



Infrastructural Challenges Influencing Academic Performance in Rural Public Secondary Schools in Iringa District, Tanzania

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Abstract: *The study sought to investigate how infrastructural challenges influence students' academic performance. Specifically, to describe the challenges encountered by school heads on improving school infrastructure for academic performance in rural public secondary schools in Iringa District. The research used a mixed approach and convergent parallel research design. Maslow's theory of hierarchy of needs developed by Abraham Maslow in 1943 was employed to underpin the study. The total target population was 22,457 people from which 151 respondents comprised of 48 teachers, 97 students, 5 heads of schools, and 1 District Education Officer were involved in the sample size.. The study used a combination of probability and non-probability through simple random sampling and purposive sampling techniques, respectively, to select the respondents. The data was collected through questionnaires, interviews and observation. The analysis for quantitative data was done using descriptive statistics, with the aid of Statistical Package for Social Science (SPSS) version 21, while qualitative data was coded and categories through thematic analysis. The findings of the study revealed that students' performance in rural public secondary schools in Iringa District was unsatisfactory due to inadequate school infrastructures like libraries, laboratories, classes, dormitories, and instructional materials. This study concluded that school infrastructure is very essential to develop and provide quality education, which leads to growth and excellence.. Inadequate infrastructure negatively influences academic performance. The study recommended that the government, with other stakeholders, should increase funding for schools to provide and support adequate teaching and learning materials besides standard infrastructure in secondary schools.*

Keywords: *Academic performance, Challenges. School infrastructure, Rural and secondary schools*

How to cite this work (APA):

Mgimba, A. E. & Mwila, P. M. (2022). Infrastructural challenges influencing academic performance in rural public secondary schools in Iringa District, Tanzania. *Journal Research Innovation and Implications in Education*, 6(2), 17 – 24.

1. Introduction

School infrastructure refers to things like school buildings, playgrounds, public amenities, libraries, laboratories, and other facilities which contribute to a positive learning environment (Tanzania Institute of Education (2013). School infrastructure plays an essential role in education for resolving problems of students' access to the school system and to improve their performance. Proper infrastructure, which includes: chairs, tables, desks, lighting system,

sanitary services, and internet services enable students to comfortably stay and learn in school; while the teachers and other staff members within the school carry out their school related duties effectively (Cuesta, Glewwe and Krause, 2015).

However, there are times when, regardless of the infrastructure, students do not perform well. According to Mokaya (2013) as supported by Ngwaru

and Oluga (2015), physical space and concentration do not matter, but researchers and psychologists suggest that environmental factors can increase academic performance and motivate attendance (Kapur, 2018). On the same note Naz, Hussain, and Khan (2018), for instance, state that overcrowded and stressful environments can affect the learning capabilities of children. Therefore, we can deduce that the site for educational institutions like schools is of a crucial concern, as noise and temperature levels are said to impact negatively on the students' ability to comprehend subject content during lessons. Physical conditions can have both positive and negative effects on the students' all-inclusive development in terms of motivation in learning.

The World Bank (2016) reported that the enrolment of secondary schools increases from year to year. This increase, which is not proportionate to improvement of school infrastructure to accommodate the increasing numbers, leads to overcrowding in the classrooms where one class has more than 74 students. In consideration of the crucial role that school infrastructure plays in achieving the desired learning outcomes, the increase in number of student results in the need for additional resources: materials, informational resources, physical resources, and total textbooks per student.

Baghdady and Zaki (2019) explain that secondary schools in Sub-Saharan Africa (SSA) perform poorly, and the governments are facing several challenges in achieving their objectives for secondary education. Among these challenges are lack of funding and necessary infrastructure in rural areas. It is in this view that Amsterdam (2010), states that the quality of the learning environment is an important contributor to students' outcomes and thus, it is clear as to how the whole issue of the economy is completely affecting the quality of school infrastructure, which is essential to the whole process of teaching and learning within the school environment.

In addition to the availability of school resources, proper management of those resources in the teaching and learning process lead to high student academic performance. Therefore, a school management committed to enabling the learners achieve the desired competencies should make efforts to improve on the quality of school environment by constructing, rehabilitating and repairing school physical facilities with the help of central and local governments (Nzoka and Orodho, 2014). On the other hand, Yusuph (2019) states that in Tanzania, the students enrolment was 261,951 students in 2000, while in 2017 the enrolment reached 1,908,857 students. He further notes that, the rise in enrolment has challenged schools infrastructure on implementation of free secondary education policy, as schools require adequate learning infrastructure,

including classrooms, desks, tables, toilets, staff houses, and offices.

The education sector development plan 2016/2017-2020/2021 points out that one of the biggest challenges facing schools due to poor infrastructure is poor learning outcomes, as seen in the national examinations results. Some of these challenges include lack of textbooks and overcrowding in the classrooms. Nonetheless, in five years, the education sector development plan goals have targeted to build and upgrade education facilities and to provide a safe school environment that will ensure effective teaching and learning process.

Apart from the goals stated in the education sector development plan, Tanzania Institute of Education (2013) reports that, the government and local authorities planned to ensure appropriate infrastructure, provide adequate standard physical resources, and develop facilities that are considered critical such as classrooms, administration offices, laboratories, libraries, dormitories, staff houses, and ICT facilities. The intended strategic plans were good as they would enable the learners to develop knowledge, skills, values and attitudes, to make responsible decision and take action in dealing with learning to access knowledge from different sources by using computer and e-books.

School infrastructure plays an indispensable role in the teaching and learning process. According to Yusuph (2019), school infrastructure makes it possible for learners to study comfortably and improve academic performance and engagement of students and teachers in the teaching and learning process. For this reason, investment in school infrastructure is essential in resolving problems of improvement of students' academic performance. In Tanzania, TIE (2013) stipulates that in secondary schools there should be adequate infrastructure, standard physical resources and facilities to be provided to public schools by both central and local governments. These include classrooms, laboratories, libraries, ICTs, and dormitories.

Developed countries have succeeded in having good school infrastructure which leads to better student performance. The case of Tanzania, including Iringa Rural District, the government has improved school infrastructure from 2015 to 2020 and students' results have improved significantly compared to previous years. It is in this context that the researchers sought to find out the magnitude of the contribution of school infrastructure as a factor in student achievement of learning outcomes. Unfortunately, research has not yet fully investigated on the challenges facing heads of schools on improving school infrastructure for students' academic performance in rural public secondary schools in Iringa District. Hence, this study covers the gap.

2. Literature Review

School infrastructure includes facilities such as buildings, playgrounds, ICT devices, teaching and learning resources among others which enable students and staff to realize the desired outcomes in the teaching and learning process (Saga, 2014). The availability of school infrastructural challenges faced and their influence on academic performance in rural secondary schools were assessed through theory and literature from both primary and secondary sources.

Maslow's theory of hierarchy of needs developed by Abraham Maslow in 1943 was employed to underpin the study. He describes different levels of needs in his hierarchy of needs. The psychological needs are those that every human being needs. The basic human needs include water, settlement, a safe environment from hurt and injury, care, appreciation, participation and acceptance.

Limon (2016) conducted a study on the effects of adequacy of school facilities on students' performance and achievement in technology and livelihood education in the Philippines. The researcher used a mixed-method design through questionnaires and interviews as instruments of data collection. The researcher found out that insufficient school facilities negatively impacted on students' achievement and that the administration did not take any significant action in addressing these major education issues. The study concluded that school stakeholders should closely look into ways of focusing on support and management of facilities in the field of Technology and Livelihood Education (TLE). To overcome the challenges facing school heads therefore, the government and other stakeholders must strongly provide school infrastructure to facilitate teaching and learning programmes in schools. This would highly equip students with better skills for academic performance.

Challenges faced by educators as they struggle to integrate technology in the school as well as classrooms include insufficient equipment or connectivity, internet problems, poor electricity supply and inadequate teachers training or skills (Russeu, and Stam, 2016). In order to facilitate quality education therefore, there is need to consider the prevailing situations in the learning institutions and supply the required equipment related to technology. From this point of view, effective curriculum implementation could be carried out successfully through the provision of sufficient teaching and learning facilities.

Suliah and Arafat (2019) assessed headmasters' strategies to maximize using infrastructure, and teachers' role in improving the quality of learning in elementary schools in Pakistan. The researcher used pure qualitative (descriptive) method. Interviews, observation and document analyses were used as instruments of data

collection. The study findings indicated that headmasters used their effort to maximize the teaching and learning processes in the classrooms, but did not achieve their objective due to an insufficient number of the classrooms; where classes are split by dividing study hours so that some come in the morning and others come in the evening. The study suggested that in order to improve the quality of learning, there is need to increase more teachers, and all stakeholders to work hard towards improving school infrastructure. It is evident from the study that free education increases students' enrolment annually which can lead to overcrowding classrooms if the required infrastructure is not improved accordingly. To reduce congestion, more classrooms need to be put up to sustain the number of enrolled students.

Yakaboski and Nolan (2011), examined the financial challenges in improving school infrastructure, resulting from the change in education system, particularly free education, which led to a great rise in enrolment. The schools could not establish school infrastructure hence asking parents to help with building or equipment funds. It is evident that a country with limited resources will struggle due to the massive enrolment, compromising the quality of education. Since the students' enrolment is increasingly high, the government and all the stakeholders should concentrate on improving educational infrastructure, mostly classrooms, which are largely scarce due to the rise in enrolment. In response to such a challenge, buildings would contribute to students' better academic performance.

Wamunyu (2012) conducted a study on challenges facing secondary school heads in the management of school projects in Kenya. The study findings indicate that heads of schools have been overwhelmed with poor project and misuse of resources. This has led to serious complaints by the Teachers' Service Commission (TSC). The study proposed that the ministry of education should organize training programmes on project management, financial management, evaluation and monitoring, for school heads

Chepkonga (2017), asserts that there is scarcity of school infrastructure in secondary schools in Kenya. In the study, it was revealed that most secondary schools lack school infrastructure and that schools were running out of adequate learning facilities which influenced the quality of education. The call was made for the government to construct more facilities to ensure that quality education is provided in public schools.

Also, Gichu, Kabaara and Njagi (2017) carried out a research on challenges faced by head teachers in public schools in Kenya. The study involved descriptive research design and used questionnaire and structured interview schedules as instruments for data collection. The researchers found out that there were vast challenges facing heads of schools such as poor and unsatisfactory infrastructure which affected the implementation and

improvement of academic performance in their schools. The researchers concluded that head teachers were facing serious challenges when they want to improve approaches on management plans in the areas of improving academic performance and maintaining high levels of discipline in their schools. Therefore, there is need to ensure presence of adequate school infrastructure by asking other stakeholders to contribute in enhancing good performance in public secondary schools, instead of relying purely on government budget.

Saga (2014) researched on access and quality challenges facing community secondary schools in Kilolo District Iringa Region in Tanzania. The findings revealed that the challenges facing the heads of schools in community schools include inadequate teaching and learning materials as well as school infrastructure. High academic performance of secondary schools is influenced by the availability of learning resources according to teacher and students' ratio. Therefore, effective teaching and learning processes in secondary schools require laboratory equipment, libraries and classrooms. With availability of such infrastructure there would be a good chance for students to perform well.

The findings from the literature review reflect the situation in Tanzania and Iringa district in particular, where the problem of school infrastructure, especially in rural public schools has become so severe. To respond to this situation, the researcher sought to examine infrastructural challenges encountered by school heads in the provision of quality education for academic performance in rural public secondary schools in Iringa District.

3. Methodology

The researcher used mixed research approach whereby both quantitative and qualitative methods are used to collect and analyse data. These approaches helped the researcher to obtain more details and specific information about the problem of the study. The researcher used convergent parallel mixed research to be able to get the required information from the respondents, analyses the two components independently and interprets the results together (Creswell, 2018). The target population for this study involved all students (21535), all teachers from

public secondary schools (890), heads of schools from (31) public secondary schools and (1) District Education Officer in Iringa Rural District, a total of 22457 people. The research used probability and non-probability sampling techniques to select participants for the sample size from five schools which were purposively selected of 31 public secondary schools, 97 students out of 2921 and 48 teachers out of 91 were selected respectively using simple random sampling; making a total of 151 respondents. In probability sampling, simple random sampling technique was used to select teachers and students, while in non-probability sampling technique, the researcher employed purposive technique to select the District Education Officer and heads of schools. Data collection involved, questionnaires, interviews, and observation schedules.. The study instruments were ascertained using a pilot study carried out in one of the schools not included in the study. The reliability tested gave a coefficient of reliability $r = 0.7$ which allowed the researcher to use the tools for the study. The researcher analysed quantitative data collected through questionnaire by using descriptive statistics with the aid of a statistical package for social science (SPSS) version 21, which were presented in frequencies and percentages. The researcher also, analysed qualitative data collected through interview by coding and categorised them thematically in narratives.

4. Results and Discussion

School Infrastructural Challenges' Influence on academic performance.

This study aimed at identifying the infrastructural challenges facing school heads in the provision of quality education for academic performance. Respondents involved were teachers, students, school heads and District Secondary Education Officer (DSEO). Teachers and students were given questionnaire to fill, while school heads and the District Secondary Education Officer were interviewed. The researchers prepared Likert scale questions to respondents (teachers and students). The responses of participants are summarized and presented in table 1. The scale is rated from the lowest to highest degree of agreement in the following order: Strongly Disagree, Disagree, moderate, Agree and Strongly Agree.

Table 1: Responses on Infrastructural Challenges Influence on academic performance (n=145 respondents)

Statement	SD F (%)	D F (%)	M F (%)	A F (%)	SA F (%)
Good classroom furniture does not attract students to perform Well	17(11.7)	19(13.1)	32(22.0)	26(18)	51(35.2)
School infrastructure does not simplify well teaching and learning process	49(33.8)	36(24.8)	23(15.9)	20(13.8)	17(11.7)
Laboratories do not provide appropriate chance to students to be creative and innovative	55(37.9)	45(31.0)	20(13.8)	14 (9.7)	11 (7.6)
The absence of library helps students to think critically	49(33.8)	35(24.1)	26(18.0)	22(15.2)	13(8.9)
The presence of computers helps students to expand their knowledge and skills	56(38.6)	37(25.5)	22(15.2)	20(13.8)	10(6.9)

Source: Field data, (2021)

The findings show that 11.7 percent of the respondent strongly disagreed, 13.1 percent of the respondents disagreed, 22 percent of the respondents indicated moderate, 18 percent of the respondents agreed and 35.2 percent of the respondents strongly agreed. The classrooms were overcrowded, not painted, and floors not cemented. Heads of schools face this challenge to ensure that school furniture is available yet there are no funds to facilitate the provision of the furniture. This leads to negative outcomes in both teacher and student performance. In this situation, students cannot perform effectively due to lack of school infrastructure.

In an interview, the head of school “A” said:

Challenges that arise from the shortage of school infrastructures are not limited to school construction like classrooms only. This does not encourage the students and the teachers to teach and learn seriously. Similarly, the fee free basic education policy is now being abandoned by the government. Parents have left the matter of education to the government; they have resigned themselves, and they don't care if the children are taught or not, everything is left to the government (Interviewed August, 2021).

Parnwell, (2015) indicates that sufficient and well-maintained classroom furniture becomes a catalyst for students to learn better. Limon (2016), states that insufficient school facilities negatively impacted student achievement and that the administration did not take any significant action in addressing these major education issues. This implies that there is no motivation on both

the teachers and the students when there are insufficient facilities such as school furniture.

Moreover, the findings show that 33.8 percent of the respondents strongly disagreed with the statement that school infrastructure does not simplify well teaching and learning process, 24.8 percent of the respondents disagreed, 15.9 percent of the respondents indicated moderate, 13.8 percent of the respondents agreed and 11.7 percent of the respondents strongly agreed. Lyimo, Too, and Kipng'etich (2017) explained that most of the secondary schools in Tanzania have a shortage of instructional materials. This implies that lack of instructional materials can result in low students' academic performance in secondary schools. Therefore, the heads of schools fail to implement their school goals due shortage of teaching and learning materials. The result of which will negatively affect student achievements academically. School physical facilities like laboratories as well as gas system and water system, toilets, libraries, and dormitories were observed and it was evident that they were partially built. The inside was not yet completed. Every year there is a new work plan but other work plan remains without being completed. These incomplete projects include classrooms, toilets and laboratories. This has led to wastage of funds as it hinders the school goals for achieving efficient results; given that sustainable infrastructure plan predicts positive outcomes. The interview from the District Education Officer (DEO) “X” said, “School infrastructures are not available to all schools due to large numbers of students' enrolment, few holes of toilets, shortage and uncompleted classrooms and laboratories projects in almost all schools”. This implies that,

information clearly proves that there is a challenge in the completion of school infrastructures thus has led to poor achievement of schools' teaching and learning objectives.

Table 1 shows that 37.9 percent of the respondents strongly disagreed that Laboratories do not provide appropriate chance to students to be creative and innovative, 31.0 percent of the respondents disagreed, 13.8 percent of the respondents indicated moderate, 9.7 percent of the respondents agreed and 7.6 percent of the respondent strongly agreed. These findings show a situation contrary to the assumption of Vygotsky in the sociocultural learning theory who stated that the interaction of sociocultural environment tools like laboratories with students can lead to continued change for the positive, in students' behaviour in schools (Mawere, Mubaya, Reisen and Stam, 2016). This means that the presence of laboratory can change students' behaviour positively in the learning process. The opposite of it can change the outcomes negatively, as far as the academic outcomes are concerned. The absence of laboratories and the equipment therein can therefore make students unproductive after graduation.

In response to the statement that the absence of library leads students to think critically, 33.8 percent of the respondents strongly disagreed, 24.1 percent of the respondents disagreed, 18 percent of the respondents indicated moderate, 15.2 percent of the respondents agreed and 8.9 percent of the respondents strongly agreed. Insufficient school facilities like school libraries without facilities such as textbooks, magazine and newspaper cause difficulties in learners' critical thinking processes (Chepkonga (2017). This statement clearly implied that many schools operate without libraries and had affected the academic performance of their students. Poor performance of students limits the cognitive development of students in secondary schools. Therefore, this situation leads to poor performance among the students due to lack of school library facilities.

While, 38.6 percent of the respondents strongly disagreed with this statement that the presence of computers helps students to expand their knowledge and skills, 25.5 percent of the respondents disagreed, 15.2 percent of the respondents indicated moderate, 13.8 percent and 6.9 percent of the respondent agreed and strongly agreed respectively. This means that there are challenges on ICT facilities which could not motivate students in the teaching and learning process, also this challenge leads students to perform poorly. The lack of ICT facilities in schools makes it difficult for teachers to perform their duties because the environment does not support effective teaching.

This means that with fee free basic education policy, much as it is very good for the learners to study without payment, it poses a challenge to school administrators. There is no comparison between students and school facilities, which can cause failure of students due to

shortage of school infrastructure. One of the heads in school "C" added:

Some of the impacts of fee free basic education policy include four students sitting per table; for example, there are 196 students in form one, but they have only two classes. Similarly, there are only 12 computers compared to the number of students in each class, and four computers are not in a good working condition. Also, two classrooms are still in the process of constructions since last year hence students do not have space in the present classes. This then makes it difficult to evaluate the lessons as required (Interviewed August, 2021).

This implies that, the big number of students enrolling in secondary schools need a long plan preparation for school construction and provision of school facilities to enhance effective teaching and learning process. Parents and community need to be sensitized to support school infrastructure for their children because findings of this research indicated that they do not understand their responsibility or they are not involved in supporting education. In Maslow's hierarchy of needs, the effort of the community in the African culture, within the context of Ubuntu states that it is the group and not an individual that motivates daily activities such as education (Mawere, Mubaya, Reisen and Stam, 2016). Therefore, from these findings, it is evident that even within the context of Tanzania as a nation, school infrastructure is constructed for individual schools but support from the community are needed for the projects to succeed.

Through observation, the researcher observed that schools had a few chairs and tables for the teachers and students which were not sufficient for the high number of students. This led students to squeeze in one table or desk. One of the heads in school "D" explained thus: "Two chairs are shared by three students. Students enter in the class while running and struggling to get chairs where one desk is shared by five students". Similarly, the headteacher of school "C" added:

On the issue of chairs and tables this is a big problem, students fight for chairs. Students are many compared to the number of chairs and tables available for both the teachers and the students. We have a lot of troubles during exams. We are forced to do internal exams by exchanging rooms. Consequently, it is difficult even to assess the success or failure of a student in the classroom because they could copy from each other due to the proximity (Interviewed, August 2021).

The means that the presence of sufficient chairs and desks or tables have a major contribution to the students' performance for they get to sit comfortably while listening to the teacher, studying without discomforts and

will be able to critically evaluate curricular successes and failure. According to Reisen and Stam (2016) the sociocultural theory, emphasises cognitive development by good interaction with the environment and making good use of the available school resources. This means that educational planners and other education stakeholders should influence the cognitive development of children by taking care of school properties. Therefore, all these challenges make the teachers and students lose the motivation to teach and study diligently because the environment is not supportive. At the end, the result can be negative or unsatisfactory due to insufficient school infrastructure. Similarly, lack of equipment for practical content in the laboratory leads to poor performance.

5. Cocclusion and Recommendations

5.1 Conclusion

The findings found that, most of the rural public secondary schools in Iringa district have inadequate school infrastructure which leads students not to perform well. Therefore, according to the findings, it shows that for the students to perform well, conducive environment could facilitate high academic performance to students especially in rural public secondary schools. The majority of the students are affected by inadequate school infrastructure such as desks, chairs, laboratories' equipment and libraries with textbooks. This leads to students' failure to be creative, innovative, think critically, and expand their knowledge, skills, and abilities leading to students' poor performance. Based on the findings, the researcher concluded that school

infrastructure is very essential for enhancing quality education; yet inadequate to facilitate effective teaching and learning process for the purpose of realising students' goals after graduation, develop student's talents, making students creative and innovative to improve their knowledge and skills.

5.2 Recommendations

The study recommends the following to the government through the ministry of education, that:

1. The government needs to design standard school infrastructure according to the current situation, school infrastructure should be improved in the area to enhance students' academic performance by increasing instructional materials and equipment.
2. Community members should provide more support in improving school infrastructure to ensure provision of better and quality education by getting involved in schools and supporting to construct school infrastructure especially school dormitories, libraries and other physical facilities to reduce overdependence on government funds.
3. Policy makers need to establish policies which are relevant to the Tanzanian context aimed at improving students' academic performance according to the environment. They should also allow other stakeholders to be involved in policy making decisions to reduce complaints on education issues from the community.

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