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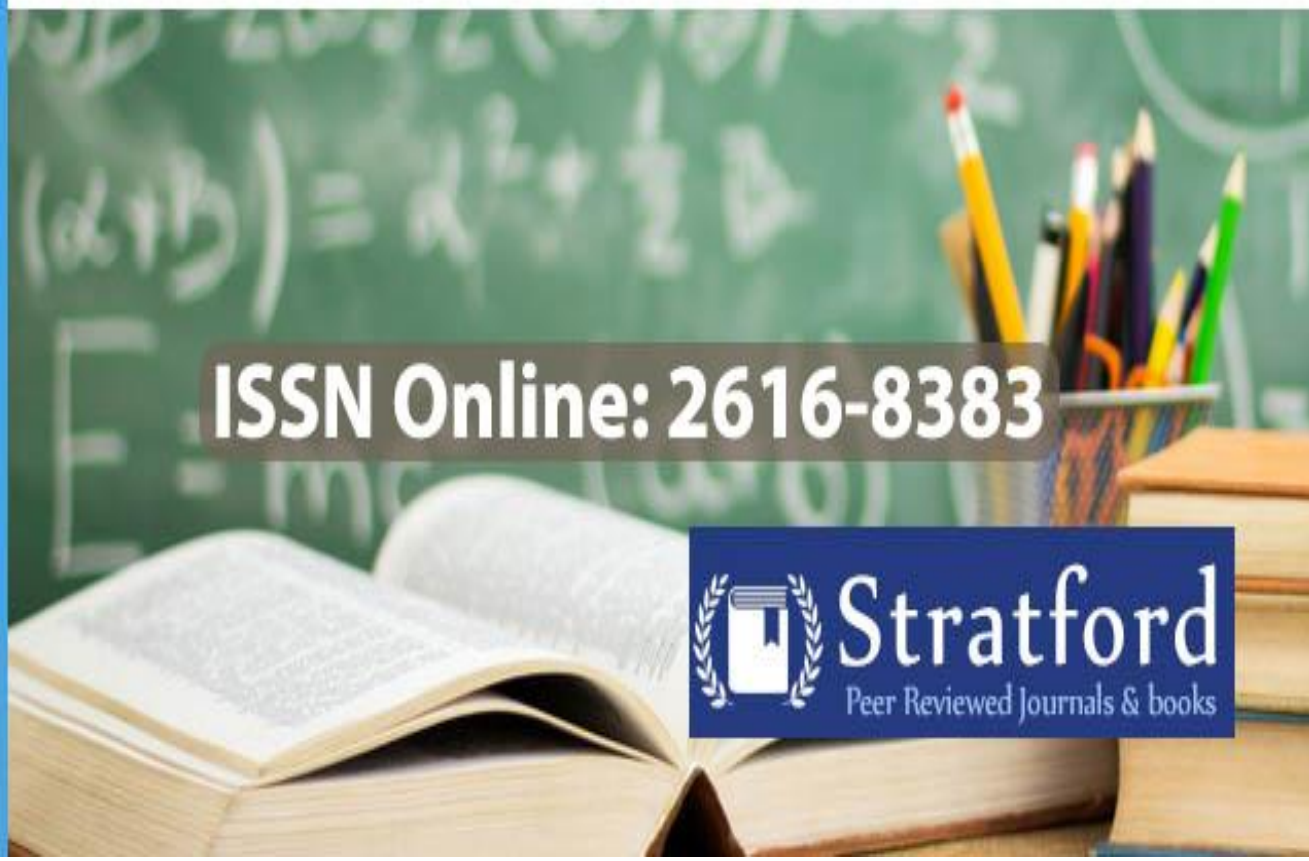

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Relationship between School Infrastructure and Students' Academic Performance in Twelve Years Basic Education in Rwanda

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Abstract

The school infrastructures play a significant role in the development of both school performance and students' academic performance. Well settled school physical plants, help the students to discover and develop their talents. This study therefore, aimed to investigate the relationship between school infrastructure and students' academic performance in twelve years' basic education in Rwanda. The study employed correlation research design and the sample size of 200 people. In this study, school infrastructure was used as independent variable while students' academic performance was used as dependent variable. The study used questionnaire and guided interview as the research instruments. The quantitative findings that were collected from questionnaire, were analyzed by using SPSS software vision 21 and the data collected from guided interview was analyzed by using thematic method. The results that were obtained, indicated that the average of 70.5 % disagreed on the adequate school infrastructures available in Twelve Years Basic Education (12YBE) in Gasabo district. The inadequate school infrastructures indicated in twelve years basic education reduces the academic performance of students. Despite, the improvement of students' academic performance valued at an average of 27.1% which is low. The study also found, that there is a significant low positive correlation between school infrastructures and students' academic performance in 12YBE in Rwanda as it was proved by Karl Pearson coefficient of correlation (r) was +0.408. The qualitative findings revealed that school infrastructures to be available in 12YBE are like completed classrooms, well equipped libraries

and laboratories, adequate playgrounds and school sanitation. However, these infrastructures were experienced to be inadequate in 12YBE in Rwanda.

Keywords: *School Infrastructure, Students' Academic Performance, School Physical Plants.*

1.0 Introduction

1.1 Background of the Study

Education in world is taken as the root of socio-economic, scientific and technological advancement (Olufunke, 2012). Getting quality education, needs to have well equipped learning institution with sufficient facilities so as to improve education productivity (Stream, 2006). Education is also important for economic and social development of any given country (Shannon, 2013). Schools are one of the key factors of getting the required education. The effective school settings should be equipped with complete infrastructures which can allow different educators to provide effective education by making teaching and learning process adequately. This can facilitate the cognitive development of the youths.

According to Stream (2006), school infrastructure which is well equipped is one of the factors that can promote the school performance. It was also discovered that, a big number of insufficient school infrastructures located in rural and suburban areas which leads to low school outcomes and development (Shannon, 2013). The advantages of allocating sufficient school infrastructures which are also equipped, can support educational effort (Bruner, 2001). The United Nations Education for Scientific and cultural organization (UNESCO, 2008), revealed that, education reforms need to involve all educational stakeholders to support effective teaching and learning styles that may work, due to well-equipped laboratories, libraries and also effective classrooms settings. UNESCO (2007), did a report related to school facilities and working condition of the schools in rural areas and noted that, the schools without school infrastructures or those with unmaintained equipment affect learners' achievements in schools. Shannon (2013), also added that, the academic performance of students may be reduced by insufficient school materials however, the students cannot also be aware of developing their talents due to inadequate school physical plants.

In Africa, the learning instructions established in formal education require well equipped school infrastructure (Lanham, 2000). Academic achievement of learners is highly affected by available educational infrastructure in the given school (Karue & Amukowa, 2013). This implies that the school whose standard infrastructures which are also well equipped, provides better students' academic performance rather than the school which doesn't have complete school infrastructures and well equipped. Furthermore, Furniture, indoor air quality and class size are important infrastructures related variables that impact teaching and learning achievement.

MINEDUC (2007), elaborated education sector policy which stated the strategic plan of establishing the shape of new school infrastructures such as adequate classrooms and well-equipped libraries and laboratories in schools in order to enhance quality education in Rwanda effectively and efficiently mainly students' academic performance. However, Rwanda experiences the same case of developing country that meet the problems related to the quality of education due to inadequate school infrastructures. Therefore, the government of Rwanda has put in place different measures to overcome this problem, like involving communities in classroom

construction through community work, Army week activities where Rwanda defense forces played a role in classroom construction in different part of the country.

1.2 Problem statement

Basing on Education Sector Strategic Plan(ESSP), the main goals of education to be achieved, were like enhancing students' participation in education so as to standardize skills, to improve the in-service of educational delivery effectively and efficiently by the purpose of acquiring the related education which can help the students to perform and compete at the labor market (ESSP, 2013). By the time the government of Rwanda established the sighted to 2020, the government introduced free education to be delivered from primary to secondary level so as to reduce the level of illiteracy in the country. This program of free education also came for the purpose of increasing literacy rate and fighting against ignorance in youths. Through this effect, education become free up 12YBE (EDPRS, 2011; JICA, 2012; IDCJ, 2012). The enrollment in 12YBE was significantly increased since the system was made free of charge. This created the shortage of school infrastructure that affects the level of students' academic performance where the level of students' academic performance in 12YBE in selected schools was at the level 69.3percent. McGowen (2007) noted that school infrastructure has significant influence on student academic performance. This mean that the schools with inadequate infrastructure such as school libraries, laboratories, adequate classrooms, player grounds.

In Rwanda, the earlier study showed that student in 12YBE increase day to day but infrastructure in these schools are not expanding proportionally. Classrooms are not enough to accommodate available learners, laboratories and libraries are not equipped adequately to support students learning and practices hence their academic achievement being affected. The students, parents and society in general were complaining for poor performance of the students enrolled in 12YBE especially in national examination done at the end of their advanced level. This study was therefore, sought to investigate the relationship between school infrastructure and students' academic performance in 12YBE in Gasabo District.

1.3 General Objective

The purpose of this study was to investigate the relationship between school infrastructure and students' academic performance in 12YBE in Gasabo district Rwanda.

1.4 Objective of the study

To establish the relationship between school infrastructure and students' academic performance.

1.5 Research Question

What is the relationship between school infrastructure and students' academic performance in 12YBE in Gasabo District in Rwanda?

1.6 Significance of the Study

The findings of this study, may be significant to school leaders and other educational stakeholders in Rwanda. The research findings may be helpful to identify how the school infrastructures can affect the students' academic performance. This may also help the ministry of education to establish adequate school infrastructures ready to develop the school performance and literacy level of students in 12YBE in Rwanda.

2.0 Literature review

2.1 Theoretical Literature

The school infrastructure is one of the factors that help the development of educational program delivery (Lanham, 2010). School infrastructures should indicate environment which is well conducive and which meet the educational requirement in terms accommodation of the students' wellbeing and also, they should be the integral component that provide effective teaching and learning process. According to Eduard (2006), there is a real linkage which should be found with in learning environment mostly by age status in terms of students' outcomes known as students' academic performance. The school buildings and provision of effective education should be based on historical change of school and provide unique opportunities that can improve the school performance (Lanham, 2010). Therefore, teachers, students, school infrastructures and curriculum are considered to be the input variables while student' academic performance was considered as output variable (McGwen, 2007).

2.1.1 School infrastructures

Osahon (2010), defined the school infrastructures as physical structures which are known as shelter for educational activities including classrooms, laboratories, workshop, teaching staff office and school administration offices, toilets, reading rooms, dispensaries, libraries, dining halls and assembly halls. Ogunsaju and Oyedeji (2012), defined school infrastructures as the school buildings which embrace permanent structures that includes laboratories, classrooms and libraries. Abraham (2003), said that all physical structures with in the school can also be used by the school community. All physical infrastructures in the school are grouped in the category of school physical plants (Ehiemetalor, 2011). This implies that the school physical plants should be evaluated accordingly in order to make students' standard skills needed to perform the school activities.

2.1.2 Important of school infrastructures in education

The school physical infrastructures like classrooms, libraries laboratories and staff houses enhance physical learning environment that leads to the provision of technical skills and to develop qualitative and adequacy aspects that are needed in the school setting (Maron & Brooth, 2007). Housing teachers and students according to the school environment, improve student's performance where teachers can get opportunity of providing special courses to those teachers that teach practical subjects through school laboratories (Watson, 2013). Sanitation facilities which comprise waste disposal ,drainage and adequate water for personal hygiene ,cleaned toilets and other materials used while making school infrastructures modify the level of cleanliness which attract and motivate students get improved academic performance (Kinder , 2013).

According to Sidhul (2012), the school infrastructures promote the performance of curricular and co-curricular activities provided by school. The nature and size of school infrastructures presents the shape and size of classrooms. The shape and size of classrooms and availability of educational materials, change the way through which students participate in school instruction. Practical courses could not be maintained for science students in school setting without science laboratories (Sidhu, 2012). Therefore, the availability of school infrastructures should be supported by parents and educational stakeholders that provide their financial capacities (Mgbodile, 2010). The extent

to which school administrators perform the organizational goals depends on the combination of various variables which lead to the effective management of school infrastructures (Obi, 2011).

2.1.3 Students' academic performance

According to Nyongesa (2011), Academic achievement of students is the results of the school available infrastructure such as classrooms, libraries, sanitation facilities to facilitate the performance of class assignments, homework assignments, tests, examinations and participations. The pressure of parents and other individuals like teachers and school administrators to improve the academic performance that also help the school to come with the new updated advanced strategies like introduction of effective teaching and learning methods, instructional strategies and rewarding students for good performance so as to encourage the motivating factors in schools which tend to work more and to make improvements (Nyongosa, 2011).

The academic concepts are made to establish the participation of students and teachers in the classroom setting. Therefore, it is vital that classroom environment should be maintained and well organized (Kudari, 2016). The efficiency management of the classroom, promote the lesson delivery, instructional strategies and teaching and learning process so as to make effective discipline and communication in the classroom and also to help the students to learn better and improve their academic performance (Kodari, 2016). The school resources should be maintained and used so as to promote the academic performance in such way that school textbooks should be always updated, learning materials, hand-outs and technology should be available in the school setting and also well -organized library facilities and laboratory facilities specifically in science subjects in order to develop the school outcomes known as students' academic performance (Maina, 2010). The student will be helped to get the related learning concepts that make them to understand their focus as academic concept where students' dependent upon the library facilities in order to obtain textbooks and other material needed and well -equipped laboratories (Maina, 2010).

2.1.4 School infrastructures and students' academic performance

School infrastructures like school library keeps all forms of information needed to enhance and develop positive teaching and learning activities like textbooks, charts, magazines, maps, journals, newspapers, programmed textbooks and non-printed materials such as films, records, pictures and audio and also science apparatus and chemicals (National examinational research center, 2002).

According to Gidado (2010), school infrastructure like school classrooms are needed to perform various activities of school program as well as for extra-curriculum activities. School plants facilitate the implementation of teaching and learning activities so as to achieve the specific objectives of curriculum, to encourage and promote self -instruction of teachers, to present learning task of teachers and to motivate students (Agun, 2009).

The school libraries and laboratories which are equipped, serve various benefits that lead to the effective academic performance like provision of students' direct interaction with the realities found in social and physical environment, promoting the acquisition and retention of actual knowledge, simulating the interest of voluntary reading, facilitating the attitudes and behavior change and also illustrating and clarifying non-verbal symbols (Alcon, 2007).

2.1.5 Effects of school infrastructures on students' academic performance

The school infrastructures like co –curricular infrastructures which include music rooms and theater rooms, help the students to be engaged in the participation of various activities done in the school and develop their social and mental skills as well as being developed physically and emotionally (Nganga, 2003).The availability of effective playground and equipment, help students to search and develop their talent .Therefore, co-curricular facilities must be allocated effectively and efficiently and also structured properly for nurturing students' talents (Khaemba ,2007).

Modern approaches developed in education sector, should focus on the development of the students' academic performance (stephens & schaben, 2002). The effective learning achievement show that co –curricular activities should be organized and supported accordingly by the school management holder so as to enhance the student's academic outcomes in which curricular co-curricular must be balanced (Brosh ,2012).

2.1.6 Government policy on students' academic performance in secondary schools

The government goal is to make sure that all citizens are getting quality education. The development physical and material resources are highlighted in laws and policies governing education system of the country. The students' academic performance is developed due the availability of infrastructures like school libraries and laboratories that are well equipped and maintained school classrooms and also having trained teachers Therefore, school administrators should put much efforts on school infrastructures to be available in school setting so as to provide effective and efficient quality and quantity education since enrollment has increased (Mworia, 2013). The implementation of educational policies and improvement of the school infrastructure has reduced the problem of poor performance of the students (Mworia, 2013).

2.2 Empirical literature review

While reading the other researches related to the school infrastructures and students' academic performance which were done, you can find a number of people showing that school infrastructures has a significant impact on students' academic performance.

Paul (2015), conducted a research in Latin America which was entitled as school infrastructures and education outcomes in which the researcher used questionnaires and interview guide during data collection where he found that school libraries and creation of new schools lead to the development of learning and enrollment. The researcher also found that toilets enhance students learning so as to solve their personal needs he also continued developing that laboratories and drinking water facilities also promote enrollment of the students.

David (2012), conducted a study in USA, at Michigan University. The study was entitled importance of school infrastructure on quality education improvement. Structured questionnaires were used as data collection instruments. The study findings indicated that school infrastructure influence students' academic performance is highly correlated in the university.

2.3 Critical review and research gap identification

The time you look at the findings of the other researchers which were done related to the school infrastructures, you can realize that there is a gap in the understanding of the relationship between school infrastructures and students' academic performance.

Paul (2015), carried out a research which took place in Latin America where his study was to investigate the school infrastructures and education outcomes. The found that school infrastructures like libraries promote learning and enrollment rate but the study didn't show the impact of school infrastructures on students' academic performance in classroom setting and competition done at national level.

David (2012), conducted the study in the University of Michigan located in United States which was entitled as the importance of infrastructure development to high quality literacy instruction and study found that the school systems should be developed in terms of curriculum, students' examination and decentralization of teachers but the study did not specify the level of the developed students literacy due to the development of the school infrastructures.

Joy (2016), did the study whose the case study in Nigeria and it was entitled as the impact of the school facilities on students' academic performance in which the study concluded that school facilities should be considered as factors that enhance goals of secondary school education but the study did not demonstrate the impact of school facilities on students' academic performance especially in classroom setting.

Chirstine (2010), did a study whose case study in South Africa in which the study was entitled as the school infrastructures and quality learning and the study found that the school were having poor sanitation state and lack of sport equipment facilities and other need school facilities like well -equipped school libraries and laboratories but the study did not show the effect caused by the lack of effective school facilities on students' academic performance.

2. Conceptual framework

This is the part of this study which can show the diagrammatic linkage between the variables of the study such as independent and dependent variables.

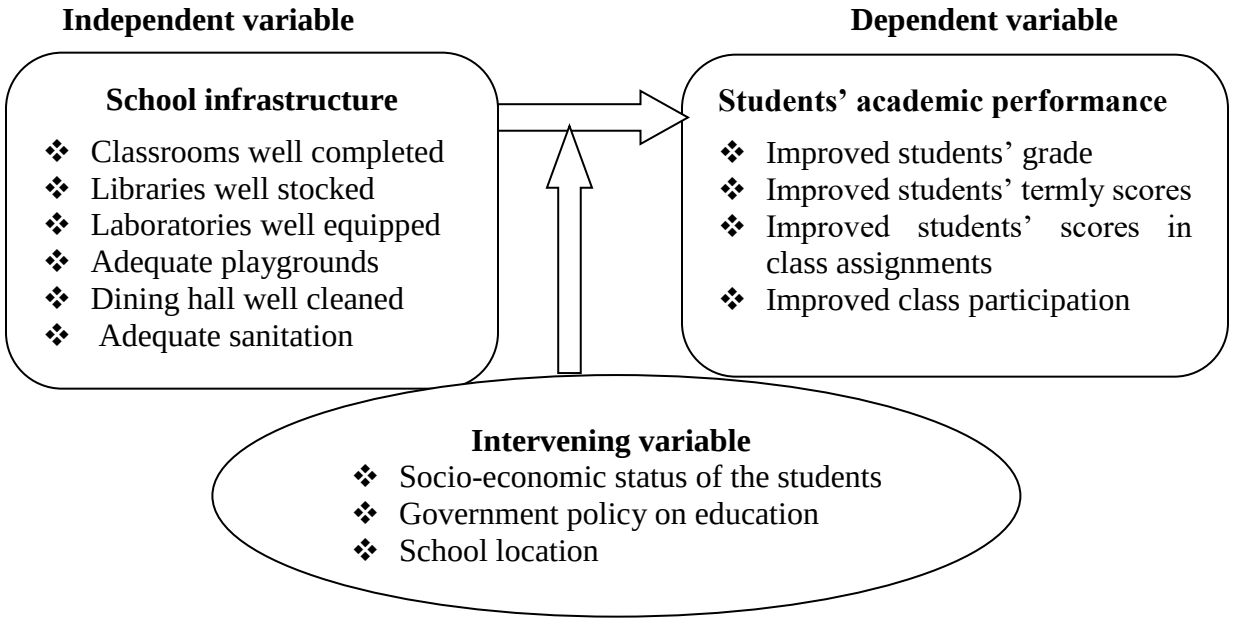

Figure 1: Conceptual framework

Conceptual framework presented in the figure 1 shows, how school infrastructure is related with students' academic performance in twelve years basic education in Rwanda. School infrastructure was taken as independent variable (cause) and students' academic performance was taken as dependent variable (effect). This shows as that student performance in 12YBE education in Gasabo district can be influenced by available school infrastructure. Classrooms, libraries, laboratories, playgrounds, dining halls and sanitation materials are taken as indicators of school infrastructures (independent variable) on the other hand student grade in national examination, school exam result and students' promotion are taken as indicators of students' academic performance (dependent variable).

3.0 Research Methodology

This study employed descriptive research design, to describe the school infrastructures available in 12YBE in Gasabo district in Rwanda and also to correlation research design, to indicate the relationship between school infrastructures and students' academic performance. The target population was 400 people that gave 200 respondents of the study as it was recommended by (Yamane, 1967). Proportionate method was used to identify the respondents from five strata comprised by school head teachers, deans of studies, teachers, students and parents. Questionnaire and guided interview were used as research instruments for data collection so as to indicate the respondents' perceptions related to the availability of school infrastructures and students' academic performance in 12YBE. The collected quantitative findings were analyzed by using SPSS software version 21 and presented in form of figure and tables while qualitative findings were analyzed by suing thematic approach and presented in form of text. The research instruments distributed to the respondents of this study during data collection were reliable at the level of 82.5 % which is above 70% by using Cronbach's Alpha.

4.0 Findings

4.1 Introduction

The purpose of this study was to investigate the relationship between school infrastructure and students' academic performance in Twelve Years Basic Education (12YBE) in Gasabo district Rwanda. It was revealed that, the increase in provision of school infrastructures, can also increase the academic performance of students in 12YBE.

4.2 Availability of school infrastructures in 12 YBE

Table 1. School infrastructures in 12YBE

Statements	SD		D		N		A		SA		Mean	Std.
	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%		
School has enough classrooms	8	16	30	60	8	16	4	8	0	0	2.16	0.79
Equipped school library	15	30	28	56	5	10	2	4	0	0	1.88	0.75
Adequate school playground	15	30	27	54	4	8	0	0	0	0	1.94	0.84
Cleaned school dining hall	16	32	22	44	8	16	3	6	1	2	2.02	0.96
Adequate school sanitation facilities	18	36	24	48	6	12	2	4	0	0	1.84	0.79

SD: Strongly Disagree**, D:** Disagree**, N:** Neutral**, A:** Agree**, SA:** Strongly agree**, Std:** Standard deviation.

The Table 1 it presented the perceptions of 50 students studying in twelve years basic education in Gasabo district in which they perceived on the availability of school infrastructures in 12YBE so as to identify whether the schools of 12YBE in Gasabo district have well completed classrooms, libraries and laboratories well equipped, adequate playgrounds and well cleaned dining hall as well as having adequate sanitation facilities. Therefore, the students' perception on the availability of school infrastructures in terms of having enough classrooms was responded at the mean of 2.16 and the standard deviation of 0.79 where 76 percent of students in 12YBE in Gasabo district disagreed that they have enough classrooms in their schools while 8 percent agreed on having enough classrooms in their schools.

The students also perceived on the availability of having equipped library, their perceptions were provided at the mean of 1.88 and standard deviation of 0.75 and 86 percent of the students disagreed on the availability of having equipped library while 4 percent agreed. On another hands, the students provided their perceptions on having adequate playgrounds where they respondents at the mean of 1.94 and the standard deviation of 0.84 and 84 percent of the students disagreed on the availability of adequate playgrounds while there is no student agreed on the availability of adequate playgrounds in school.

About the availability of cleaned dining hall in 12YBE, it was responded at the mean of 2.02 and standard deviation of 0.96 where 76 percent of students disagreed on the availability of cleaned in schools while 8 percent of students agreed. The students also perceived on the availability of having sanitation facilities where it was responded at the mean of 1.84 and standard deviation of 0.79 where 84 percent disagreed on the availability of sanitation facilities in school while 4 percent agreed. Therefore, this implies that 12YBE do not have sufficient infrastructures due to the fact that greater number of students disagreed on the availability of school infrastructures.

4.3 Students' academic performance in 12YBE

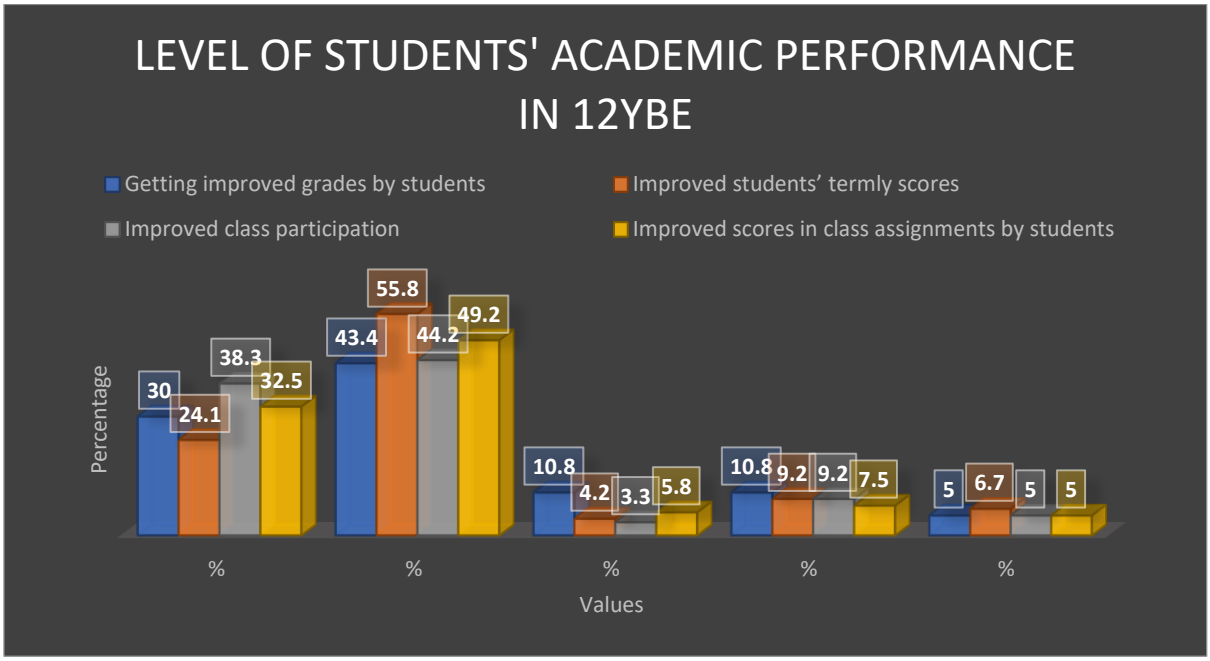

Figure 2: respondents' perception on the level of students' academic performance in 12YBE

The figure 2, show the perception of respondents on the level of students' academic performance due the availability of school infrastructures. The majority of respondents disagreed on the improved students' academic performance where 55.8% disagreed and 24.1%that, on the improved students termly scores in 12YBE. On another hand, 49.2% also disagreed and 32.5% strongly disagreed on the improved students' scores in class assignment. The majority of respondents also disagreed on the improved students' grades and class participation where the figure 2, shows that 44.2% disagreed and 38.3% strongly disagreed on the improved students' grades while 43.4% disagreed and 30% strongly disagreed on the improved class participation in 12YBE.

4.4 Relationship between school infrastructures and students' academic performance in 12YBE

Table 2: Correlation matrix

Correlations

		Availability of school infrastructure	Students' academic performance
Availability of school infrastructures	Pearson Correlation	1	.408**.
	Sig. (2-tailed)		.003
	N	50	50
Students' academic performance	Pearson Correlation	.408**	1
	Sig. (2-tailed)	.003	
	N	50	50

**. Correlation is significant at the 0.05 level (2-tailed).

Table 2, shows the correlation between the availability of school infrastructures and students' academic performance in 12YBE. It was noted that the relationship between the two variables (school infrastructures and students' academic performance) was significant due to the fact that P-Value was 0.003 which was less than the level of significant of 0.05. It was also presented, there is a low degree of positive correlation between school infrastructures and students' academic performance in 12YBE where Karl Pearson coefficient of correlation (r) was 0.408.

4.5 Respondents' perceptions from guided interview on the relationship between school infrastructures and students' academic performance

The respondents of this study indicated their perceptions related to the relationship between school infrastructures and students' academic performance. They responded that due to insufficient school materials, big number of students in classroom (teacher: students ration), lack of regular financial support to maintain the school infrastructures, it was not easy to students to improve their academic performance. They also added that, some students of 12YBE did not access to school library as well as school laboratory due to insufficient equipment.

5.0 Summary of the findings

The objective of this study which was to establish the relationship between school infrastructure and students' academic performance. The perceptions from the respondents of this study indicated, that there was a significant low positive correlation between school infrastructures and students' academic performance as it was proved by Karl Pearson coefficient of correlation (r) was +0.408.

6.0 Conclusion

The conclusion of this study was established due to the research question of this study which was "what was the relationship between school infrastructures and students' academic performance in twelve years basic education in Gasabo district in Rwanda?" it was concluded that there was a

significance of low positive correlation found between school infrastructures and students' academic performance in 12YBE in Gasabo district in Rwanda.

7.0 Recommendations

The general recommendations and recommendation for further research were also established in this study.

7.1 General recommendations

The following recommendations were addressed to educational planners, ministry of education and school head teachers as well as parents:

1. Educational planners should make effective set up that could enhance the schools of 12YBE to be equipped accordingly and to have all necessary infrastructures required in school setting.

2. The ministry of education, should provide regular financial support needed to allocate the infrastructures in schools and focus on regular maintenance.

3. The school head teachers should make effective management of the allocated school infrastructures and address any issue related to school infrastructures that can discourage the effective working condition of the school activities.

4. Parents should also make their participation in the development of school infrastructures so as to promote teaching and learning conditions of their children and enhance academic performance of their children.

7.2 Recommendation for further research

The further research can be conducted to find out the relationship between school infrastructures and students' academic performance in public boarding secondary school in Rwanda so as to make comparative analysis.

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