, e represents the expected degree of precisions where e=1-P and P is equal to 0.95 then e=1-0.95, so e=0.05

As N is 15011

n is calculated to be $\mathbf{n} = \frac{401}{1+401(0.05^2)} = \mathbf{200}$

Table 3.1:- Target Population and Sample size.

Respondents	Population	Percentage (%)	Simple size
Students	375	93.5	187
Teachers	15	4.0	8
Head teachers	10	2.5	5
TOTAL	**401**	**100**	**200**

Source: Field data (2024)

In this study, two approaches for gathering data were utilized: quantitative and qualitative data collection. These methods enable researchers to gather all information relevant to the research goals. The researcher utilized a combination of qualitative and quantitative methods, incorporating closed-ended questionnaires, interviews guides, and observations for data collection in this study. All of these tools collaborate to guarantee the accuracy and dependability of the information.

Findings and Discussion:

Demographic Characteristics of Respondents

The participants in this research are made of 401 participants composed of 375 students, 10 headteachers, and 15 geography teachers from public day advanced secondary schools in Nyaruguru district. The study examined the demographic characteristics of respondents through different aspects like gender, age, educational levels and working experience.

Table 4.1:- Characteristics of the respondents.

Statement		Frequency	Percent	Valid Percent
Valid	Headteachers	5	2.5	2.5
	Teachers	8	4	4
	Students	187	93.5	93.5
	Total	**200**	**100**	**100**

Primary data,2024

Out of the total 200 respondents, the largest group comprised students, representing 93.5% of the sample. Teachers accounted for 4% of the respondents, a smaller but relevant portion of the sample. Headteachers constituted the smallest group, with only 2.5% of the respondents. While few in number, their participation is essential as they oversee the administration and management of schools, offering a broader view of school policies and their effects on teaching and learning environments.

Gender of Respondents

Researcher sought to determine the gender of all respondents in order to prevent bias in data analysis related to gender. The tables 4.2, 4.3 and 4.4 provide a summary of the gender of the respondents.

Table 4.2:- Gender of Head Teachers.

Statement		Frequency	Percent	Valid Percent
Valid	Female	1	20.0	20.0
	Male	4	80.0	80.0
	Total	**5**	**100.0**	**100.0**

Primary data,2024

The table 4.3 indicate the gender of headteachers where the majority of respondents were female with 66.7% of all respondents while the rest were for males means that gender for headteacher were respected to avoid any bias and ensure gender inclusion in this research.

Table 4.3:- Gender of Teachers.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	3	37.5	37.5	37.5
	Female	5	62.5	62.5	100.0
	Total	8	100.0	100.0	

Primary data,2024

The table 4.4 illustrates the gender distribution of the teachers who participated in the study. Out of the eight respondents, the majority were female, accounting for 62.5% of the total teacher respondents. This suggests that women were more represented in the teaching sample, which could reflect a higher proportion of female teachers in the study's context or within the particular schools examined. Male teachers made up 37.5% of the respondents, indicating a smaller but still significant representation. This distribution may suggest a gender imbalance in the teaching workforce within the study area, or it could simply be a reflection of the specific participants involved in this research.

Table 4.4:- Gender of Students.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	116	62.0	62.0	62.0
	Female	71	38.0	38.0	100.0
	Total	187	100.0	100.0	

Primary data,2024

The table 4.5 highlights the gender distribution of the student respondents who participated in the study. Of the 187 students, the majority, 62%, were male, while females are 38.0%, indicating that male students made up a larger portion of the sample. This could reflect a higher enrollment of male students in the schools studied, or it may simply be the outcome of the sample selection process. Female students represented 38% of the respondents, a smaller but still substantial proportion. While fewer in number, female students' participation is significant in ensuring that both genders are represented in the study, allowing for a more comprehensive understanding of student experiences.

Age of Respondents

The researcher sought to know the age of the participants to verify the maturity and reliability of their responses. In this study, the results were outlined in table 4.6 as shown below:

Table 4.5:- Age of Students.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	10-14years	57	30.5	30.5	30.5
	15-20years	123	65.8	65.8	96.3
	21-30years	7	3.7	3.7	100.0
	Total	187	100.0	100.0	

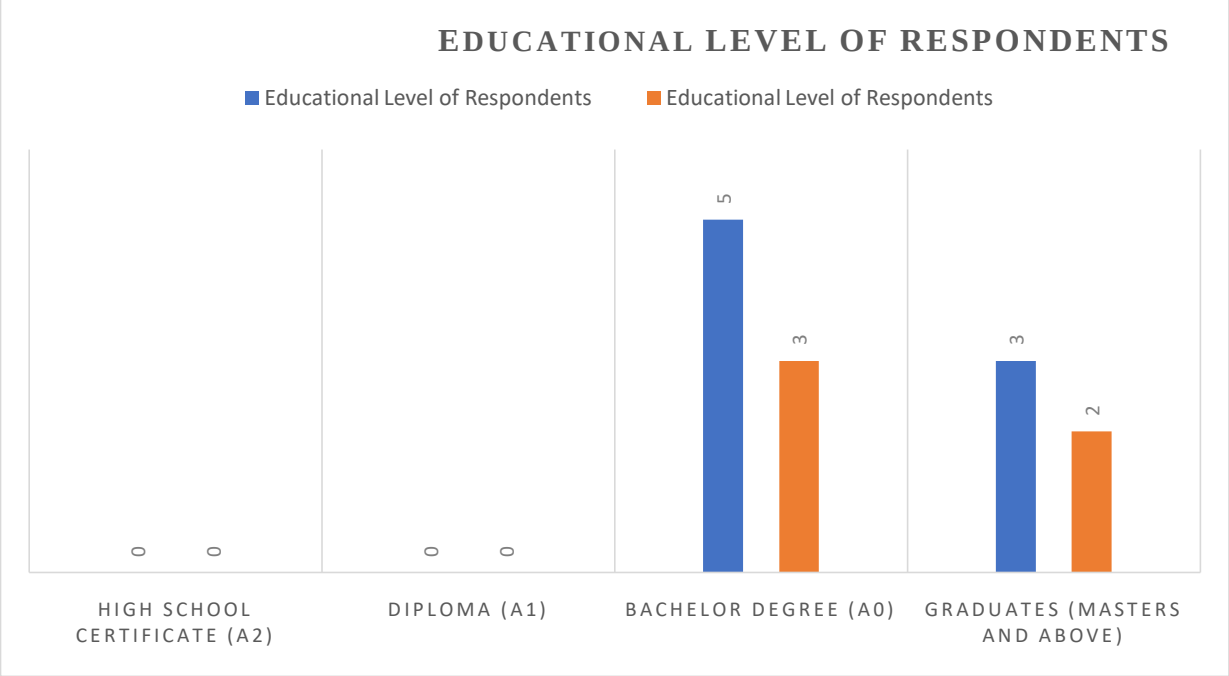
The table provides an overview of the age distribution of student respondents who participated in the study. The majority of students, 65.8%, were aged between 15 and 20 years, which is typical for secondary school students and suggests that the study primarily focused on adolescents. This age group, representing the transition from mid to late

adolescence, is likely to provide valuable insights into the challenges and experiences relevant to this critical developmental stage.

Educational Level of Respondents

The researcher needed to know the qualification of respondents especially for teachers and head teachers, the findings are summarized in figure 4.1

Figure 4.1:- Educational Level Respondents.



Primary data, 2024

The figure 4.1 represents the educational levels of teachers and head teachers who participated in the study. Among the teachers, five hold a Bachelor's Degree (A0), while three hold a Graduate Degree (Masters and Above). This shows a balance between undergraduate and graduate-level qualifications, with a slight majority of teachers holding a Bachelor's degree.

For head teachers, the educational attainment is similarly high. Three head teachers hold a Bachelor's Degree (A0), while two have advanced to Graduate-level education (Masters and Above).

Working experience

The research investigated the work experiences of teachers and head teachers from various schools in Nyaruguru district. The results of the study are summarized in figure 4.2.

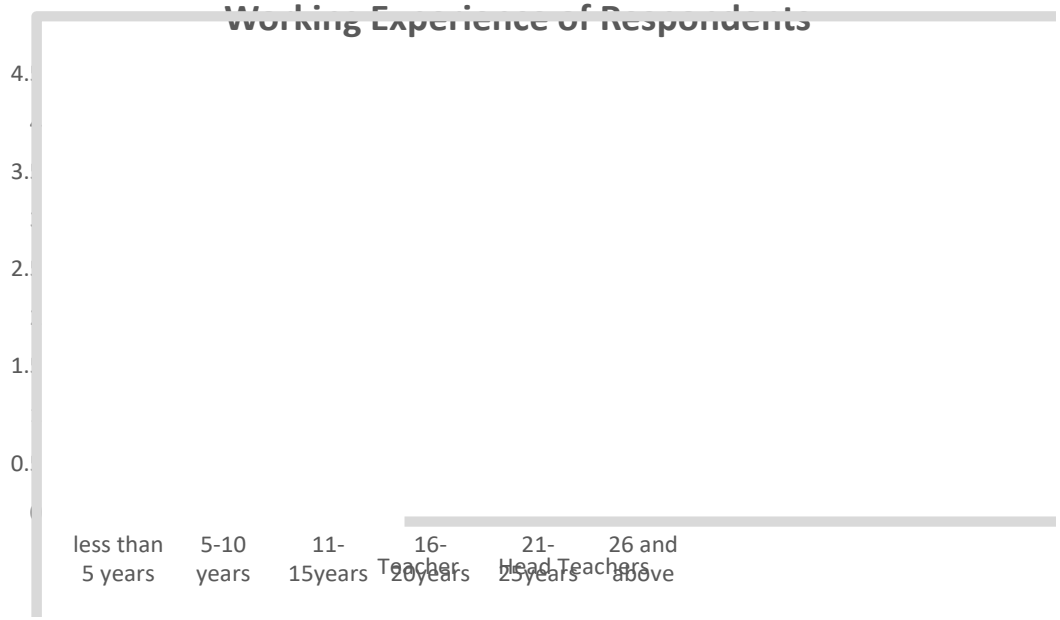
Researcher,2024

The figure 4.2 illustrates the working experience of teachers and head teachers who participated in the study, categorized into various time frames: less than 5 years, 5-10 years, 11-15 years, 16-20 years, 21-25 years, and 26 years and above. Among the teachers, 12.5% have less than 5 years of experience, indicating a small number of relatively new professionals. The majority, 50%, fall within the 5-10 years range, suggesting that half of the teaching staff is in the early to mid-stages of their careers. Additionally, 25% of teachers have 16-20 years of experience, indicating a smaller proportion of more experienced individuals. Interestingly, no teachers have between 11-15 years, 21-25 years, or over 26 years of experience, reflecting a gap in those experience categories.

For head teachers, working experience distribution shows a much higher level of professional tenure. The majority, 60%, have 11-15 years of experience, demonstrating that most head teachers are in the mid to advanced stages of their careers. Another 40% have 21-25 years of experience, further underscoring the trend that head teachers are

more experienced than the teaching staff. There are no head teachers with less than 5 years of experience or in the 5-10, 16-20, or 26 years and above categories, which highlights a consistent trend of extensive experience among those in leadership roles.

Figure 4.2:- Working Experience of Respondents.



Presentation of Findings

The research focused on identification of factors of the learning environment that influence students' academic performance in geography in public day advanced level secondary schools in Nyaruguru district, Rwanda, on determination of the influence of Classroom seating arrangement on students' academic performance in geography in public day advanced level secondary schools in Nyaruguru district, Rwanda, on determination of relationship between the school teaching environment and students 'academic performance in geography in public day advanced secondary schools in Nyaruguru district, Rwanda. The initial data was presented in demographic frequencies and percentages using figures and tables of characteristics of the participants. The research questions were displayed in a table of means and standard deviations were calculated for pertinent items, while the final data sets were derived from the interview guides.

Factors of the Learning Environment that Influence Students' Academic Performance in Geography

The first objective of the study was to identify factors of the learning environment that influence students' academic performance in geography in public day advanced level secondary schools in Nyaruguru district, Rwanda. The statements used to reach to measure this objective were about conducive classroom environment (e.g., lighting, seating arrangement) to learning geography, the availability of adequate geography textbooks and resources (like maps and charts), The provision of opportunities for practical learning in geography (field trips, experiments, etc.) by the school, the availability of technology tools (computers, internet) in learning geography.

Table 4.6:- Students Opinions on the Factors of the Learning Environment that Influence Students' Academic Performance in Geography.

	SD		**D**		**N**		**A**		**SA**			
Statements	**Fr**	**%**	**Fr**	**%**	**Fr**	**%**	**Fr**	**%**	**Fr**	**%**	**Mean**	**St. Dev**
Our classroom environment (e.g., lighting, seating arrangement) is conducive to learning geography.	14	7.5	90	48.1	0	0.0	78	41.7	5	2.7	2.8396	1.134

In my school, availability of geography textbooks and resources (maps, charts, etc.) is adequate.	46	24.6	98	52.4	2	1.1	32	17.1	9	4.8	2.2513	1.148
My school provides opportunities for practical learning in geography (field trips, experiments, etc.).	112	59.9	42	22.5	0	0.0	23	12.3	10	5.3	1.8075	1.242
In my school, the availability of technology (computers, internet) enhances learning in geography.	22	11.8	67	35.8	7	3.7	47	25.1	44	23.5	3.1183	1.419

Primary data,2024

Nearly half of the students agree that classroom conditions (like lighting and seating) are conducive to learning, a slight majority express dissatisfaction, indicating that basic classroom needs are met but improvements are needed for optimal learning. Resource availability is a major concern, with most students reporting inadequate access to textbooks, maps, and charts, which limits their engagement with geography. Practical learning opportunities, such as field trips and experiments, are notably scarce, with nearly 60% of students strongly disagreeing that these experiences are provided. Access to technology is inconsistent, with a divided student response highlighting disparities in access to computers and internet resources for learning. These findings suggest that addressing classroom conditions, resource gaps, and practical learning opportunities could significantly enhance students' geography learning and overall academic engagement.

Table 4.7:-Teachers Opinions on the Factors of the Learning Environment that Influence Students' Academic Performance in Geography.

	SD		**D**		**N**		**A**		**SA**			
Statements	**Fr**	**%**	**Fr**	**%**	**Fr**	**%**	**Fr**	**%**	**Fr**	**%**	**Mean**	**St. Dev**
My classroom environment (e.g., seating arrangement, lighting) in my geography classes is conducive to student learning.	0	0.0	0	0.0	0	0.0	0	0.0	8	100.0	5.000	.000
I encourage interactions with my students, that stimulate their participation and questions in geography classes.	0	0.0	0	0.0	0	0.0	3	37.5	5	62.5	4.625	.517
The physical facilities of our school (e.g., classrooms, libraries) contribute positively to students' success in geography.	2	25.0	4	50.0	0	0.0	0	0.0	2	25.0	2.500	1.603
There is enough geography learning resources (e.g., textbooks, maps) in our school to support students' learning in geography.	6	75.0	2	25.0	0	0.0	0	0.0	0	0.0	1.250	.462

Primary data,2024

Teachers unanimously agree that their classroom environments, including seating arrangements and lighting, are conducive to learning, suggesting a supportive space for geography instruction. Additionally, there is strong consensus that interactive teacher-student engagement is promoted, enhancing students' understanding and interest in the subject. However, perceptions of physical facilities, such as classrooms and libraries, are divided; half of the teachers feel these are insufficient to support student success. Most teachers express significant dissatisfaction with the lack of geography resources, such as textbooks and maps, with almost all respondents reporting shortages. This shortage of resources is seen as a major limitation on students' ability to fully engage with and understand geography, underscoring the need for improved resource availability to support effective learning.

Interview guides:

The interview with school head teachers highlights the significant influence of the learning environment on students' academic performance in geography. Head teachers emphasize that a well-arranged classroom setup with flexible seating fosters active participation and collaboration, which is essential for a subject like geography that often involves discussions and interaction. They note that visual aids such as maps and charts spark curiosity and provide constant reference points. Additionally, the availability of adequate learning resources, including up-to-date textbooks, atlases, and digital tools like GIS, greatly enriches students' understanding by connecting theory with real-world geographical phenomena. Effective teaching methods, such as field trips and project-based learning, further enhance engagement, allowing students to observe and apply concepts first-hand, which supports critical thinking and problem-solving skills.

The Influence of Classroom Seating Arrangement on Students'Academic Performance in Geography

The second objective of the study was sought to determine the influence of classroom seating arrangement on students' academic performance in geography in public day advanced secondary schools in Nyaruguru district, Rwanda. The statements used to measure this objective were about seating arrangement in geography classroom that supports effective teaching and learning, encouragement of active participation, seating arrangement that allows effective collaboration, the seating arrangement and students comfort and ability to learn, classroom atmosphere that fosters students positive attitude towards geography learning and students' engagement in geography lessons. Then the answers were presented in table 4.7 and table 4.8 for students and teachers' perceptions respectively. The data collected from student respondents in the study represented in the table 4.7 reveals valuable insights into how classroom seating arrangements influence students' academic performance in geography in public day advanced secondary schools in Nyaruguru district, Rwanda.

Table 4.8:- Students Perception on Influence of Classroom Seating Arrangement on Students'Academic Performance in Geography.

	SD		D		N		A		SA			
Statements	**Fr**	**%**	**Fr**	**%**	**Fr**	**%**	**Fr**	**%**	**Fr**	**%**	**Mean**	**St. Dev**
The seating arrangement in my geography classroom allows me to see the board clearly.	8	4.3	28	15.0	0	0.0	27	14.4	124	66.3	4.235	1.265
The seating arrangement in my classroom encourage to participate actively in geography lessons.	13	7.0	17	9.1	3	1.6	112	59.9	42	22.5	3.818	1.096
The seating arrangement allows me to collaborate effectively with my classmates during geography activities.	0	0.0	18	9.6	10	5.3	68	36.4	91	48.7	4.240	.933
The interactions I have with my geography teachers encourage me to participate and ask questions.	0	0.0	9	4.8	1	0.5	47	25.1	130	69.5	4.593	.737

Primary data,2024

Most students feel that seating enables clear visibility of the board (80.7% agreement), which is essential for following lessons effectively. Additionally, a majority of students agree that the seating setup fosters active participation (82.4%) and supports collaboration with classmates (85.1%), both of which are crucial for learning. High levels of teacher-student interaction further enhance engagement, with 94.6% of students affirming that teacher encouragement fosters participation and questioning, positively impacting learning. However, a small group of students reported issues with visibility and participation due to seating, indicating that adjustments to accommodate all students could improve learning experiences across the board.

Table 4.9:- Teachers Perception on Influence of Classroom Seating Arrangement on Students'Academic Performance in Geography.

	SD		D		N		A		SA			
Statements	**Fr**	**%**	**Fr**	**%**	**Fr**	**%**	**Fr**	**%**	**Fr**	**%**	**Mean**	**St. Dev**
The seating arrangement in my geography classroom supports effective teaching and learning.	0	0.0	3	37.5	0	0.0	1	12.5	4	50.0	3.750	1.488
The seating arrangement in my classroom allows me to provide individual attention to students who need extra help in geography.	1	12.5	2	25.0	0	0.0	3	37.5	2	25.0	3.375	1.505
My students are able to interact and collaborate with their peers effectively due to the seating arrangement in geography class.	1	12.5	4	50.0	0	0.0	3	37.5	0	0.0	2.625	1.187
The overall atmosphere I create in my geography classes fosters a positive attitude towards learning among students.	0	0.0	1	12.5	0	0.0	2	25.0	5	62.5	4.375	1.060
My students' engagement in geography lessons is enhanced by the classroom seating arrangement.	1	12.5	1	12.5	0	0.0	2	25.0	4	50.0	3.875	1.552

Primary data,2024

While some teachers feel that the seating layout supports effective teaching, individualized attention, and student engagement, a significant portion believes it could be improved, particularly to facilitate peer collaboration. Half of the teachers feel the current arrangement limits student interaction during geography activities, a factor crucial for understanding through group work. Most teachers agree that they create a positive classroom atmosphere conducive to learning, though they suggest that adjustments to seating arrangements could further enhance both individual support and collaborative opportunities, potentially boosting academic performance in geography.

Interview guides:

During interview guideHead teachers highlighted the positive impact of interactive teaching methods and flexible seating arrangements on student engagement and academic performance in geography. Teachers employ group discussions, debates, and presentations to foster a collaborative environment, encouraging students to actively participate and think critically about geographical concepts. By connecting lessons to real-world issues like climate change and using visual aids and technology, teachers make geography more relevant and engaging. Additionally, they promote student-centered learning through independent research and project-based activities, which build

confidence and communication skills. Flexible seating arrangements, such as clusters or U-shapes, are tailored to support geography's interactive nature, allowing teachers to provide personalized attention and facilitate group work. This setup encourages both student-teacher interaction and peer collaboration, enhancing comprehension and making geography classes more dynamic and effective.

The Relationship Between Teaching Environment and Students' Academic Performance in Geography

The third objective of the study aimed to determine the relationship between the school teaching environment and students 'academic performance in geography in public day advanced secondary schools in Nyaruguru district, Rwanda. The statements used to measure the third objective of the study focused on teachers' understanding of challenges and problems students face in learning geography subject and provision of necessary support, the interest of school administration and teachers in students future academic and career success, the level of order and discipline maintained in the schools and school's infrastructures that facilitate learning and success. Then the answers were presented in table 4.9 and table 4.10 for students and teachers' perceptions respectively.

Table 4.10:-Perception of Students on The Relationship Between Teaching Environment and Students' Academic Performance in Geography.

	SD		D		N		A		SA			
Statements	**Fr**	**%**	**Fr**	**%**	**Fr**	**%**	**Fr**	**%**	**Fr**	**%**	**Mean**	**St. Dev**
My geography teacher understands the challenges and problems I face in learning the subject and provides necessary support.	5	2.7	13	7.0	0	0.0	43	23.0	126	67.4	4.454	.995
My school administration and my teachers show genuine interest in my future academic and career success in geography.	2	1.1	15	8.0	7	3.7	51	27.3	112	59.9	4.369	.960
The level of order and discipline maintained in the school helps create a learning environment where I can focus on improving my performance in geography.	77	41.2	24	12.8	3	1.6	57	30.5	26	13.9	2.631	1.585
My school's infrastructure facilitates learning and conducive to success in geography.	108	57.8	51	27.3	9	4.8	9	4.8	10	5.3	1.727	1.109

Primary data,2024

The study on the relationship between the school teaching environment and students' academic performance in geography in Nyaruguru district reveals mixed insights from student respondents. Students generally feel well-supported by their geography teachers, with 90.4% acknowledging their teachers' responsiveness to their learning challenges, fostering positive teacher-student relationships that enhance engagement and motivation. Additionally, 87.2% of students believe that both teachers and school administration are invested in their academic and career success, creating a motivating atmosphere that supports academic performance. However, perceptions of school discipline and infrastructure are more varied. While some students find school discipline helpful, others feel it may not effectively support their learning, with a mean score of 2.631 and high variation in responses. Infrastructure receives largely negative feedback, as most students (85.1%) feel their school's physical environment is inadequate for geography learning, citing issues like poor classroom conditions and limited resources, which likely hinder

academic performance. Overall, the findings suggest a need for improved infrastructure and consistent disciplinary practices to create a more conducive learning environment in geography.

Table 4.11:- Perception of Geography Teachers on The Relationship Between Teaching Environment and Students' Academic Performance in Geography.

	SD		D		N		A		SA			
Statements	**Fr**	**%**	**Fr**	**%**	**Fr**	**%**	**Fr**	**%**	**Fr**	**%**	**Mean**	**St. Dev**
I understand the challenges and problems my students face in geography, and I adjust my teaching methods to help them succeed.	0	0.0	0	0.0	0	0.0	0	0.0	8	100	5.000	.000
The school administration and I actively show concern for students' future academic and career success in geography.	0	0.0	2	25.0	0	0.0	4	50.0	2	25.0	3.750	1.164
The level of order and discipline maintained in our school enhances the teaching and learning process in geography classes.	3	37.5	2	25.0	0	0.0	3	37.5	0	0.0	2.375	1.407
The cleanliness and organization of the school environment create a positive setting that contributes to students' focus and success in geography.	1	12.5	4	50.0	1	12.5	2	25.0	0	0.0	2.500	1.069
My school's infrastructures (e.g., classrooms, libraries) are adequately maintained and support students' academic success in geography.	4	50.0	1	15.5	0	0.0	1	12.5	2	25.0	2.500	1.851

Primary data,2024

The study reveals that while geography teachers in Nyaruguru district demonstrate a strong commitment to supporting students' academic and career aspirations, there are significant concerns regarding school discipline, cleanliness, and infrastructure. Most teachers acknowledge their role in fostering students' success, but varied responses show that inconsistencies in how this support is conveyed could impact students' motivation. Similarly, mixed perceptions of school discipline—where some teachers see it as conducive to learning while others find it disruptive—suggest that a more uniform disciplinary approach could improve the learning environment. Furthermore, many teachers feel that inadequate cleanliness and organization in the school setting hinder student focus, and insufficient infrastructure, such as poorly maintained classrooms and libraries, limits effective geography learning. Addressing these issues in school management, particularly in resource-limited areas, could strengthen the educational environment and better support academic performance in geography.

In an interview conducted with head teachers to assess the relationship between the school teaching environment and students' academic performance in geography at public day advanced secondary schools in Nyaruguru district,

Rwanda, the majority emphasized the critical importance of the physical environment in enhancing student outcomes. Head teachers highlighted that their school's infrastructure is tailored to foster a conducive learning atmosphere, featuring well-ventilated classrooms, ample natural light, and comfortable seating arrangements that minimize distractions. They noted that spacious classrooms prevent overcrowding, which is essential for student concentration and engagement, particularly in interactive subjects like geography. Furthermore, access to specialized facilities, such as science labs, computer rooms, and well-stocked libraries, is crucial for supporting academic performance, offering resources like maps and technology that enrich the learning experience. Head teachers also mentioned the significance of quiet study areas and collaborative spaces for group work, as well as well-maintained outdoor environments that facilitate experiential learning and recreational activities. Overall, they believe that a well-designed physical environment plays a vital role in promoting both academic achievement and personal development among students.

Correlation Analysis

This study examined two factors: learning environment as the independent variable and students' academic performance in geography as the dependent variable. The main focus was on exploring the correlation between the educational atmosphere of schools and the academic achievement of students in geography in public day advanced secondary schools in Nyaruguru district, Rwanda.

Table 4.12:- Correlation of Variables.

Statements

		School learning environment	**Students' academic performance in geography**
School learning environment	Pearson Correlation	1	.924**
	Sig. (2-tailed)		.000
	N	187	187
Students' academic performance in geography	Pearson Correlation	.924**	1
	Sig. (2-tailed)	.000	
	N	187	187

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

Primary data,2024

The table 4.11 presents the correlation between the school learning environment and students' academic performance in geography, based on a sample of 187 observations. The Pearson Correlation coefficient between the two variables is 0.924, indicating a very strong positive correlation. This suggests that improvements in the school learning environment are strongly associated with higher academic performance in geography. A correlation coefficient close to 1 show that as the quality of the learning environment increases, students' performance in geography tends to improve significantly.

The Sig. (2-tailed) value of 0.000 indicates that the correlation is statistically significant at the 0.01 level. This means that there is less than a 1% probability that this correlation occurred by chance, thus confirming that the relationship between the school learning environment and geography performance is highly reliable and not random. The significance level underscores the importance of the learning environment in influencing students' academic outcomes in geography. The strong and statistically significant correlation observed in the table highlights the critical role that the learning environment plays in shaping students' academic success in geography. Factors such as classroom organization, availability of learning resources, and teaching methods are likely contributing to this relationship. Schools looking to enhance geography performance should focus on improving these elements to create a more supportive and effective learning environment.

Regression Analysis

The primary purpose of regression analysis is to determine how the dependent variable changes as the independent variable(s) change. It helps in understanding the strength and nature of the relationships between variables and is often used to make predictions or forecasts.

Table 4.13:- Regression Analysis Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.926[a]	.912	.912	.43607	.374

a. Predictors: (Constant), Learning environment

b. Dependent Variable: Students' academic performance

Primary data,2024

The table 4.12 presents the results of a regression analysis examining the relationship between the learning environment (predictor) and students' academic performance (dependent variable). The R value of 0.926 indicates a very strong positive correlation between the learning environment and academic performance. The R square (0.912) shows that 91.2% of the variance in students' academic performance can be explained by the learning environment, suggesting a highly predictive model. The adjusted R square (0.912) is consistent, indicating that the model is not overfitting. The standard error of the estimate (0.43607) reflects the average distance between observed and predicted values, and the Durbin-Watson statistic (0.374), which is quite low, may suggest some level of autocorrelation in the residuals, which would require further investigation. Overall, the model demonstrates a strong relationship between the learning environment and students' academic performance.

Numerous studies have established that the learning environment is a critical factor in student achievement. Research by Fraser (2018) and later studies consistently indicate that a positive learning environment, characterized by adequate resources, supportive teacher-student interactions, and minimal disruptions, strongly correlates with higher academic performance. The R value of 0.926 in this model aligns with this evidence, showcasing a strong relationship between these variables.

Conclusion and Recommandations:

Conclusion:

In conclusion, this study examined the impact of the learning environment on students' academic performance in geography in public day advanced secondary schools in Nyaruguru District, Rwanda. Focusing on factors within the learning environment, classroom seating arrangements, and the overall teaching environment, the study identified significant elements that influence students' success in geography. The findings indicate that the learning environment in these schools substantially affects students' academic performance. Specific factors, such as access to geography resources, classroom lighting, and ventilation, were found to enhance students' focus and engagement, thus positively influencing performance. The study also highlighted that seating arrangements play a critical role; classrooms organized to foster collaborative learning and clear teacher-student visibility contributed to improved academic outcomes. Furthermore, a positive correlation was observed between the broader teaching environment—comprising teacher support, instructional materials, and conducive school infrastructure—and higher student achievement levels in geography.

These insights underscore the importance of creating well-structured and resource-equipped learning environments to support academic success in geography and similar subjects. Improving these conditions in public day secondary schools in Nyaruguru and similar districts may help bolster students' performance, thereby contributing to their overall educational development.

Recommendations:

Based on the findings of the study the following recommendations were made to improve students' academic performance in geography, educational planners should prioritize enhancing school infrastructure and learning resources, particularly in rural areas like Nyaruguru. This includes providing well-lit, spacious, and ventilated classrooms, along with modern tools such as maps, globes, and GIS technology to support geography instruction. Policymakers should ensure equitable resource allocation and fund improvements in school facilities while promoting teacher professional development for innovative and resourceful teaching methods. School leaders should create collaborative, student-centered classroom layouts and assess the learning environment regularly. Teachers are encouraged to adopt interactive methods like group discussions, field trips, and project-based learning to engage students effectively, while stakeholders, including parents and communities, should actively support improvements and advocate for optimal learning conditions.

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