Relationship Between the Availability of Teaching Materials and Students' Academic Performance in Rwanda

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Abstract: One of the preoccupations of Rwandan educational leaders is to provide schools with enough teaching materials in order to increase students' academic performance. This report describes the influence of the availability of teaching material on students' academic performance. The study used quantitative research and employed a correlation research design. The questionnaires were distributed to 339 students at a university in Rwanda selected through purposive sampling. Among the respondents, 179 were male while 160 were female. 189 were doing sciences while 150 were in arts. Results show that the students agreed to have a high perception of their academic performance. They also agreed to the fact that their school has many teaching materials that are available. The results show that there was a moderate positive relationship between availability of teaching material and students' academic performance ($r = .454^{**}$, $n = 339$, $p < .01$). The study concluded that schools should keep providing quality teaching materials to maintain good students' academic performance.

Keywords: *teaching materials, student's academic performance, university, Rwanda, correlational design, university students*

Introduction

Academic performance is a controversial issue that is common all over the world. This is due to the fact that as nations develop economically, they also want to improve the quality of education in order to have skilled human capital (Arora & Singh, 2017). It is with this regard that the government of Rwanda opted to base its economy on quality education by improving the conditions of teaching and learning in order to have skilled and competent citizens needed on the labor market nationwide and worldwide. The government of Rwanda is doing a lot in its entire means by constructing new schools and adding new rooms to existing schools including related facilities like science laboratories and computer laboratories, as well as their equipment in order to give access to quality academic performance to young Rwandans.

In addition, according to Stefan (2019), in the World Education News and Reviews, Rwanda is reported to be among many African countries that have increased the number of students in local and international education by offering scholarships and through collaborating with international higher learning institutions. Doing so, the government expects to have a great number of students with high and best academic performance. Manizabayo and Gaikwad (2018) found that studying abroad offer many advantages like getting quality education, interacting with foreigner scholars, and in return, having a high chance to access better-pay job.

One of the concerns of the government of Rwanda is to improve student academic performance by equipping schools with qualified lecturers and sufficient number of teaching and learning materials. Studies have demonstrated that when schools have enough teaching and learning materials, students learn with high motivation, resulting in the best student academic performance (Arora & Singh, 2017; Ilomo & Mlavi, 2016). However, many schools in developing countries, including Rwanda, suffer from a shortage of teaching and learning materials in schools, which may lead to poor academic performance (Ilomo & Mlavi, 2016).

This study aims to inform decision makers about the current state of learning materials in

schools and their impact on students' academic performance, and that these have a negative impact on the country's development in general and the student. In most cases, students' academic performance is highly affected by factors such as lecturer preparedness, family social and economic status, teaching and learning materials, learning environment and school infrastructure (Boateng, Asare, Manu, Sefah, & Adomako, 2020). In addition, some factors are related to the student himself/herself such as lack of motivation, low self-esteem, study habits, intellectual skills, personality, interest, distraction, lack of basic learning materials, and illness (Alva & Manuel, 2017).

Literature Review

In this section, the researchers defined the key concepts of research and other related studies. The study traits and the influence of availability of teaching materials on students' academic performance are also discussed here. The variables that were studied include mainly student academic performance (dependent variable) and availability of teaching materials (independent variable). Presented in this section is the review of these two variables.

Student Academic Performance

The term academic performance is broadly used in schools and high learning institutions at all levels of education. Some authors limit academic performance on student Grade Point Average (GPA), or grades simply (Liang, Jones, & Robles-Pina, 2018), and on standardized test scores (Thomas, Cassady, & Heller, 2017). Other authors go far and consider the academic performance with the skills a student should exhibit after completing a certain level of studies. According to Alva and Manuel (2017), academic performance is measured based on student grades. This can be the criteria that defines the students to be performing well or poorly. In addition, students' academic performance defines the lecturer-student relationship, which means that the lecturer preparedness and the methods that are used in teaching and learning have a great effect on student academic performance, whether positive or negative (Gbollie & Keamu, 2017). Low level of preparation to teach on the side of lectures and sticking on the traditional ways of teaching have been hindrances on the good performance of students in many countries.

The academic performance of students depends to some extent on the funding and benefits that the government mobilizes to support education (Abdul-Rahaman, Ming, Abdul Rahaman, & Amadu, 2018). For instance, in the Republic of Ghana, which is passionate about increasing the performance of students, the government allocates a considerable amount of budget in education. Money goes to the wellbeing of teachers in terms of salaries and other benefits and to the wellness of students at schools. School leaders are convinced that by creating a conducive teaching and learning environment, students will learn well; thus, increase their performance. Schools where students perform well are those that put enough budget in the well-being of students. In addition, Usman and Madudili (2019) suggested to the government of Nigeria to put adequate funding in educational sector which in return may enhance the academic performance of students. Manizabayo (2019) demonstrated that the richer the country, the stronger its educational system becomes. The finances that are invested in education have a significant role on the development of performance of students.

Currently, education is another type of investment, and this reason gives a meaning of why students and funding organizations run back and forth in order to find best schools where students can perform well academically (Martorell, Stange, & McFarlin, 2016). Schools where students do not perform well are most likely to have a low number of new enrollments. Because of this way of viewing education, the owners of schools' strain to put much investment in terms of money and quality workers to attract many students who can enroll. Although some people think that students' academic performance may be affected by the family background, many parents and students believe that the success and failure of the students are highly associated with the school factors (Boating et al., 2020). So, people have faith in school services and consider schools as a place where learning comes from. In the performance of students, a study shows that there is a difference between students who get basic material aids and those who do not get

anything for supporting their education at schools (Abdul-Rahaman et al., 2018).

Another study conducted in the Philippines shows that family resources affect positively or negatively the performance of students in sciences, mathematics, and languages (Francisco & Celon, 2020). The negative impact is associated with the fact that students lack what to manipulate in their processes of learning. Parents and funding organizations do not give to the students whatever they need to maximize their learnings. As a result, they do not perform well in their academics. Jain, Bekuma, Pandey, and Gothania (2021) supported this result by adding that there is a correlation between sciences, mathematics, English and students' academic performance of undergraduate students. Although the money allocated in instruction materials are positively correlated to the success of students, self-determination is another element of academic performance (Chao & Chou, 2017). Students with high determination, courage, and motivation succeed well in their academics.

The quality of institution also influences the students' academic performance. According to Lima-Vargas, Obaya, Lima-Vargas, and Rosales-Soriano (2021), in Latin American countries, the institutional quality of high institutions hinders the quality of the graduates from these schools. This situation is the same in developing countries where institutions do not have sufficient quality classrooms and laboratories to put in action what they have learned in theory. Students spend time and energy trying to understand the content and at the same time, it becomes tough to them to match theories and practices needed in the workplace. Nyisingize (2018) found that there is a big gap between the workplace and the skills supposed to be demonstrated by graduates from high learning institutions of Rwanda. Some graduates do fit in with the workplaces available. Because of this gap, Rwanda turns to skilled workers from abroad.

In addition, a Colombian study conducted on students' academic performance by Kweon, Ellis, Lee, and Jacobs (2017) showed that the healthy learning environment positively affect students mentally and physically. Thus, a healthy environment affects their performance. There is a link between schools and green surroundings areas. Students tend to perform well in schools which have more trees, green space, and a large land. The learning conditions and school working environment have influence on the academic performance of students. Consequently, this also affects the work they will occupy in the future.

Availability of Teaching Materials

Teaching materials refer to the teaching aids that are available for school disposal. They play a great role to make teaching and learning effective. Some are used once and expire while others can be reused. These materials are also called instructional materials that are associated to the theory in order to give a good and deep understanding of the content (Asrizal, Amran, Ananda, Festiyed, & Sumarmin, 2018). These teaching aids include but not limited to books, computers, and laboratory materials and technological gadgets which lead to quality academic performance (Dube & Mlotshwa, 2018).

Several authors emphasize the use of teaching and learning materials as irreplaceable in the educational process as students learn better when they manipulate objects that contribute to knowledge construction instead of mere memorization (Shrout & Rodgers, 2018). When teaching materials are available, the task of the lecturers becomes easy as students themselves observe real facts. However, the teaching aids such as computers are not enough to both lecturers and students in developing countries (Suyanto, 2017).

According to Francisco and Celon (2020), teacher instructional practices using available teaching aids are conditions of students' academic performance. The same authors have demonstrated that the use of a variety of instructional practices in a well-designed learning environment positively impact the performance of students at all levels of education. In Nigeria, Usman and Madudili (2019) demonstrated that the learning environment plays a significant role in increasing the academic performance of students. However, in many developing countries of Africa and Asia, many universities lack computers and internet connection to deliver instruction. Consequently, lecturers are still using the traditional ways of teaching (Suyanto, 2017).

This kind of situation compromises the desires of students to perform well. In Rwanda, a study conducted on teaching methods showed that high learning institution lectures still use traditional methods of teaching such as lecture method and sometimes sandwiched with discussion because these lecturers do not know other methods that may be best to create students who are critical thinkers (Nyaga & Murugi, 2018). There is an intense need of training in new teaching strategies which they can use to teach students who will perform well in the workplace.

Activity-based strategy is one of the strategies that lead to the performance of students (Mokiwa & Agbenyeku, 2019). Moreover, activity-based strategy is associated with learning by the theory of John Dewey (Hildebrand, 2018) which puts the emphasis on student's activity to acquire knowledge. This idea is aligned with constructivism theory which motivates students to construct new knowledge based on previous experiences. The assessment for the performance of students is also highly based upon factors such as personal characteristics and psychological factors (Jain et al., 2021). With this regard, the high learning institutions of Rwanda aim at training students of character and good personality who will lead the entire society to development. There is no gender discrimination in the educational system, and the country promotes the education of all its citizens. Only the GPA and score are conditions of promotion and getting job.

There is a need of adjusting the high learning institutions' curriculum to the employers' demand on the labor market (Nyisingize, 2018). Because of this need, the Higher Education Council of Rwanda is demanding all the Rwandan high learning institutions to be equipped with the updated teaching materials and to collaborate with employers to establish a system of education which may satisfy both graduates, schools, and employers. With this hope, there will be a well-prepared future labor force who will perform well at the workplace.

This study aimed at addressing the following research questions:

1. What is the status of the availability of teaching materials and students' academic performance according to the respondents?
2. What relationship exists between the availability of teaching materials and the students' academic performance?

Methodology

This study was based on the scientific principles of quantitative research (Haig, 2018). The data were collected using a survey questionnaire as a research instrument. This research is a quantitative survey of the availability of the teaching materials in relation to students' academic performance.

Research Design

The research design of a study helps the researcher in planning and implementing the study to obtain intended results, thus increasing the chance of obtaining information that could be associated with the real situation (Apuke, 2017). It is in this regard that this study used a correlation research design. However, some questions were studied in a descriptive way.

Research Setting

The research was conducted in one of the universities in Rwanda, in the College of Education. The selected university is a unique public university and it has six colleges grouped according to areas of study. In this college, the students come from all over the copuntry, and these students are spread in all programs and levels.

Population and Sampling Technique

The population of the research was 3,272 students registered in the University's College of Education in the academic year 2019-2020 for the day and regular program. Random sampling was used to choose the sample from the whole population with equal probability of inclusion in the sample. Thompson's formula was used to calculate the sample. When the population is too large, they use the few numbers to represent the whole population (Thompson, 2012). In this study, a sample of 344 students were selected based on the following conditions: (a) respondents who were enrolled for the academic year 2019-2020, (b) respondents who were under sponsorship loan

program, and (c) were in undergraduate level of the arts and science programs in the College of Education. The sample was calculated as follow:

$$n = \frac{Np(1-p)}{(N-1)(e^2/z^2)+p(1-p)}$$

Where

N: The population size

p: Proportion belonging to the specified category

e: Margin of error

Z: Value corresponding to the level of confidence

n: Sample size

$$n = \frac{3272 \times 0.5(1-0.5)}{(3272-1)\left(0.05^2/1.96^2\right)+0.5(1-0.5)}$$

$$n = 344$$

Data Collection

The data were collected using a questionnaire as the research instrument. This instrument was divided into two sections. Section A was composed of items related to the demographic characteristics of the respondents including age, gender, level and program of study. The items related to the variables studied were in section B. This instrument was a Likert scale questionnaire ranging from strongly agree to strongly disagree. The items were ranked from 1 = *Strongly Disagree* (SD), 2 = *Disagree* (D), 3 = *Neutral* (N), 4 = *Agree* (A), to 5 = *Strongly Agree* (SA). The verbal interpretation of the scores is shown in Table 1.

Table 1

Interpretation of All Variables

To confirm the reliability of the study, a pilot test was conducted by administering the questionnaire to 35 students. SPSS was used to calculate the Cronbach alpha and measure the scale reliability between items. In the pilot test, the Cronbach alpha was 0.710 on the availability of teaching materials, and after data collection, it became 0.711, which is good for analysis. For the second variable, which is academic students' performance, the Cronbach alpha was 0.712 during the pilot test, and after data analysis, it became 0.710, which is also reliable. Since data were collected during the COVID-19 pandemic, the questionnaires were distributed to students in person by observing preventive measures against the virus. The researchers and respondents were required to wear face masks and observe social distancing of one meter to avoid the spread of the virus. The researchers also provided hand sanitizer to the respondents.

Data Analysis

To analyze the demographic data and the descriptive questions, the researchers used the SPSS software using means, standard deviation, and percentages to identify the extent that the respondents tend to approach mean. For the second question, the researchers analyzed data using Pearson correlational analysis in order to assess the relationship between availability of teaching materials and student academic performance.

Scales	Responses	Mean Interval	Verbal interpretations
5	*Strongly agree*	4.5 - 5.0	Very high
4	*Agree*	3.5 - 4.49	High
3	*Neutral*	2.5 - 3.49	Average
2	*Disagree*	1.5 –2.49	Low
1	*Strongly disagree*	1.0 –1.49	Very low

Ethical Considerations

This study was conducted in one of the universities in Rwanda, in the College of Education. Data were collected during the COVID-19 pandemic, so to get the approval for the data collection, the researchers arranged an online meeting with the school administrators. All the respondents participated willingly without any discrimination or external benefit to them (Navalta, Stone, & Lyons, 2019). Each participant signed an informed consent letter, and their identities were kept confidential. For ethical reasons, the researchers asked the respondents not to disclose the names of their faculty members and departments. During the administration of the questionnaire, each respondent was given freedom to answer the questionnaire and withdraw themselves from the research any time during the research process (Navalta at al., 2019). The respondents spent at least 30 minutes to fill the entire questionnaire, and no one was physically or mentally harmed during the entire process. The respondents had the right to work on the questionnaire privately and drop the answered questionnaire in the basket provided. The research instrument used was valid and objective, and there was no data manipulation (Zyphur & Pierides, 2017). The researcher gave credit to the borrowed words from other authors.

Results

This part highlights the main findings from this study. The literature to support the findings is also presented in this section. Data cleaning before its analysis was done to reduce the number of respondents from 344 to 339. Below is the presentation of results of demographic profile and research questions.

Demographic Profiles of the Respondents

The analysis of data demonstrated the demographic profiles of the respondents in terms of gender, age, academic levels, and the programs of the students who responded to the questionnaires. Table 2 summarizes the distribution of students according to their profiles.

Table 2
Distribution of Respondents According to Their Demographic Profile

	Frequency	Percentage	Cumulative Percentage
Gender			
Male	179	52.8	52.8
Female	160	47.2	100
Total	339	100	
Age - group			
15-20	20	5.9	5.9
21-25	219	64.6	70.5
26-30	100	29.5	100
Total	339	100	
Academic Level			
Level 1	20	5.9	5.9
Level 2	60	17.7	23.6
Level 3	160	47.2	70.8
Level 4	79	23.3	94.1
Level 5	20	5.9	100
Total	339	100	
Program			
Sciences	189	55.8	55.8
Arts	150	44.2	100
Total	339	100	

The table indicates that there were 179 (52.8 %) males while there were 160 (47.2%) females out of the total respondents of 339. Regarding the age, this variable was grouped and the majority of the respondents at 219 (64.6 %) were in the age-group between 21 to 25 years old. The lowest age–group was that of the 15 to 20 years old (5.9 %).

With their academic level, 160 (47.2%) respondents were in academic level 3, while 79 (23.3%) were in level 4. There were 60 (17.7%) who were in level 2 and 20 (5.9%) in level 1 and level 5 respectively. With the program of study, the data shows that 189 (55.8%) were registered in sciences while 150 (44.2%) were studying the arts and humanities.

Perception of Respondents on their Academic Performance and Availability of Teaching Materials

The study sought to answer the question on the status of the students' academic performance and availability of teaching materials. The results of this question are presented in two categories. Category one presents the results of perception of respondents according to the students' academic

Table 3
Perception of Student's Academic Performance

Student's Academic Performance Items	M	SD	R	VI
1. I am deeply involved in my courses. I like my option and department.	4.97	0.30	SA	VH
2. I perform well because I like my option.	4.82	0.71	SA	VH
3. I am always appreciated because of the academic work which demonstrates the innovation.	4.44	0.50	A	H
4. The prior knowledge that I got previously is put in real life.	4.35	0.76	A	H
5. My overall grade demonstrates my academic performance.	4.23	0.42	A	H
6. The teaching strategies that my teacher uses in the classroom are in line with the performances he/she wants to develop in me.	4.15	0.35	A	H
7. When I am unsure about something related to my performance, I have access to appropriate advice for direction.	3.38	0.54	N	A
8. Overall Student's Academic Performance	4.33	0.51	A	H

Legend: M= means; SD= Standard Deviation; R= Response; VI= Verbal Interpretation

performance. The second category is about the perception of respondents on the availability of teaching materials.

Perception of respondents on students' academic performance. The students were asked to fill the questionnaire by encircling the number in Likert scale questionnaire that labeled how they perceived their academic performance. The questionnaire ranged from 1 to 5 and each assertion was given one point. The overall mean score was M = 4.33 (SD = 0.5111) which is agree and it gives a verbal interpretation of high perception of the academic performance. Table 3 demonstrates the perception of student on their academic performance.

In addition, students strongly agreed that they are involved in their courses and like their option and department (*M = 4.97, SD = 0.30*) which is interpreted as very high. They scored strongly agree on the item that stated that they performed well because they liked their option (*M = 4.82, SD = 0.71*) and it is also interpreted as very high. However, the respondents said that their access to appropriate advice for direction in their performance was only average (*M = 3.38, SD = 0.51*).

Table 4
Perception of Students on Availability of Teaching Materials

Availability of Teaching Materials Items	M	S. D	R	VI
1. The projectors help me to visualize what the teacher explains.	4.89	0.40	SA	VH
2. I always recall what I performed by using practical learning materials.	4.44	0.65	A	H
3. The laboratory equipment helps me to manipulate different experiences.	3.91	0.98	A	H
4. In laboratories, I visualize the materials and relate quickly to the theories I learned.	3.89	0.90	A	H
Overall Availability of Teaching Materials	4.28	0.73	A	H

Legend: M= means; SD= Standard Deviation; R= Response; VI= Verbal Interpretation

Perception of students on the availability of teaching materials. The overall mean and standard deviation of this variable is agree (*M* = 4.28, *SD* = 0.73), and it is interpreted as high. From the highest score mean of items to the lowest score mean, the students confirmed that their school have projectors that help them visualize learnings (*M = 4.89, SD = 0.40*). Indeed, the respondents agreed that they can visualize the materials and relate them to theories (*M = 3.89, SD = 0.90*). These findings are supported by Dube and Mlotshwa (2018) in the study where they found that quality teaching materials lead to good student achievement, while poor teaching materials lead to poor quality education. Table 4 summarizes the perception of students on the availability of teaching materials.

Relationship Between Variables

The study also sought to answer if there is any relationship between the availability of teaching materials and the students' academic performance. The results were obtained after conducting the Pearson correlation test using SPSS software. The data show that the independent variable is positively correlated with the dependent variable. There is a moderate positive relationship between availability of teaching materials and students' academic performance ($r = .454^{**}$, $n = 339$, $p < .01$). The positive correlation between availability of teaching materials and student academic performance means that when the teaching materials are available, the student academic performance increases. This result suggests that as the government of Rwanda equips the University's College of Education with quality and available teaching materials, the greater the number of students who perform well.

Discussion

The results of the study demonstrated the high perception of students' academic performance on the side of respondents. However, this result is opposite to the findings of Nyisingize (2018) regarding the alignment of educational curriculum in workplace competence. He found that the employers complain about the performance of graduates from high learning institutions of Rwanda. The respondents also agree that they have enough learning materials at their disposal that help them perform well. This may be true as the government puts more effort to equip its high learning institutions with teaching and learning materials. The results also reveal that there is a moderate positive relationship between the availability of teaching materials and students' academic performance. This is true as the student learns and performs well through the manipulation of materials that lead to knowledge construction (Asrizal, et al., 2018).

Conclusion

The participants in this study were mainly males between the age groups of 21 to 25. Most of the respondents were in academic level three and were doing sciences. This implies that in the future, there will be a greater number of young science teachers in secondary schools. The respondents had a high perception of both availability of teaching materials and students' academic performance. This shows that these future teachers are confident to have enough skills and competencies to teach in secondary schools and qualify for further studies. Finally, the study revealed the positive relationship between the availability of teaching materials and students' academic performance. This perception implies that academic success depends on having enough and reliable teaching materials.

The following recommendations are given based on the findings of the study. Some recommendations are addressed to the educational stakeholders because of their capacity of changing the situation. Other recommendations are addressed to further studies since the performance of students is an endless activity.

Educational Stakeholders

Based on the results, it is recommended that provision of teaching materials in schools continue. The researchers also recommend that the government should make a regular follow-up about the use of teaching materials in schools and for the standardization of these teaching and learning materials. Frequent workshops on linking theory to practice in teaching and learning to both lecturers and students is also recommended.

Further Researchers

The researchers recommend that further studies in this field be conducted using a qualitative approach. Since this was conducted only in the College of Education, the researchers recommend conducting the same study with other colleges. The study will help understand whether for graduates who feel confident while studying, they are likely to secure a job after their studies. The researchers also recommend that studies be conducted on the effects of other variables such as self-motivation, self-esteem, and social and economic family status on student academic performance.

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