# THE RELATIONSHIP BETWEEN PHYSICAL INFRASTRUCTURE AND STUDENTS' PERFORMANCE IN KYOTERA DISTRICT, UGANDA. A CROSS-SECTIONAL STUDY.

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# Page | 1 Abstract.

#### Background

Physical infrastructure in schools refers to the tangible learning environment, including classrooms, libraries, laboratories, toilets, desks, lighting, and ventilation. This environment plays a vital role in shaping the quality of education and students' academic outcomes. The study examined the relationship between physical infrastructure and students' performance in Kyotera District, Uganda.

#### Methodology

The researcher used a cross-sectional survey design with both qualitative and quantitative approaches. The study population consisted of head teachers, teachers, health workers, and students from candidate classes. A sample size of 148 respondents consisted of 6 head teachers, 6 health officers, 118 students, and 18 teachers. The study used both questionnaires and interviews as methods of data collection. Quantitative data was collected, edited, coded, and then entered on a computer using the Statistical Programme for Social Scientists (SPSS). The relationship between the independent and dependent variables was tested using the Pearson product-moment correlation coefficient. Thematic analysis was used during qualitative data analysis.

#### Results

The study found that male respondents were the majority (63.5%) compared to their female counterparts (36.5%), as far as teaching experience was concerned, most teachers, 50 (33.7%), had experience ranging between 6 and 10 years, followed by those 40(28%) with experience between 11 and 20 years. There is a strong positive correlation between physical infrastructure and students' academic performance. This confirms that when the school has sufficient physical infrastructure, there is a high possibility of performing well academically.

#### Conclusion

It can therefore be concluded that there is a strong and significant relationship between physical infrastructure and students' academic performance in secondary schools in Kyotera District.

#### Recommendations

The study recommended that the government allocate more funding to public secondary schools for the construction of adequate learning physical facilities, while private secondary schools should be compelled to do so.

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#### Background of the study Historical Perspective

The development of any country is directly proportional to the level of development of its education system (Hanushek, 1997). A lot depends on how much attention the country pays to education. The major purpose of education is to educate all citizens and give everyone adequate opportunities to succeed in life (Hanushek, 1997). It is important to note that through knowledge and skills, all individuals can achieve greatness (rock et al., 2000). It is generally agreed that the more knowledge and skills a person acquires, the better the chances of achieving informed mobility (Rost, 2016). There is hardly any factor in society that is as formidable as education. Aristotle, about society, once said that the educated differ from the uneducated as much as the living differ from the dead (Di Leo, 2007). Education deals with knowledge that is recognizably worthwhile and capable of achieving a voluntary and committed response, and it leads to new mental perspectives, 2016).

In both developed and developing nations, education is a very crucial process through which an individual's life chances are determined. Beyond the economic significance. education is viewed as a good in itself and indeed a basic human right for the lower level of education (World Bank. 2015). Education is a universal investment in human beings

and a valuable resource for the economic benefit of the Page | 2 country. Governments all over the world committed themselves to the provision of Education for All (EFA) at Dakar, Senegal in 2000 (UNESCO, 2003).

Education does not exist in a vacuum but in an environment structured of physical facilities and material resources that are used in teaching and learning. The specifications given for the establishment, management, and material resources in public secondary schools are stipulated in the laws and policies that govern the county's education system. The goal of the infrastructure system in secondary schools is to increase the school attendance of students, enhance staff motivation, and improve the academic achievement of students (Alimi, 2004). There is a link between school architecture and its users (students and teachers). Research has shown that a well-planned school with a clean and safe learning environment is important for academic achievement (h, 2016; Earthman & ti, 1996). Physical facilities play a key role in the attainment of the school's intended objectives and overall quality performance in national examinations. Secondary schools are often characterized by a lack of infrastructure facilities such as adequate classrooms, latrines, hostels, and laboratories.

School education was introduced in Uganda by missionaries from Europe in the late nineteenth century, mainly by the Church Missionary Society, the White Fathers, the Mill Hill Fathers, and the Comboni Missionaries (Aguti, 2002; Ssekamwa, 2014). They first educated the sons and daughters of chiefs, who would later work as clerks and other civil servants. Whereas, Aguti (2002) insinuates that the purpose of those missionaries was not to educate all, but for children of chiefs; the Education Policy Review Commission Report (1989), in contradiction, shows that there were some mission schools that provided equal opportunity to children from all corners of society. This point is stressed by Ssekamwa (2014), who points out that to eradicate illiteracy, missionaries started church schools wherever they established a mission or in its outstations. This is further emphasized by the Uganda Episcopal Conference Education Policy (1997), which reiterates that in Uganda, formal school education was initiated by religious denominations to eradicate ignorance from society. It is those church schools that later evolved into the present church-founded primary schools. As stressed by the Education Policy Review Report (1989), most of the children attended small rural schools, called Church Schools, unsupported by the government. In support of the aforementioned argument, Ssekamwa (2014) notes that "unfortunately, there was little financial support by the colonial government for the missions in their educational work" (p. 302). However, the colonial government was not fully detached from the financial management of the schools. The same author, in this regard, furthermore observes that "throughout the colonial era, missionaries controlled the system of education, but governments were mainly concerned with grants to aid in running the mission schools".

There were efforts by the colonial government in Uganda to establish rules and procedures for educating the Ugandans right from the missionary days. The British Colonial Policy in 1923 advised the British colonial administrators in Uganda to provide education for the African child. Soon after, the American-sponsored Phelps-Stokes Commission of 1924-1925 was set up to assess the development of education in Uganda, where the Department of Education was established under the direction of Eric Hussey (Ssekamwa, 2014). Thereafter, better schools were built, teacher training and grading were introduced, and grants from the government were formalized. However, the significant state financing of education, according to Magara (2009), started in 1940 when the Thomas Education Committee recommended the involvement of governments in grant-aiding schools.

In 1937, the De La Warr Commission recommended that Makerere be developed as a regional university college, serving the British East African territory. The interest of the government then was to get as many African workers. That was why the Binns Commission of 1951 encouraged the rapid growth of education in Uganda (Education Policy Review Commission Report, 1989). However, that type of education was not favorable to national development. Ssekamwa (2014) intimates that "the main aim was to produce white-collar workers, whose preoccupation was to seek already created jobs, instead of creating new jobs" (p. 307). However, in 1953, the Report on African Education in Uganda, drawn up by a committee chaired by Bernard de Bunsen, emphasized the Africanization of education and the training of high-level personnel needed for the country's economic development (Education Policy Review Commission Report, 1989).

In 1963, the Ugandan Government appointed a Commission under the chairmanship of E. B. Castle, and the commission proposed the merging of primary and junior secondary schools. At the primary level, it placed emphasis not only on quantitative expansion but also on quality. The Castle Commission also underlined the need for expanding girls' education. The government instituted another commission in 1977, under the chairmanship of Senteza Kajubi, to review the education system in Uganda. However, the report of the said Kajubi Commission was not published, and its recommendations were not implemented because of the liberation war of 1978-1979. Consequently, since independence, the structure of education in Uganda has been according to the Castle Commission Report on Education in

Uganda of 1963, with a few policy reforms. Therefore, as Juuko and Kabonesa (2007) argue, the present structure of education in Uganda has been in existence since missionary days, particularly since 1965, following the recommendation of the Castle Education Commission Report on Education. This reflects how outdated the system is, thus crying for revision and updating.

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The introduction and implementation of Universal Primary Education (UPE) in 1997 in Uganda as a means of meeting the second of the eight Millennium Development Goals (MDGs), led to high demand for Secondary education (Uganda Education Statistical Abstract, 2009). The World Bank education report for African countries shows that academic performance in Uganda has been very low for the previous decades, and this appears to be affected by the quality of school infrastructural facilities, although a lot has been done on enrolments and access to Secondary School education. Academic performance in most Secondary Schools in Uganda has been challenged by a crisis of high school dropouts and low performance (UNESCO, 2008). However, in the past decades, no one has ever established the influence of School infrastructure on students' academic performance in Kyotera District.

#### **Theoretical perspective**

This study was based on the Classical Liberty Theory advanced by Rousseau between 1712 and 1778. The classical liberty theory states that each person is born with a great amount of capacity to perform better. Thus, the educational system should be designed so as to remove barriers of any nature (institutional or infrastructural) in a person's life. The classical liberal theory also states that social mobility will be promoted by providing equal opportunity to access education.

According to Rousseau (the theory proponent), personality qualities should not jeopardize social equity so long as society rewards people according to their status. It follows those social institutions, such as educational institutions, should attempt to create an enabling environment by having the infrastructural facilities needed to excel in academics. Educational institutions should treat people equally by providing the needed facilities, and people should take advantage of education opportunities and perform better in their examinations. There is therefore need to ensure students from all parts of the country get the needed physical infrastructure to guarantee equal opportunities for education access, which will later improve their living standards and thus improve academic performance. Classical Liberty Theory is useful in understanding how learning is achieved through successful student-resource interactions. The author adds that the theory is also useful in understanding the impacts of infrastructural resources on students' academic outcomes. The current study, therefore seeks to assess the relationship that exists between school

infrastructure and students' academic performance in selected schools of Kyotera District.

#### **Conceptual perspective**

In this study, school infrastructure utilization is the independent variable, and academic performance is the dependent variable. Students' performance is defined as the ability of students to attain something (Oxford Advanced Learner's Dictionary, 2014), while academic performance refers to the quality and quantity of knowledge, skills, techniques, and positive attitudes, behavior, and philosophy that learners achieve or acquire (ubi, 1990). This ability is evaluated by the marks and grades that the students attain in a test or examination, which is done at the end of a topic, school term, year, or education cycle. The scores and grades that each student obtains measure the degree of achievement. The quality of the grade and the number of candidates who pass in various grades determine the level of academic performance in a given class or institution in a given period in a particular examination, be it internal or public (Ferguson, 1999).

In this study, school infrastructure was used as the independent variable. School infrastructure is generally defined as the set of interconnected structural elements that provide a framework supporting the entire structure of development. For purposes of the study, the researcher will concentrate on physical infrastructure, Health, and sanitation infrastructures, as well as Co- co-curricular facilities and will concentrate on physical infrastructure, and the main focus will be on the quality of libraries, laboratories, and quality of classrooms. Crowded classroom conditions not only make it difficult for learners to concentrate but inevitably limit the amount of time teachers can spend on innovative teaching methods such as cooperative learning and group work. Co-curricular facilities are those infrastructures that are meant to bring social and physical adjustments in a child. These include fields, recreation centers, and rooms for indoor games, among others.

Good sanitation is where the environment is clean, concurring with the School Sanitation Consultative Meeting Report (1999), which defined it as personal and universal cleanliness. Personal cleanliness involves food hygiene practices, safe disposal of solid and liquid waste, safe collection, storage, and use of clean water, especially for drinking. Good sanitation, therefore, is the cleanliness of toilets and bathrooms, cleanliness of the drainage system, access to hand washing facilities, and the good state of dustbins.

Co-curricular facilities are those infrastructures that are meant to bring social and physical adjustments in a child. These include fields, recreation centers, and rooms for indoor games, among others.

#### **Contextual perspective**

A report from the Kyotera District Education Office (2008) shows that secondary schools in Kyotera have an imbalanced provision of educational physical facilities. It is common to have schools with class sizes up to 80-100 students. In some schools, there are inadequate classrooms, staff offices, laboratories, toilets, and libraries. Some classes lack well-fitted doors and window panes, while others have leaking roofs, and remastered and dusty floors. Many schools appear to suffer from inadequate maintenance and

have dusty compounds that are likely to be hazardous to the health of learners and teachers (Kajubi, 2012). This situation does not provide a quality learning environment and therefore may have a direct or indirect impact on the teaching and learning process and eventually, negatively affect students' academic performance.

Records from the Kyotera District Statistics Office (2021) indicate that secondary schools in the district perform with desired results in national examinations. In a recent report of 2023 by the Daily Monitor newspaper, it was reported that Kyotera District in Central Uganda was among the poor performers in the country, with nearly 30 percent of the total students failing the exams. Out of the 12,328 candidates who sat for UCE exams, only 770 passed in division one. Several reasons that have contributed to poor performance were given. These include inadequate provision of quality educational facilities and poor planning of educational physical facilities. Therefore, school managers and parents need to be informed about the conditions of their school infrastructural facilities to appreciate the difference these facilities could make in the quality of education acquired by their children (Tiberondwa, 2012). Hence, there was a need for the researcher to ascertain the role of school infrastructure utilization on learners' academic performance in Kyotera District. Therefore, this study examined the relationship between physical infrastructure and students' performance in Kyotera District, Uganda.

#### Methodology Research Design

The researcher used a cross-sectional survey design with both qualitative and quantitative approaches because the study intended to pick only some representative sample elements of the cross-section of the population. The crosssectional survey research design was used because the method gathers data from a relatively large number of different categories of respondents at a particular time. According to Mugenda and Mugenda (1999), this design is used when the study is aimed at collecting data from the respondents without the need to make a follow-up of the same respondents; thus, it saves time to collect the necessary information when the design is used. A cross-sectional survey design collects data to make inferences about a population of interest at one point in time. The advantage of a cross-sectional survey is its flexibility in that it can be conducted using any mode of data collection.

#### **Study population**

The study population consisted of head teachers, teachers, health workers, and students from candidate classes. A total of 240 target population was used with 6 head teachers, 6 health officers, 198 students, and 30 teachers. The above was believed to be informed about the variables under study.

#### Sample Size

A total sample size of 148 out of 240 target populations was selected or drawn from all categories of respondents. This population acted as a sample and provided relevant information for the study. The sample size was determined with the help of the formula forwarded by

- Yamane (1967) as N
  - 2

n = 1 + N(e)Where;

N: Number of the target population that conforms to the characteristics of the sample required, e: Margin of error (5%).

n: sample size

Given the population of 240 respondents, n = 240/1+240X (0.05) ^2 n = 148

Respondents for each category were computed based on their weight, according to Neyman

(1934) allocation formula as follows: nh (Nh)n N

Where:

n h - The sample size for stratum h,

n - Total sample size,

- N h -The population size for stratum h,
- N- The total population

Table 1: Sample size						
<b>Respondents' category</b>	Target population	Sample size				
Head teachers	6	6				
health officers	6	6				
Students	198	118				
Teachers	30	18				
Total	240	148				

Source: Field Study by the Researcher, 2025

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#### Sampling technique

Purposive sampling and stratified sampling techniques were employed.

#### Purposive sampling

Page | 5 The purposive sampling technique was employed because it facilitates the collection of data from specific types of people who can provide the desired information. Purposive sampling involves identifying and selecting individuals or groups of individuals who are knowledgeable about or experienced with a phenomenon of interest (Creswell and Plano, 2011). Teddlie and Fen Yu (2007) affirm that purposive sampling is typically designed to pick a small number of cases that yield the most information about a particular phenomenon. This technique was employed to select the head teachers and health officers. These categories of respondents provided the desired information.

#### Stratified sampling

Hair (2007) states that this type of sampling technique is the most recommended technique as it considers the geographical diversity of a population. Kumar (2008) adds that this technique improves the representativeness of the sample by reducing sampling error and that this sampling method becomes cheaper as the researcher only concentrates on differences within the stratum, hence saving on costs, and is quick and easy. Stratified sampling requires the classification of the population into smaller groups (strata) with similar characteristics, and from each stratum, samples are selected randomly (Kombo and Tromp, 2010). When the samples randomly selected from each stratum are proportional to the total number of samples in the entire stratum, the sampling technique is called proportionate random sampling (Kothari, 2004). In stratified sampling, all characteristics present in the population are reflected in the samples selected since the basis of stratification is to have sub-groups whose samples are of similar characteristics (Orodho, 2003). This sampling technique is advantageous because the researcher makes sure that there is no bias in the sample selected.

#### **Data Collection Methods**

The study used both a questionnaire survey and an interview as methods of data collection.

#### Interview

According to Ranjit Kumar (2011), the interview is when an interviewer reads questions to respondents and records their answers. It also involves verbal interchange, often face-to-face, though the telephone may be used, in which an interviewer tries to elicit the information, benefits, and opinions from another person. Interviews gave an opportunity to the researcher to revisit some of the issues

that had been overlooked in other instruments, and yet they were deemed vital for the study. The interviews captured questions on the independent and dependent variables, and in the course interview, probing was applied so as to elicit a good response rate. An interview with each respondent lasted for only ten minutes or less. This method involved developing questions on a piece of paper to guide the entire exercise. The researcher used this method to obtain firsthand information from respondents in detail since the researcher had a chance to probe the respondents in addition to asking predetermined questions. Key informant interviews enabled the researcher to obtain quality data in a relatively short period of time from knowledgeable people. It also enabled one to obtain the same views, which could be a prohibitively time-consuming and expensive amount of information and insight from in-depth (Family Practice, 1996). All the important information was captured, as the respondents had all the time to express their views verbally, as the researcher was recording. About the above, this method was used to get information from head teachers and health officers.

#### **Questionnaire survey**

Kothari (2004) defines a questionnaire as a set of questions sent to a person concerned with a request to provide answers and return the questionnaire. This is an appropriate and costeffective method that is free from the interviewer's bias (Babbie, 2011). According to Sekaran (2003), the questionnaire is a popular method of collecting data because researchers can gather information fairly easily, and responses are easily coded. The structured questionnaire was developed following recommended guidelines by various scholars including Kothari (2005); Sekaran and Bougie (2010), and Saunders et al. (2009). Questionnaires were preferred because they were convenient as respondents filled them during their free time and had a chance to consult for views and information. Self-administered questionnaires with closed-ended questions were used to collect data from teachers and students. This helped the researcher to save time for other academic matters. Surveys were useful in describing the characteristics of a large population. No other research method can provide this broad capability, which ensures a more accurate sample to gather targeted results from which to draw conclusions and make important decisions (Scheuren, Fritz, 2004). Surveys also required selecting populations for inclusion, pre-testing instruments, determining delivery methods, ensuring validity, and analyzing results.

#### Data Collection Instruments Interview guide

The instrument had pre-designed questions about the issues to be discussed as a guide to the interview and to ensure that all relevant aspects were covered. The instrument is intended to tap extra and detailed information on opinions, beliefs, and perceptions on the topic. Interviews allowed the researcher to clarify items in the study by repeating and rephrasing questions that seemed unclear to respondents (Kothari, 2004). Interviews were held with head teachers. The interview guide also helped to get some answers to unanswered issues in the questionnaire.

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#### Structured questionnaires

The researcher constructed a questionnaire that had closedended questions, which were designed to obtain information and data from the teachers and students. Structured questionnaires were preferred by the researcher because of their advantages, like: being easy to administer to a large population, which is largely literate; teachers and students who were the main respondents are literate. Questionnaires require less time and money compared to other methods like focus group discussions (Moser and Kalton, 1979). However, because questionnaires did not allow probing, prompting, and clarification (Amin, 2005), the researcher employed interviews in order to collect additional data that might have been left out by the questionnaires, whose items were fixed.

#### Data quality control Validity

In scientific research, validity refers to the extent to which the instruments are relevant in measuring what they are supposed to measure (Amin, 2005). The researcher requested her two supervisors to score the content with the questionnaire, and the average percentage of the score was used to determine the Content Validity Index (CVI). The average percentage was above 50%, hence the content was considered to be valid. The formula below was used to check for the validity of the research questions.

CVI = <u>No. of Questions (Items) declared Valid</u> Total No. of Questions (Items)

According to Sarantakos (2016), validity is the property of a research instrument that measures its relevance, precision, and accuracy. Validity tells the researcher whether an instrument measures what it is supposed to measure and whether this measurement is accurate and precise.

It measures the quality of the process of measurement, and one that reflects the essential value of a study, which is accepted, respected, and indeed expected by the researchers and users of research. A pilot test was used as an important part of the study, done before asking the respondents to fill out the questionnaires. This is because it assures the validity of the study instruments. Wiersma (1985) noted that piloting is important because it helps to identify misunderstandings, items that are unclear and unusable, or insufficient items. It also ensures that the questions have clear words and that the

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respondents understand the questions properly (Dahlberg & McCaig, 2010). To carry out the pilot test, the researcher issued questionnaires to 10 students who were excluded from the study about two weeks before the study. From the answers given, the researcher was able to gauge the effectiveness of the questionnaires in collecting the required data, detect mistakes, and improve the questionnaire. Some of the items detected included questions that were not clear or were misunderstood, and improvements were made to them. Some questions seemed hard for students at some levels of education to understand, and thus, the questions were made as simple as possible. This was done to refine the questionnaire before being subjected to the real study.

#### Reliability

Mugenda and Mugenda (2003) define reliability as a measure of the degree to which a research instrument yields consistent results or data after repeated trials. The pilot study enabled the researcher to assess the clarity of the questionnaire items so that those items found to be inadequate or vague were modified to improve the quality of the research instrument, thus increasing its reliability. The reliability of data was confirmed by the approval of data collection methods and tools by the university through the research supervisor, pre-testing of the tools, and careful choice of relevant questions and words used in the study. In this study, the reliability of the instrument was improved through a pilot study where the questionnaire was given to 10 learners who were not included in the study. From their response, the researcher was able to identify questions that were not clear or were misunderstood and made improvements to them. Some questions seemed hard for students at some levels of education to understand, and thus, the questions were made as simple as possible. It was done to refine the questionnaire before being subjected to the real study. The following mathematical formula for Cronbach's alpha was used to measure the reliability and internal consistency.

#### Where:

K is the number of test items

V is the average variance, and

C is the average of all covariances between the components across the current sample.

#### **Research Procedure**

To obtain primary data, the researcher got an introductory letter from the graduate school of

Team University to introduce him to the management of the Kyotera District Education Department, where the study took place. The introductory letter was used to seek permission for the researcher to carry out research in the area.

#### **Data analysis**

Both quantitative and qualitative data were analyzed as follows.

#### Quantitative Data Analysis

Page | 7 Data from the field were coded and entered into the Statistical Package for Social Sciences (SPSS) version 22 for analysis. This software could quantitatively analyze complex data collected through various means. The study used both descriptive and inferential statistics to analyze data from SPSS. Frequencies, mean, and standard deviation were used for descriptive statistics, while Pearson Product-Moment Correlation Coefficient and regression analysis were done for inferential statistics. The study used a low significance level of 0.05 to control Type I and Type II errors. All the data analysis of the study was reported in the form of tables.

#### **Qualitative analysis**

The data collected using qualitative methods was perused, edited for consistency, and tested for completeness, aimed at the correctness of the data collected. The researcher used inductive content analysis. Qualitative data collected was received, and reviewed thoroughly, and interviews were transcribed. These were sorted and classified into themes and categories using ATLAS 7 software. The data collected through interviews was analyzed and presented in the form of statements, like paraphrasing and quotations. Through such a process, patterns, trends, and relationships from coded information were established.

#### **Ethical Considerations**

There are several reasons why it is important to adhere to ethical norms in research. First, norms promote the aims of research, such as knowledge, truth, and avoidance of error. For example, prohibitions against fabricating, falsifying, or misrepresenting research data promote the truth and avoid error. Second, since research often involves a great deal of cooperation and coordination among many different people in different disciplines and institutions, ethical standards promote values that are essential to collaborative work, such as trust, accountability, mutual respect, and fairness (Amin, 2005). To avoid plagiarism, the work was subjected to the anti-plagiarism test using the anti-plagiarism software called Turnitin, of different authors were acknowledged whenever they were cited.

Various ethical rules were respected during the research process. First, the researcher got a letter of introduction from the Graduate School of Kabale University which was submitted to the district education officer of Kyotera District in order to get permission to collect data and the acceptance letter was provided. The respondents were protected by keeping the information given confidential and where there was a need to reveal, the researcher promised respondents that she would first get their consent. With regard to individual freedom, no respondents were forced to participate in the study and they were free to withdraw from the study anytime they wished. The respondents were assured that the data to be collected was for academic purposes only. The questionnaires did not include the names of the respondents for issues of privacy and secrecy.

Throughout the research process plagiarism was avoided by quoting and referencing.

SN	Item	Freq.	%	
1.	Gender of Respondents			
	Male	94	63.5%	
	Female	54	36.5%	
	Sub-total	148	100.0%	
2.	Teaching Experience			
	1-5 years	33	22.3	
	6-10 years	50	33.7	
	11-15 years	40	28.0	
	Above 16 years	25	16.9	
	Sub-Total	148	100.0%	
3.	Level of Study			
	Ordinary Level	78	52.3	
	Advanced Level	70	47.3	
	Sub-Total	148	100.0%	
4.	Teacher Qualifications			

#### **Results.**

**Table 2. Background Characteristics** 

Bachelor's Degree	61	41.2	
Masters	14	9.5	
Sub-Total	148	100.0%	

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Generally, demographic characteristics influence the study findings greatly, especially in survey studies such as this one. As such, the results on respondents' demographics indicate that Male respondents were the majority (63.5%) compared to their female counterparts (36.5%). This means that male respondents influenced the study findings the most because they were the majority. As far as teaching experience was concerned, most teachers, 50 (33.7%), had experience ranging between 6 and 10 years, followed by 40(28%) with experience between 11 and 20 years. This implies that most teacher respondents had between 6- and 16 years of teaching experience. Most secondary schools employ and retain teachers in this age bracket because teachers in this age group are the most dynamic, creative, and experienced. Teachers above 16 years or more of teaching experience are old and have seen it all; at this time, people begin to think of their retirement.

Concerning the level of study of the student respondents, most of the respondents, 78 (52.3%), were at the ordinary level, while 70 (47.3%) were at the advanced level of study. Then, regarding teacher qualifications of the respondents, most of them, 73(49.3%) held diplomas, 61 (41.2%) had Bachelor's degrees, and 14 (9.5%) possessed Master's degrees.

# Physical infrastructure and students' academic performance in Kyotera District

Results under this theme were sought by research objective one of this study, which sought to examine the relationship between physical infrastructure and students' performance in Kyotera District. Participants were presented with the statements on the five-point Likert scale (strongly agree (SA), agree (A), not sure (NS), disagree (D), and strongly disagree (SD). Their responses were presented and analyzed using a frequency distribution table with percentages. For simplicity of analysis, in this study, "strongly agree" and "agree" were aggregated to mean "agree", and "strongly disagree" and "disagree" were aggregated to mean "disagree". To make the analysis more explicit, the mean for items was computed to aid the analysis. In this study, a mean of 5.0 means that all participants agreed with the statements put to them and a mean of 1.0 means that all the participants disagreed with the statement put to them; a mean of above 3.0 indicates that the majority of the participants were in agreement on the statements put to them; a mean of below 3.0 indicates the majority of the participants were in disagreement; and a mean of 3.0 indicates that the participants were neutral.

Statement	SD	D	NS	А	SA	Mean	Std.
The library is equipped with up to	35	18	6	28	49	3.81	.732
date and relevant textbooks	(25.7%)	(13.2%)	(4.4%)	(20.6%)	(36%)		
Teaching aids, maps, & Charts are	0	7	6	82	41	4.00	.808
adequate in the school	(0.0%)	(5.1%)	(4.4%)	(60.3%)	(30.1%)		
Laboratory chemicals and apparatus are	0 (0.0%)	6 (4.4%)	20	75	35		
enough in the school			(14.7%)	(55.1%)	(25.7%)	4.14	.645
Laboratories are utilized for optional	7	27	14	68	20		
subjects because of inadequate Classrooms	(5.1%)	(19.9%)	(10.3%)	(50%)	(14.7%)	3.59	.541
Classrooms have adequate	7 (5.1%)	13	7 (5.1%)	27	82		
ventilation		(9.6%)		(19.9%)	(60.3%)	3.90	.757
The number of students' desks,	14	20	0	67	35		
The teacher's chairs and tables in the room are adequate	(10.3%)	(14.7%)	(0.0%)	(49.3%)	(25.7%)	3.94	.761
The school has enough space for	7	13	0	54	62		
A wide range of teaching and learning Approaches	(5.1%)	(9.6%)	(0.0%)	(39.7%)	(45.6%)	3.94	.745

#### Table 3: Physical infrastructure and students' academic performance in Kyotera District

#### Source: Primary data

Table 3 shows that the majority of respondents agreed with the statements rated on the questionnaire. This is explained by their mean, which is above 3, and their standard deviations, which are close to 1. The respondents' responses were as follows;

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Table 3, shows that the majority of respondents (56.6%) agreed their library was equipped with up-to-date and relevant textbooks (Mean= 3.81; Standard deviation= 0.732). Additionally, 90.4% of respondents agreed that teaching aids, maps, and charts were adequate in the school (Mean= 4.00; Standard deviation= 0.808). Furthermore, 80.8% agreed that the laboratory chemicals and apparatus were sufficient in the school (Mean= 4.14; standard deviation= 0.645). Moreover, 64.7% of participants agreed that laboratories were used for optional subjects due to inadequate classrooms (Mean= 3.59; Standard deviation= 0.757). Regarding classrooms, 80.2% agreed that they had

adequate ventilation. Additionally, 75% agreed that the number of students' desks, teachers' chairs, and tables in the room was sufficient (Mean= 3.94; Standard deviation= 0.761). Finally, 85.3% agreed that the school had enough space for a wide range of teaching and learning approaches. These findings indicate that secondary schools in Kyotera District, to a large extent, had the physical infrastructure in place, as evidenced by the results stated here. What is the implication of this finding? These findings were supplemented by interviews, in which a participant was quoted as saying:

"......having adequate learning facilities like well wellstocked library, laboratory (both science and ICT), enough furniture and classrooms is no doubt an added advantage towards excellent academic performance because it means literally that they don't lack anything...." (MHSK DH 03)

# The Relationship between physical infrastructure and students' performance in, Kyotera District

Table 4:	Pearson correlation coefficient for physical infrastructure and students'	academic				
norformanco						

	P		
		Physical infrastructure	Students' academic performance
Physical infrastructure	Pearson Correlation	1	.003
	Sig. (2-tailed)		.675**
	N	136	136
Students' academic Performance	Pearson Correlation	.003	1
	Sig. (2-tailed)	.675**	
	N	136	136

Table 4 indicates a strong positive correlation between physical infrastructure and students' academic performance ( $r = .675^{**}$ ; p < .003). This suggests that physical infrastructure significantly influences students' academic performance. Practically, this means that when schools have adequate infrastructure in place, there is a high likelihood that students will excel academically. This indicates that any positive change in physical infrastructure correlates with an increase in students' academic performance by 67.5%.

# Indicators of students' academic performance

In an attempt to understand indicators of students' academic performance, the respondents gave their opinions based on a five-point Likert scale of "strongly agree" (SA), "agree" (A), "undecided" (UD), "disagree" (D) and "strongly disagree" (SD). To ease the analysis, the percentages for "strongly agree" and "agree" were aggregated together to represent "agree", and the percentages for "strongly disagree" and "disagree" were also aggregated together to represent "disagree". Data was analyzed using percentages and the mean.

Statement	SD	D	NS	A	SA	Mean	Std.
Students have computer knowledge	17 (12.5%)	11 (8.1%)	4 (2.9%)	96 (70.6%)	8 (5.9%)	3.81	.639
Students possess knowledge about the Use of instructional materials	9 (6.6%)	8 (5.9%)	3 (2.2%)	116 (85.3%)	0 (0.0%)	4.06	.745
Performance standards in terms of grade scores in this school are high	8 (5.9%)	18 (13.2%)	6 (4.4%)	98 (72.1%)	6 (4.4%)	3.60	.617
Students' level of self-awareness is high	11 (8.1%)	14 (10.3%)	4 (2.9%)	106 (77.9%)	1 (0.7%)	3.86	.813
Students perform better in weekly tests and end-of-term exams	12 (8.8%)	11 (8.1%)	6 (4.4%)	101 (74.3%)	6 (4.4%)	3.30	.694
I am satisfied with the level of students' academic performance in this school	11 (8.1%)	11 (8.1%)	3 (2.2%)	103 (75.7%)	8 (5.9%)	3.66	.638
Students perform well in practical Lessons	13 (9.6%)	9 (6.6%)	6 (4.4%)	99 (72.8%)	9 (6.6%)	3.78	.731

#### Table 5: Descriptive statistics on academic performance

Source: Primary data, 2025

Table 5 shows that the majority of respondents agreed with the statements rated on the questionnaire. This is explained by their mean which is above 3, and their standard deviation which is close to 1. The respondents' responses were as follows;

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Table 5 indicates that the majority of the respondents (76.5%) agreed that students have computer knowledge in their school (Mean= 3.81; Standard deviation= 0.639). Also, 85.3% agreed that students possess knowledge about the use of instructional materials (Mean= 4.06; Standard deviation= 0.745). In addition, 76.5% agreed that performance standards in terms of grade scores in this school are high (Mean= 3.60; Standard deviation= 0.617). In addition, 78.6% agreed that Students' level of self-awareness is high (Mean= 3.86; Standard deviation= 0.813). Regarding students' academic performance, 78.7% agreed that students perform better in weekly tests and exams (Mean= 3.30; Standard deviation= 0.694). Also, 81.6% agreed that they were satisfied with the level of students' academic performance in this school (Mean= 3.66; Standard deviation= 0.638). Finally, 79.4% agreed that students perform well in practical lessons (Mean= 3.78; Standard deviation = 0.731). This implies that the level of students' academic performance in, Kyotera District is somewhat good as portrayed by positive responses from the participants.

#### Discussion

# Influence of physical infrastructure on students' academic performance in Kyotera District

The first objective sought to establish how physical infrastructure influences students' academic performance in Kyotera District. Results from the study indicate that there is a strong positive correlation between physical infrastructure and students' academic performance in secondary schools. Findings show that the availability of spacious classrooms, a laboratory, an equipped library, dormitories, and enough space in the school has a strong bearing on students' academic performance. Results confirmed that in the presence of adequate physical infrastructure in the school, there is a high possibility that secondary school students will perform better, provided other aspects are kept constant.

These findings are in agreement with Chan (1996), who conducted a study on the impact of physical infrastructure on students' performance and concluded that technology and adaptabilities of physical infrastructure better-equipped students for success, and that to ignore that fact was to disregard the physical difficulties of learning. On classroom size, studies have shown that students in larger classes may perform more poorly, resulting from reduced motivation, and this leads to increased absenteeism. As classroom size is reduced, instructors have a greater chance to provide students with individual attention and can respond to the reduced class size by reallocating resources toward lowachieving students or by adopting teaching methodologies

geared toward student needs (Behangana, 2017). The impact of classroom size on achievement can therefore be ambiguous, depending on the instructor's teaching method and student motivation. A well-planned and organized layout of physical classroom infrastructure does much to banish apathy, supplement the inadequacy of books, as well as arouse students' interest by giving them something

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practical to see, and do, and at the same time helping to train them to think things out for themselves.

#### Conclusion

It was concluded that there is a strong positive correlation between physical infrastructure and students' academic performance. This confirms that when the school has sufficient physical infrastructure, there is a high possibility of performing well academically.

#### Recommendation

The school administration should improve the infrastructural environment of the schools so as to improve academic performance among the students in their respective schools.

The school administration should ensure that the number of toilets is adequate, kept clean, and upholds privacy, and that at no point should female students share such facilities with their male counterparts. This will enhance the retention of students, thereby enhancing performance.

A specific land size and proper location should be a fundamental requirement for school registration. This should be adhered to strictly to avoid the mushrooming of schools without the vital infrastructure that enhances learning.

The school administration should not only provide a variety of co-curricular facilities but also ensure that they are wellmanaged.

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### **Conflict of interest**

The author declares no conflict of interest.

#### Author contributions

John Ssebuuma was the principal investigator. Dr. Muhamad Ssendagi supervised the research study.

#### **Data availability**

Data is available upon request.

#### Informed consent

All participants consented to this study.

#### **Author Biography**

John Ssebuuma holds a Master's Degree in Education Planning and Management from Team University. Dr. Muhamad Ssendagi is a lecturer at Team University.

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