

FACTORS CONTRIBUTING TO STUDENTS' ACADEMIC PERFORMANCE IN BIOLOGY STATE EXAMINATION AT UPPER SECONDARY SCHOOLS IN GITEGA COMMUNE, GITEGA PROVINCE IN BURUNDI

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ABSTRACT

The students' academic performance is the key element for both learners and teachers in examining the educational objectives for all subjects. This work is entitled "Factors contributing to Students' Academic Performance in Biology State Examination at Upper Secondary Schools in Gitega commune, Burundi" explores the factors that influence the students' academic performance in biology national examination, particularly in Gitega commune. All school directors, laboratory, and library staff, and six senior students who did biology national examination over five school years from 2016 to 2020 in all upper secondary schools with Biology-Chemistry and Earth sciences combination formed a study population. The stratified sampling technique to carry out this correlational study for choosing the upper secondary schools from urban and rural school areas. This study covered 12 upper secondary schools, 12 library staff and 3 laboratory staff, and 1961 senior six students who were selected purposively according to the above learning combination six in 1961 senior students over five consecutive school years (2016 to 2020) as a sample. The instruments used for collecting data were questionnaires and the document review checklist. Descriptive statistics, Analysis of variance (ANOVA) and multiple linear Regression test were used to analyze the collected data and the interpretation was guided by a literature review.

The findings of this study indicated that teachers' academic qualifications were inversely associated with the students' academic performance whereas the teachers' professional qualifications and students' academic performance were also negatively linked. Also, there was statistically a significant association between teaching experience and students' academic performance while professional training of biology Teachers are significantly associated with students' academic performance. Other contributing factors to students' academic achievement such as physical facilities (laboratory, library, staff room, computer lab and biology textbooks were significantly and positively linked with students' academic performance. Based on these findings, recommendations were made.

Keywords: Teachers' characteristics, Teachers' qualification, teaching experience, Professional training, Teaching, learning materials, Academic performance

Suggested citation:

Bosco, N. J., Ntawiha, P., & Alexis, A. (2023). Factors Contributing to Students' Academic Performance in Biology State Examination at Upper Secondary Schools in Gitega Commune, Gitega Province In Burundi. *Universal Journal of Educational Research*, 2(3), 191-203.

INTRODUCTION

The academic performance constitutes a backbone in appraising the significant impact of school curriculum at hand. This is the main concern of education stakeholders across the world. They play a key role in accompanying the implementation of curriculum goals. Its good or bad implementation determines the degree of teachers and learners' performance. The factors that influence better performance vary from one area to another given that the teaching and learning environments are not the same. According to MINERS (2020), in Burundi education context, teaching of Biology followed teacher-centred method which did not give learners opportunities to explore and draw on what they have been taught from the program. Biology is taught as one of the main subjects found in all science sections and is part of the national examination. The learner's performance in biology therefore goes in a very varying way, given that the intervening teaching and learning factors make a difference of Biology- Chemistry and Earth sciences. These national examinations open the doors to university studies and students were oriented at different learning combinations and fields based on their results.

Similarly, the study conducted by Moses (2016) on academic performance in Biology at Secondary School Certificate Examination (SSCE) in Nigeria stated that the senior secondary school certificate examination is the final examination uniformly conducted and administered by the commission in charge of the national examination and undertaken by senior six secondary students for the final award of the certificate. Also, Moses (2016) argued that although the students of different schools were taught under the same curricula and the same administrative supervision, the performance varies widely from one school to another. Based on that, the variation in performance is not only in overall school performance but also in the standard and grades achieved by those students who passed the national exam.

The previous trends may be caused by many factors such as teachers' qualifications, years of teaching experience, in-service training or professional training, availability of physical facilities, teaching and learning materials and resources, etc. However, Sureka & Murugesan (2017) in his study indicated that the poor performance of students is mainly due to the lack of motivation of teachers; poor infrastructure; students' attitude to learning; lack of teaching skills and competence of science teachers; and the lack of opportunities for professional science development teachers. In the same study, he stated that another series of factors which include the program, qualifications, workload, experience and disposition, general lack of teaching skills, and ineffective style of the delivery of the object are also identified as causes. Similarly, according to Anita (2012) in his study conducted in Kenya which aimed to establish the relationship between the characteristics of teachers and the academic performance of biology students, she claimed through his results that there was no significant relationship between teacher qualifications and students' academic success. Also, the same author asserted that the experience of teachers had a significant relationship with the academic performance of biology student.

From the perspective of school performance, the inadequate quality of teaching and learning materials, resources and physical facilities is not limited to Burundi. In African countries, even Burundi, many schools lack material resources such as textbooks, blackboards, maps, audiovisual and electronic teaching aids such as radio, tape recorder, television, and video recorder. In this respect, Adeogun (2001) stated that schools whose teachers use more teaching materials perform better than schools whose teachers do not use teaching materials. He also asserted that the importance of teaching materials is evident in the academic performance of students. Based on this importance of these materials, the study conducted by Babayomi (1999) revealed that schools at all levels of education are required to have quality and adequate teaching facilities to improve the school performance of their students. It is therefore, to this end, that this study investigates the factors (teachers' characteristics, teaching and learning materials and resources) contributing to students' academic performance at upper secondary level in Gitega commune, Burundi.

According to UNESCO & Burundi (2014), the report indicated that the Burundi education system insists on the need to promote the teaching of science and technology in secondary schools to be able to respond to future science and technological-related challenges in this dynamic world. Nevertheless, the pilot study conducted at Bureau des Evaluations du Système Educatif Burundais (BESEB, 2021) indicated the variation in national test scores. The following chart resumes the scoring rate in past five school years (from the edition year 2016 to 2020) in biology national exam at upper secondary level.

Edition year	2016	2017	2018	2019	2020
Success rate	26.6%	28.4%	50.9%	89.9%	68.8%

There is a varying relative rate of success as time goes on in terms of performance in biology in Burundi in general. The success of any teaching and learning process which invariably influences students' academic performance depends on the effectiveness and characteristics of the teacher, teaching and learning materials and resources. The factors that contribute to such a scoring dynamism may result from teachers' qualifications, teaching experience, professional training and teaching and learning materials, the lack of sufficient resources, and insufficiency of school equipment in Burundi. The previous affect the students' academic performance outcomes in its full sense. This study is meant to investigate on the relationship between learners' academic performance in biology and the factors underlying them.

However, according to MENRS (2021) in Burundi, there is no study that has been undertaken in this regard. Thus, that is why the current study aims to find out the factors affecting the academic performance of senior six students in the Biology National Examination at the upper secondary level (grade 12) at selected public upper secondary schools in Gitega Commune, Burundi.

The main objective of the study is to find out the factors which contribute to students' performance in Biology State Examination at the Upper Secondary school level in Gitega Commune, Gitega Province, Burundi.

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The specific objectives of this study are to: (1) determine how teachers' characteristics affect students' performance in biology state examinations, and (2) find out the influence of the availability of teaching and learning materials applied by biology teachers on students' performance in the biology state examination.

Two research questions have guided this study: (1) how do teachers' characteristics affect students' performance in the biology state examination? (2) how do teaching and learning materials influence students' academic performance in the biology state examination?

This study focuses on the theoretical model named "the Production Function Approach" (PFA). It is built on the principle of the input-output approach (Gordon, 2007). It can be defined as the transformation of raw materials (input) into goods and services (output). Simply put, a production function is a representation of the functional relationship between the number of inputs used and the number of outputs produced. It reflects the technical relationship between the physical inputs and the output.

Many researchers have preferred to use this model to determine the factors that contribute to student academic performance. Martha (2010) stated that student performance or academic achievement is treated as the output factor and the input factors are the independent variables. Along the same lines, Tangaraju et al. (2013) found that common entry factors used teaching and learning materials, teacher quality, and family factors.

In this study, the exit factor is the academic performance of the student, and the entry factors are the characteristics of the teachers (such as the qualifications of the teachers, the years of teaching

experience, the professional training of the teachers) as well as the availability of teaching and learning materials and resources.

METHODOLOGY

Research design

This study adopted a correlational survey research design. Creswell (2012) stated that a correlational research method is used to examine relationships and patterns of relationships between variables in a single group of subjects. Along the same lines, he added that correlational research studies a range of factors, including the nature of the relationship between two or more variables and the theoretical model that could be developed and tested to explain these resulting correlations.

Therefore, this research design was the best in this particular study because it allows the researcher to determine the relationship between teacher characteristics, teaching, and learning resources, and students' performance after an action or event has already occurred (Neil, 2010).

Data collection tools and methods

This study used two research tools such as the document review checklist and survey questionnaires for collecting all required information about the current phenomenon.

The researcher used a checklist for inventory records of all teaching and learning materials and physical facilities that are needed to be available at school for biology teaching and learning environment.

Questionnaires were used for collecting the data by surveying the school directors, laboratory, and library staff. The school authority's survey was used by the researcher in identifying the personal information of school directors and biology teachers for the last five consecutive years (from 2016 to 2020) and also to know their characteristics such as their academic and professional qualifications, their experience and to ask whether they did or not the professional training. The laboratory and library staff's survey consists of gathering the information on the availability of biology teaching and learning materials and resources during the targeted last five consecutive years of schooling.

Targeted population

The targeted population of the study consists of all school authorities (school directors), biology teachers, and senior six students for the last five years at upper secondary schools of Gitega commune with the combination made by Biology-Chemistry and Earth Sciences, in which Biology is taught as the main science subject of the section.

The target population was composed of eighteen (18) upper secondary schools with an approximate population of 18 school directors, 18 biology teachers, and 2562 senior six students who passed the state examination for the last five years (2016-2020). Therefore, for the current study, all school directors, the characteristics of all targeted biology teachers (18), and the scores of all the six senior students within those upper secondary schools were targeted as the study population and it is indicated below (table 1).

Table 1. Target population

School area	Upper secondary schools	School headmasters	Biology teachers	Senior six students
Urban	11	11	11	1784
Rural	7	7	7	778
Total	18	18	18	2562

Source: Gitega commune education office, (2020)

Sample size and Sampling techniques

The stratified sampling technique that consists of strata (urban and rural) was used to select secondary schools. Among strata, the purposive sampling technique was used to select upper secondary schools with the Biology-Chemistry and Earth sciences combination, senior six students (for the last five years) and headmasters (school directors), and biology teachers of the targeted secondary schools. Table 2 shows the breakdown of the sample.

Table 2. Sample composition of the study participants

Category of participants	Population	Sample size
Biology teachers	12	12
Students of senior six form of all sampled schools	1961	1961
School directors	12	12
Total	1985	1985

Source: **Gitega province education office, (2020)**

Data analysis procedures

Quantitative data collected in the field were analyzed using descriptive and inferential statistics using the Statistical Package for the Social Sciences (SPSS). The frequency distribution and percentages were used to analyze the background information of the participants and were also used to determine the average scores (%) of the students in the state examination of biology from the 2016 edition to the 2020 edition. Multiple linear regression and Analysis of variance (ANOVA) was used to determine the relationship between teachers' characteristics (teacher's academic and professional qualifications, teaching experience as well as professional training), availability of materials teaching and learning and the students' academic performance over the past five years (2016-2020).

RESULTS AND DISCUSSIONS

The current study aims at founding out a link between variables such as teachers' characteristics and students' performance in biology as well as the availability of teaching and learning materials and resources and student performance in biology that were assessed using multiple linear regression and ANOVA. The Senior Secondary (SS6 or Grade 12) students' performance in Biology State Examination from the school year 2015-2016 to 2019-2020 session from the sampled schools were presented in the tables below.

Overall students' academic performance with grades from 2016 to 2020

The following table (table 3) presents different grades of students' academic performance from the state examination of Biology from 2016 to 2020.

Table 3. Grades of students who passed the national exam in biology from 2016 to 2020

Scale (%)	Grade Description	Number of students	Percentages
90-100	Excellent	2	0.1%
80-89	Highest Distinction	27	1.4%
70-79	High Distinction	172	8.7%
60-69	Distinction	343	17.5%
50-59	Pass/Satisfactory	515	26.3%
0-49	Fail	902	46%
Total		1961	100%

From Table 3, it was observed that on 1961 SS6 biology students who sat for the biology state examination from 2016 to 2020, only two students (0.1%) were graded excellent, 27 (1.4%) with the

highest distinction, 172 (8.7%) with high distinction, 343 (17.5%) with distinction, 515 (26.3%) with satisfaction while 902 students (46%) failed.

Question 1: How do teachers' characteristics affect the students' academic performance in the Biology State Examination?

Teachers' Qualifications to sampled schools between 2016 and 2020. It was observed that a great number of biology teachers in these sampled schools hold a bachelor's degree. It was shown in the following tables. Academic Qualification. Table 4 shows the academic qualification of biology teachers in all sampled schools from 2016 to 2020. Professional qualification. Table 5 shows the professional qualification of biology teachers in all sampled schools from 2016 to 2020.

Table 4. Teachers' Academic Qualification between 2016 and 2020

Academic qualification	Frequency	Percentage
Bachelor's degrees	11	91.7
Diploma	1	8.3
Total	12	100

From table 4, it was observed that 91.7% of biology teachers (11) who taught in all sampled schools hold bachelor's degrees while 8.3% of teachers (1) have Diplomas.

Table 5. Teachers' Professional Qualification between 2016 and 2020

Teacher Professional Qualification	Frequency	Percentage
Bachelor's degree in education	5	41.7
Bachelor's degree without Education	6	50.0
Diploma	1	8.3
Total	12	100

From table 5, it was observed that only 41.7% of biology teachers (5) have Bachelor's degrees in Education, 50% of them have Bachelor's degrees without an education background (6), and only one biology teacher (8.3%) have graduate Diploma.

Table 6. Teachers' years of teaching experience from 2016 to 2020

Years of teaching experience	Number of teachers	Percentages
1-5 years	7	58.3
6-10 years	5	41.7
Total	12	100

In table 6, it was observed that 58.3% of the biology teachers (7) in all sampled schools have 1-5 years of experience while 41.7% of biology teachers (6) in the sampled schools with 6-10 years of experience.

Table 7. Teachers' professional training between 2016 and 2020

Number of trainings attended	No of teachers	Percentages
1-3 training	4	33.3%
4-6 training	8	66.7%
Total	12	100

Table 7 revealed that 66.7% of all sampled teachers (8) had participated in between four and six training while 33.3% of teachers (4) have participated in 1 to 3 training.

Relationship between Teachers' characteristics and students' academic performance using multiple linear regression and Analysis of variance (ANOVA)

Table 8 presents the record of the association between teachers' years of teaching experience and students' performance in the biology state examination tested using multiple linear regression and analysis of variance (ANOVA).

Table 8. Analysis of variance (ANOVA) of Teachers' characteristics in relation to Students' Academic Performance

	Degree of freedom	Sum square	Mean square	F	F critical value	Sig.	R	R Square
Regression	9	5876.034	652.893	4.28	0.204	.000	.975	.729
Residual	2	304.727	152.364					
Total	11	180.763						

Table 9. Regression model of teachers' characteristics

	Coefficients	Standard Error	t Stat	p-Value	Lower limit 95%	Upper limit 95%
Constant	26.334	42.328	0.622	0.597	-155.791	208.459
A.Q	-8.137	16.265	-0.500	0.667	-78.117	61.844
P.Q	-2.983	8.408	-0.355	0.757	-39.1567	33.194
T.E	1.282	1.969	0.651	0.582	-7.189	9.753
P.T	1.847	7.043	0.262	0.818	-28.458	32.152

A.Q: Academic Qualification; P.Q: Professional Qualification; T.E: Teaching Experience.
P.T: Professional training

From this table (9) of multiple linear regression, the performance is equal to: $26.334 - 8.137A.Q - 2.983P.Q + 1.282T.E + 1.847P.T + E$.

From table 9, it was revealed that increasing one unit in academic qualifications is associated with an average of 8.137 unit decrease in student performance. This means that more teachers are academically qualified, and student performance decreases. Along the same line, increasing one unit in professional qualification is associated with an average of 2.983 unit decrease in student performance; it means that more biology teachers are qualifications qualified, and the student performance decreases. In general, it was found out that teachers' qualifications (academic and professional qualifications) are inversely associated with the students' academic performance in the biology state examination in Gitega commune at all sampled schools over five years (2016-2020). The current findings are in line with the study conducted by Anita et al. (2013) who found that there was no significant relationship between teacher's qualifications and student academic achievement.

It was also found that increasing one unit of teaching experience is associated with an average of 1.282 increase in student performance. The more teachers are experienced at teaching biology, the more students do well. Similarly, to the current study, Agbatogun (2010) stated that some studies have shown that years of teaching experience consistently contribute to higher test scores, while other studies have found a negative effect that results from a high proportion of inexperienced teachers in schools, leading to lower rates of higher dropouts and lower student scores. In the same way as the current research, Betts et al. (2003) argued that teacher experience is significantly correlated with student achievement in science and that teachers with more than five years of teaching experience are most effective, while those with inexperience may be likely to negatively and significantly influence the performance of students.

Equally, the same table (9) showed that increasing one unit of professional training is associated with a 1.847 increase in student performance; that means that the more biology teachers are professionally trained, the more students performed well. These findings illustrated that there was

statistically a significant link between professional training and students' academic performance over the targeted five years. The current finding is similar to the study of Holtzman (2005) who found that professional training is more important in teaching because trained teachers can teach more effectively than untrained teachers. Similarly, the study by Akinfe, Olofinniyi and Fashiku (2012) argued that the role of professionally qualified or trained teachers is an important teaching quality that enhances the academic success of biology students.

In general, for all teachers' characteristics that were considered to overcome the current study, from the ANOVA (table 8) of the previous independent factors, the R square equals 0.729. This means that the student performance in the biology national examination is explained by the four independent factors such as academic qualification, professional qualification, teaching experience, and professional training, at 72.9%. Therefore, there is an association between independent and dependent variables. And the other 27.1 % is explained by other variables that are not included in this model. Then, this value is called an error term. In general, the p-value (0.000) is less than 0.05. This means that the four previous independent variables are significant to the dependent variables. Hence, there is statistically a significant influence of teachers' characteristics on students' academic performance in biology state examinations at upper secondary schools within Gitega commune over five school years (2016-2020).

Question 2: How do teaching and learning materials, and resources influence students' academic performance in the biology state examination?

Availability of physical facilities

Table 10. Availability of physical facilities

Physical facilities	Frequency	Percentages
Laboratory	3	11.1%
Library	11	40.7%
Computer Lab	1	3.7%
Staffroom	12	44.4%
Total	27	100%

From table 10, it was observed that between 2016 and 2020 and out of 27 physical facilities found in all sampled schools, 12 (44.4%) have staff rooms, 11 (40.7%) of sampled schools have libraries, only 3 schools (11.1%) among them have laboratories while only one school (3.7%) have a computer lab.

Table 11. Availability of biology textbooks at sampled secondary schools and Student Textbook ratio.

School Name	2016	2017	2018	2019	2020	No. of books Available	No student	Student Book Ratio
Lycée Sainte Bernadette	4	4	10	42	42	102	180	2:1
Lycée Communal Urbain de Gitega	2	2	3	51	51	109	288	3:1
Lycée de la COMIBU de Gitega	1	2	5	9	13	30	87	3:1
Lycee Sacré Coeur Ingolstat de YOBA	2	2	4	13	13	34	91	3:1
Lycée des Amis de Kwibuka	2	3	6	12	13	36	95	3:1
Lycée Sainte Dorothee de Gihiza	1	1	2	4	5	13	55	5:1
Lycée Communal MUBUGA	1	2	4	21	20	48	190	4:1
Lycée Notre Dame de la Sagesse de Gitega	4	4	7	53	54	122	345	4:1
Lycée Regina Pacis de Gitega	3	6	9	29	29	76	205	4:1
Lycée Gitega	5	7	11	22	26	71	181	4:1
Lycée Sainte Thérèse de Mushasha	4	4	13	28	29	78	206	4:1
Lycée Communal Nyakibingo	1	1	4	5	5	16	38	2:1
Total	30	38	78	289	300	735	1961	3:1

From table 11, it was observed that according to the number of books available at all sampled schools and the total number of students, the average student textbook ratio is three students for one textbook (3:1).

Influence of physical facilities, teaching and learning materials and resources on Students' Academic Performance

Table 12. Analysis of variance (ANOVA) between physical facilities and students' academic performance

	Degree of freedom	Sum square	Mean square	F	F critical Value	Sig.	R	R Square
Regression	4	3198.537	799.634	1.617	0.285	.000	.720	.519
Residual	6	2967.089	494.515					
Total	10	6165.626						

Table 13. Regression model for physical facilities in relation to the physical facilities and teaching and learning materials/biology textbooks.

	Coefficients	Standard Error	t Stat	p-Value	Lower limit 95%	Upper limit 95%
Constant	6.8	38.517	0.177	0.866	-87.448	101.048
Laboratory	27.414	23.773	1.153	0.293	-30.756	85.585
Library	26.486	23.773	1.114	0.308	-31.685	84.656
Computer lab	-0.3	31.449	-0.010	0.993	-77.253	76.653
Staff room	10	31.449	0.318	0.761	-66.953	86.953
TLM/B	0.251	0.590	0.423	0.712	-2.288	2,789

TLM/B: Teaching and Learning Materials/ Books

From table 13, the multiple linear regression (13) indicates that the performance is equal to: $6.8+27.414\text{Lab}+26.486\text{Lib}-0.3\text{comp lab}+10\text{ Staff room}+0.251\text{TLM/B}+E$.

From table 13, it was found out that increasing one unit in a laboratory is associated with an average of 27.414 unit increase in student performance. This means that the more schools that are equipped with laboratories, the more the student performance academically increases or the more the students are academically performed. On the same line, increasing one unit library is associated with an average of 26.486 unit increase in student performance. In other words, the more schools are equipped with libraries, the more the student performance is well done. In particular, increasing one unit of the staff room is associated with an average of 10 percent increase in student performance; it means that the more schools are equipped with staff rooms, the more the students perform well. In general, the p-value (0.000) is less than 0.05. This means that the four previous independent variables are significant to the dependent variables.

To this end, it means that the availability of technology significantly affects the students' academic performance in the positive way of higher success of biology students in secondary schools of Gitega. These findings are in the same line as the study by Nicholas (1975) who stated that without a sufficient range of resources, learners cannot individualize learning and, in the same vein, Orlich and Harder (2001) in learning and performance, become difficult. Similarly, the study conducted by Abdullahi (2010), stated that didactic material is a locally made or imported tool that helps to facilitate the teaching/learning process, and then there is a positive achievement in students taught by biology teachers exposed to the didactic material during courses as cited by Effiong et al. (2015).

Similarly, increasing one unit of the computer lab is associated with an average of 0.3 unit decrease in the student performance. In other way, more in the schools with computer labs, more students'

performance decrease. Therefore, there is no significant impact between the availability of the computer lab in targeted and the students' academic performance in biology state examinations in Gitega commune from the school year of 2016 to 2020.

Generally, from the ANOVA (table 12), the findings indicated that the R square is equal to 0.519. This means that the student performance in the biology national examination is explained by the four independent factors, such as laboratory, library, and computer lab and staff room, at 51.9%. Therefore, there is an association between independent and dependent variables. And the other 48.1% is explained by other variables that are not included in this model. In general, the p-value (0.000) is less than 0.05. This means that the four previous independent variables are significant to the dependent variables. To this end, there is a significant relationship between the previous four factors and the students' academic performance at upper targeted secondary schools in Gitega commune over five years, from 2016 to 2020.

Table 11 also indicates that the student textbook ratio is another factor that can influence the students' academic performance in the biology examination. On average, it is found that from 2016 to 2020, the textbook student ratio was 1:3 in all sampled schools. As long as teaching and learning materials, in particular the textbooks of teachers and students are concerned, table 13 with the multiple linear regression, it was found out that increasing one unit in teaching and learning materials, in particular biology textbooks, is associated with an average of 0.251 unit increase in students' academic performance. It means that schools with sufficient biology textbooks at the targeted schools, students perform well. It shows that the students who are taught with enough biology textbooks performed better than students who taught without teaching and learning materials, in particular biology textbooks. In the same vein, the study conducted by Mwiria (1985) found that student performance is affected by the quality and quantity of teaching and learning materials. Also, the same author revealed that institutions with adequate facilities such as textbooks have a better chance of passing exams than those that are poorly equipped. Therefore, poor performance could be due to inadequate teaching and learning materials and equipment.

CONCLUSION AND RECOMMENDATIONS

Conclusion

The current study found the influence of teachers' characteristics (academic and professional qualifications, teaching experience, and teachers' professional training) and availability of teaching and learning materials on students' academic achievement in the State Biology Examination in upper secondary schools (senior six).

The finding from the test of the two research questions that a significant relationship exist between the independent variables {teachers' characteristics (such as teacher academic qualification, teacher professional qualification, teaching experience, and professional training of biology teachers), availability of teaching and learning materials and physical facilities} and the dependent variable (students' academic performance). The assessment of the relationship between teachers' qualification and students' academic performance revealed that there was an inverse association between teachers' qualifications (academic and professional) and students' academic performance while between the years of teaching experience and professional training, and student's academic performance in Biology State Examination at sampled upper secondary schools, there was statically a significant relationship. Apart from the influence of teachers' characteristics, it was found that the availability of other contributing factors, such as the physical facilities (science laboratory, library, staff room, and computer lab and teaching and learning materials such as the availability of biology textbooks impacted positively to the students' academic performance. The findings cited above revealed that these factors presented a significant positive contribution to students' academic performance in the biology state examination in upper secondary schools of Gitega commune, Gitega province in Burundi over the five years from 2016 to 2020.

Recommendations

Based on the results and conclusions of this work, the following recommendations are formulated. For Education policy and school administration:

1. Provide all necessary teaching and learning materials or resources that can be adopted by biology teachers when teaching daily lessons to create student motivation and improve students' practical skills.
2. Organize annual training seminars for teachers and professionally financed workshops on the teaching of biology.
3. Therefore, further studies are needed to establish other factors which determine the academic performance of students in the same locality of the province of Gitega and throughout the Burundian country. For example, researching the following factors influencing students' academic performance, such as quality of teaching staff, effective use of educational resources, time spent studying biology, school administration, student attitudes towards biology, teaching strategies, etc.

CONFLICT OF INTEREST AND FUNDING

The authors declare that there was no conflict of interest during the entire period of the study conduct. The author has received the research fund from the African Centre of Excellence for Innovative Teaching and Learning Mathematics and science, University of Rwanda-College of Education (ACEITLMS/UR-CE).

ACKNOWLEDGMENT

I would like to express my gratitude to God for giving me wisdom and perseverance. I could not have done this work without his blessing.

My sincere gratitude goes to my supervisor, Dr. Philothère NTAWIHA, who guided me from the beginning of this dissertation. Without his continuous supervision and encouragement, I would not have come this far.

I thank the UR-College of Education Ethics Committee for reviewing and approving my research proposal. I am grateful to the University of Rwanda for granting me a research fund. Without this funding, my work would not have been accomplished.

I thank a lot the Ministry of National Education and Scientific Research for authorizing me to conduct my research work in all sampled schools.

Finally, I am thankful to HAKIZIMANA Godefride the Education Director of Gitega Province, all school directors and all library and laboratory staff of all sampled secondary schools who gave me relevant information for facilitating the completion of this research. Without their acquiescence and contribution, this work would not have been possible. May God bless you all.

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