EDUCATIONAL INPUTS AND THEIR IMPLICATIONS FOR OUTPUT
IN PUBLIC SECONDARY SCHOOLS IN NYARUGENGE AND
NYAMASHEKE DISTRICTS, RWANDA

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E83/CTY/26901/2011

A THESIS SUBMITTED TO THE SCHOOL OF EDUCATION IN
PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE AWARD
OF THE DEGREE OF DOCTOR OF PHILOSOPHY OF KENYATTA
UNIVERSITY

TITLE PAGE
MARCH, 2016
DECLARATION

I declare that this proposal is my original work and has not been presented in any other university/institution for consideration. This research proposal has been completed by referenced sources duly acknowledged. Where texts, data (including spoken words), graphics, pictures or tables have been borrowed from other sources, including the internet, these are specifically accredited and references cited in accordance with anti-plagiarism regulations.

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DEDICATION
This thesis is dedicated to Almighty God, my parents, and relatives.
ACKNOWLEDGMENTS

After long years of formal education, I get the highest degree from one of the top universities in my field. Without the support of many people, it would have not been possible for me to make this great achievement.

First of all, I would like to express my deepest gratitude to my supervisors, Dr. Mary A. Otieno and Dr. Levi I. Libese. As researchers and lecturers, they taught me patience, passion, devotion and thoroughness which are the necessity for a true researcher. They have also given me endless encouragement which helped me overcome a lot of difficulties during this research.

While Prof. Nzabalirwa Wenceslas, Dr. Rugar, Dr. Ogeta, and Dr. Nyambura were not my supervisors, they provided me with a lot of hearty advice and guidance based on their practical experience in my field. I am also grateful to Ms. Vanessa, the departmental secretary for her assistance when I was at Kenyatta University.

I am also very grateful to Susan Kabasage for her moral and financial support in the course of my studies. My heartfelt gratitude also goes to my parents and relatives for having prayed for and supported me throughout my formal education. Furthermore, I would like to appreciate all of my friends: Nasiforo, Jean Pierre, Alphonse, Sylvain and Corneille for having been by me during my studies. My sincere thanks are also addressed to all respondents who participated in this study as respondents.

Finally, my PhD program was sponsored by the Government of Rwanda through Rwanda Education Board. I would like to express my hearty gratitude to the government of Rwanda; without this sponsorship it would not be possible to make this achievement.
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ABBREVIATIONS AND ACRONYMS

9YBE: Nine Year Basic Education

12YBE: Twelve Year Basic Education

B.A.: Bachelor of Arts

BEd.: Bachelor of Education

BREDA: Bureau Régional (de l’UNESCO) pour l’Education en Afrique

BSc.: Bachelor of Science

DEO: District Education Officer

DFID: UK Department for International Development

EFA: Education for All

FBO: Faith Based Organization

FTI: Fast Track Initiative

GNP: Gross National Product

GoR: Government of Rwanda

HEC: Higher Education Council

ICAI: Independent Commission for Aid Impact

Km: Kilometer

M.A.: Masters of Arts

MBA: Masters of Business Administration

MDGs: Millennium Development Goals

MINECOFIN: Ministry of Economic Planning and Finance
MINEDUC: Ministry of Education

NGO: Non-Governmental Organization

NISR: National Institute of Statistics of Rwanda

PhD: Doctor of Philosophy

R: Pearson product moment correlation coefficient

R²: Regression analysis coefficient/Coefficient of determination

REB: Rwanda Education Board

S3NE: Senior Three National Examination

S6NE: Senior Six National Examination

UK: United Kingdom

UNESCO: United Nations Educational, Scientific and Cultural Organization

UNICEF: United Nations Children’s Fund

WWW: World Wide Web

WASAC: Water and Sanitation Corporation Ld
ABSTRACT

Despite the Rwandan government’s efforts to improve quality of education by increasing the supply of educational inputs in secondary schools, educational output continues to be below international standards. Therefore, the purpose of this study was to determine whether and to what extent the relationship exists between educational inputs and output in public secondary schools in Nyamasheke and Nyarugenge districts. To this end, this study sought to identify educational inputs provided in public secondary schools located in Nyamasheke and Nyarugenge districts, determine the extent to which each educational input provided correlate with educational output, find out the determinants of educational output and explore the strategies adopted by school managers to enhance educational output. This study was guided by Education Production Function theory and it adopted a correlation research design. The target population involved 2248 students, 70 head teachers and 2 district education officers, making a total population of 2320. A sample of 241 students, 21 head teachers and 2 district education officers was used. Stratified sampling, simple random sampling and purposive sampling techniques were used to select this sample. Questionnaires for students and for head teachers, document review schedule, and interview schedule with district education officers were used to collect relevant data. Expert judgment and test-retest techniques were used to test instruments’ validity and reliability respectively. Descriptive statistics such as frequencies, percentages, means were used to describe the provision of inputs, and Pearson r as well as regression analysis were used to describe the implications of educational inputs for output. Thematic analysis approach was used for qualitative data. The findings were presented in graphs, tables and texts. After data analysis, it was found that educational inputs are not sufficiently provided. It was also found that among endogenous inputs, teacher academic qualification, professional training, experience, availability of library, and laboratory student classroom ratio, are the key predictors of students performance as each of them account for between 41% and 78% of student’s performance. Furthermore, it was found that among exogenous inputs, the key predictors of students’ performance are their prior performance and their parental educational level as they explain between 18% and 43% of students’ performance. Among financial inputs the study revealed that expenditures on staff, on boarding, and recurrent expenditure are the key predictors of students’ performance as their contribution varies between 44% and 62% of school mean performance. It was recommended that the government and other stakeholders should invest more in provision of the key educational inputs to enhance output. It was also recommended that means should be provided to implement the strategies adopted to boost the quality of educational output. Future researchers were recommended to carry out a similar research in primary schools and universities to see if educational inputs provided have the same implications at these levels of education.
CHAPTER ONE
INTRODUCTION

1.1 Introduction
This chapter comprises the background to the study, statement of the problem, purpose and objectives of the study, research questions, significance of the study, limitations and delimitation, assumptions, theoretical framework, conceptual framework, and the definition of key terms.

1.2 Background to the study

Education has been recognized worldwide as of paramount importance for economic development of any nation. On this basis, Barbara, Alain and Ramahatra (2003) note that education is one of the most powerful instruments known for reducing poverty and inequality and for laying the basis for sustained economic growth. This is not far from the idea of Woodhall (2004) who states that “Education is a form of investment in human capital that yields economic benefits and contributes to a country’s future wealth by increasing the productive capacity of its people.” Likewise, UNESCO (2014) notes that education plays the key role in the reduction of poverty, increasing opportunities for new jobs and accelerating economic growth as well as sustainable development.

This role of education is statistically supported in UNESCO’s Education for All global monitoring report. For example, according to UNESCO (2014) while globally skills and knowledge acquired in each year spent in school increases individual’s earnings by 10% on average, UNESCO confirms that probability of
being poor after completion of secondary school education reduces by 60%. This is because education has been found to be the key factor that increases the productivity of an individual (Woodhall, 2004).

Furthermore, UNESCO (2014) insists that education of girls contributes to the reduction of mortality rate. This is because if it was possible that all women in low income countries had completed primary education, mortality rate of under 5 year children would fall by 15% and if they had completed secondary school, it would reduce by 49%. It is to be noted that the reports has revealed that 6.6 millions of under five year children died in 2012 only.

The role of education in raising environmental awareness is also of great importance. Highly educated people are the ones who are highly concerned with environmental issues. To this end, in its EFA global monitoring report UNESCO (2014) states that in developed countries while 25% of people who have not attended secondary school express their concern for environment, 37% of those who have attended or completed secondary school education are concerned with environmental issues and 46% of those with post-secondary education are concerned with environment. Finally, to emphasize the key role of education in reducing birth rates, the report states that in sub-Saharan Africa and South and West Asia, education of girls until they complete primary education can help reduce early marriage by 64%. 
It is due to these immense benefits that many countries have committed themselves to heavily invest in education. In this regard, UNESCO recommends that countries should heavily invest in education by allocating at least 20% of their total budget and at least 6% percent of their GNP to education. However, as the EFA global monitoring report indicates, this target has not yet been achieved as in 2011, the global average of educational expenditure was 15% and 5.1% of the national budget and GNP respectively (UNESCO, 2014). Likewise, Woodhall (2004) emphasizes that if a country spends more on educating its population, incomes will grow sufficiently to more than recover the investment.

Although in many countries the amount of money spent on education is still little, the World Bank report (2012) has revealed that in some countries expenditure on education is near or above the global target. For instance, the report indicates that in 2010 the public spending on education was at 17.21% of the government expenditure in Kenya, 19.20% in South Africa, 24.4% in Ghana, 18.33% in Tanzania, 25.1% in Burundi, 15.04% in Uganda and 18.2% in Rwanda.

This amount of money spent on education impacts on the quality of education. In its EFA global monitoring report, UNESCO (2014) notes that the major factor that is hindering the achievement of Education for All and quality of education in general is the lack of sufficient funds in education sector. The report emphasizes that although access to education has improved in many countries, quality which was described as the ‘global learning crisis’ is still a serious problem.
According to the same report, globally more that 250 million of children whose majority are from poor families are not at school to learn the basic literacy and numeracy skills which can allow them to get work and fulfill life.

In view of the above, the report of the Independent Commission for Aid Impact: ICAI (2012) on the impact of Department for International Development (DFID) aid to support education in three East African countries (Tanzania, Ethiopia and Rwanda) indicates that UK aid programmes were failing because the quality of education that is being provided to most children in the three countries is so low in such a way that the large majority of pupils are failing to attain basic levels of literacy or numeracy. This is corroborated by the report of UNESCO (2014) which states that while the assumption is that after four years of formal schooling children should be able to read, in Sub-Saharan Africa the situation is worse as 77% of children in Sub-Saharan Africa cannot read a sentence or part of it after four years of schooling.

In their report, World Bank, Ministry of education: MINEDUC, Bureau Régional de l’UNESCO pour l’Education en Afrique: UNESCO BREDAR (2011) the quality of education is viewed as the result of a set of factors within the education system that are believed to lead to better student outcomes, including measurable dimensions of student learning and it comprises the sufficient and effective supply of direct resources/inputs to schools such as infrastructure, teachers, learning and teaching materials among others.
In the same way, in its report, UNESCO (2014) reveals that one of the means to end the global learning crisis (poor quality) is to ensure equitable access to well-trained teachers and to ensure there is attraction and retention of highly qualified, experienced and committed teachers as well as ensuring adequate provision of other resources that are needed by the teacher to make sure children are learning. However, the provision of teachers and other educational resources needs a particular and urgent attention in most of Sub-Saharan African countries and other developing countries.

According to UNESCO (2014) the insufficiency and sometimes lack of teaching personnel that in most cases leads to increased class size is one of the factors that hold back education quality. For instance, in Mali, the ratio of pupils per trained teacher is 92:1 in Primary school. Likewise, during the school year 2009/2010 the ratio of pupil per trained teacher was above 100 per 1(100:1) in Kano state in northern Nigeria. The highest ratio was observed in Jonglei state of South Sudan where the average pupil/teacher ratio was 145:1. The report of UNESCO goes on to say that of the 60 countries analyzed, 75% of secondary school teachers are trained in only 30 countries although they do not meet the international standards.

On the other hand only 11 countries were found to have less than 50% of their teaching personnel trained. Furthermore, the report emphasizes that while the effectiveness of the teacher in delivering quality education requires quality
instructional materials, in some countries textbooks are becoming scarcer. For instance, the student textbook ratio increased in Malawi where 28% and 63% of students had no textbook in school years 2000 and 2007 respectively. The situation was worse in Cameroon where in primary school, the ratio of pupil per textbook was 11:1 and in some subjects such mathematics, this ratio could reach 13:1. Finally, the report indicates that in the United Republic of Tanzania, student/textbook ratio 1:1 only for 3.5% of all students in grade 6 (UNESCO, 2014).

In Rwanda, the government introduced free primary education in 2003 and in 2009 the 9-Year Basic Education (9YBE) programme was introduced to offer six years of primary education and three years of secondary education to all Rwandan children free of charge. This was later in 2010, extended to the 12-Year Basic Education (12YBE) programme that offers both primary and secondary education for free (www.newtimes.co.rw). This has led to an impressive increase in enrolment at both primary and secondary levels. For example, the net enrollment at secondary level increased from 13.9% in 2008 to 22.6% in 2010 and to 28% in 2012 (MINEDUC, 2013).

This increase in enrolment raised the concern for the teaching staff and conducive learning environment to enhance the quality of education that is being offered. For this purpose GoR has adopted a number of strategies to enhance the quality of education. These strategies include: the establishment
of Kigali Institute of Education (KIE) and affiliated Colleges of Education to address the deficit in secondary school teachers, the creation of Teacher Service Commission to ensure effective management and in-service training for available teachers, and the textbook liberalization policy that allows private partners to supply books in schools in order to close the gap that existed in the supply of textbooks to reach the target of having student-textbook ratio of 1:1 by 2014.

The implementation of these strategies requires heavy financial investments. It is in this perspective that the GoR developed the Long-Term Strategy and Financing Framework (LTSFF). This is a ten year education financing strategy that is guided by the GoR’s vision 2020, PRSP, EFA initiatives, and MDGs (MINEDUC, 2006). The LTSFF assumes that the total expenditure on education would have to increase from 65 billion RWF in 2006 to 137 billion RWF by 2010 and 204 bn RWF by 2015. In USD, this is estimated to be 117 million USD in 2006, compared to 255 million USD in 2010 and 400 million USD in 2015.

If the above spending targets were to be met, education expenditure would reach at least an estimated 25% of the GoR total budget; a percentage that is above the UNESCO requirements. However, there is still a significant gap in the education sector budget support/spending as indicated by the citizen’s guide on the national budget 2013/14. According to this guide, while the total GoR’s budget for 2013/14 budget year was 1,653.5 trillion, only 236.3
billion, that is 14.3% of the national budget, will be spent on education (MINECOFIN, 2013).

For resource mobilization, LTSFF has identified eight areas of possible mobilization for additional resources to bridge the gap in the education sector financing. These areas include: a) Increasing the share of government recurrent budget to education, b) Looking for funds from potential development partners such as the Fast Track Initiative (FTI), c) District and community participation (e.g construction of classrooms by community through UMUGANDA (community work), d) Contributions from Non Governmental Organizations (NGOs), e) Contributions from Faith Based Organizations (FBOs), f) Workers contributions, g) Private sector contributions, and h) School contributions (MINEDUC, 2006).

Despite the diversification of areas for resources mobilization to finance education for quality concern, the quality of education in Rwanda, as in many other developing countries, is still questionable. For example in its report, ICAI (2012) revealed that education quality in Rwanda as well as in the two other east African countries (Tanzania and Ethiopia) is so low to the extent that the large majority of pupils are failing to attain basic levels of literacy or numeracy. This report concurs with the UNICEF annual report for Rwanda which states that in addition to the rapid expansion of the Nine and Twelve Year Basic Education which created high pupil/teacher ratio and led to double-shift arrangements in primary school, the switch to English as the language of
instruction worsened the quality of education (UNICEF, 2013). This corroborate the report of the World Bank, MINEDUC, and UNESCO BREDA (2011) which state that the quality of education in Rwanda is still low and the government should improve the key inputs such as the distribution of basic resources to schools, and improve the teaching practices in the classroom in order to enhance students learning.

The poor quality of education in Rwandan education can be shown by the decline that has been observed in Senior Six National Examination performance from 2008 to 2012. According to MINEDUC (2013) the percentage of students passing the upper secondary leaving examination was decreasing then slightly raising since 2008. For instance, of the total students who sat for the exams, the percentage of those who passed was 89% in 2008, 88.9% in 2009, and it declined to 87.4% in 2010 the slightly rose to 87.5% in 2011 and then to 88.2% in 2012. These percentages are below the target of the Ministry of Education which was to have at least 90% and 95% of students passing S6NE above the minimum mark and receive leaving certificate by 2012 and 2014 respectively (MINEDUC, 2010).

As per UNESCO (2014) recommendation, Rwandan government has made considerable efforts to increase educational inputs in schools for the purpose of improving the quality of education. It is in this regard that it has targeted to increase the percentage of students who pass S6NE to 90% and 95% by 2012 and 2014 respectively. It has also targeted to make students textbook ratio of 1:1 by
2014, student qualified teacher ratio of 28:1 by 2014 and student classroom ratio of 24:1 among others. However, the report of the World Bank, MINEDUC and UNESCO BREA (2011) indicates that although there is improvement in inputs provision, in some places the provision still need special attention. For instance, whereas the national student to classroom ratio was 27.3:1, it was 35.3:1 in Kigali. Furthermore, the report reveals that although the national student to textbook ratio is 5.3:1 in the western province, more than 7 students share one book.

In the same vein, the report of MINEDUC (2013) states that although there have been considerable improvements in providing qualified teachers, the gap is still wide. The report goes on to show that the number of qualified teachers at secondary level rose from 57.4% in 2008 to 60.4% in 2009, slightly declined to 60% in 2010, then rose to 64% in 2011, and to 67.5% in 2012. Similarly, while student/teacher ratio was 28:1 in 2008, it changed to 24:1 in 2009, sharply rose to 29:1 in 2010, then to 24:1 in 2011 and finally to 23:1 in 2012. Moreover student/qualified teacher ratio is still high despite a considerable fall in the ratio: it fell from 49:1 in 2008, to 40:1 in 2009, then sharply rose to 49:1 in 2010, and sharply fell to 37:1 in 2011 and finally to 34:1 in 2012.

Furthermore, according to MINEDUC (2013) during the school year 2012, out of 534712 students that were in secondary schools, 145600 students were orphan. This means that 27.23% of secondary school students in Rwanda are orphan. From these orphan students, 23.5% are students who do not have their mothers,
54.6% are those who lost their fathers, and 21.9% do not have both parents. Furthermore, 48.9% of these orphan students are male while 51.1% are female. While the target was to reducing the number of boarding secondary schools to reduce the social cost of education (MINEDUC, 2006), only about 16% of households in Rwanda have power (NISR, 2013). This means that on only day students from these households can do their evening self-study and take home assignments without difficulties relating to lighting.

As far as Nyamasheke and Nyarugenge districts are concerned, there are differences in resource allocation. The national budget indicates that the total budget of Nyamasheke district was 12.750 billion RWF in 2013/14 budget year. From this budget 4.109 billion, 32.22% of the total budget was spent on education with secondary education taking 50.32 % (2 billion) of the total spending on education. From this 2 billion spent on secondary education, 63.2% was used for teacher salaries, 7.87% was spent on the payment of capitation grant, 11.65% on school feeding, 0.78% on hygienic and conducive learning environment for girls, 0.75% on supervision of exams and 15.76% was spent on education support projects i.e. provision of tangible fixed assets such as buildings, playgrounds, etc (MINECOFIN, 2013).

On the other hand, the total budget for Nyarugenge district in the fiscal year 2013/14 was 12.980 billion RWF and education was allocated only 2.267 billion RWF, that is 17.47% of the total budget of the district. Secondary
education was allocated 49.5% (1 billion) of the total education spending; with 69.41% going to teacher salaries, 5.46% for capitation grants, 8.11% was used for school feeding, 0.76% was used for hygienic and conducive learning environment for girls, 0.77% was spent on supervision of exams and 15.49% went to education support projects i.e. acquisition of tangible fixed asset.

In terms of resources provision, discrepancies exist between the two districts. While 55% of secondary schools in Nyamasheke district were equipped with computer, 82% of all schools in Nyarugenge district had computers. 16% of schools in Nyamasheke had internet connection compared to 36% in Nyarugenge district. In addition, only 25% of schools in Nyamasheke have computer labs against 50% in Nyarugenge district. 64% and 63% of schools were equipped with science kit in Nyamasheke and Nyarugenge respectively. Likewise, while 6% of schools in Nyamasheke have science corner, 7% of schools had science corner in Nyarugenge district. Finally, only 14% of schools in Nyamasheke had science labs while 30% of schools in Nyarugenge have science labs.

The report of MINEDUC (2013) shows that whereas 82% of secondary school teachers in Nyarugenge district were under-qualified in 2008, only 50% of secondary teachers were under-qualified in Nyamasheke district. Furthermore, the teaching load of secondary school teachers in the two districts was different in 2007. They were more overloaded in Nyarugenge district than in Nyamasheke.
district: the average secondary teacher workload was 23 periods per week in Nyarugenge district while it was 18 periods per week in Nyamasheke district. Moreover, the report of the World Bank, MINEDUC, UNESCO BRED (2011) indicates that while the average experience of secondary school teachers in Nyamasheke district was 6.5 years in 2007, it was 11 years in Nyarugenge district.

The performance in the two districts has shown variations over the years. The report of MINEDUC (2013) showed that the City of Kigali in which Nyarugenge district is located has been characterized by poor performance in S6NE and for the school years, 2010, 2011, and 2012 Nyarugenge was the 3rd in the three districts making the City of Kigali. On the other hand, the Western province where Nyamasheke district is located has been performing well over the years. It has been ranked either the 1st or the 2nd in provinces of Rwanda and Nyamasheke districts was the 2nd in 2010, 1st in 2011 and 2012 out of seven districts located in the western province.

As mentioned earlier the provision of adequate educational inputs has been suggested as the means of improving the quality of education. However, the provision of educational inputs in public secondary schools in Rwanda did not meet the targets that were set. Moreover, the students’ performance in Senior Six National Exams (S6NE) continues to be poor and below the desired national and international standards, as discussed in the above literature. This raises the question to know whether educational output, in this case performance in S6NE,
is the function of the quality and quantity of educational inputs provided in education public secondary schools. Therefore, a need arises to establish whether inputs such as teacher characteristics, physical facilities, instructional materials, student/classroom ratio, per student expenditure among many others affect educational output, as measured in terms of student performance in S6NE. The lack of knowledge on how these inputs correlate to student academic achievement in education production process would not help educational planners and policy makers come up with policies to improve efficiency in education by emphasizing the most important inputs.

1.3 Statement of the Problem
In education production function process, the quality of educational output dependents on the quality and quantity of educational inputs such as teacher characteristics, physical facilities, instructional materials, financial resources, and students’ background. It is in this perspective that in order to improve the quality of educational output in secondary schools in Rwanda, provision of various educational inputs has been accelerated. Despite these efforts made to accelerate the provision of education inputs with the purpose of improving the quality of performance, a wide gap still exists between the current situation and the national as well as international standards. For instance, in financial year 2012/13 only 14.3% of the national budget was spent on education, only 67.5% of teachers were qualified to teach at secondary level in 2012, the national student-textbook ratio was 5:1 while the target was to make it 1:1 by 2014. Moreover, while the
target was to have at 90% and 95% of students passing S6NE above the minimum mark in 2012 and 2014 respectively, only 88.2 passed in 2013, Nyamasheke and Nyarugenge Districts being at a particular disadvantage over the years.

Due to this gap in achieving the desired targets, there is a need to evaluate the implication of various educational inputs for maximum output in public secondary schools. This would help educational planners and other educational stakeholders improve the quality of educational output by prioritizing the most important educational inputs.

1.4 Purpose of the Study

The purpose of this study was to determine the degree to which a relationship exists between educational inputs and the output in public secondary schools in Nyamasheke and Nyarugenge districts.

1.5 Objectives of the study

This study sought to achieve the following objectives:

1. To find out educational inputs provided in public secondary schools in Nyarugenge and Nyamasheke districts.

2. To establish the extent to which each educational input provided correlates with educational output public secondary schools in Nyarugenge and Nyamasheke districts.
3. To find out the key determinants of educational output in public secondary schools in Nyarugenge and Nyamasheke districts.

4. To explore strategies adopted by the managers to improve educational output in Nyarugenge and Nyamasheke districts.

1.6 Research questions

This study was guided by the following research questions:

1. What are the educational inputs provided in public secondary schools in Nyarugenge and Nyamasheke districts?

2. To what extent do endogenous inputs correlate with school mean performance in public secondary schools in Nyarugenge and Nyamasheke districts?

3. To what degree do exogenous inputs correlate with students’ academic performance in public secondary schools in Nyarugenge and Nyamasheke districts?

4. To what level do financial inputs correlates with school mean performance in public secondary schools in Nyarugenge and Nyamasheke districts?

5. What are the key determinants of educational output in public secondary schools in Nyarugenge and Nyamasheke districts?
6. What are the strategies adopted by school managers to improve educational output in Nyarugenge and Nyamasheke districts?

1.7. Significance of the study
The findings of this study are significant because they provided knowledge on the status and adequacy of educational inputs provided in public secondary schools in Nyamasheke and Nyarugenge districts and how these inputs affect educational output. Specifically, the following people will benefit from the results of this study: firstly, Educational planners may benefit from the results of this study in that after revealing how each input affects educational output, they may be aware of which input to spend more on in their planning process.

Secondly, schools and students may also benefit much from this study in that after revealing how educational inputs affect educational output, schools with inadequate inputs may be provided with more educational inputs, hence improving students’ performance and their ability to fit in the labour market.

Thirdly, the results of this study may be of immediate benefit to the ministry of education in that after revealing how educational output is related to educational inputs provided in public secondary schools, it will accelerate the provision of the most important educational inputs to impart desirable skills and knowledge in Rwandan children.

Finally, since this study provided information on how educational output depends on the quality and quantity of educational inputs, its results may be of immense benefit to future researchers. They may use the results as reference for their
future studies on educational input-output analysis or used it as a basis for their future research.

1.8 Limitation and Delimitation

1.8.1 Limitations
The following were the limitations of this proposed study:

1. This study was carried out in public secondary schools located in Nyamasheke and Nyarugenge districts. Therefore, the findings of this study cannot be generalized beyond these two districts or to private schools.

2. During data collection process, respondents may have been biased and provided untrue information when completing the instruments.

3. Due to the design of this study, correlation design, which explores the relationship between two variables without manipulating them, the correlation between the two variables does not imply a causal relationship.

1.8.2 Delimitation
This study confined itself to educational inputs provided in public secondary schools in Nyamasheke and Nyarugenge districts and their relationship to output. It had only focused on endogenous, some selected exogenous and financial inputs and their relationship with the educational output measured in terms of students’ performance in S6NE. Other forms of educational output were not concerned
with this study. Literature was reviewed only on endogenous, exogenous and financial inputs considered in this study and their relationship to educational output. Only Senior Six National Examination Results were used as an indicator of students’ performance. This is because it is a standard test that all senior six students are supposed to sit for under the same conditions, at the end of the six years of secondary education in Rwanda. Only S6 students who were in session in the course of the school year 2014 were included in the sample of this study. Finally, there are several educational inputs that are provided in Rwandan education system, but this study focused only on teacher characteristics, instructional materials, physical facilities, class size (pupil-classroom ratio), pupil-teacher ratio, pupil-textbook ratio, school leadership, family background, expenditure per student, and teacher salaries.

1.9 Assumptions
This study was conducted under the following assumptions:

1. The respondents understood the purpose of this study, cooperated and answered honestly.

2. Education sector in Rwanda was engaged in a production function process where output is the function of the combination of various educational inputs.

4. Head teachers of public secondary schools had good knowledge of all endogenous and financial inputs provided in their schools.

1.10 Theoretical framework
This study was premised on the theory of Education Production Function (EPF). In economics, the theory of production function states that there is a relationship between physical outputs of a production process and physical inputs or factors of production. According to Hanushek (1979) in production function, the amount of output depends on the amount of inputs given the constraints imposed by the underlying technical process. In the same vein, Pritchett and Filmer (1997) adds that the production function is a theoretical construct which gives mathematical expression to the production relationship that defines the maximum output to be produced from different combinations of given sets of inputs. In any firm, the Production Function is expressed in a functional form as: \( Q=f(X_1,X_2,X_3, \ldots,X_n) \) Where \( Q \) is the quantity of output and \( X_1,X_2,X_3,\ldots,X_n \) are the quantities of factor inputs (such as capital, labour, land or raw materials).

In education, production function views education sector as an industry that uses a variety of inputs to maximize output (Hanushek, 1979). This consideration of education sector as a firm that is run on the basis of profit-maximization allows for the application of production function theory to this study on educational inputs and their implications for output in public secondary schools in Nyamasheke and Nyarugenge districts. The application
of production function in education is referred to as Education Production Function (EPF). Therefore, the only purpose of schools/education is to take children (raw materials) and convert them into graduates with desirable skills and knowledge (final products). Applying Production Function theory in Education, Bowles (1970) has defined Education Production Function as follows:

\[ A = f(X_1, \ldots, X_m, X_n, \ldots, X_r), \]

where

- \( A \) = Some measure of school output; e.g. performance
- \( X_1, \ldots, X_m \) = Variables measuring the school environment. These include amount and quality of teaching services, the physical facilities of the school, and the length of time that the student is exposed to these inputs;
- \( X_n, \ldots, X_r \) = Variables representing environmental influences on learning outside the school—e.g. the parents’ educational attainment, socio-economic status of students, etc.
- \( X_s, \ldots, X_z \) = Variables representing the student’s ability and the initial level of learning attained by student prior to entry into the type of schooling in question, e.g. students’ prior performance.

Therefore, Education Production Function takes schools as enterprises in which "raw materials" (children) and other inputs (teachers, books, libraries,
laboratories, etc) are combined through a given process or technology to produce certain outputs (products) (Hanushek, 2007).

Applying Education Production Function as expressed by Bowles (1970) to the study of educational inputs and their implications for output in public secondary schools in Nyarugenge and Nyamasheke districts, the equation took the following form:

\[ A = f(X_1, X_2, X_3, X_4, X_5, X_6, X_7, X_8, X_9, X_{10}, X_{11}, X_{12}, X_{13}, X_{14}, X_{15}, X_{16}, X_{17}, X_{18}, X_{19}, X_{20}, X_{21}, X_{22}, X_{23}, X_{24}, \ldots), \]

where

\[ A = \text{Students’ academic achievement (performance in S6NE)} \]

\[ X_1 = \text{Teacher qualification} \]
\[ X_{11} = \text{Play grounds} \]
\[ X_2 = \text{Teacher professional training} \]
\[ X_{12} = \text{Staff room} \]
\[ X_3 = \text{Teacher’s experience} \]
\[ X_{13} = \text{Boarding} \]
\[ X_4 = \text{Teaching load} \]
\[ X_{14} = \text{Walking distance} \]
\[ X_5 = \text{Pupil-teacher ratio} \]
\[ X_{15} = \text{Parenthood status} \]
\[ X_6 = \text{Class size} \]
\[ X_{16} = \text{Family size} \]
\[ X_7 = \text{Pupil-textbook ratio} \]
\[ X_{17} = \text{Parental literacy level} \]
\[ X_8 = \text{Student computer ratio} \]
\[ X_{18} = \text{Parental education level} \]
\[ X_9 = \text{laboratory} \]
\[ X_{19} = \text{Parental occupation} \]
$X_{10} =$ Library

$X_{20} =$ Energy used for lighting

$X_{21} =$ Student’s prior performance

$X_{23} =$ Recurrent expenditure

$X_{22} =$ Expenditure on staff/salary

$X_{24} =$ Total school revenue
1.11 Conceptual framework

Based on education production function model, variables of this study were conceptualized as follows:

**Figure 1.1: Conceptual framework**

**Independent variables**
- Exogenous inputs:
  - Family background
  - Students’ previous performance

**Endogenous Inputs:**
- Teacher characteristics
- Pupil-teacher ratio
- Class size
- Pupil/textbook ratio
- Physical facilities
- Instructional materials
- Students-computer ratio

**Financial inputs:**
- Per student expenditure
- Teacher salaries and fringe benefits

**Education Production Process (Teaching/learning process)**

**Dependent Variable**
- Educational Output:
  - Students’ academic performance in S6NE

*Source: Researcher’s conceptualization of the research variables*

Education production function views education sector as an industry that uses a variety of inputs to maximize output (Hanushek, 1979). Therefore, in developing the conceptual framework for this study, it was assumed that
education sector in Rwanda is engaged in a production function where various educational inputs are put in the production process (teaching/learning process) to get desired output (performance). As indicated in figure 1.1, educational inputs that form the production process for this study, are divided into three categories. The first category is made of endogenous inputs also referred to as school-related inputs, that is, those inputs that the school has control over. They include: teacher characteristics (their qualification, professional training, working experience, and teaching load), student/teacher ratio, class size, pupil/textbook ratio, and physical facilities. This study used all these endogenous inputs to establish their relationship to educational output (student performance) in public secondary school in Nyamasheke and Nyarugenge districts.

The second category of educational inputs is exogenous inputs that are commonly referred to as non-school related variables. These are those inputs that the school does not have direct control over but affect much student achievement. Exogenous inputs for this study include: family background (parental education level, occupation, and the number of siblings among others) and student’s prior performance. These inputs were assumed to have a certain influence on students’ performance especially in day secondary schools. They were therefore used for this study to investigate how they affect student’s performance in S6NE.

The last category of educational inputs is financial inputs. These are the expenses that are used to provide endogenous inputs in schools and to ensure effective
running of the school. Depending on their sources, some of these inputs may fall under endogenous inputs while some others fall under exogenous inputs. However, for the sake of this study they were examined separately. They include per student expenditure, recurrent expenditure, and teacher salaries and other fringe benefits. This study attempted to explain how all these financial inputs affect student academic achievement in public secondary schools located in Nyamasheke and Nyarugenge districts.

As figure 1.1 shows all these educational inputs (Endogenous, exogenous and financial inputs) were used as predictor variables (independent variables) and educational output was used as the criterion variable (dependent variable). This means that figure 1.1 assumes that student performance (output) in S6NE is a function of the combination of various educational inputs through education production process (teaching/leaning process) over a period of time (Six years of public secondary schooling in Rwanda).
1.12 Operational definition of terms

**Academic achievement:** Ability to exhibit possession of desirable knowledge, skills and competences after some years of schooling

**Educational input:** Any type of resources (human, physical and financial) used in education system to get results

**Endogenous inputs:** Any educational resources that the school has control over; they include teachers, learning materials, buildings, etc.

**Exogenous inputs:** Any educational resources that the school does not have control over; they include socio-economic status of parents, parental education level, school location, etc.

**Financial inputs:** all money expenditures within the school system; they include per student expenditure and teacher salary, recurrent expenditure, etc.

**Educational output:** this is the result of the input after going through teaching/learning process; for example the cognitive development of the child as measured by performance in a given test.

**Students/teacher ratio:** the average number of students per teacher at a specific level of education in a given school year.

**Students/classroom ratio:** the average number of students per classroom at a specific level of education.

**Students/textbook ratio:** the average number of textbook per student at a specific level of education

**Student/qualified teacher ratio:** the average number of pupils per qualified teacher at a specific level of education in a given school year.
**Implication:** Relationship between inputs and output or how educational inputs affect educational output.

**12 Year Basic Education school:** a school that offer both six years of primary education and six years of secondary education free of charge.

**9 Year Basic Education school:** a school that offer six years of primary education and three years of lower secondary education free of charge.

**Education manager:** the one who provide most of endogenous and financial inputs in public secondary schools; he/she owns the school totally or partially. In decentralized education system, the manager of public schools is the district.

**Public secondary schools:** Any school that offer post primary education and that is subsidized by the government of Rwanda.
CHAPTER TWO
REVIEW OF RELATED LITERATURE

2.1 Introduction
This chapter reviews already existing literatures in relation to the variables of this study. It specifically covers different views of renowned scholars and researchers on the relationship between different educational inputs used this study and educational output. Finally, this chapter ends with the summary indicating the gap in the existing literature on the topic under investigation.

2.2 Endogenous Inputs and educational output
Endogenous inputs are the school related inputs that is, the resources that the school has control over. Endogenous inputs include: teacher characteristics, student-teacher ratio, student-classroom ratio, student-textbook ratio, physical facilities, instructional materials, and school leadership. For the purpose of this study each of these inputs is examined in this section.

2.2.1 Teacher characteristics
The role of a teacher in attaining educational goals is of paramount importance. According to Bakhda (2004) the primary role of the teacher is to create a conducive atmosphere for learning: he/she prepares learning content, prepares classroom environment, orders materials, uses a variety of methods to deliver learning, assesses the level of learners, manages time and students, and should be a good role model. As the literature described here suggests, the attainment of educational goals and objectives highly depends on the teacher. To this end, Chall and Popp (1990), Stuart (2004) and Rodgers (2001), highlight that in order to achieve
educational goals, “there is a need to focus on teachers’ adequacy and competency in respect to their pedagogical practices and strategies and mastery of the curriculum and subject content”. In support of this, Ekwesili (2006) states that students' success depends on the amount of learning that takes place in the classroom which in turn is the result of the teacher’s effectiveness and efficiency in his/her daily teaching.

According to Murnane (1975) a teacher is the most important input in a school setting and his/her quality significantly affect students’ academic achievement. This was voiced by Lassa (2000) who states that teaching is an art that should be performed by a highly qualified person who can plan, deliver lessons in order to effectively achieve set objectives. Guga (1998) adds that not everybody can provide quality education. He emphasizes that education should be provided by a highly trained teacher for the purpose of achieving educational objectives in a given society.

Several studies have been conducted to investigate the impact of teacher as a school input on the educational output. The findings of most of these studied revealed that a positive correlation exists between the teacher and educational output. For example, Abraham and Morrison (2006) conducted a research to determine the key determinant of school effectiveness. The results of their study indicate that teachers were the key factors affecting the internal efficiency of the any schools. Similarly, another study was carried out in Nigerian secondary schools by Oshodi (1991) to find out whether there is a
correlation between utilization of different educational resources and students’ academic achievement. The findings of his research revealed that the most important factor affecting students’ academic achievement was the teachers’ quality.

In a similar study conducted by Bali and Alvarez (2003) it was found that the level of skills that teachers possess affect student’s performance and they therefore concluded that students who attend schools with highly skilled teachers perform better than those who attend less skilled teachers. Finally, in a study carried out to find out the problems of teacher staffing in Nigerian secondary schools, Ijaiya (1998) found that secondary schools were experiencing a serious shortage of teachers and he made a conclusion that lack of teachers was the main cause of poor performance and poor education quality in Nigerian secondary schools. Therefore, the review addresses the following teacher characteristics:

a) Teacher’s academic qualification
Research studies have been conducted to investigate the impact of teacher’s academic qualification on students’ academic achievement. Their findings were contradictory. For instance, Aduwa (2004), conducted a research to find out the key determinants of students’ achievement in Nigerian secondary schools. The findings of this research revealed that in addition to “student’s cognitive abilities, self-esteem, self-concept, home environment, study habits and motivation, teacher’s qualification has a significant influence on students’ academic performance”.

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However, in another similar study Iyamu (2005) found that cognitive abilities, home environment, motivation, and self-concept of students cannot have a significant influence on students’ performance if they are not taught by competent teachers. Likewise, in their study, Ehrenberg and Brewer (1995) found that highly qualified teachers teach better than less qualified teachers and they concluded that students taught by highly qualified teachers benefit more than those taught by those with low academic skills. This was reiterated by Ferguson (1991) who asserted that teachers’ quality of teaching and assignments highly correlate with his/her academic qualification in the subjects he/she teaches. This was partly contradicted by Darling-Hammond (2000) who found that in lower classes students benefit much from less qualified and experienced teachers than highly qualified and experienced teachers. Specifically Darling-Hammond found these students learn more from Bachelor’s degree holders than Master’s degree holders.

Although most of the results of the studies conducted on the relationship between teacher’s qualification and students’ performance have revealed that students taught by highly qualified teachers perform better that those taught by less qualified teachers, teachers’ academic qualification in Rwanda is still low. For instance, while 67.5% of all secondary school teachers were qualified in Rwanda, in 2008, the percentage of under-qualified secondary school teachers was 82% and 50% in Nyarugenge and Nyamasheke districts respectively (MINEDUC, 2013, World Bank, MINEDUC, and UNESCO BREDA, 2011). In this perspective, there is need to examine the extent to which students performance in
Nyamasheke and Nyarugenge districts can be attributed to their teachers qualification.

b) Teacher’s professional training
Teacher professional training is another important variable that determine students’ performance. For example, in the study conducted by Monk (1994) to found out whether a relationship exists between teacher’s professional training and students’ academic achievement, it was found that teacher’s professional training has a positive impact on the academic success of students he/she teaches. He therefore confirmed that the number of pedagogical courses teacher has taken in pedagogy positively affect students’ performance. He therefore recommends that teachers should be professionally prepared to enhance the education quality. This idea was corroborated by Rockooff (2004) who asserts that the qualification and experience of a teacher have positive effects on his/her teaching as well as on students’ academic performance.

The statement of Rockoof does not differ from the view of Hanushek, Rivkin and Kain (2005) who state that the qualification and the teaching experience of a teacher significantly affect the performance of students. Likewise, in their previous research aimed at decomposing the factors contributing to students achievement, Hanushek, Rivkin and Kain (1998) found that in addition to school factors, teacher related factors contribute to student academic success. It is in this perspective that they recommended that teacher training should be examined to raise their future productivity. In support of this, Ijaiya (1998) stated that
improving the quality of the teaching force in schools is seen as the key to raising student achievement.

The research findings on teacher education/training have shown that there is a relationship between teacher education/training and the performance of students. However, student-trained teacher ratio still needs attention in Rwanda. The percentage of secondary school qualified teachers was 67.5% in 2012 and the national student-qualified teacher ratio 34:1 (MINEDUC, 2013). This implies that teacher education in Rwanda needs to be emphasized. In view of the literature above cited, there is need to examine the extent to which teacher education/training affects students’ performance in Nyamasheke and Nyarugenge districts.

c) Teacher’s Experience
As far as teacher experience is concerned, several studies have been conducted to establish the relationship between teacher experience and students’ academic achievement. The findings of these research had shown either correlation or no correlation. For instance, while Clotfelter, Helen and Jacob (2007) find strong positive effects of teacher experience on students achievement, Aaronson, Barrow and William (2007) and Betts, et al. (2003) found no significant correlation between teacher experience and student achievement. In their study on teacher characteristics and students’ performance, Greenwald, Hedges, and Laine (1996) found that there is a positive relationship between some teacher characteristics (experience) and outcomes. A similar study was carried out by
Krueger (1999) and the results showed that there is a positive impact of having highly experienced teachers on students’ achievement. Corroborating this, Hanushek, Kain and Rivkin (1998) in their study found that students taught by teachers with two years of teaching experience perform better than their counterparts taught by teachers with no experience. However they found that having more than two years of teaching experience does not affect students’ performance.

As the aforementioned research findings have shown positive association of teacher experience with students’ academic achievement, it is the role of educational institutions to retain experienced teachers to deliver quality education. In support of this, Owolabi (2007) emphasizes that the more experienced teachers as well as the retiring teachers who still want to continue teaching should be retained so that they can improve the quality of their countries educational system through their wealth of experience.

The aforementioned literatures showed a positive correlation between teacher experience and student achievement. However, according to the report of the world Bank, MINEDUC, and UNESCO BREDÁ (2011), the average experience secondary school teachers in Nyamasheke and Nyarugenge districts was respectively 6.5 years and 11 years in 2011 and students performance in S6NE was different in both districts. Therefore, there is need for the study to investigate whether the amount of teaching experience affect students’ performance in Rwanda.
d) Teaching load
Teacher workload include instructional time, supervision time, lesson preparation time, assessment time, time spent on management meetings and participation in extracurricular activities (Dibbon, 2004). According to Trethaway (2001) increased workload adversely affects the quality of their classroom teaching and lesson preparation, and adversely impact on extracurricular activities. It also adversely affects their emotional wellbeing, their family life, relationship with friends and leisure activities. Finally it affects their commitment to job (60% said they would leave teaching when opportunity arose).

In their study on teacher recruitment and retention, Dibbon and Sheppard (2001) found that almost 50% of the new teachers were giving consideration to leaving their position because of reasons related to heavy workload, a stressful teaching environment and lack of opportunities for advancement and pay increases. In his report on the impact of workload on teachers and students, Dibbon (2004), states that the failure to address the issues associated with a high workload will result in lower levels of teacher satisfaction and higher levels of attrition; which will have impact on the students’ performance. Similarly Fullan (2001) states that high teaching load leads to teachers’ stress and job dissatisfaction which in long run impact on students’ academic achievement.

From the aforementioned literatures, teaching load significantly influences teachers’ motivation, teaching practices, and job satisfaction; which in long run affect students’ academic achievement. However, although teachers were more
overloaded in Nyarugenge district (23 periods per week) than in Nyamasheke district (18 periods per week), students’ performance in the two districts varied over the years (World Bank, MINEDUC, & UNESCO BRED, 2011). This raises the question of whether the teacher workload affects student performance in Rwanda in general and in Nyamasheke and Nyarugenge districts in particular. Therefore this study sought to establish whether and to what extent teaching load affect students’ performance in S6NE in the two districts.

2.2.2 Class size/student-classroom ratio
Student-classroom ratio is the average number of pupils/students per classroom at specific level of education in a given school year. A lower pupil/student classroom ratio implies that the teacher has a very small class to teach, which enables him/her to pay more attention to individual students which positively affect the performance of pupil/students (UNESCO, 2009). Pupil-classroom ratio which is considered as the measure of the class size provides an opportunity to learn and thus affect students’ academic performance.

Different research findings suggested that class size affect the students’ performance, others have contradicted this. For instance, the findings of research by Kweku (1979) indicate that class size significantly affect students’ academic achievement and can be used to predict students’ performance as they are highly correlated. Likewise, the finding of an experimental research conducted in Tennessee between 1985/86 and 1988/89, revealed that small class size positively affect student performance. The study concluded that the reduction
in class size corresponds to an increase of 1% in students’ performance (Krueger, 1999).

Hanushek, Rivkin and Kain (1998) find that class size effects are statistically significant for 4th and 5th formers but not for 6th formers. However, although significant, the magnitude of the effects is considerably smaller than that obtained by Krueger, and account for less than 0.1% of the total variation in student achievement. Similarly, according to the findings of a research conducted by Angrist and Lavy (1999) in Israel in the early 1990s there are robust gains in student achievement from smaller classes.

A similar research was carried out by Barro and Lee (1996) who found that the ratio of students per class together with the ratio of students per teacher significantly affect students’ performance in both national and international tests. Conversely, in their longitudinal study on the impact of class size on students’ performance, Goldhaber and Brewer (1997) found that class size significantly affect students’ performance though students from big class size perform better than those in small class size. Their findings were collaborated by Goldhaber, Brewer, and Anderson (1999) who in their subsequent research found that better students’ performance was linked with large class sizes.

In another study, Cooper and Cohn (1997) found that smaller class sizes negatively affect students’ performance. This was voiced by Hanushek (1997) who found reduced class size does not imply better students’ performance as this
latter is a function of many other factors. This goes hand in hand with the findings of a quasi-experimental research conducted in Connecticut district schools by Hoxby (1998) to establish the relationship between class size and students’ academic success. Hoxby found that class size does not significantly affect students’ academic achievement. However, in their research Wright, Horn and Sanders (1997) emphasize that when class size interacts with other educational inputs, it affect students’ performance. Therefore, it should be taken as a key input to enhance the quality of education.

The finding of Wright, Horn and Sanders is not far from the finding of Crosnoe, Johnson, and Elder (2004) who found that although class size does not directly affect students’ performance, it contributes to the creation of a more intimate settings and hence increasing good teacher-student relationship which may have a positive effect on student academic performance.

The results of different studies on class size variable have positively or negatively associated pupil-classroom ratio/class size with students’ academic achievement. Few other studies have found no relationship between the two variables. According to MINEDUC (2013) although in 2012 there was no significant difference between the class size in the two districts: 39.5:1 in Nyamsheke and 39.3 in Nyarugenge, the students’ performance in S6NE was different. This raises the question of whether there is relationship between class size/pupil-classroom ratio and student performance in Rwandan public secondary schools.
2.2.3 Student-teacher ratio

Student-teacher ratio is the average number of students per teacher at a specific level of education in a given school year. The purpose is to measure the level of human resources input in terms of teachers in relation to the size of the student population. A high pupil teacher pupil suggests that each teacher has to be responsible for a large number of pupils. In other words, the higher the pupil-teacher ratio, the lower the relative access of pupils to teachers. It is generally assumed that a low pupil-teacher ratio signifies smaller classes, which enables the teacher to pay more attention to individual students, which may in the long run result in a better performance of the pupils (UNESCO, 2009).

In its EFA global monitoring report, UNESCO (2014) confirms that students/teacher ratio is one of the key indicators of the quality of education. UNESCO goes on saying that although the great majority of Sub-Saharan African countries increased the number of secondary school teachers by 50% from 1999 to 2011, students-teacher ratio still exceeds 30:1 and the ratio of students per qualified teacher is above 40:1, that is addition of 10 students. UNESCO concludes that this jeopardize the quality of education.

Studies have been conducted to examine the relationship between pupil/teacher ratio and students’ academic achievement and found that they are somehow correlated. For instance, in their research, Barro and Lee (1996) found that students-teacher ratio and class size significantly affect the students’ academic performance in different international tests. Their findings go hand
in hand with the findings of the research conducted by Becker (2006) to explore the relationship between class size and pupil-teacher ratio. He discovered that pupil-teacher ratio and students’ academic achievement are highly correlated. Moreover, this corroborate with the findings of Kornfeld (2010) who found that larger pupil-teacher ratio negatively affect students’ academic achievement.

As the findings of the studies mentioned earlier showed smaller student-teacher ratio positively affect students’ performance. According to MINEDUC (2013) student-teacher ratio was 29:1 in Nyamasheke and 28:1 in Nyarugenge districts; a ratio that is above the national student-teacher ratio of 23:1. Although the difference in student-teacher ratio is small between the two districts, students’ performance in S6NE was different between the two districts. There is therefore the need to examine how the present student-teacher ratio affects student’s performance in Rwanda.

2.2.4 Student-textbook ratio
Textbooks are one of the key ingredients in any education systems. The importance of textbooks in a school setting has been highlighted by many scholars and the latter have linked textbooks with students’ academic achievement. They have insisted that textbooks are the only source of knowledge for both students and teachers and have therefore recommended that sufficient textbooks should be provided in schools to enhance quality of education. For instance, In their longitudinal study conducted in Thailand to highlight the influence of textbooks on students’
academic success, Lockheed, Vail and Fuller (1986) found that textbooks availability and adequacy affect students’ academic achievement. Likewise, in his study on the impact of resources and resources utilization on students’ performance, Oni (1992) found that recommended textbooks significantly affected students’ performance in introductory technology, business studies and home management. This was later supported by the findings of White (2004) who conducted a research in Ghana to establish the relationship between textbooks and students’ performance and found that improved textbook provision was a significant factor in improving students’ achievement.

Provision of textbooks in schools does not only increase students’ performance, but it also contributes to the effectiveness of teachers. This is because teachers use them to improve their teaching practices. In support of this, Squire (1991) emphasizes the importance of textbooks for teachers’ effectiveness by stating that textbooks are good sources of knowledge for teachers and without replacing them they complement their role in classroom. Squire therefore recommends that those who want to improve the quality of education should accelerate the provision of quality textbooks. In the same vein, Farombi (1998) emphasizes the impact of textbooks by stating that “school libraries may not be effective if the books therein are not adequate and up-to-date as its impact may only be meaningful if the library could be opened to the students always for a considerable length of time in a school day.”
From the literature above, it is logical to make conclusion that availability and adequacy of textbooks positively affect student’s achievement and teachers’ effectiveness. While the national target was 1:1, the national average student-textbook ratio in 2012 was 5:1. However, in some parts, like in the western province where Nyamasheke district is, student-book ratio is 7.6:1 which means that more than 7 students share one book (MINEDUC, 2013). If adequacy of textbooks positively affect students’ performance as the results of various studies have shown, students’ performance in the two districts is likely to be negatively affected given the high ratio. Therefore, there is need for the study to establish the relationship between student/textbook ratio and students performance in S6NE in Rwanda.

2.2.5 Physical facilities
In a school system, physical facilities play an important role. Without them learning cannot take place. Akinfolarin (2008) has identified physical facilities in school as a key factor which affects academic performance in the school system. According to him school physical facilities include classroom furniture, recreational equipment among others. For Hallak (1990) facilities constitute a key factor in school system and their contribution to students’ academic success cannot be ignored. According to him, laboratories, classrooms, libraries, dormitories, staff rooms, refectories, furniture, recreational equipment, toilets, playgrounds, instructional materials and other school buildings among many others are the major school physical facilities. To
emphasize the importance of the provision of the physical in a school system, Hallak (1990) states that availability and adequacy of the physical facilities in a school enhance the performance of that school. He further emphasizes that when classroom are populated or when the school buildings are not beautiful and attractive, the performance of that school is likely to be of poor quality.

Bandele (2003) emphasized the importance of school physical facilities by stating that facilities such as modern laboratories, libraries and classrooms should be adequately provided in all schools for the purpose of quality of education. Research studies have been conducted to establish the link between students’ performance and the availability of physical facilities in a school. Most of the findings of these research revealed that school facilities highly correlate with students’ academic performance. For instance, Olutola (1982), found that students’ academic performance highly depends on the availability and quality of the physical facilities provided in the school they study in. Explaining this, Olutola states that this is because school facilities creates a conducive learning environment and hence enhance effective teaching/learning activities. Corroborating this, Ayodele (2000) established a positive relationship between availability of different school facilities and students’ performance. In the same vein, the study conducted by Vandiver (2011) revealed that availability and adequacy of school facilities positively affect students’ academic performance.
According to London (1993) in many developing countries where students performance in public exams is still poor certain important school facilities are not provided and where they are available, they are of poor quality or in critical conditions. As Oni (1992) states the internal efficiency and productivity of any schools highly depend on the availability, adequacy and relevance of the school facilities. This goes hand in hand with the findings of Cynthia & Megan (2008) who found that there is a high positive relationship between the quality of school facilities and student academic achievement in English and Mathematics.

The aforementioned literature highlighted the role of good physical facilities like buildings, classrooms, toilets, recreational equipment, etc. in determining student academic achievement. However, during the school year 2012, the conditions of secondary school facilities were appalling. For instance, only 44% of all secondary schools had access to electricity through the national grid, 14% were using solar power, 24% were supplied electricity by electric power generators, 5% were using biogas system and the remaining 13% did not have access to any of the four sources power (MINEDUC, 2013). In view of the literature on this variable, there is a need to examine whether the present provision of physical facilities affect students’ performance in Rwanda.
2.2.6 Instructional materials

Many scholars have provided different definitions of instructional materials. For example, Isola, (2010) defines instructional materials as “objects or devices, which help the teacher to make a lesson much clearer to the learner.” Agina-obu (2005) refers instructional materials as “concrete or physical objects which provide sound, visual or both to the sense organs during teaching.” According to Maruff and Gbolagade (2011) “Instructional materials are those materials that are available in various classes, such as audio or aural, visual or audiovisual. Thus, audio instructional materials refer to those devices that make use of the sense of hearing only, like radio, audio tape recording, and television.” They go on to say that “visual instructional materials on the other hand, are those devices that appeal to the sense of sight only such as the chalkboard, chart, slide, and filmstrip. An audio-visual instructional material however, is a combination of devices which appeal to the sense of both hearing and seeing such as television, motion picture and the computer.”

Instructional materials play an important role in creating a very conducive learning environment that facilitate the acquisition of new skills and thus improving school effectiveness. To support this, James (2010) asserted that “teachers especially in primary Education should be encouraged to use as many teaching and learning aids as possible to set an environment which is stimulative and conducive to learning and in which pupils can be easily guided through the discovery of knowledge on their own.” This idea has been reiterated by
O’Donghue (1971) who stated that that “Learning materials are important because they can significantly increase student achievement by supporting student learning.”

Several studies have been conducted to examine the relationship between instructional materials and academic achievement of the students and their findings revealed in some instances a relationship between instructional materials and student academic performance exist or not. For instance, Isola (2010) conducted a research on the effects of instructional resources on students’ performance in Kwara State in Nigeria. He correlated material resources with academic achievements of students in ten subjects. His findings revealed that achievements of students for the past five years were related to the resources available for teaching each of the subjects. He therefore concluded that material resources have a significant effect on student’s achievement in each of the subjects.

The effect of the school facilities was reiterated by Ajayi and Ogunyemi (1990) who states that the rationale of providing instructional materials is to meet the purpose and needs of educational system. They therefore recommend that students should have full access to available resources for references and use them to learn at their own pace. This according to them increases the academic performance of students. In the same vein, Popoola (1990) conducted a research to investigate the impact of instructional materials on students’ performance in Ogun State. Using five secondary schools to collect data on
availability of instructional materials, he collected examination results for five years and compared achievements of students in schools with adequate material resources and achievements of students in schools with inadequate material resources. He found a significant difference in the achievements of the two sets of students. The schools with adequate instructional materials performed better than those with inadequate instructional materials.

In their experimental research on the effect of standard instructional resources on students’ performance in physics, Maruff and Gbolagade (2011) found that standard instructional materials have a significant effect on students’ performance. They found a significant difference in the performance of students taught using standard instructional materials and those taught using improvised instructional materials. These findings were contradicted by the findings of the research conducted by Aliyu (1993) as cited by Johnson (1998). Aliyu found that there is no significant difference between students who study in secondary schools equipped with adequate instructional materials and those in schools with inadequate instructional resources. However, Aliyu found that instructional materials are more important in the teaching/learning of pure sciences than in social sciences.

From the literature reviewed on the relationship between instructional materials and students’ performance, it is clear that some research findings found a relationship while others found no relationship between the two variables. According to MINEDUC (2013) provision of instructional materials in secondary
schools still need a particular attention. For instance, of all secondary schools in Rwanda, 64% have computers, 18% have internet connection, 25% have computer labs, 60% have science kit, 5% have science corner and 15% have science laboratories. In view of the literature related to provision of instructional materials there is need to examine whether students’ performance in S6NE is dependent on instructional materials provided in public secondary schools in Rwanda.

2.2.7 School leadership
The term leadership has been defined by Coleman and Glover (2010) as the action of leading a group of people or an organization. According to Thomson (1992) there are a number of activities that school leaders must perform to ensure effective running of a school. According to him school leaders must understand changes as well as manage them, they must involve and motivate staff, create a positive culture, build group vision, develop quality educational programs, provide a positive instructional environment, encourage high performance, apply evaluation processes, analyze and interpret outcomes, be accountable for results, maximize human resources utilization, stimulate public support, and engage community leaders.

Several studies have been conducted to investigate the relationship between school leadership, especially principal’ leadership, and student learning and achievement and their findings have revealed a significant and positive relationship. For instance, findings of the research by Marks and Printy (2003)
revealed that in addition to classroom instructions, school leadership contributes much to student learning and performance. Similarly, Leithwood and Mascall (2008) found that the influence of collective leadership was most strongly linked to student achievement through teacher motivation. This is not far from the findings of Duke, Tucker, Slamonowicz and Levy (2006) who found that the lack of effective leadership in schools lowers students’ achievement because the absence of quality leadership often results in ill-adapted school organization and programs. They added that it also leads to unstable and difficult staffing, students’ negative attitudes to academic work and discipline, an unhealthy school system and climate, and non-cooperation of parents and community. Finally, Carpenter, Geletkanycz and Sanders (2004) concluded that school leader’s personal character and values play a role in the school’s effectiveness as these influence the attitude and cooperation of the school staff and students.

2.3 Exogenous inputs and educational output
Exogenous inputs are the resources that the school does not have control over i.e. they are nonschool related inputs. They are family background-parental socio-economic status, parental education level, family size, family structure, and parents’ occupation-, school location, students’ past academic background, etc. For the purpose of this study only family background and students’ past academic background will be examined.
2.3.1 Family background

Family background is a collective terminology comprising of social class/status, economic status, family size, family structure, parents’ educational level, occupation and other factors pertaining to family life. According to Jeynes (2002) the socio-economic status of a child is most commonly determined by combining parents' educational level, occupational status, and income level. This was supported by Majoribanks (1996) who asserted that family background is key to the students' life and outside of school, it has the most important influence on student learning, and it includes factors such as socioeconomic status, two-parent versus single-parent households, divorce, parenting practices and aspirations, maternal characteristics, family size, and neighborhood.

In one way or another, all these parental factors affect education and particularly the academic performance of children. For example, in the study conducted in Philadelphia schools, it was found that family income and race largely accounted for school mean performance (Summers and Wolfe, 1975). In a research by Eamon (2005), it was found that Students from low socioeconomic backgrounds who attend poorly funded schools do not perform as well as students from higher social classes.

According to Fuchs and WÖßmann (2004), there is a clear pattern of performance differences by family status. Students who live with both parents perform better than students who live with a single mother, the latter
perform better than students who live with a single father, and the latter perform better than students who do not live with any parent. In each subject, student performance increases steadily with each higher category of parents’ education. They further stated that students who had at least one parent working full time performed statistically significantly better than students whose parents did not work. Finally, they stated that another indicator of family background that is strongly and statistically significantly related to student performance is the number of books in the students’ home. For example, students with more than 500 books at home performed better in math than students without any books at home.

Another research conducted by Majoribanks (1996) has shown that children from single-parent households do not perform as well in school as children from two-parent households. The same research provides several different explanations for this achievement gap. Single-parent households have less income and there is a lack of support for the single-parent which increases stress and conflicts. In addition, single parents often struggle with time-management issues due to balancing many different areas of life on their own. Finally, single-parents are less involved with their children and therefore give less encouragement and have lower expectations of their children than two-parent households.

A similar research was done by Jeynes (2002) and found that divorce also negatively affect academic achievement. He found that students whose parents had divorced were among those who scored lowest on standardized test. Possible
explanations for this relationship are that divorce can cause a family's socio-economic status level to decrease and parental connections are harmed.

Previous research findings have also shown that parental education level as well as their economic status affects students’ academic achievement. For instance, in the research by Emejulu (2006) it was found that family background especially educational level and economic status of the parents positively affect their children’s academic performance. He stated that this may be due to the fact that the highly educated parents belong to the upper and middle classes and are therefore economically buoyant. Consequently, they can afford to provide all necessary textbooks, workbooks and arrange for extra tutorials for their children.

In addition, these parents would normally send their children to the ‘best’ schools where there are well-qualified teachers, well-equipped laboratories and libraries and other necessary things that facilitate learning and success. The results do not differ from the results of a longitudinal research conducted by Hassan (2009) with the sponsorship of the Norwegian Social Research Institute (NOVA). Hassan discovered that there is a positive association between parents’ education level and their offspring’s academic achievement: the proportion of pupils who achieved the highest grades increases with increasing parental education levels, while the proportion of those who achieved the lowest grades decreases in the same direction.

Similarly, he found that a positive association between the school grades of children and parental labour market status/ employment status exists: the
proportion of those who achieved the highest grades is higher among those whose parents are employed than their counterparts, while the situation is reverse in the lowest grades. This was reiterated by Seyfried (1998) who concluded that the low socio-economic status students score about ten percent lower on the National Assessment of Educational Programs than higher socio-economic status students. Finally, other research findings have revealed smaller family size is linked with higher academic achievement. It was found that students with fewer siblings are likely to receive more parental attention and have more access to resources than children from large families. The additional attention and support leads to better school mean performance (Eamon, 2005, Majoribanks, 1996).

In the contrary to all the aforementioned research findings, the findings of a very recent research conducted by Osuafor and Okonkwo (2013) on the influence of family background on academic achievement of secondary school biology students in Anambra state, Nigeria revealed that family background including family structure, parental occupation and parental education level had no significant influence on students’ achievement in biology. Their findings showed that there is no significant influence of family structure, parents’ occupation, and parents’ level of education on students’ achievement in biology. This findings however, disagree with Onyeabo in Nwachukwu (2002) who stated that the larger the family, the poor the school achievement of their children.

The literature reviewed in this section, showed that family background affect students’ academic achievement in one way or another. The statistics released by
MINEDUC (2013) show that the family background of secondary school students is not generally good. For instance, of all 534712 secondary school students in 2012 school year, 145600 (27.2%) students were orphan. Of the 145600 orphan students 23.5% did not have their mother, 54.6% did not have their father and 21.9% did not have both parents. Furthermore, statistics show that 48.9% and 51.1% of these orphan students were male and female respectively. In accordance with the aforementioned research findings this is likely to have impact on their academic achievement. Therefore, there is need for a study to examine whether students’ academic performance in S6NE is a function of students family background in Rwanda.

2.4 Financial inputs and educational output
Financial inputs are the amount of money spent on education as expense either on the staff or the student. They include inputs such as teacher salaries, per student expenditure (paid in form of capitation grant), administrative staff expenditure, etc. for the purpose of this study, only teacher salaries and other fringe benefits, and per student expenditure will be highlighted.

2.4.1 Per student expenditure
Expenditures per student have been defined by Cooper and Cohn (1997) as the total amount of money spent on each student enrolled for the purpose of acquiring new skills and knowledge. If these are well utilized, they can affect education system in one way or another. For example, in a study conducted by Gupta, Verhoeven and Tiongson (1999) to investigate the key
determinants of enrolment, it was found that the amount of money a given
country invests in education determines the rate of enrolment in that country. In
fact, their findings revealed that the more the country invests in education the
higher the rate of enrolment.

Several other studies were conducted to correlate expenditure per student with
academic performance and their results were contradictory. For instance, Figlio
(1997) conducted a research to find out the impact of the national incomes
and expenditures on the allocation of resources in education and whether
variations in financial incomes and expenditures correspond to variations in
students’ academic performance. His findings revealed that reduced
expenditures negatively affect students’ performance especially in all major
subjects. Moreover, the study conducted by Dewey, Husted and Kenny (2000) to
examine whether per pupil expenditure has effect on pupils’ academic
performance. The findings of this study revealed that expenditure per pupil
positively affect pupils’ academic achievement.

Contrary to these research findings, several other studies were conducted to
investigate whether there is relationship between per student expenditure and
student’s academic achievement. The findings of these studies have shown
that no relationship between the two variables can be established. For
instance, in his study Marlow (2000) examined the effect of per student
expenditure in primary and secondary schools on students’ performance in
reading, writing and mathematics. He found that there is no relationship between
higher expenditures on education and students’ academic achievement. He went on to say that the reason for the absence of relationship may the fact that the big proportion of the educational expenditure is allocated to administrative and teaching staff not for the purpose of enhancing quality but for other purposed.

The findings of Marlow are not far from the findings of Hanushek (1981) who, using a production-function equation was designed to measure the relationship between inputs and outputs in an industrial setting, assessed the relationship between school spending (input) and the students’ academic success (output) in different countries. He found that per pupil expenditures in those countries varied widely and he found no relationship between higher expenditures and better academic achievement of students. He therefore concluded that additional educational spending would produce good results only when educational system has ability to utilize the additional expenditures efficiently. However, after reviewing the same data, Greenwald, Hedges, and Laine (1994) found that when some specific expenditure are isolated, a relationship exists between some specific expenditure and students’ academic achievement.

2.4.2 Teacher salaries and fringe benefits
Another financial input in education system is the teacher salaries and other fringe benefits in monetary terms. These are most important in education system because they are one of the factors that determine teachers’ motivation and commitment to their job, which has also been found to be determinant of students’ academic achievement. Evidences from different research findings show that teacher salaries
affect their students’ academic performance. For example, in their research, Hanushek, Kain and Rivkin (1999), examined the impact of teacher salaries on students’ performance and found that higher salaries positively affect students’ academic performance. However, he found that a strong relationship exists for only more experienced teachers and for less experienced teacher the relationship is moderate. This was later voiced by Dewey, Husted and Kenny (2000) in their study conducted to investigate the impact of salary differentials on students’ performance. They found that higher salaries are key determinant of students’ academic achievement. This corroborate with the findings of research by Pritchett (2003) who found that increased teacher salaries are linked with improved students’ performance.

From the research findings presented in the literature related to teacher salaries and other fringe benefits, a conclusion can be made that higher salaries and fringe benefits positively affect teachers’ motivation and commitment to their work, which in turn affect students’ performance. However, teacher salaries as well as other work related fringe benefits in Rwanda are still very low in comparison with other public servants. For instance, while other public servants holding a bachelor’s degree have a net monthly pay of 200000 Frws, secondary school teachers with a university degree earn 113000 Frws per month. A diploma holder in other public sectors earns 144000 Frws per month while he earns 89000 in education sector. Finally, a holder of secondary school certificate teaching at secondary level earns 27000 against 80000 of his
counterpart in other public sectors (MINEDUC, 2013). According to the aforementioned research findings this pay differentials between teachers and other public servants may demotivate them; hence affecting the performance of students they teach. It is in this regard that a study is needed to examine the extent to which teacher salaries affect their students’ performance in Rwanda.

2.4. Summary
In this chapter, the literature related to the variables of this study has been reviewed. The views from different scholars and various research findings indicated that there is a clear link between various educational inputs and output. On one hand, the literature showed that educational inputs such as teacher characteristics, physical facilities, low student/teacher ratio, instructional materials, low student/textbook ratio, per student expenditure, and teacher salaries among others positively affect student’s academic achievement. On the other hand, the research findings showed a negative or absence of relationship between these inputs and the output. Due to these inconsistencies in the findings, no conclusion can be made that the declining performance S6NE is the function of educational inputs provided in public secondary schools in Rwanda. Therefore, this research sought to provide information on how educational inputs correlate with output in public secondary schools in Nyamasheke and Nyarugenge districts.

Furthermore, the literature revealed that no academic research was conducted on the relationship between educational inputs and output in the context of Rwanda.
The only information on educational inputs in Rwanda is limited to the description of their availability in schools. Therefore, this research went beyond the simple description of availability of educational inputs and described the degree of relationship that exists between the available inputs and the output in public secondary schools in Nyamasheke and Nyarugenge districts.

Finally, from the literature reviewed, limited studies were conducted on the relationship between both endogenous and exogenous inputs and the output in a single study. This study therefore investigated the implications of endogenous, exogenous, and financial inputs for output in public secondary schools in Nyamasheke and Nyarugenge districts.
CHAPTER THREE
RESEARCH DESIGN AND METHODOLOGY

3.1 Introduction

This chapter describes research design and methodology. It specifically, highlights the research design, variables, location of the study, target population, sampling techniques and sample size, research instruments, pilot study, validity and reliability, data collection techniques, data analysis, logistical and ethical issues.

3.2 Research design

This study adopted a correlation research design. According to Fraenkel and Wallen (2009) correlational study investigates the possibility of relationships between two or more variables through a correlation coefficient without any attempt to influence or manipulate them. Similarly, Amin (2005) states that correlation method involves collecting data in order to determine whether and to what degree a relationship exists between two or more variables. He adds that the more related two variables are, the more accurate the predictions based on their relationship. Therefore, a correlational research design was suitable for this study because the major purpose of this study was to determine whether and to what degree the relationship exists between various educational inputs and the output in public secondary schools in Nyamasheke and Nyarugenge. The use of correlational research design helped predict the criterion variable (student’s performance in S6NE) basing on the magnitude of relationship that will be found.
This means that basing on the provision of educational inputs such as teacher characteristics, student-teacher ratio, student-classroom ratio, student-textbook ratio, physical facilities, instructional materials, family background, student’s prior performance, per student expenditure, and teacher salaries, it was possible to predict the students’ performance in S6NE. The location of the study was Nyarugenge and Nyamasheke districts in Rwanda and the data for this study were collected from district education officers, head teachers, and senior six students through interview, questionnaire, and document analysis guide.

3.3 Model specification, definition and measurement of Variables

3.3.1 Model specification

The estimated models for this study were expressed as follows:

**Regression model for determinants of school performance**

\[ SP = a + B_1 TC + B_2 SCR + B_3 STR + B_4 SBR_4 + B_5 SCOR + B_6 APR + B_7 REX + B_8 TSI \]

Where

SP= School Performance

\( a = \) Constant (Coefficient of intercept)

TC=Teacher characteristics, SCR=Student-classroom ratio; STR=Student teacher ratio; \( X_4 = \) Student book ratio; SCOR=Student Computer ratio; APR=Availability of physical resources, REX=Recurrent expenditure; TSI=Total school incomes
B₁…B₈: Regression coefficient of each educational input expressed above

**Regression model for students’ performance**

\[
SP = a + B₁BS + B₂WD + B₃PS + B₄FS + B₅PEL + B₆PES + B₇SPP.
\]

Where

SP = Student Performance

a = Constant (Coefficient of intercept)

BS = Boarding status; WD = Walking distance; PS = Parenthood status;
FS = Family size; PEL = Parental education level, PES = Parental employment status, SPP = Student’s prior performance.

B₁…B₇: Regression coefficient of each educational input expressed above

3.3.2 Definition and measurement of variables

*Boarding status*; was a dummy that takes the value of one if boarding and zero if otherwise

*Walking distance*; was numeric and short distance walkers were expected to perform better than long distance walker.

*Parenthood status*; was a dummy that takes the value of 1 if orphan and zero if otherwise.
*Family size;* was numeric and students from small size families were expected to perform better than others.

*Parental education level,* was a dummy that takes the value of 1 if educated from high school diploma (S6 leaving certificate) and above and zero if otherwise.

*Parental employment status,* was a dummy that takes the value of 1 if employed and zero if otherwise.

*Prior performance,* was numeric and students who performed better in S3NE were expected to perform better in S6NE.

*Teacher characteristics;* was a dummy that takes the value of 1 if qualified to teach and zero if otherwise.

*Student-classroom ratio* was obtained by taking students population divided by the number of classroom.

*Student teacher ratio* was obtained by dividing the number of students by the number of teachers.

*Student textbook ratio* was obtained by taking the number of students divided by the number of textbooks.

*Availability of physical resources,* a dummy that takes the value of one if available and zero if otherwise; the key resources considered were library and laboratories.
Reccurent expenditure, was numeric and it was obtained by adding up all school expenditures

Total school income, was numeric and it was obtained by adding up all schools income from different educational financiers.

3.4 Location of the study

This study was conducted in two districts of Rwanda: Nyarugenge and Nyamasheke. The former represented urban area and the latter represented the rural area. Nyamasheke district is in the western province while Nyarugenge district is located in the city of Kigali. The two districts have been chosen to be used in this study because there have been inconsistencies in students’ performance in S6NE: although performance in the two districts has been changing over the years Nyamasheke has been among good performers and Nyarugenge amongst poor performers despite unequal provision of inputs. Furthermore, these districts have been chosen because they have all categories of schools: single boarding, mixed boarding and day schools, 12 years basic education schools and secondary schools. Most of the population in Nyamasheke district lives on either farming or fishing while most of the population in Nyarugenge as an urban district is involved in small and big business and some others are employed in private or public institutions. The climate in Nyamasheke district is cooler than in Nyarugenge because of the Lake Kivu and Nyungwe National Park.
3.5 Target Population
The target population for this study was all head teachers and senior 6 students in all public secondary schools located in Nyamasheke and Nyarugenge districts. According to MINEDUC (2013), there are 21 schools in Nyarugenge and 49 schools in Nyamasheke, making a total of 70 schools with 2248 senior six students. Therefore, the target population was all 70 head teachers from all public secondary schools in the two districts, all 2248 senior six students in the 70 public secondary schools, and the 2 district education officers, making a total of 2320. Head teachers were targeted because they are the ones who ensure the everyday management activities of the schools and therefore, they are assumed to have knowledge of all educational inputs provided in their schools.

S6 students were targeted by this study because they are supposed to have acquired all the desired skills and knowledge after going through the 6 years of secondary school education in Rwanda and they are ready to sit for S6NE; a measure of the acquired skills and knowledge. Finally, district education officers were targeted because they are the direct managers and planners for public secondary schools in the two districts. They are therefore in good position to provide information on the strategies adopted to enhance the quality of educational output in their districts. The following table summarizes the population for this study.
Table 3.1: Target population of the study

<table>
<thead>
<tr>
<th>District</th>
<th>Students</th>
<th>Head teachers</th>
<th>DEOs</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
<td>Female</td>
<td>Total</td>
</tr>
<tr>
<td>Nyarugenge</td>
<td>442</td>
<td>350</td>
<td>792</td>
</tr>
<tr>
<td>Nyamasheke</td>
<td>638</td>
<td>818</td>
<td>1456</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>1080</td>
<td>1168</td>
<td>2248</td>
</tr>
</tbody>
</table>

3.6 Sampling techniques and sample size

3.6.1 Sampling techniques

To get the sample for this study, first the schools in each district were stratified according to their categories: day versus boarding schools, 12 years basic education schools versus secondary schools, girls’ versus mixed schools. Stratification of the school helped ensure that all the categories of schools are represented. To give each school equal chances of being selected, simple random sampling technique were used to select schools from each stratum. Furthermore, head teachers of the selected schools were purposively included in the sample for this study.

As far as the selection of students is concerned, students from the selected schools were also stratified according to their gender to make sure that all genders are represented in the sample. Then, simple random sampling technique
was used to select the desired number of students from each stratum. This gave all students equal chance of being selected to be part of the sample for this study.

3.6.2 Sample size

According to Fraenkel and Wallen (2009) for the purpose of external validity of the research, the sample should be as large as possible depending on the time for the research and its purpose. Therefore, for the purpose of the external validity of this study 30% of all schools was considered representative of the population. This means that 21 of 70 secondary schools located in Nyamasheke and Nyarugenge were selected to form the sample of this study.

The students sample size for this study was determined using the formula for sample size determination as given by Yamane (1967) in Israel (2003). For him, the formula for sample size determination is as follows:

\[ n = \frac{N}{1 + N(e)^2} \]

Where \( N \): stands for population, \( n \): stands for sample size, and \( e \): stands for sampling error

The application of this formula with a sampling error of 0.05 gave a sample size of 241 students. The following table summarizes the sample size for this study:
Table 3.2: Sample of the study

<table>
<thead>
<tr>
<th>District</th>
<th>Students Male</th>
<th>Students Female</th>
<th>Students Total</th>
<th>Head teachers Male</th>
<th>Head teachers Female</th>
<th>Head teachers Total</th>
<th>DEOs Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nyarugenge</td>
<td>53</td>
<td>42</td>
<td>95</td>
<td>5</td>
<td>1</td>
<td>6</td>
<td>1</td>
</tr>
<tr>
<td>Nyamasheke</td>
<td>64</td>
<td>82</td>
<td>146</td>
<td>13</td>
<td>2</td>
<td>15</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>117</td>
<td>124</td>
<td>241</td>
<td>18</td>
<td>3</td>
<td>21</td>
<td>2</td>
</tr>
</tbody>
</table>

3.7 Research instruments

The research instruments for this study were questionnaires, interview schedule, and document review guide.

a) Questionnaire

Detailed questionnaires on educational inputs were used to collect data from both head teachers and senior six students. These questionnaires were titled: head teachers’ questionnaire on educational inputs and students’ questionnaire on educational inputs. Both head teachers and students questionnaires were made of close-ended questions. The advantages of close-ended questionnaires include: ability to elicit specific responses, which are easy to analyse, they allow comparison among groups, and they are economical in terms of time, etc. (Amin, 2005). The head teacher’s questionnaire comprised of four sections. Section A was about general information on school, section B was about information on
staff and students, section C was about information on physical facilities and teaching resources, and section D was about information on the financial resources. The students’ questionnaire was made of three sections. Section A was about general information on student and school, section B was about information on student’s family background, and section C was about information on student’s prior performance.

b) Document review guide

The second type of instrument that was used to collect data for this study was a document analysis guide. This was used to get information on students’ performance in S3NE and in S6NE. It helped also to get information on some financial inputs such teacher salaries. The use of document review guide helped obtain additional information and validate the information collected through questionnaires.

c) Interview schedule

The last category of instrument that was used to collect data for this study was interview schedule. This was used to gather information from district education officers on the strategies adopted to improve educational output.

3.8 Pilot study

The instruments for this study were pre-tested in schools that were not to be included in the main study. The researcher himself distributed instruments to 3
head teachers and 10 students who were purposively selected from those schools. This enabled the researcher to identify ambiguous and vague question items, make wording clear, rephrase sentences, provide enough space for answers, and revise the layout of instruments where it was necessary. During the pilot study, the research realized that some French speakers had problem in understanding some question items. Hence, head teachers’ questionnaire was translated into French to facilitate French speaking head teachers.

3.8.1 Validity

Amin (2005) defines validity as the appropriateness of the instrument in measuring whatever it is intended to measure. On the other hand, he defines content validity as the extent to which the content of an instrument corresponds to the content of what it is designed to measure. For this research, content validity was checked to determine the extent to which the instruments were really helping to achieve the purpose of this study. To verify the content validity of the instruments, the researcher used expert-judgment technique. This implies that the researcher sought judgments and opinions from two experts in educational planning from the department of Educational Management, Policy and Curriculum studies of Kenyatta University. These experts were given the instruments and the research objectives and questions to make judgments concerning how well all question items were related to intended objectives and research questions. Their opinions and judgments were incorporated before administering the instruments for data collection process.
3.8.2 Reliability

According to Amin (2005) reliability is the degree to which the instrument consistently measure whatever it is measuring. On the other hand, Amin defines stability reliability as the degree to which the results of the same test by the same individuals are consistent over time. To determine the stability of the instruments for this research, test-retest technique was used. This means that the instruments for this study were administered twice to 13 respondents (3 head teachers and 10 students) who were purposively selected from schools that were not to be used in the main study. For the first administration, respondents were given questionnaires and their answers were scored and recorded. After a period of two weeks questionnaires were distributed to the same respondents who answered and their responses were scored and recorded two. After this exercise Spearman rank order correlation coefficient was computed to correlate the results from the two administrations of the questionnaire. The following formula was used to calculate Spearman rank order correlation coefficient.

$$r_s = 1 - \frac{6 \sum D^2}{n (n^2 - 1)}$$

Where $r_s$: stands for spearman’s correlation coefficient, $n$: stands for size of the sample, and $\Sigma D$: stands for the sum of difference between ranks.

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After the application of the formula, the calculated correlation coefficients were 0.81 for students’ questionnaire and 0.92 for head teachers’ questionnaire. Therefore, the instruments for this study were reliable as Orodho (2009) recommends that the instruments are reliable if the calculated correlation coefficient is 0.75 or above.

3.9 Data collection techniques

To avoid any possible loss of questionnaires and to ensure accurate responses, personal administration with on-the-spot-collection method was used to collect data from students. Using this, the researcher delivered the questionnaires in person and he waited for the respondents to complete them and collected them on the spot. No research assistants were used for this study but the researcher sought assistance from patrons/matrons to be able to administer questionnaires to students. For head teachers’ questionnaire, personal administration with collection after time interval method was used. This means that the researcher himself distributed the questionnaire to head teachers and collected them after two or three weeks. Using a recorder, the researcher himself recorded the interview he conducted with all districts education officers. Finally, the researcher himself visited the National Examination Council as well as the district office to request for relevant documents.
3.10 Data Analysis

Descriptive statistics were used to analyze quantitative data for this study. Specifically, frequencies, percentages and means, were used to describe educational inputs provided in public secondary schools in Nyamasheke and Nyarugenge districts. Furthermore, Pearson product moment was used to show the correlation between educational inputs and output. Finally, regression analysis was used to indicate the determinants of educational output in public secondary schools in Nyamasheke and Nyarugenge districts. For qualitative data that were collected through interview, thematic analysis approach was used to analyze them. This means that responses given by district education officers during the interview were put into relevant themes. After the analysis of data, tabular and graphical modes were used to present the findings obtained from quantitative data and textual mode was used to present qualitative findings.

3.11 Logistical and Ethical Considerations

Before collecting data from the respondents of this study, the researcher ensured that all instruments for this were valid and reliable. Furthermore, the researcher got clearance from Graduate school of Kenyatta University. After getting this clearance, the researcher sought affiliation to University of Rwanda-College of Education as an academic institution to work with during the research. He then sought for permission from the Ministry of Education in Rwanda, and permission from the Nyarugenge and District authorities to be able to collect data in schools located in the two districts. In addition to this, before delivering the questionnaire
the researcher verbally sought for informed consent from students. However, for head teachers and district education officers a written informed consent was sought. The researcher also respected the principle of anonymity of respondents by asking them not to write their names on the questionnaire. Furthermore, during and after data collection, the researcher ensured strict confidentiality of the information gathered from the respondents by keeping it in a safe place. Finally, during this research, the researcher has avoided plagiarism by acknowledging authors he quoted in this study.
CHAPTER FOUR
PRESENTATION OF FINDINGS, INTERPRETATION AND DISCUSSION

4.1 Introduction
This chapter presents the findings, interpretation and discussion according to the objectives and research questions that guided this study. This study sought to achieve the following objectives:

1. To find out educational inputs provided in public secondary schools in Nyarugenge and Nyamasheke districts.

2. To establish the extent to which each educational input provided correlates with educational output public secondary schools in Nyarugenge and Nyamasheke districts.

3. To find out the key determinants of educational output in public secondary schools in Nyarugenge and Nyamasheke districts.

4. To explore strategies adopted by the managers to improve educational output in Nyarugenge and Nyamasheke districts.

The research questions that guided this study were as follows:

1. What are the educational inputs provided in public secondary schools in Nyarugenge and Nyamasheke districts?

2. To what extent do endogenous inputs correlates with school mean performance in public secondary schools in Nyarugenge and Nyamasheke districts?
3. To what degree do exogenous inputs correlate with students’ academic performance in public secondary schools in Nyarugenge and Nyamasheke districts?

4. To what level do financial inputs correlates with school mean performance in public secondary schools in Nyarugenge and Nyamasheke districts?

5. What are the key determinants of educational output in public secondary schools in Nyarugenge and Nyamasheke districts?

6. What are the strategies adopted by school managers to improve educational output in Nyarugenge and Nyamasheke districts?

The presentation of the findings in accordance with the above research objectives and questions was done using graphic, textual and tabular modes of data presentation. Percentages, means, Pearson product moment correlation coefficient, regression analysis, and thematic analysis methods were used to analyze the data. The chapter is subdivided into six main sections. Section one is the introduction of the chapter. This section provides an overview of the chapter and it gives a reminder of the research objectives and questions. Section two involves the general and demographic information. Section three presents descriptive findings regarding the provision of educational inputs as given by head teachers and students themselves. Section four presents the results on the correlation between each educational input provided and the output. Section five
presents the findings on the key determinants of educational output and finally section six summarizes the findings on the strategies adopted by public secondary school managers to enhance the quality of both inputs and output in Nyamasheke and Nyarugenge districts.

4.2 General and demographic information
Students as well as head teachers were asked to provide some general and demographic information on themselves or on the school. The results are as follows:

4.2.1 School location
The geographical location of the school is very important for any study seeking to describe school inputs. School location is assumed to have a significant impact on student performance. This made it very important to describe the geographical location of the public secondary schools under this study. Figure 4.1 summarizes the location of schools in the two districts.

![Figure 4.1: Proportion of schools by location](image)
Figure 4.1 shows that the majority (71.43%) of public secondary schools under this study are located in rural areas. The figure further indicates that nearly a third (28.57%) of the public secondary school in Nyamasheke and Nyarugenge districts are located in urban areas. This is not far from the report of MINEDUC (2014) which has shown that the majority of public secondary schools in Rwanda are in rural areas.

4.2.2 Type of the school
The type of the school is of great concern for any study aiming at describing the general characteristics of the school. This is because the type of the school is one of the key factors considered in the selection of students after any national exams (P6 and S3 exams). Therefore, it was assumed to have a certain influence of students’ performance. For the purpose of this study three typologies were thought to be of great interest: free versus non-free schools, boarding versus day schools, and finally single gender versus mixed schools. The first categorization of public secondary schools in the two districts was about free to non-free secondary schools, that is, public schools where students do not pay any money in form of school fees versus public schools where students pay school fees. Furthermore, it is important to note that all free secondary schools offer day education only while non-free schools can offer boarding only or both boarding and day services. Figure 4.2 gives the proportion of the schools under this study by category.
From figure 4.2 it is clear that more than a half of public secondary schools in Nyamasheke and Nyarugenge districts provide free secondary education. To be specific, the figure shows that while 52.38% of public secondary schools in the two districts provide free education, 47.62% are non-free secondary schools. This is attributed to the initiative of the Rwandan government to increase the number of twelve year basic education (12YBE) schools in order to provide free secondary education to every Rwandan citizen.

It is to be noted that 12YBE schools receive those students who have not performed well in the national exams. These are students who are in the third, fourth, and fifth divisions because those in the first two divisions are allocated in non-free public secondary schools which are more equipped than free secondary schools. It is also important to mention that there are more non free secondary schools in rural area than in urban areas. According to MINEDUC (2013) students’ performance in rural schools has been better than that of their counterparts in urban schools in both S3NE and S6NE.
The next categorization of public secondary schools focused on the type of schools in terms of providing day or boarding services. Figure 4.3 summarizes the type of public secondary schools in terms of boarding status.

![Pie chart showing the categorization of schools into day versus boarding schools]

**Figure 4.3: Categorization of schools into day versus boarding schools**

From figure 4.3 it is apparent that more than a half (52.38%) of the public secondary schools in the two districts are day schools, that is, students in these schools commute every day to be able to attend classes. On the other hand, 28.57% of the public secondary schools in the two districts provide boarding services and finally as the figure shows 19.05% of the public secondary schools provide both day and boarding services. The big number of day schools can be explained by the government initiative of providing day and free secondary education to all school-age Rwandans in order to achieve Universal Secondary Education.

The last categorization of public secondary school in the two districts focuses on whether the school is single or mixed school. Figure 4.4 provides the proportion of single and mixed schools.
From figure 4.4 it is clear that the majority (85.71%) of the public secondary schools in Nyamasheke and Nyarugenge districts are mixed schools. Only 14.29% of the schools in the two districts remain single-girls schools. It is to note that some schools started as single-boys schools but they have been progressively converted into mixed schools. The idea was to mainstream girls into Rwandan education system and to cater for the increased girls’ enrolment. It is also worth noting that currently there is no single-boys public secondary school in Rwanda.

4.2.3 Sex of the respondents
Any study aiming at analyzing the relationship between educational inputs and output cannot leave out gender issue. Therefore, it was found very important to describe the sex of students in schools under this study. Figure 4.5 presents the gender of students.
From figure 4.5 it is clear that the proportion of girls and boys is almost equal. To be specific figure 4.5 shows that 50.66% of students were females and 49.34% were males. This means that females are slightly more than males. This may be attributed to the efforts made by the government of Rwanda to encourage girls to go to school. Another explanation may be that normally females represent a big proportion of the Rwandan society. It can be noted that according to the report of the provisional results of the 2012 population and housing census conducted by the National Institute of Statistics of Rwanda: NISR (2012) generally females are more than males in Rwanda. In fact the provisional results have revealed that females represent 51.8% of the entire population of Rwanda and the remaining 48.2% are males. It is to be noted that education of girls is of paramount importance for the development of any country. For example the report of
UNESCO (2014) indicates that if all women in developing countries had completed primary education the mortality rate of children under five years old would fall by 15% and if they had completed secondary education it would fall by 49%.

4.2.4 Distribution of students’ population by year of study
This study went further to analyze the distribution of students population by the year of study. This was assumed to be of interest for this study because it enables to know enrolment trend and repetition trend. It is to be noted that both enrolment and repetition rates impact on resources which in turn affect performance. Figure 4.6 gives an overview of the students’ distribution by the year of study in public schools under this study.

Figure 4.6: Distribution of students by year of study

Figure 4.6 shows that there are variations in students distribution by the year of study. From the findings in the figure, it is clear that while 17.3% of students are
in senior one, 16.4% of all students study in senior two. This shows that the number of students who enrolled has increased by 0.9% in the last two years (2013-2014). A further analysis of figure 4.6 indicates that 12.02% of students in schools under this study are in senior three and 21.11% of the total students in the two districts study in senior four. The implication of this is that in 2012 the number of students who enrolled declined by 9.09%. Figure 4.6 also reveals that 17.45% and 15.72% of students study in senior five and senior six respectively. This implies that the number of students who enrolled in 2010 increased by 1.75%. In a nutshell, figure 4.6 reveals that students in public secondary schools in Nyamasheke and Nyarugenge districts are not proportionally distributed over years.

4.3 Provision of educational inputs in public secondary schools
The first objective of this study was to find out the extent to which various educational inputs are provided in public schools located in Nyamasheke and Nyarugenge districts. Both students and head teachers were asked to provide information on students’ family background, teacher characteristics, physical facilities, teaching aids and school financial resources. This section therefore presents the findings on provision of educational inputs in public secondary schools in the two districts. Because of the complexity of this section, it has been subdivided into three sub-sections: sub-section one involves the provision of endogenous inputs, section two concerns the provision of exogenous inputs, and section three presents information about the provision of financial inputs. The
findings on the provision of various educational inputs provided in Nyamasheke and Nyarugenge public secondary schools are presented herein.

4.3.1 Provision of Endogenous inputs

4.3.1.1 Information on teaching staff

The role of a teacher in teaching and learning process is of paramount importance. This is because a teacher is the one who prepares the learning content, orders materials, delivers learning through different methods, assesses the level of learners, and manages time among many others (Bakhda, 2004). Therefore the attainment of school objectives would not be possible without adequate teachers. Therefore, this study analyzed the characteristics of teachers in public secondary schools in Nyamasheke and Nyarugenge districts. The characteristics which were examined include: academic qualification of teachers, their professional training, teaching experience, and workload.

a) Qualification of teachers

For any study investigating the relationship between teacher characteristics and students’ performance, the qualification of the teacher should be given a key consideration. Academic qualification here refers to the level of education attained by teachers: high school, diploma, bachelors, or masters. It is in this perspective that this study sought to describe the qualification of teachers in schools under investigation. Table 4.1 gives an overview of teacher’s qualification.
Table 4.1: Proportion of teacher by academic qualification

<table>
<thead>
<tr>
<th>Qualification</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>S6 leaving certificate</td>
<td>84</td>
<td>17.83%</td>
</tr>
<tr>
<td>Diploma</td>
<td>94</td>
<td>19.96%</td>
</tr>
<tr>
<td>Bachelor’s degree</td>
<td>288</td>
<td>61.15%</td>
</tr>
<tr>
<td>Master’s degree</td>
<td>5</td>
<td>1.06%</td>
</tr>
<tr>
<td>Others</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>471</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

Table 4.1 reveals that 17.83% of teachers hold a S6 leaving certificate. This means that they are not qualified to teach at secondary level. According to MINEDUC (2010) the minimum qualification for lower secondary school teachers is a diploma or its equivalent in education. It is to be noted that different research findings have revealed teachers academic qualification is the key determinant of students’ performance (Aduwa, 2004, and Iyamu, 2005). Hence, the performance of students taught by these unqualified teachers is likely to be affected.

Although the number of secondary school teachers with S6 leaving certificate is still significant, there has been considerable improvement as in 2012 the percentage of secondary school teachers with a S6 certificate was 22% (MINEDUC, 2013). This improvement may be attributed to the efforts the
government had put into teacher training. It is to be noted that to enhance teacher qualification, the government merged the former Kigali Institute of Education with its affiliated colleges into one college of education under the University of Rwanda to train more qualified secondary school teachers. In addition, Distance Training Programme (DTP) was strengthened to provide in-service education to unqualified teachers in order to upgrade their academic qualification. Table 4.1 further indicates that 19.96% of teachers in the two districts hold a diploma. This implies that as per MINEDUC requirements, these teachers are qualified to teach only at lower secondary education level and not at upper secondary level (MINEDUC, 2010).

From the findings in table 4.1 it is also apparent that the majority of teachers in schools under review have at least a bachelor’s degree. Specifically, the details in the table show that 61.15% of teachers hold a bachelor’s degree in an area related to education or not related to education. Only 1.06% of teachers have a master’s degree in education or in any other areas that are not related to education. None of the teachers in the two districts has any other type of qualification. It is to note that the role of teacher’s qualification is very important in the education production function process. This is why the minimum requirement to teach at lower secondary level in Rwanda is at least diploma or its equivalent (MINEDUC, 2010).
It is to be mentioned that the study conducted by Bali and Alvarez (2003) confirmed that the academic qualification of teachers goes hand in hand with their teaching skills and all these affect their students’ academic performance. Bali and Alvarez further added that students who study in schools with highly qualified teachers perform better than their counterparts in schools with less qualified teachers. This was corroborated by the finding of the research conducted by Darling-Hammond (2000) who found that in post primary schools students learn more from teachers with high qualification than from teachers with low qualification. In fact, Darling-Hammond confirmed that students benefit more from teachers who possess Bachelor’s or Master’s degree in the subjects they teach than those with diploma or another type of degree. Therefore, this implies that as the number of teachers who hold bachelor’s degree and master’s degrees increases, students’ performance in the two districts is expected to improve.

b) Professional training
Teachers’ quality is not only measured in terms of academic qualification but their professional training is also significant. Professional training refers to whether a teacher has undergone pedagogical training or not. The professional training of teacher was of interest for this study because it was thought to have either a negative or positive impact on educational output. This is because previous studies have revealed that teacher’s professional training affects the way he/she teaches. Furthermore, in Rwanda as well as in other developing countries,
a number of teachers are teaching and yet they have not underdone any pedagogical course. It is in this regard that this study went further to investigate the professional training of teachers in public schools under this study. Table 4.2 presents the summary of teachers by their professional training.

**Table 4.2: Proportion of teachers by professional training**

<table>
<thead>
<tr>
<th>Type of degree</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bed</td>
<td>48</td>
<td>16.38%</td>
</tr>
<tr>
<td>B.A. with Education</td>
<td>66</td>
<td>22.52%</td>
</tr>
<tr>
<td>Bsc. With Education</td>
<td>72</td>
<td>24.57%</td>
</tr>
<tr>
<td>B.A.</td>
<td>39</td>
<td>13.31%</td>
</tr>
<tr>
<td>Bsc.</td>
<td>63</td>
<td>21.50%</td>
</tr>
<tr>
<td>Med</td>
<td>1</td>
<td>0.34%</td>
</tr>
<tr>
<td>MA, Msc. MBA</td>
<td>4</td>
<td>1.37%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>293</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

Table 4.2 shows that the majority (63.47%) of teachers with bachelor’s degree are qualified. That is to mean that they have received trainings related to education at undergraduate. Of these teachers, 16.38% hold a bachelor of Education (BEd.), 22.52% hold a bachelor of arts with education (B.A. with Ed.) and 24.57% are holders of bachelor of science with education (BSc. with Ed.). This is a clear indication that the government target has not yet been reached. It is
to be noted that the government of Rwanda had target to have at least 75% of all secondary school teachers qualified by 2015, (MINEDUC, 2010).

From table 4.2 it is also clear that more than a third (34.81%) of teachers holds a bachelor’s degree in areas that are not related to education. To be specific 13.31% of teachers have a bachelor of arts and 21.5% have a bachelor of science. This means that although they have a bachelor’s degree they are not supposed to be teaching as their area of specialization is not teaching. They lack pedagogic skills that are needed to be an effective teacher. However, it is very important to mention that a post graduate program aiming at training these teachers with pedagogical skills has been designed by the University of Rwanda, college of education. Finally, table 4.2 reveals that only 0.34% of teachers have a master of education and 1.37% holds either a master of arts, of science or Business administration.

It very important to note that teacher’s professional training highly affects how he/she teaches and hence affecting students’ performance. On this, Monk (1994) asserted that the professional training of a teacher significantly affects students’ performance. Monks found that students who are taught by teachers who had undertaken pedagogical courses perform better than those taught by teachers who had not taken any pedagogical course. This was later confirmed by Rockooff (2004) who found that there is a link between teacher’s professional training and the way he/she teaches as well as the academic achievement of his/her students. Explaining this, Rockooff states that teachers who have taken coursework in
pedagogy are the ones who better know and apply the teaching and learning in classroom.

c) Teaching experience
Another important indicator of teacher quality is his/her teaching experience. This is assumed to have a significance impact on students’ performance. This is so because teacher’s experience is assumed to increase his/her professionalism. Therefore, this study went further to describe the experience of teachers in schools under investigation. Table 4.3 gives an overview of teachers’ experience.

Table 4. 3: Proportion of teachers by experience

<table>
<thead>
<tr>
<th>Experience</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-3 years</td>
<td>207</td>
<td>43.95%</td>
</tr>
<tr>
<td>4-6 years</td>
<td>139</td>
<td>29.51%</td>
</tr>
<tr>
<td>7-9 years</td>
<td>67</td>
<td>14.23%</td>
</tr>
<tr>
<td>10-12 years</td>
<td>23</td>
<td>4.88%</td>
</tr>
<tr>
<td>13-above</td>
<td>35</td>
<td>7.43%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>471</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

The findings in table 4.3 show that nearly a half (43.95%) of teachers in the two districts have a teaching experience of less than three years. This implies that most of teachers are the new recruits and they are unlikely to be as efficient as experienced teachers. According to Krueger (1999) there are significant differences between the performance of students taught by highly experienced
teachers and those taught by inexperienced or less experienced teachers in favor of those taught by experienced teachers. From table 4.3 it is also clear that 29.5% of teachers in the two districts have a working experience of between four and six years. This means that they are experienced enough to perform well in their duties. Table 4.3 further indicates that 14.23% of teachers have an experience of between seven and nine years. This is an encouraging percentage which indicates stability among the teaching forces.

The results presented in table 4.3 further indicate that 4.88% of teachers in schools under this study, have a teaching experience of between ten and 12 years. Finally, table 4.3 reveals that 7.43% of teachers have an experience of more than thirteen years in the teaching career. It is to be noted that many research findings have linked teacher’s experience with students’ performance. For instance in the research conducted by Krueger (1999) students’ academic performance was linked with teaching experience. This was previously confirmed by Rivkin (1998), who had also found that students who are taught by more experienced teachers perform better than those taught by less experienced teachers.

In his research Jacob, (2007) voiced this by finding out that the performance of students taught by more experienced teachers was better than the performance of their counterparts who were taught by less experienced teachers. Therefore, as suggested by Owolabi (2007), it is the responsibility of the government to retain more experienced teachers so that they can use their experience and knowledge to improve education system. Owolabi goes on to say that teacher’s experience
increases his/her confidence, mastery of the content, and the way of applying pedagogical principles for effective teaching.

d) Teaching load
This study went further to analyze the teacher characteristics that affect educational output. It is in this perspective that teacher’s workload was made one of the independent variables for this study. This is because heavy workload is assumed to have a negative impact on teacher’s professionalism. Table 4.4 highlights the workload of teachers in schools under investigation.

**Table 4.4: Proportion of teachers by workload**

<table>
<thead>
<tr>
<th>Teaching hours</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 18</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>19-22</td>
<td>1</td>
<td>0.21%</td>
</tr>
<tr>
<td>23-27</td>
<td>45</td>
<td>9.55%</td>
</tr>
<tr>
<td>28-32</td>
<td>412</td>
<td>87.47%</td>
</tr>
<tr>
<td>33-above</td>
<td>13</td>
<td>2.76%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>471</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

From table 4.4 it is patent that the big majority (87.47%) of teachers in schools under this research have a workload of between 28 and 32 hours per week, a workload that is above the recommended load of between 24 and 28 hours per week (MINEDUC, 2010). The implication for this is that teachers who have a day off in a week, which is the practice in Rwanda, work 8 hours per day. This is
tiresome and cannot allow teachers to have time for lesson preparation and enough time to mark. Similarly, table 4.4 shows that 2.76% of teachers teach more than 32 hours week. This is alarming because for teachers to effectively deliver, they need more time to read, prepare lesson, and mark. With such a big number of hours to work, teachers cannot fulfill their duties effectively. A final analysis of table 4.4 reveals that 9.76% of teachers in the two districts teach less than twenty eight hours per week. Compared to their colleagues, these teachers are likely to deliver.

It is very important to know that a high workload have an impact on both the teacher and students he/she teaches. On this, Trethaway (2001) states that a heavy workload negatively affect the quality of lesson preparation and the actual classroom teaching as well as the extracurricular activities which are of great importance for effective teaching. In addition to this, Trethaway found that heavy increased workload negatively affects the emotional well-being of teachers, their family life, relationship with friends as well as their leisure activities. This was corroborated by Dibbon (2004) who found that heavy workload leads to teachers’ job dissatisfaction. Finally, Fullan (2001) had previous emphasized that in addition to low level of job satisfaction, high teaching load causes stress and higher levels of attrition within education system.

4.3.1.2 Information on physical facilities and teaching/learning resources
In education production function process, teachers and students are not the only key inputs to obtain quality output. Physical facilities and teaching/learning
resources are of great importance. According to Akinfolarin (2008) physical facilities in school are one of the key factors affecting students’ academic performance in education system. Similarly, James (2010) adds that provision and utilization of teaching/learning resources lead to an environment that stimulates students to learn and therefore create an environment in which learners being guided by the teacher can easily discover new knowledge on their own. In this perspective, this study sought to describe physical facilities and teaching/learning resources provided in public secondary schools in Nyamasheke and Nyarugenge districts. This sub-section presents the findings on provision of physical facilities and teaching/learning resources in public secondary schools under investigation.

a) Physical Facilities
Physical facilities are key inputs in education production function process. As the literature review revealed, adequate provision and effective utilization of physical facilities affect students’ performance. Therefore, this study sought to describe various physical facilities provided in public secondary school in Nyamasheke and Nyarugenge districts. Table 4.5 describes the physical facilities available in schools under investigation.
Table 4.5: Availability of physical facilities

<table>
<thead>
<tr>
<th>Physical facility</th>
<th>Quantity</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemistry laboratory</td>
<td>13</td>
<td>61.9%</td>
</tr>
<tr>
<td>Physics laboratory</td>
<td>13</td>
<td>61.9%</td>
</tr>
<tr>
<td>Biology laboratory</td>
<td>13</td>
<td>61.9%</td>
</tr>
<tr>
<td>Library</td>
<td>12</td>
<td>57.1%</td>
</tr>
<tr>
<td>Dormitory</td>
<td>10</td>
<td>47.62%</td>
</tr>
<tr>
<td>Refectory</td>
<td>12</td>
<td>57.14%</td>
</tr>
<tr>
<td>Computer lab</td>
<td>16</td>
<td>76.2%</td>
</tr>
<tr>
<td>Computer connected to internet</td>
<td>3</td>
<td>14.28%</td>
</tr>
<tr>
<td>Computer not connected to</td>
<td>18</td>
<td>85.71%</td>
</tr>
<tr>
<td>Staff room</td>
<td>19</td>
<td>90.48%</td>
</tr>
<tr>
<td>Football play ground</td>
<td>7</td>
<td>33.33%</td>
</tr>
<tr>
<td>Basketball play ground</td>
<td>9</td>
<td>42.86%</td>
</tr>
<tr>
<td>Handball play ground</td>
<td>8</td>
<td>38.09%</td>
</tr>
<tr>
<td>Volley ball play ground</td>
<td>12</td>
<td>57.14%</td>
</tr>
<tr>
<td>Hydropower electricity</td>
<td>18</td>
<td>85.71%</td>
</tr>
<tr>
<td>Solar energy</td>
<td>1</td>
<td>4.76%</td>
</tr>
<tr>
<td>Generator</td>
<td>8</td>
<td>38.09%</td>
</tr>
<tr>
<td>Bio-gas</td>
<td>2</td>
<td>9.52%</td>
</tr>
<tr>
<td>Piped water/WASAC</td>
<td>17</td>
<td>80.95%</td>
</tr>
<tr>
<td>Under ground water</td>
<td>4</td>
<td>19.05%</td>
</tr>
<tr>
<td>Vehicle</td>
<td>9</td>
<td>42.86%</td>
</tr>
</tbody>
</table>

The findings presented in table 4.5 show that nearly two thirds (61.9%) of public secondary schools in Nyamasheke and Nyarugenge districts have chemistry, physics and biology laboratories. This means that more than a third (38.1%) of public schools in the two districts do not have science laboratories. This therefore raises the question of how and where students in these schools do their practicals.
without laboratory equipment. This is an indication that in some public schools, science subjects are only taught theoretically, which would not facilitate effective teaching and learning of science subjects. However, although a lot of efforts still need to be made, the situation in the two districts is not bad compared to national statistics. As it is indicated in education statistics yearbook, 60% and 15% of all public and private schools in Rwanda have science kits and science laboratory respectively (MINEDUC, 2013).

Highlighting the importance of laboratory in secondary school Khawla and Abdul (2006) confirmed that the number of experiments performed by students in laboratory highly affects students’ academic performance. William and Maureen (2012) as quoted by Neji, Amba, Ukwetang, John, Nja, and Cecilia (2014) asserted that the adequacy of laboratory facilities in a school increases students’ ability in problem solving critical thinking, acquisition of new scientific and technological knowledge and skills in science and mathematics.

Table 4.5 also reveals that more than a half (57.1%) of schools have library, this means that the remaining (42.9%) public schools in the two districts do not have library. The implication of this is that the available books are kept in cupboard placed in offices or in staffrooms. This raises the question of how students in these schools without a physical library access and effectively use the books available in their schools. The lack of a physical library in the schools denies students the time of reading. According Lonsdale (2003) the library size together
with the quality of the materials it contains significantly affects students’ academic learning and achievement. Emphasizing the importance of library, Farombi (1998) states that that school libraries should be always opened and accessible for students in order to contribute to students’ learning.

From table 4.5 it is also apparent that while 47.62% of the public schools in the two districts have dormitories, 57.14% of the schools have refectories. This may be due to the fact that most schools (52.38% as indicated in figure 4.3 are day schools. However, as far as refectory is concerned, this raises the question of where these day schools feed their students. This is because one of the decisions taken during the 2014 Rwandan leaders’ retreat was to start school feeding programme throughout the country in order to increase learners’ concentration at school, enhance quality of education and fight malnutrition (Mbonyinshuti, 2004). This raises the question of where and how schools without refectories implement this program.

In this era of advanced technology, computer should be given important place in education. This is because the current labour market requires good knowledge and skills of computer. To this end, school must be equipped with computers in order to impart in students the knowledge and skills required by the labour market. However, the findings presented in the table 4.5 have revealed that only 76.2% of public schools in Nyamasheke and Nyarugenge districts have computer rooms. The implication of this is that 23.8% of public schools in the two districts
do not have computer lab. This raises the question of how students in these schools learn computer or how teachers conduct their computer lessons. The finding on computer availability in public secondary schools in Nyamasheke and Nyarugenge districts contradicts the report of MINEDUC (2013) which in its report states that only 25% of secondary schools in Rwanda have computer laboratories. In the same vein, the findings in table 4.5 show that while 14.28% of public secondary schools in the two have computers connected to internet, 85.71% have computers that are not connected to internet. The implication of this is that internet connectivity in public secondary schools in the two districts is still below the national internet connectivity in secondary schools. It is to be mentioned that the statistics released by Rwanda Ministry of Education indicates that nationally 18% of secondary schools are covered with internet connectivity (MINEDUC, 2013).

In a school setting, another basic physical facility is the staffroom. However, although the majority (90.48%) of public secondary schools in Nyamasheke and Nyarugenge districts have staff room, the remaining 9.52% of public secondary schools are not in possession of staffroom. The implication for this is that teachers in these schools without staffroom do not have an official place to prepare their lesson, meet and discuss with peers, or get advice and support from each other. According to Hanson (2014) a “staff room is a place to sit down, have a tea, coffee and breather, do marking, and have laugh. In addition it is a place where new teachers can ask old hands for advice and support.” This raises the
question of how teachers in schools which do not have staffroom get support from each other.

Other basic physical facilities in a school are playgrounds. The findings presented in table 4.5 show that while only 33.33% of public secondary schools in the two districts have a playground for football, 42.86% of public secondary schools have playground for basketball. In the same vein, the table reveals that 38.09% of schools possess handball playground. Finally, table 4.5 shows that 57.14% of public secondary schools in the two districts have playground for volleyball. Although some schools have more than one playground for a game, the findings presented in table are clear indication that public secondary schools in the two districts are poorly equipped in terms of playgrounds. According to Sattelmair and Ratey (2009), for effective learning students should have time to play together at school. They continue to say that opportunity to play at school leads to increased socialization among children and hence enhance their attention and concentration on academic activity in classroom. In the same vein, the study conducted by Guest and Schneider (2003) has revealed that students’ academic success is positively affected by their level of participation in extracurricular activities. They found that those who highly participate in extracurricular activities perform better that those who do not.

Table 4.5 further reveals that most of the public secondary schools in Nyamsheke and Nyarugenge districts are well equipped with electricity. Specifically, the
table indicates that 85.71% of public schools in the two districts use hydropower electricity. This may be attributed to the government initiative of electrifying at least 70% of all Rwandan household by 2017 (www.focus.rw). Electricity in a school is very important because it allows learning at night and when the weather is not friendly. It also facilitates computer lessons and other multimedia-based lessons. Table 4.5 goes on to show that 38.09% and 4.76% of public secondary school in the two districts have generator and solar energy respectively. Finally, table 4.5 shows that 9.52% of public schools in the two districts use bio-gas as an alternative source of energy to supplement electricity. These findings are an indication that public secondary schools in the two districts are well equipped in terms of electricity.

As Antoine de Saint-Expery expressed “Water is not necessary to life, but rather life itself”. Therefore, water must be provided in schools to ensure there is life. To this end, this study sought to describe the level of water supply in public secondary schools located in Nyamasheke and Nyarugenge districts. As shown in table 4.5 the majority (80.95%) of public secondary schools in the two districts have piped water that is supplied by either WASAC or other local companies dealing with water supply. This means that the remaining schools (19.05%) use underground water or rain water. It is to note that there has been an improvement in regard to water supply in public secondary schools. This is because in 2013, while only 53% of secondary schools in the western province had access to tap water, 90% of secondary schools in Kigali city had access to tap water and
nationally only 51% of secondary schools had access to water (MINEDUC, 2013).

The last look at table 4.5 reveals that the majority of public secondary schools in the two districts do not have school vehicles. Only 42.86% of the schools have school vehicle, meaning that the remaining 57.14% of public schools in the two districts do not have vehicles. A vehicle in a school is very important for both management team and students. It enhances learning by facilitating field trips, sports and leisure activities, which in turn affect students’ performance. It also makes transport of the management team and that of students, especially when they are sick, easier.

Availability of the physical facilities in schools is not enough to provide quality. The extent to which these facilities are provided in relation to the number of students is the most important. In this regard, this study went further to describe the ratio of the basic facilities to students. This is because student-facility ratio is one of many other factors that affect performance. Table 4.6 shows the ratio of key facilities to students.
Table 4.6: Ratio of students to facility

<table>
<thead>
<tr>
<th>Facility</th>
<th>Quantity</th>
<th>Student/facility Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Desks</td>
<td>6192</td>
<td>2.06/1</td>
</tr>
<tr>
<td>Computer</td>
<td>781</td>
<td>17/1</td>
</tr>
<tr>
<td>Classroom</td>
<td>340</td>
<td>38/1</td>
</tr>
<tr>
<td>Toilet</td>
<td>577</td>
<td>22/1</td>
</tr>
</tbody>
</table>

Table 4.6 shows that the student-desk ratio is 2.06/1. This means that in some public secondary schools in the two districts more than two students sit on a desk. This is not normal as the practice is that a desk should accommodate two pupils. Table 4.6 further indicates that the student-computer ratio is 17/1, meaning that seventeen students use one computer. This can be interpreted that there is poor provision of computers in public secondary schools in Nyamasheke and Nyarugenge districts.

The implication of this is that computer lessons are not conducted effectively because of the big number of students on one computer. Consequently, students will not be able to get enough computer skills. It is to be noted that in computer lessons, the ideal was to have at most two students using one computer (MINEDUC, 2010). According to Salem (2011) the use of computer in education significantly contributes to students’ academic performance. This was also confirmed by the study conducted by Aloraini (2012) who found that computer is an effective educational tool to enhance students’ academic achievement.
A further look at table 4.6 reveals that the student-classroom ratio is 38/1. This means that there are at least 38 students in each classroom of any public secondary school in Nyamasheke and Nyarugenge districts. This ratio has not changed since 2013. This is because as the statistics of the Rwandan Ministry of Education indicates that the national ratio of students per classroom was 38:1 during the school years 2012 (MINEDUC, 2013). As UNESCO (2009) states a small ratio of students per classroom ratio is good for quality of education because when the teacher is teaching a small class he/she gets opportunity to pay attention to individual learners which is one of the key determinant of students’ academic success.

Finally, table 4.6 indicates that students-toilet ratio is 22/1, meaning that twenty two students use one toilet. This is an indication that public secondary schools in the two districts are well equipped in terms of sanitation facilities as the ideal was to have twenty two students using one toilet (MINEDUC, 2010).

b) Availability of books
Availability of physical facilities, the presence of teachers and students in school system are not enough for learning to take place. The need for textbooks is of paramount importance. Therefore, in order to establish the relationship between educational inputs and output in public schools in Nyamasheke and Nyarugenge districts, this study sought to describe the extent to which different textbooks are provided in public secondary schools in the two districts. Table 4.7 provides details on availability of textbooks in schools under this study.
Table 4.7: Availability of books

<table>
<thead>
<tr>
<th>Books</th>
<th>Quantity</th>
<th>Percentage</th>
<th>Student/textbook Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Entrepreneurship</td>
<td>4407</td>
<td>7.02%</td>
<td>2.9</td>
</tr>
<tr>
<td>Economics</td>
<td>1381</td>
<td>2.20%</td>
<td>9.3</td>
</tr>
<tr>
<td>Computer science</td>
<td>2696</td>
<td>4.30%</td>
<td>4.7</td>
</tr>
<tr>
<td>English</td>
<td>8466</td>
<td>13.49%</td>
<td>1.5</td>
</tr>
<tr>
<td>French</td>
<td>5011</td>
<td>7.98%</td>
<td>2.6</td>
</tr>
<tr>
<td>Kinyarwanda</td>
<td>2984</td>
<td>4.75%</td>
<td>4.3</td>
</tr>
<tr>
<td>History</td>
<td>3048</td>
<td>4.86%</td>
<td>4.2</td>
</tr>
<tr>
<td>Mathematics</td>
<td>9270</td>
<td>14.77%</td>
<td>1.4</td>
</tr>
<tr>
<td>Physics</td>
<td>7204</td>
<td>11.48%</td>
<td>1.8</td>
</tr>
<tr>
<td>Biology</td>
<td>7229</td>
<td>11.52%</td>
<td>1.8</td>
</tr>
<tr>
<td>Chemistry</td>
<td>7593</td>
<td>12.10%</td>
<td>1.7</td>
</tr>
<tr>
<td>Religion</td>
<td>1594</td>
<td>2.54%</td>
<td>8.03</td>
</tr>
<tr>
<td>Geography</td>
<td>1878</td>
<td>2.99%</td>
<td>6.8</td>
</tr>
<tr>
<td><strong>Total/Overall ratio</strong></td>
<td><strong>62761</strong></td>
<td><strong>100%</strong></td>
<td><strong>3.9</strong></td>
</tr>
</tbody>
</table>

From table 4.7 it is clear that 7.02% of books available in public schools under this study are related to entrepreneurship with a student textbook ratio of 2.9. Table 4.7 also shows that textbooks for economics represent 2.20% with a student-textbook ratio of 9.3, meaning that 9 students use one book of economics. Table 4.7 further indicates that computer science books represent 4.30% of the total books with a ratio of 4.7. The big percentage (13.49%) of the total texts available in public secondary schools under this study are claimed by English.
textbooks with a ratio of 1.5. This may be attributed to the efforts that the
government and other key educational stakeholder had put in the teaching of
English language. It is very important to know that before 2008 the majority of
secondary schools and higher learning institutions in Rwanda were using French
as a medium of instruction. It after the cabinet resolution of 8th October 2008 that
all primary, secondary schools and higher learning were compulsory asked to
make English the language of instruction (Pamela, 2013).

Table 4.7 further indicates that 7.98% of textbooks provided in public schools in
the two districts are French books with a ratio of 2.6. Kinyarwanda language
claims a percentage of 4.75% with a ratio of 4.3. Textbooks for history represent
4.86% of the total books with a ratio of 4.2. The most provided textbooks are
mathematics books. They represent 14.77% of the total books with the smallest
ratio of 1.4. This may be attributed to the commitment of the government and
other stakeholders to promote science and technology which require good
knowledge and application of mathematics. Furthermore, the table shows that
physics and biology represent 11.48% and 11.52% respectively with a ratio of 1.8
for each.

Further analysis of the availability of textbooks in public schools under this study
reveals that while chemistry represents 12.1% of the total books with a ratio of
1.7, geography represent 2.99% of the total books with a ratio of 6.8. Finally,
although religion is a non-examinable subject, as a cross-cutting subject, it
represents 2.54% of the total books with a high ratio of 8.03.
Overall, as table 4.7 indicates student-textbook ratio is still high. The overall ratio is 3.9/1 meaning that four students use one textbook. This ratio is too high compared to the target. It is to be note that the target of the government was to make student-textbook ratio 1/1 by the year 2014 (MINEDUC, 2013). To achieve this target, the government has liberalized the supply of textbooks in public schools (MINEDUC, 2006). Although the target has not yet been reached, thanks to textbook liberalization there is hope that it will be achieved. It is to be noted that reduced student-textbook ratio positively affects students’ performance and teacher’s effectiveness (Lockheed, Vail and Fuller, 1986, and Squire, 1991). Similarly, White (2004) emphasizes that sufficient provision of textbooks in education system positively affect students’ academic performance.

4.3.2 Provision of exogenous inputs

a) Students’ boarding status
The students’ status is very important for any study that is interested in establishing the relationship between educational inputs and output. It helps establish whether being a boarding or day student affect students’ performance. Therefore, for the purpose of this study, students were asked to mention whether they are boarding or day. Table 4.8 summarizes the results on students’ boarding status.
Table 4.8: Proportion of students by boarding status

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Day students</td>
<td>121</td>
<td>50.2%</td>
</tr>
<tr>
<td>Boarding students</td>
<td>120</td>
<td>49.8%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>241</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

From table 4.8, it is clear that more than a half (50.2%) of students in public secondary schools in Nyamasheke and Nyarugenge districts are day students. This is in line with the government policy which encourages day schools to fully implement its commitment of providing free secondary education to all Rwandan citizens. With the establishment of free secondary schools, the number of day students quickly increased to the extent that it outnumbered the number of boarding students. It is to be noted that the government is the key financier of these schools and parents only provide school materials.

Table 4.8 also shows that nearly a half (49.8%) of students in schools under this study are boarding. This is attributed to the fact that before the introduction of free secondary education, all public secondary schools were to be boarding. This is the reason why these schools still represent a considerable number of public secondary schools and therefore accommodate a considerable number of students. It is worth noting that although the government provides the same capitation grant to these schools, parents pay school fees to supplement the school budget; making them non-free secondary schools.
b) Walking distance from home to school

After getting information on students’ boarding status, it is of great interest to know the distance day students walk from their home to school and vice-versa. This helps the researcher know whether walking long distances or short distances affect students’ performance. This study therefore sought to know the distance walked by day students in public secondary school under review. Table 4.9 gives the summary of the findings on this issue.

Table 4.9: Distance walked by students from home to school

<table>
<thead>
<tr>
<th>Distance</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-2 km</td>
<td>42</td>
<td>34.71%</td>
</tr>
<tr>
<td>3-4 km</td>
<td>48</td>
<td>39.67%</td>
</tr>
<tr>
<td>5-6 km</td>
<td>19</td>
<td>15.7%</td>
</tr>
<tr>
<td>7-above</td>
<td>12</td>
<td>9.92%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>121</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

From table 4.9 it is apparent that the majority (39.67%) of day students walk a distance of between three and four kilometers from their home to school and the same distance from school back to their home. This distance is too long to make them exhausted. As the consequence, after walking such long distance students are likely not to effectively/carefully follow classes as short distance walkers. Table 4.9 further reveals that almost the same percentage (34.71%) of day students in schools under this study walk a distance of between one and two
kilometers. This distance is reasonable to walk and attend class without any delay or tiredness.

The results from Table 4.9 also reveal that 15.7% of day students in schools investigated walk a very long distance of between five and six kilometers to go to school or to go back to their home. This distance is too long for a student to attend classes at 7:00 am. This implies that to be able to attend on time, these students wake up at least at 5:00 am and in the evening they reach their home very late; hence they can’t get time to revise their studies as their counterparts in boarding or those who walk short distances.

It is finally crucial to note that Table 4.9 indicates that a small but important percentage (9.92%) of day students walk a significantly long distance of more than seven kilometers to go to school or to go back to their home after class. This distance is too long tiring for anybody to do any job. This means that if these students are to attend class on time they have to wake up three hours before the time classes start or reach home three hours after classes.

c) Parenthood status

A further analysis of exogenous inputs went to students’ parenthood status. This is because it may have an impact on student social, educational, and physical development. Therefore, this study sought to describe students’ parenthood status in public secondary schools under this study. Table 4.10 gives the proportion of students by parenthood status.
Table 4.10: Proportion of students by parenthood status

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total orphan</td>
<td>11</td>
<td>4.6%</td>
</tr>
<tr>
<td>Only mother alive</td>
<td>50</td>
<td>20.7%</td>
</tr>
<tr>
<td>Only father alive</td>
<td>12</td>
<td>5%</td>
</tr>
<tr>
<td>Both parents alive</td>
<td>168</td>
<td>69.7%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>241</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

Table 4.10 shows that the majority (69.7%) of students have both parents (mother and father). This finding concurs with the statistics released by Rwanda Ministry of Education in its 2012 education statistics yearbook which revealed that most (75.7%) of students in Rwanda come from nuclear family (MINEDUC, 2013). Table 4.10 further indicates that almost a quarter (20.7%) of students in the two districts, are orphans on their father meaning that only their mothers are alive.

Similarly, the findings in table 4.10 indicate that 5% of students in the two districts are orphans on their mother, meaning that only their fathers are alive. Finally, table 4.10 indicates that 4.6% of students in the two districts are total orphan, meaning that none of their parents is alive. This means that some of them are heads of the family where they take care of their sisters and/or brothers, some others live with guardians. The reason for such a big number of orphan students may be found in sad history where more than a million of people were killed.
The findings on students’ family status are not far from the statistics that were released by the Ministry of Education in Rwanda. These statistics revealed that 27% of all students in 2012 were orphan. Among these orphan students 23% did not have their mother, 54.6% did not have their father and 21.9% did not have both parents. As Fuchs and WÖßmann (2004) highlighted, the students’ parenthood status is a key determinant of students’ academic achievement. They found that the performance of the two-parented students is better than the performance of the single-parented students.

In his investigation, Majoribanks (1996) explained the reasons for these differences. He explained that the differences in their performance are caused by the fact that single-parented students are poorer than students from nuclear households. Another reason given by Majoribanks is that single-parents are not too much involved with their children and hence students from single households receive little care and encouragement from their parents. Finally, Majoribanks explained that due to absence of the mutual support between a wife and husband, single parents do not give enough time to their children.

d) Family size
This study went further to describe exogenous educational input in public secondary schools that are located in Nyamasheke and Nyarugenge districts. Therefore, family size was thought to be an important variable for this study. This is because the number of children the family has to take care of may affect student performance in one way or another. However, it is to wonder which
family size impact more on performance of students: is it small family size or big one? For the purpose of this study, family size was made one of the independent variables. Table 4.11 provides the students’ family size in schools under this study.

**Table 4.11: Proportion of students by family size**

<table>
<thead>
<tr>
<th>Number of children</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-2</td>
<td>18</td>
<td>7.47%</td>
</tr>
<tr>
<td>3-4</td>
<td>60</td>
<td>24.9%</td>
</tr>
<tr>
<td>5-6</td>
<td>68</td>
<td>28.22%</td>
</tr>
<tr>
<td>7-8</td>
<td>65</td>
<td>26.97%</td>
</tr>
<tr>
<td>9-10</td>
<td>23</td>
<td>9.54%</td>
</tr>
<tr>
<td>11-12</td>
<td>5</td>
<td>2.07%</td>
</tr>
<tr>
<td>13-14</td>
<td>1</td>
<td>0.41%</td>
</tr>
<tr>
<td>15-16</td>
<td>1</td>
<td>0.41%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>241</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

Table 4.11 indicates that 7.47% of students in public secondary schools in Nyamasheke and Nyarugenge districts come from families with one or two children. Furthermore, the findings in table 4.11 show that 24.9% of students come from families with three or four children. This means that only 32.37% of students in the two districts come from small family size.
Table 4.11 goes on to show that while 28.22% of students in public secondary schools in the two districts come from families with five or six children 26.97% come from families with seven or eight children. The findings in table 4.11 further indicates that 9.54% and 2.07% of students in schools under this study are students whose families have nine or ten and eleven or 12 children respectively. In addition, table 4.11 reveals that 0.41% of students are those whose families have thirteen or fourteen children. As it is indicated in the table the same percentage is for students whose families have 15 or 16 children.

In a nutshell, from table 4.11 it is clear that the majority of students studying in public secondary schools in Nyamasheke and Nyarugenge districts come from large families. This may have impact on their academic performance because many research conducted in this area have linked family size with academic achievement. In the research conducted by Eamon (2005) it was revealed that students from small family size receive more care and attention from their parents than those from families with a lot of siblings. This was previously found that by Majoribanks (1996) who asserted that due to increased parental attention, students from families with few children perform better than their counterparts from big families. This true because students from small families receive more resources and support from their families as the latter can afford to provide all necessary textbooks and arrange for extra tutorials for their children (Majoribanks, 1996; Eamon, 2005; and Emejulu, 2006).
e) Parental literacy level
This study went further to describe the characteristics of the families from which students come. Another important characteristic analyzed is the parental literacy level. This is because the literacy level of students the parents is one of the factors that can affect students’ development in all aspects of life. Table 4.12 gives an overview of the literacy level of parents of students investigated.

**Table 4. 12: Parental literacy level**

<table>
<thead>
<tr>
<th>Literacy level</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>None can read and write Kinyarwanda</td>
<td>20</td>
<td>8.3%</td>
</tr>
<tr>
<td>Both can read and write Kinyarwanda</td>
<td>71</td>
<td>29.5%</td>
</tr>
<tr>
<td>One of them can read and write Kinyarwanda</td>
<td>38</td>
<td>15.8%</td>
</tr>
<tr>
<td>Both can read and write French/English</td>
<td>83</td>
<td>34.4%</td>
</tr>
<tr>
<td>One of them can read and write Kinyarwanda</td>
<td>29</td>
<td>12%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>241</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

From table 4.12 it is clear that that the majority (34.4%) of students in Nyamasheke and Nyarugenge public secondary schools come from families in which both parents can read and write French or English. This implies that these parents are those who have at least attended secondary school level or went further. Students from these parents can benefit coaching and tutorials from parents during holidays, weekends, or during evening self-study. It is to be noted that the official languages in Rwanda are Kinyarwanda, French, and English. The
latter being a medium of instruction from the upper level of primary school up to university.

The results in table 4.12 also indicate that more than a quarter (29.5%) of students come from families in which both parents can read and write Kinyarwanda only. This is an indication that the number of Rwandans who have at most completed primary school is still too big. Furthermore, the findings in table 4.12 show that 15.8% of students in schools under investigation come from families in which only one parent can read and write Kinyarwanda, meaning that one of the parents has gone to school and the other has never gone to school. Table 4.12 goes on to show that 12% of students come from families in which only one parent can read and write French or English. This means that only one parent has reached secondary school.

Finally, table 4.12 indicates that a non-negligible percentage (8.3%) of students in schools under investigation come from illiterate families. This means that one of their parents can or could read nor write Kinyarwanda. This shows that education services were not taken to ordinary citizens. There were few schools and people were not motivated to go or send their children to school as the majority were living on farming.
f) **Highest level of education reached by parents**

A thorough description of exogenous inputs in education cannot leave out/exclude parental education level. This is because parental education level may affect students’ performance in one way or another. Therefore, parental educational level was assumed to be one of the independent variable for this study. Table 4.13 presents the summary of students’ parental educational level.

**Table 4.13: Education level of parents**

<table>
<thead>
<tr>
<th>Education level</th>
<th>Father</th>
<th></th>
<th>Mother</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frequency</td>
<td>Percentage</td>
<td>Frequency</td>
<td>Percentage</td>
</tr>
<tr>
<td>Never went to school</td>
<td>40</td>
<td>16.6%</td>
<td>48</td>
<td>19.9%</td>
</tr>
<tr>
<td>Never completed primary</td>
<td>49</td>
<td>20.3%</td>
<td>46</td>
<td>19.1%</td>
</tr>
<tr>
<td>Completed primary</td>
<td>53</td>
<td>22%</td>
<td>51</td>
<td>21.2%</td>
</tr>
<tr>
<td>Never completed secondary</td>
<td>20</td>
<td>8.3%</td>
<td>24</td>
<td>10%</td>
</tr>
<tr>
<td>Has a s6 certificate</td>
<td>22</td>
<td>9.1%</td>
<td>25</td>
<td>10.4%</td>
</tr>
<tr>
<td>Never completed university/has diploma</td>
<td>17</td>
<td>7.1%</td>
<td>14</td>
<td>5.8%</td>
</tr>
<tr>
<td>Has bachelor’s degree</td>
<td>30</td>
<td>12.4%</td>
<td>27</td>
<td>11.2%</td>
</tr>
<tr>
<td>Did a postgraduate course</td>
<td>10</td>
<td>4.1%</td>
<td>6</td>
<td>2.5%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>241</strong></td>
<td><strong>100%</strong></td>
<td><strong>241</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>
The findings presented in table 4.13 are an indication that the majority of parents in Nyamasheke and Nyarugenge districts have a certain level of education. To be specific, table 4.13 shows that only 16.6% fathers and 19.9% of mothers have never gone to school; meaning that more mothers than fathers had never gone to schools in the two districts. This may be attributed to the fact that in the Rwandan traditional culture the role of woman was to get children and take care of them and few of them could be sent to school.

Table 4.13 further shows that 20.3% of fathers and 19.1% of mothers went to primary school but never completed. The big number of parents who had never completed their primary education may also be attributed to inaccessibility of schools and poverty. Students from poor families were likely to drop out school and join the labour market in order to supplement incomes of their families. Furthermore, table 4.13 shows that 22% of parents and 21.2% of mothers completed primary school.

Similarly the findings in table 4.13 reveal that 8.3% and 10% of fathers and mothers respectively went to secondary school but never completed. The implication for this is that these parents have joined the labour market after completing the lower secondary education or have dropped out before they sit for S6NE. The table goes on to show that almost the same proportion (9.1% and 10.4% for fathers and mothers respectively) has completed secondary education. This means that they all hold a S6 leaving certificate that can enable them to get a job.
As far as post-secondary education is concerned, table 4.13 indicates that fathers are more educated than mothers. The details in the table show that while 7.1% of fathers have a diploma or have never completed university, only 5.8% of mothers have the same level. The reason for this may be that after completing secondary schools most girls opt to get married. Another reason may be that most girls join professional courses which require them to enter labour market immediately after completing secondary school.

In the same vein, table 4.13 shows that 12.4% and 11.2% of fathers and mothers respectively have a bachelor’s degree and only 4.1% of fathers and 2.5% of mothers have done a post-graduate course. It is to note that this little number of parents with bachelor’s degree and above may be attributed to insufficient number of universities in Rwanda. According to HEC (2014) before 1994 genocide there were not a lot of universities in Rwanda where the entire country had one public university and one private university.

According to Emejulu (2006) student’s academic performance is significantly affected by his/her parental education level among many other family related factors. Emejulu provided explanations to this by stating that that highly educated families are able to provide their children with good and recommended textbooks as well as pay for extra tutorials because they are likely to be financially well compared to uneducated or less educated. In addition to this parents who have attained higher levels of education have ability to take their children to quality schools.
g) Parental occupation
A further description of exogenous inputs went to parental occupation. Parental occupation is assumed to have a significant impact on students’ performance. Therefore for the purpose of this study, occupation of the parents was made one of the independent variables. Table 4.14 gives an overview of parental occupation.

Table 4.14: Parental occupation

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Farming</td>
<td>139</td>
<td>57.7%</td>
</tr>
<tr>
<td>Business</td>
<td>46</td>
<td>19.1%</td>
</tr>
<tr>
<td>Teaching</td>
<td>3</td>
<td>1.2%</td>
</tr>
<tr>
<td>Fishing</td>
<td>3</td>
<td>1.2%</td>
</tr>
<tr>
<td>Public/private sector</td>
<td>44</td>
<td>18.3%</td>
</tr>
<tr>
<td>Others</td>
<td>6</td>
<td>2.5%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>241</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

From the findings presented in table 4.14 it apparent that more than a half of students come from families whose main occupation is farming. This means that the majority of students in public secondary schools in Nyamasheke and Nyarugenge districts come from agricultural families. This finding concurs with the finding of the national census which was conducted in 2012 and revealed that 80% of the Rwandan population practice agriculture as their profession (NISR,
Therefore, it is not surprising that the majority of students in public secondary schools in Nyamasheke and Nyarugenge districts come from farming families. A further analysis of parental occupation revealed that 19.1% of students in schools under study come from families whose main occupation is business. In the same vein, 18.3% of students have parents who work in either public or private sector. This means that they work either for the government or private companies.

Table 4.14 also indicates that students whose parents are teachers or fishers are 1.2% for each. Finally the findings in table 4.14 reveals that 2.5% of students are from families whose occupation are other than farming, business, teaching, fishing, and public/private service. The other occupations mentioned are military and police services and pastorship. It is to be noted that in his longitudinal research on parental background and academic achievement, Hassan (2009) found that there is a strong relationship between the employment status of the parents and the academic performance of their students. In fact Hassan found that students from employed parents perform better than their counterparts whose parents are unemployed.

The findings of Hassan were previously voiced by Seyfried (1998) who revealed that students from parents with low market status score about ten percent lower than those higher labor market status students. This is true because parents with high labor market status can afford to provide necessary materials and extra tutorials for their children. They can also send their children to best schools.
where there are well-qualified teachers, well-equipped laboratories and libraries, and other necessary facilities (Emejulu, 2006).

**h) Type of energy used at home for lighting**

The description of exogenous inputs went further to the type energy used for lighting in students’ home house. Since some schools are day schools, the type of energy used was thought to be among significant variables that may influence the performance of day students. This is because day students need enough light to revise their studies at their parents’ home. Figure 4.7 gives a summary of the findings on this variable.

![Pie chart showing energy usage by students](image)

**Figure 4.7: Proportion of students by type of energy used at their parents’ home for lighting**

From figure 4.7 it is clear that the majority (63.1%) of students in schools under this study come from families whose main type of energy used for lighting is
electricity. This may be attributed to the government’s initiative to distribute electricity to at least 70% of all Rwandan households by 2017. According to Tumwebaze (2014) the current percentage of households endowed with electricity stands at 22% of the total Rwandan households. However, there is hope to increase this percentage due to efforts the government has put in electrification of Rwandan households. This will in turn increase the number of students from households endowed with electricity.

Figure 4.7 further reveals that 6.6% of students come from household which use solar panel as the main source of energy for lighting their home. Finally, from figure 4.7 it is apparent that nearly a third (30.3%) of students comes from families which still rely on kerosene as the main source of energy to lighten their houses. The reason for this big number may be attributed to the fact that many household are still scattered in remote village where the distribution of electricity will take some years. However, with the government policy of grouping the population into agglomerations, there is hope that the target of electrifying 70% of all Rwandan households by 2018 will be achieved.

i) Students’ previous performance in Tronc commun exam
Students’ previous performance in tronc commun exam was thought to be another variable that may have a significant impact on students’ performance in S6NE. According to REB (2014) students’ performance in senior three national
exams (tronc commun exam) are classified into 5 divisions depending on their performance. Table 4.15 gives the proportion of students falling in each division.

**Table 4. 15: Proportion of students by division**

<table>
<thead>
<tr>
<th>Division</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Division 1</td>
<td>85</td>
<td>35.3%</td>
</tr>
<tr>
<td>Division 2</td>
<td>46</td>
<td>19.1%</td>
</tr>
<tr>
<td>Division 3</td>
<td>65</td>
<td>27%</td>
</tr>
<tr>
<td>Division 4</td>
<td>44</td>
<td>18.3%</td>
</tr>
<tr>
<td>Division 5</td>
<td>1</td>
<td>0.4%</td>
</tr>
</tbody>
</table>

| Total      | 241       | 100%       |

From table 4.15 it is apparent that the majority of students in the schools under investigation performed better in tronc commun exam. The details in the table show that more than a third (35.3%) of students falls into the first division. This means that they qualified to be admitted to boarding schools. In addition, table 4.15 reveals that 19.1% of students had fallen into the second division, meaning that they have also qualified to be admitted in boarding schools which are supposed to be more equipped than day schools.

The findings from table 4.15 further show that 27% and 18.3% of students fall into the third and fourth division respectively. Students in these two divisions are those who don’t qualify to go to boarding schools. They are supposed to continue upper secondary education in day schools which are free. It is to be noted that these schools are less equipped than boarding schools. Finally table 4.15 indicates that only 0.4% of students have been classified into the fifth and last division.
Students in this division have almost completely failed. However, they are also admitted to free secondary schools. This may affect the subsequent performance of these students as less equipped schools perform poorly than well-equipped schools (Vandiver, 2011; and Popoola, 1990).

**j) Mean performance in each subject**

Students’ performance in key subjects may be another factor that can influence students’ future performance. The key subjects are those subjects that examinable in S3NE (Tronc Commun Exams). Therefore, this study sought to describe the mean performance in each examinable subject in Senior 3 national exams (Tronc commun exam). Table 4.16 presents the mean performance in each of the subjects sat for in Tronc commun exam.

**Table 4.16: Mean performance in each subject**

<table>
<thead>
<tr>
<th>Subject</th>
<th>N</th>
<th>Mean</th>
<th>Std Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mathematics</td>
<td>241</td>
<td>4.6639</td>
<td>2.66909</td>
</tr>
<tr>
<td>English</td>
<td>241</td>
<td>4.6846</td>
<td>2.48833</td>
</tr>
<tr>
<td>Kinyarwanda</td>
<td>241</td>
<td>4.4191</td>
<td>1.68655</td>
</tr>
<tr>
<td>Biology</td>
<td>241</td>
<td>3.8091</td>
<td>2.07688</td>
</tr>
<tr>
<td>Chemistry</td>
<td>241</td>
<td>4.9627</td>
<td>2.49054</td>
</tr>
<tr>
<td>Physics</td>
<td>241</td>
<td>5.6100</td>
<td>2.4641</td>
</tr>
<tr>
<td>Geography</td>
<td>241</td>
<td>4.3195</td>
<td>2.20643</td>
</tr>
<tr>
<td>History</td>
<td>241</td>
<td>4.1369</td>
<td>2.26429</td>
</tr>
</tbody>
</table>
From table 4.16 it is apparent that students performed better in sciences subjects than in other subjects. To be more specific, table 4.16 shows that the best performed subject is physics with a mean performance of 5.61. It is followed by chemistry with a mean performance of 4.96. Mathematics comes the fourth after with a mean performance of 4.66 after English which is the third with a mean performance of 4.68. This may be attributed to the government efforts to promote the teaching of science through provision of laboratory equipment. Likewise, in partnership with its main educational stakeholders, the government has organized and sponsored a number of trainings and workshops for science teachers to equip them with more skills regarding science teaching.

Table 4.16 further shows that the fifth performed subject is Kinyarwanda with a mean performance of 4.31. In the same vein, the table shows that the sixth subject in performance is geography with a mean performance of 4.32. This is followed by history with a mean performance of 4.13. Finally, the results in table 4.16 reveal that the poorly performed subject is biology which has a mean performance of 3.8.

4.3.3 Provision of financial inputs
Financial inputs are the most important input in an education production function process. This is because they are used to provide other educational inputs such as physical facilities, teaching and learning resources, recruiting and paying competent teachers, among many others. It is in this regard that this study sought
to describe financial inputs provided in public secondary schools in Nyamasheke and Nyarugenge districts. A thorough description of financial inputs is provided in this subsection.

a) Sources of school finances
The source of the school finances is of great importance for any study aiming at describing the relationship between financial inputs and output. This provides educational planners with information on where they can focus to get additional resources for education. Therefore, this study went further to describe the sources of financial resources in public secondary schools in Nyamasheke and Nyarugenge districts. Figure 4.8 gives the summary of the sources of the school finances in the two districts.

![Figure 4.8: Source of funding](image)

From figure 4.8 it is apparent that the key financier of all public schools in the two districts is the government. This is because all (100%) public secondary
schools get some money from the government. Figure 4.8 further indicates that the second source of the financial resources in public secondary schools and Nyamasheke and Nyarugenge districts is the parents. This is because nearly a half (47.62%) of schools in the two districts get their financial resources from parents in the form of school fees. It is to note that boarding schools are the only public schools that are allowed to charge schools. Similarly, as figure 4.8 indicates more than three quarter (76.19%) of public schools get their financial resources from parents in the form of parents’ contributions. This money is used to pay teacher allowances to supplement their monthly salary paid by government. The implication is that the burden of parents to finance education of their children increases.

Figure 4.8 also shows that 14.29% of public secondary schools in Nyamasheke and Nyarugenge benefit from donors’ funds. Finally, the findings in figure 4.8 show that 23.81% of public secondary schools in the two districts get their financial resources from income generating projects. Some of the income generating projects mentioned include: farming, renting physical facilities for meetings and other functions and culturally based-activities.

b) Total amount by type of school financial sources
The amount contributed by each category of stakeholder is of great interest for any study aiming at establishing the link between educational inputs and output. This is because it helps get information on the amount each educational stakeholder contributes to education; which indicates the degree to which that
A stakeholder is committed to education. Furthermore, it helps know the degree to which the cost of education constitutes a burden for each stakeholder. It is in this perspective that this study went further to know the amount of money got from each financier. Table 4.17 gives an overview of the amount of money obtained from each educational financier in public secondary school in Nyamasheke and Nyarugenge districts.

### Table 4.17: Amount of money from each source of funding

<table>
<thead>
<tr>
<th>Source</th>
<th>Amount</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Government</td>
<td>261,898,495</td>
<td>17.55%</td>
</tr>
<tr>
<td>Donations</td>
<td>15,314,781</td>
<td>1.03%</td>
</tr>
<tr>
<td>User fees</td>
<td>887,216,600</td>
<td>59.46%</td>
</tr>
<tr>
<td>Income generating</td>
<td>6,753,681</td>
<td>0.45%</td>
</tr>
<tr>
<td>Parents contribution</td>
<td>321,017,847</td>
<td>21.51%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1,492,201,404</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

From table 4.17 it is clear that parents/guardians are the most contributors to the budget of public secondary schools in Nyamasheke and Nyarugenge districts. For example as table 4.17 shows while 59.46% of the total budget of public schools in the two districts is paid by parents in form of school fees, another considerable share (21.51%) of the budget comes from parents in the form of parents contributions. In total, the share of parents represents 80.97% of the budget used in public secondary schools. This is percentage is too high to the extent that education is still a burden for parents. Table 4.17 further indicates that only
17.55% of the total budget comes from the government in the form of capitation grant. However, it is very important to note that this percentage excludes the government expenditures on teacher salaries. This is because teacher salaries are treated at the district level and therefore included in the district budget and not in school budget.

Finally, table 4.17 indicates that the share of donations represents only 1.03% of the total budget used in public secondary schools in the two districts and income generating projects represent a non-significant percentage of 0.45%. The implication for this is that communities and local NGOs are not mobilized to support educational projects.

c) **Amount of money spent on different school activities**

A further analysis of financial inputs went to school expenditures. The amount of money a school spends on various educational activities may influence students’ performance in one way or another. It is in this regard that expenditures on different items in public secondary schools in the two districts were thought to be of great interest for this study. Table 4.18 presents the amount of money spent on different activities/inputs in schools under investigation.
Table 4.18: Expenditure on various school inputs/activities

<table>
<thead>
<tr>
<th>Item</th>
<th>Amount spent</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teachers</td>
<td>224,265,260</td>
<td>15.56%</td>
</tr>
<tr>
<td>Administrative staff</td>
<td>39,449,120</td>
<td>2.74%</td>
</tr>
<tr>
<td>Support staff</td>
<td>68,233,145</td>
<td>4.73%</td>
</tr>
<tr>
<td>Casual staff</td>
<td>5,482,910</td>
<td>0.38%</td>
</tr>
<tr>
<td>Boarding</td>
<td>645,847,585</td>
<td>44.81%</td>
</tr>
<tr>
<td>Stationeries</td>
<td>63,013,505</td>
<td>4.37%</td>
</tr>
<tr>
<td>Textbooks</td>
<td>18,702,731</td>
<td>1.3%</td>
</tr>
<tr>
<td>Laboratory expenses</td>
<td>16,827,350</td>
<td>1.17%</td>
</tr>
<tr>
<td>Transport</td>
<td>12,216,700</td>
<td>0.85%</td>
</tr>
<tr>
<td>Computer repair</td>
<td>11,215,326</td>
<td>0.78%</td>
</tr>
<tr>
<td>Games and other extracurricular activities</td>
<td>16,137,453</td>
<td>1.12%</td>
</tr>
<tr>
<td>Maintenance of physical facilities</td>
<td>107,158,365</td>
<td>7.43%</td>
</tr>
<tr>
<td>Water and energy</td>
<td>63,482,766</td>
<td>4.4%</td>
</tr>
<tr>
<td>Fuel</td>
<td>23,579,614</td>
<td>1.64%</td>
</tr>
<tr>
<td>Communication bill</td>
<td>10,667,290</td>
<td>0.74%</td>
</tr>
<tr>
<td>Any other activity, not mentioned</td>
<td>115,050,379</td>
<td>7.98%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1,441,329,499</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

From table 4.18 it is clear that boarding claims the biggest share of the school expenditures. In fact, 44.81% of the total expenditure in public secondary in Nyamasheke and Nyarugenge districts goes to boarding. The second item public secondary schools spend on is the allowances of teachers which claim for 15.56% of the total expenditure. The rationale for this is to increase teachers’ income to
supplement their monthly salaries paid by the government. It is important to note that a positive relationship has been established between higher salaries and fringe benefits of teachers and the performance of students they teach (Pritchett, 2003). Expenditures on teachers are followed by expenditures on miscellaneous which take 7.98% of the total expenditure. The fourth element that public secondary schools spend more on is the maintenance of physical facilities which claims for 7.43% of the total expenditure. Table 4.18 further shows that 4.73% of the total expenditure is spent on support staff. This is followed by expenditure on water and energy bill which claims for 4.4%. In the same vein, table 4.18 indicates that while stationeries take 4.37% of the total expenditure, allowances for administrative staff claim for 2.74%.

The findings in table 4.18 further show that while 1.64% of the total expenditure in public secondary schools in the two districts goes to fuel, only 1.3% is allocated to the purchase of textbooks. The table goes on to show that laboratory expenses take 1.17% of the total expenditure and 1.12% is allocated to games and other extracurricular activities. The findings in table 4.18 further reveal that 0.85% and 0.78% of the total expenditure are spent on transport and computer repair respectively.

Finally, table 4.18 shows that while 0.74% of the total expenditure is spent on communication bill, 0.38% is allocated to casual staff. It is to note that the amount of money spent in education may correlate with performance. On this, Hanushek (1981) found that students’ academic performance highly correlate
with school expenditures. Likewise, UNESCO (2014) the key factor that is harmful to the quality of education is the insufficient financing of education sector. However, it is very important to note that in some circumstances higher educational expenditures do not imply good academic performance as it should. On this, Hanushek (1981) states that increased expenditures in education bear expected fruits only when the education system has ability to utilize them efficiently.

4.4 Correlation between educational inputs and the output
The second objective of this study was to describe the extent to which educational inputs correlate with academic achievement in public secondary schools in Nyamasheke and Nyarugenge districts. To this end, Pearson product moment correlation coefficient was computed to show the correlation between each educational input and output. This section therefore presents the findings of this study on this objective. It is subdivided into three main sub-sections. The first subsection describes the correlation between various endogenous inputs and school mean performance. The second subsection summarizes the correlation between exogenous inputs and students’ performance, and the third and last subsection discusses the correlation between financial resources and school mean performance.

4.4.1 The correlation between endogenous inputs and school mean performance
Endogenous inputs are the resources that the school has control over. These are assumed to correlate with school mean performance. It is in this perspective that
this study sought to establish their link to educational school mean performance in public secondary schools in Nyamasheke and Nyarugenge districts. This subsection therefore presents the extent to which key endogenous inputs correlate with school mean performance in S6NE in the two districts.

**a) Inputs associated with the number of students**

In order to establish the extent to which student-related inputs correlates with school mean performance in public secondary schools in Nyamasheke and Nyarugenge districts, Pearson product moment correlation was computed. Table 4.19 gives the summary of the correlation coefficient as well as the coefficient of determination on student-related inputs in the two districts.

**Table 4.19: Student-related inputs and educational output**

<table>
<thead>
<tr>
<th>Independent variables</th>
<th>R</th>
<th>R²</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student-teacher ratio</td>
<td>.293</td>
<td>.085</td>
<td>.200</td>
</tr>
<tr>
<td>Student-qualified teacher ratio</td>
<td>.660</td>
<td>.435</td>
<td>.001*</td>
</tr>
<tr>
<td>Student-textbook ratio</td>
<td>.492</td>
<td>.242</td>
<td>.024*</td>
</tr>
<tr>
<td>Student-classroom ratio</td>
<td>.462</td>
<td>.214</td>
<td>.035*</td>
</tr>
<tr>
<td>Student-computer ratio</td>
<td>.643</td>
<td>.413</td>
<td>.002*</td>
</tr>
</tbody>
</table>

\*p<.05

The results presented in table 4.19 reveal that there is no significant correlation between student-teacher ratio and school mean performance in S6NE (R=.293, p>.05). However, the coefficient of determination (R²=.085) indicates that only
8.5% of the school mean performance is accounted for by the student-teacher ratio. This finding disagrees with the finding of Barro and Lee (1996) who conducted a research to establish the link between the ratio of students per teacher and the academic success of students. The study revealed that student-teacher ratio significantly affects students’ academic achievement in both national and international tests.

From table 4.19 it is also clear that there is significant correlation between the ratio of student per qualified teachers and school mean performance in S6NE (R=.660, p<.05). Basing on the coefficient of determination ($R^2=.435$), 43.5% of variations in school mean performance was accounted for by the ratio of students to qualified teachers. This concurs with the findings of Ijaiya (1998) who found that improved quality of the teaching staff highly correlates with students’ academic performance in any education system.

Another glance at table 4.19 reveals that another correlate of the school mean performance in S6NE is the student-textbook ratio. Pearson product moment correlation coefficient has revealed that a positive correlation exists between student-textbook ratio and school mean performance(R=.492, p<.05). The coefficient of determination ($R^2=.242$) indicates that 24.2% of the school mean performance in S6NE was explained by student textbook ratio. This finding goes hand in hand with the finding of White (2004) who established a positive correlation between the quantity of textbooks available in Ghanaian schools and
the performance of students. He found that schools with many textbooks perform better than schools with insufficient textbooks.

Another correlate of the school mean performance as indicated in table 4.19 is the number of student in a classroom. The calculated correlation coefficient has revealed that class size correlates with the school mean performance \( R = 0.462, p < 0.05 \). Although this correlation is moderate, the coefficient of determination obtained \( R^2 = 0.214 \), indicates that 21.4% of the school mean performance in S6NE was accounted for by the number of students in a class. The implication is that small classes performed better than big classes. This finding is supported by the finding of Kweku (1979) who found that reduced class size positively correlates with students’ academic achievement. In the same vein, it concurs with the finding of Angrist and Lavy (1999) who confirmed that small class size correlates students’ performance.

Table 4.19 indicates that there the student computer ratio highly correlates with school mean performance as indicated by the Pearson product moment correlation coefficient \( R = 0.643, p < 0.05 \). The degree of correlation between the two student computer ratio and the school mean performance was expressed by the coefficient of determination \( R^2 = 0.413 \) which means that 41.3% of variations in school mean performance in S6NE were accounted for by the number of computers a school possessed. Therefore, the more computers a school has, the better was its performance in S6NE. This finding is partially supported by the
findings of Salem (2011) who found that the use of computer in education positively correlates with students’ academic success.

**b) Inputs associated with teacher characteristics**

Teacher characteristics as an educational input include academic qualification, professional training, teaching experience, and workload. For the purpose of this study, Pearson product moment correlation coefficient was computed to determine the extent to which teacher characteristics were linked with the school mean performance in S6NE in the two districts. Table 4.20 presents the results of the study on the correlation between the two variables in the districts under investigation.

**Table 4. 20: Teacher characteristics and school mean performance**

<table>
<thead>
<tr>
<th>Independent variables</th>
<th>R</th>
<th>$R^2$</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teacher’s academic qualification</td>
<td>.792</td>
<td>.627</td>
<td>.002*</td>
</tr>
<tr>
<td>Teacher professional training</td>
<td>.748</td>
<td>.560</td>
<td>.001*</td>
</tr>
<tr>
<td>Teaching experience</td>
<td>.642</td>
<td>.412</td>
<td>.011*</td>
</tr>
<tr>
<td>Teaching load</td>
<td>.164</td>
<td>.023</td>
<td>.346</td>
</tr>
</tbody>
</table>

a. Dependent variable: school mean performance
*p<.05

The calculated correlation coefficients as shown in table 4.20 revealed that there is a positive correlation between teacher qualification, teacher professional training and teaching experience and the school mean performance in S6NE. Indeed the correlation coefficient indicates that teacher’s academic qualification
strongly correlates with the school mean performance in S6NE (R=.792, p<.05). As indicated by the coefficient of determination (R²=.627) teachers’ academic qualification explained 62.7% of the school mean performance in S6NE, meaning that schools with well qualified teachers performed better that school with less or unqualified teachers. This was partially expressed by Iyamu (2005) who established a positive correlation between the qualification of teachers and the school mean performance. For him, in addition to other factors such as students’ family background, motivation to learn, and cognitive abilities, students’ exposure to well qualified and competent teachers affects the overall school mean performance.

The results displayed in table 4.20 further reveal that a high positive correlation exists between teachers’ professional training and school mean performance in S6NE (R=.748, p<.05). In order to show how much teacher professional training contributes to school mean performance, the coefficient of determination (R²=.560) has indicated that 56% of the school mean performance in S6NE was accounted for by the variations in teachers’ professional training. This finding goes hand in hand with the finding of Monk (1994) found that there is a strong positive correlation between the number of pedagogical courses a teacher has taken and the performance of students he/she teaches.

Similarly, the results shown in table 4.20 also reveal that teacher experience is highly linked with school mean performance in S6NE (R=.642, p<.05). The
coefficient of determination ($R^2 = .412$) indicates that teacher’s teaching experience accounted for 41.2% of the school mean performance in S6NE. This implies that schools with more experienced teachers performed better than those schools with less or inexperienced teachers. This finding is in agreement with the result of the study conducted by Darlinng-Hammond (2000) who associated school mean performance with the teaching experience of the teachers a school has. Darlinng-Hammond concluded that students taught by more experienced teachers learn more and perform better than their counterparts who are taught by inexperienced or less experienced teachers. In the same vein, this finding gains support from the finding of Krueger (1999) who established a positive link between students’ performance and their teachers’ teaching experience.

Finally, from table 4.20 it can be seen that there is no significant correlation between teachers’ teaching load and school mean performance in S6NE ($R = .164$, $p > .05$). This is because as the coefficient of determination ($R^2 = .023$) indicates, the number of hours a teacher teaches per week accounted for only 2.3% of the school mean performance. This finding contradicts the findings of Trethaway (2001) who linked poor performance with heavy teaching load. For Trethaway, this is because teachers’ workload affects teacher’s preparation of lesson and the classroom teaching activities which in long run affect the academic performance of the students’ he/she teaches. This finding was corroborated by Fullan (2001) who has negatively associated increased teaching load with students’ poor academic performance.
c) Availability of physical facilities

Physical facilities such as laboratory, library, and staffroom are very important in teaching and learning. However as it has been previously seen in table 4.5 only 61.9%, 57.1%, and 90.48% of public schools in Nyamasheke and Nyarugenge districts have science laboratories, library, and staffroom respectively. It is in regard that this study sought to establish the degree to which availability of these facilities can be linked with the school mean performance in S6NE. Table 4.21 presents the correlation coefficient obtained for each facility.

Table 4.21: Physical facilities and school mean performance

<table>
<thead>
<tr>
<th>Independent variables</th>
<th>R</th>
<th>R²</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Science Laboratory</td>
<td>.374</td>
<td>.140</td>
<td>.015*</td>
</tr>
<tr>
<td>Library</td>
<td>.732</td>
<td>.536</td>
<td>.000*</td>
</tr>
<tr>
<td>Staffroom</td>
<td>.391</td>
<td>.153</td>
<td>.036*</td>
</tr>
</tbody>
</table>

As it can be read from table 4.21 there is a positive correlation between availability of science laboratories in a school and the mean performance of that school in S6NE (R=.374, p<.05). The coefficient of determination (R²=.140) indicates that availability of science laboratories in a school accounted for 14% of variations in the school mean performance in S6NE. This may be attributed to the fact that laboratory facilitates experiments in science subjects. This finding is supported by Khawla and Abdul (2006) who have associated laboratory experiments with students’ good academic performance. For them laboratory
experiments at university level account for 32% of variations in the students’ academic performance in chemistry, 41% and 26% in physics and in biology respectively.

Table 4.21 further shows that the school mean performance highly correlates with the availability of library in a school ($R=.732, p<.05$). The computed coefficient of determination ($R^2=.536$) indicates that 53.6% of variations in school mean performance in S6NE was accounted for by the availability of a library in that school. This finding is partially supported by Keith (2000) who found that the size of school library in terms of staff and the books it contains is highly linked with the mean performance of that school in reading. The finding of Keith further revealed that the size of the library explains between 5 and 15% of the variations in students’ performance at primary and secondary levels of education.

Another look at table 4.21 reveals that another correlate of the school mean performance is in S6NE is the availability of staffroom in a school ($R=.391, p<.05$). The coefficient of determination ($R^2=.153$) indicates that the availability of a staff room in a school accounted for 15.3% of the school mean performance in S6NE. This is because according Hanson (2014) a staffroom is very important and its unavailability or abolition may cause stress and exhaustion among teachers and this would in long run have a negative impact on students’ learning and academic achievement.
4.4.2 The correlation between exogenous inputs and students’ performance

In education system, exogenous inputs are the resources that the school does not have control over. These include students’ boarding status, walking distance, parenthood status, family size, parental literacy level, parental educational level, parental occupation, energy used for lighting at students’ home, and students’ past performance. Exogenous inputs are thought to correlate with students’ performance. Therefore, for the purpose of this study, they were correlated with students’ performance in S6NE. This subsection presents the findings on the correlation between each exogenous input and students’ performance in S6NE.

a) Parental background

Pearson product moment correlation coefficient was computed to correlate different exogenous inputs related to parental socio-economic status with students’ performance in S6NE. Table 4.22 gives the summary of the findings on the link between the two variables.

Table 4. 22: Parental background and students’ performance

<table>
<thead>
<tr>
<th>Independent variables</th>
<th>R</th>
<th>R²</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Family size</td>
<td>.209</td>
<td>.044</td>
<td>.001*</td>
</tr>
<tr>
<td>Parental literacy level</td>
<td>.230</td>
<td>.053</td>
<td>.000*</td>
</tr>
<tr>
<td>Parental educational level</td>
<td>.414</td>
<td>.172</td>
<td>.000*</td>
</tr>
<tr>
<td>Parental occupation</td>
<td>.357</td>
<td>.127</td>
<td>.000*</td>
</tr>
<tr>
<td>Type of energy used for lighting</td>
<td>.326</td>
<td>.106</td>
<td>.000*</td>
</tr>
</tbody>
</table>

a. Dependent variable: Students’ performance in S6NE

*p<.05

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The results of the Pearson product moment correlation coefficient calculated indicates that the size of the family a student comes correlates with his/her future performance in S6NE (R=.209, p<.05). The coefficient of determination (R^2=.044) indicates that student’ family size accounted for only 4.4% of the variations in his/her performance in S6NE. This therefore means that students from small families performed better in S6NE than their counterparts from large families.

This finding finds support from the findings of Eamon (2005) who associated good performance with small family size. According to Earmon students from families with few children are likely to get more parental care and attention which in turn increases their access to resources than their counterparts from large families. However, this finding is in contradiction with the finding of the study conducted by Osuafor and Okonkwo (2013) to find out the link between family size and students’ performance. They found that the number of children in the family a student comes from does not correlate with the performance of that student in biology.

The results presented in table 4.22 further indicate that parental literacy correlates with students’ performance in S6NE (R=.230, p<.05). The coefficient of determination (R^2=.053) indicates that that 5.3% of the students’ performance in S6NE was explained by the students’ parental literacy level. This finding was previously supported by the finding by Emejulu (2006) who established the link between the literacy level of the parents and the academic performance of their
children. For Emejulu, children from literate families performed better than their counterparts from illiterate families.

A further look at table 4.22 reveals that another correlate of students’ performance in S6NE is their parental education level (R=414, p<.05). The coefficient of determination (R²=.172), revealed that the level of education of students’ parents accounted for 17.2% of students’ performance in S6NE. This means that students from highly educated families performed better than those from families with low education level. This finding was voiced by Hassan (2009) who associated students’ academic performance and the educational level of their parents. However, this finding disagree with the finding of Osuafor and Okonkwo (2013) who in their study found no students’ performance in biology is not associated with the education level of their parents.

Another glance at table 4.22 indicates that there a positive correlation between students’ performance and the employment status of their parents as shown by the Pearson product moment correlation coefficient (R=.357, p<.05). The coefficient of determination (R²=.127) indicates that 12.7% of the students’ performance in S6NE was accounted for by the employment status of their parents. The implication of this is that students from highly employed parents performed better than their counterparts from unemployed or poorly employed parents. This concords with the finding of the research conducted by Hassan (2009) who associated better students’ academic results with better employment status of the parents. For Hassan, this is because those who are well employed are
those who are highly educated and education is highly associated with students’ performance.

A final glance at table 4.22 reveals that the type of energy used for lighting at students’ house also correlates with the students’ performance in S6NE (R=.326, p<.05). This is because day students need light to revise their studies in the evening. The coefficient of determination ($R^2=.106$) indicates that the type of energy used for lighting accounted for 10.6% of the performance of day students in S6NE. This implies that students from households that are equipped with electricity performed better than those students whose families do not have electricity.

**b) Students’ personal background**
The students’ personal background is another key input in education system. This is because in Education production Function, students are considered as raw materials that are put in the production process to get the desired output. For the purpose of this study Pearson product moment correlation coefficient was computed to establish the degree to which students’ personal background correlates their performance in S6NE. Table 4.23 presents the results of the Pearson product moment correlation coefficient for each input related to students’ personal background.
Table 4.23: Students’ personal background and their performance

<table>
<thead>
<tr>
<th>Independent variables</th>
<th>R</th>
<th>R²</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parenthood status</td>
<td>.116</td>
<td>.014</td>
<td>.072</td>
</tr>
<tr>
<td>Boarding status</td>
<td>.311</td>
<td>.097</td>
<td>.000*</td>
</tr>
<tr>
<td>Walking distance</td>
<td>.102</td>
<td>.010</td>
<td>.264</td>
</tr>
<tr>
<td>Prior performance</td>
<td>.658</td>
<td>.433</td>
<td>.000*</td>
</tr>
</tbody>
</table>

a. Dependent variable: Students’ performance in S6NE
*P<.05

Table 4.3 indicates that there is significant correlation between students’ parenthood status and their performance in S6NE (R=.116, p>.05). The coefficient of determination (R² =.014) indicates that students’ parenthood status accounted for only 1.4% of their performance in S6NE. This therefore means that the students’ performance in S6NE cannot be associated with whether a student is orphan or not. This contradicts the finding by Majoribanks (1996) who have associated good performance with parenthood status.

Table 4.23 also indicates that there is a significant correlation between students’ boarding status and their performance in S6NE (R=.311, p<.05). The strength of the correlation was shown by the value of coefficient of determination (R²=.097) which revealed that students’ boarding status accounted for 9.7% of students’ performance in S6NE. This finding was corroborated by Behaghel, Chaisemartin, and Gurgand (2015) who, in their study conducted in France found to establish a
link between students’ performance in French and Mathematics and their boarding status, found that the two variables highly correlate.

As table 4.23 indicates there is no significant correlation between the distance a day students walk from home to school and vice versa and their performance in S6NE (R=.102, p>.05). In fact, the coefficient of determination ($R^2 = .010$) indicates that only 1% of day students’ performance in S6NE was accounted for by the difference in distance they walk from home to school and vice versa.

A final look at table 4.23 indicates that students’ prior performance (performance in Tronc commun) highly correlates with their subsequent performance in S6NE (R=.658, p<.05). The coefficient of determination ($R^2 = .433$) indicates that 43.3% of students’ performance in S6NE was accounted for by their prior performance in S3NE (Tronc Commun). This concurs with the finding of Hemmings (1996) who found that in Australian schools students’ prior performance highly correlates with students subsequent performance and it could account for more than 60% of variations in students’ future performance in English, mathematics, and science.

4.4.3 The correlation between financial inputs and school performance

Financial resources are the key inputs in education production function. This is because they are used to provide other educational inputs. This study sought to find out how much incomes and expenditures of a school correlates with the
school mean performance in S6NE in public secondary schools in Nyamasheke and Nyarugenge districts. To this end, Pearson product moment correlation coefficient was computed. This sub-section presents the findings on the link between different financial inputs and school mean performance in S6NE.

a) **Expenditure on staff**

School expenditure on staff is a very important in Education Production Function of any educational system. It is to be noted that since teaching and non-teaching staff in public secondary schools are paid by the government, school expenditure on them exclude their monthly salaries. It is only about the amount of the money that schools pay to their staff members as allowances to supplement their monthly salaries paid by the government. Therefore, this money was correlated with the school mean performance in S6NE to find out the extent to which they correlate. Table 4.24 highlights the results of the Pearson product moment correlation coefficient for each type of expenditure.

**Table 4. 24: Expenditure of on staff and school mean performance**

<table>
<thead>
<tr>
<th>Independent variables</th>
<th>R</th>
<th>R²</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expenditure on teaching staff</td>
<td>.616</td>
<td>.379</td>
<td>.003*</td>
</tr>
<tr>
<td>Expenditure on administrative staff</td>
<td>.526</td>
<td>.276</td>
<td>.014*</td>
</tr>
<tr>
<td>Expenditure on support staff</td>
<td>.605</td>
<td>.366</td>
<td>.004*</td>
</tr>
<tr>
<td>Expenditure on casual staff</td>
<td>.217</td>
<td>.047</td>
<td>.345</td>
</tr>
</tbody>
</table>

a. Dependent variable: school mean performance

*p<.05
The results of Pearson product moment correlation coefficient indicates that amount of money that a school spends on its teaching staff significantly correlates with school mean performance in S6NE (R=.616, p<.05). The coefficient of determination (R^2=.379) indicates that 37.9% of school mean performance in S6NE was accounted for by the amount of money that the school spent on its teaching staff. This means that a school that spends more money on its teachers performed better than the school which spends less money. This is partly in agreement with the finding of the study conducted by Hanushek, Kain and Rivkin (1999) to find out the extent to which salaries of teachers correlates with the school performance. Their findings revealed that good performance of a school is associated with high pay of teachers. This was later confirmed by Dewey, Husted and Kenny (2000) who found that a positive correlation exists between students’ performance and teachers’ salaries. Finally, this was later corroborated by Pritchett (2003) who associated higher salaries with good academic performance.

Another look at table 4.24 reveals that expenditure on administrative staff is another correlate the school mean performance in S6NE (R=.526, p<.05). The coefficient of determination (R^2 =.276) indicates that 27.6% of the school mean performance in S6NE was accounted for by its expenditure on administrative staff. This is may be attributed to the role administrative staff in ensuring that learning and teaching are taking place in the right way.
From table 4.2 it is also clear that expenditure on support staff is significantly associated with school mean performance in S6NE (R=.605, p=.05). The coefficient of determination ($R^2=.366$) revealed that 36.6% of the school mean performance was accounted for by its expenditure on support staff. The support staff in a school include: cooks, cleaners, and security officers. This category of staff plays a key role in the achievement of the school objectives. Finally, table 4.24 indicates that expenditure on casual staff does not correlate with the school mean performance in S6NE (R=.217, p>.05). This is because as indicated by the coefficient of determination ($R^2=.047$) it accounted for only 4.7% of the school mean performance.

**b) Expenditure on key educational inputs and school mean performance**

Apart from expenditures on staff, this study went further to analyze the degree to which expenditure on other key educational inputs correlate with school mean performance in S6NE. Table 4.25 gives the summary of the findings on the correlation coefficients obtained for expenditure on each key input.
Table 4.25: Expenditure on key inputs and school mean performance

<table>
<thead>
<tr>
<th>Independent variables</th>
<th>R</th>
<th>R²</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expenditure on boarding</td>
<td>.788</td>
<td>.621</td>
<td>.000*</td>
</tr>
<tr>
<td>Expenditure on laboratories</td>
<td>.434</td>
<td>.188</td>
<td>.049*</td>
</tr>
<tr>
<td>Expenditure on computer repair and maintenance</td>
<td>.529</td>
<td>.279</td>
<td>.014*</td>
</tr>
<tr>
<td>Expenditure on games and extra-curricular activities</td>
<td>.553</td>
<td>.305</td>
<td>.009*</td>
</tr>
<tr>
<td>Expenditure on maintenance of physical facilities</td>
<td>.552</td>
<td>.305</td>
<td>.009*</td>
</tr>
<tr>
<td>Expenditure on water and energy</td>
<td>.593</td>
<td>.352</td>
<td>.005*</td>
</tr>
</tbody>
</table>

Dependent variable: School mean performance
*p<.05

As it can be seen in table 4.25 expenditure on boarding highly correlates with school mean performance in S6NE (R=.788, p<.05). The coefficient of determination (R²=.621) shows that expenditure on boarding accounted for 62.1% of the school mean performance in S6NE. This is partly in agreement with the finding of Behagel, Chaisemartin, and Gurgand (2015) who in their study conducted in France found that a positive link exists between boarding and students’ academic performance in French and mathematics.

In addition, the results presented in table 4.25 reveals that the amount of money spent on laboratory in a school correlates with its mean performance in S6NE (R=.434, p<.05). The coefficient of determination (R²=.188) indicates that expenditure on laboratory materials accounted for 18.8%
of the school performance. This means that schools which spent a lot of money on equipping their laboratories performed better than schools which do not have laboratories or spent little money on laboratories. This has been partially expressed by William and Maureen (2012) as quoted by Neji, Amba, Ukwetang, John, Nja, and Cecilia (2014) who asserted that the provision of adequate laboratories in schools increases students’ opportunities and ability to grow in problem solving, critical thinking, and acquisition of scientific and technological literacy in science and mathematics.

The results presented in table 4.25 also reveal that expenditure on computer repair and maintenance correlates with the school mean performance in S6NE (R=.529, p<.05). As the coefficient of determination indicates (R^2=.279), it accounted for 27.9% of the school mean performance in S6NE. This implies that schools which spent more money on repairing and maintaining their computers performed better than schools which did not have computers or spent less money on maintenance of computers.

According to Salem (2011) the use of computer in education significantly contributes to students’ academic performance. This was also confirmed by the study conducted by Aloraini (2012) who found that computer is an effective educational tool to enhance students’ academic achievement. This is, according to Aloraini, because computers increase students and teachers knowledge though accessing various sources of information on internet.
Games and other extra-curricular activities are very important in education system. According to Kimiko (2006) games and other extracurricular activities create a favorable environment for learning. Therefore, as the correlation coefficient in table 4.25 indicates, expenditure on games and other extra-curricular activities correlates with the school mean performance in S6NE (R=.553, p<.05). The coefficient of determination (R²=.305) means that 30.5% of the school mean performance in S6NE was accounted for by the amount of money the school spends on games and other extra curricula activities. It is to be noted that in their research Guest and Schneider (2003) found that the value that is placed on each extracurricular activity affects the relationship between that activity and academic achievement. Similarly, the findings of Simon (2001) have positively associated students’ academic achievement with their participation in various extracurricular activities. Finally, this was later emphasized by Stephens and Schaben (2002) who found that students’ participation in extracurricular activities organized by the school positively correlates with their academic performance.

Another look on table 4.25 reveals that expenditure on the maintenance or provision of the new physical facilities also correlates with the school mean performance in S6NE (R=.552, p<.05). The coefficient of determination (R² =.305) indicates that expenditure on the maintenance or provision new physical facilities accounted for 30.5% of the school mean performance in S6NE. This means that schools which had adequate or conducive physical facilities
performed better than schools which had inadequate or unconducive physical facilities. It is to be noted that according to Ayodele (2000) the adequacy of the school physical facilities positively correlates with the school performance. This goes hand in hand with the finding of Akinfolarin (2008) who found that students’ academic success is associated with the adequacy and conditions of the school physical facilities. Finally, in the study conducted by Vandiver (2011) it was revealed that since the quality of the school physical facilities creates a conducive learning environment, it also contributes to students’ academic achievement.

A final look at table 4.25 reveals that the amount a school spends on water and energy also correlates with the mean performance of that school in S6NE (R=.593, p<.05). As it can be seen in the table, the coefficient of determination (R² =.352) indicates that 35.2% of the school mean performance in S6NE was accounted for by the amount of money that the school spent on water and energy. This implies that schools supplied with water and electricity performed better than school without access to both water and electricity.

c) Recurrent expenditure
Online Collins dictionary defines recurrent expenditure as ongoing expenditure of an organization. In a school setting, this recurrent expenditure include the money that is spent on teaching, administrative, support, and casual staff, money spent on games, transport, purchase of books, communication bill, water and energy,
laboratories, maintenance of physical facilities, computer repair, stationeries, among many others. Therefore, this study sought to establish the degree to which the recurrent expenditure correlates with the school mean performance in S6NE in the schools under investigation. Table 4.26 presents the correlation coefficient for the link between the two variables.

Table 4.26: Recurrent expenditure and school mean performance

<table>
<thead>
<tr>
<th>Independent variable</th>
<th>R</th>
<th>R²</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recurrent expenditure</td>
<td>.754</td>
<td>.569</td>
<td>.000*</td>
</tr>
</tbody>
</table>

(a. Dependent variable: school mean performance
*p<.05

Table 4.26 indicates that the recurrent expenditure of the school highly correlates with its mean performance in S6NE (R=.754, p<.05). The coefficient of determination (R² =.569) indicates that the school recurrent expenditure accounted for 56.9% of the school mean performance in S6NE. This was previously voiced by Greenwald, Hedges, and Laine (1994) who associated the school recurrent expenditure and its mean performance.

d) Source of school income
This study sought to find out whether correlation exists between the amount of money from different education financiers in public secondary schools the school mean performance in S6NE. This was of the great importance for this study because the ability to know the extent to which the money from each source correlates with the school mean performance, would help schools ensure effective
management of that money for better performance. Table 4.27 presents the findings on the correlation between the two variables.

**Table 4.27: Source of funding and school mean performance**

<table>
<thead>
<tr>
<th>Independent variables</th>
<th>R</th>
<th>R²</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Money from government</td>
<td>.488</td>
<td>.238</td>
<td>.025*</td>
</tr>
<tr>
<td>Money from donors</td>
<td>.349</td>
<td>.122</td>
<td>.121</td>
</tr>
<tr>
<td>Money from school fees</td>
<td>.769</td>
<td>.591</td>
<td>.000*</td>
</tr>
<tr>
<td>Money from income generating projects</td>
<td>.337</td>
<td>.114</td>
<td>.135</td>
</tr>
<tr>
<td>Money from parents contributions</td>
<td>.724</td>
<td>.524</td>
<td>.000*</td>
</tr>
</tbody>
</table>

Dependent variable: School mean performance
*p<0.5

Table 4.27 indicates that the amount of money paid as school fees highly correlates with the school mean performance in S6NE (R=0.769, p<0.05). The coefficient of determination (R²=0.591) indicates that school fees accounted for 59.1% of the school mean performance in S6NE; meaning that schools which charged school fees performed better than those schools which did not charge school fees. This is true because schools which charge high schools are also in good position to provide all the necessary requirements for the delivery of quality education.

Furthermore, table 4.27 indicates that the amount of money paid to the school by parents as teachers’ allowances highly correlates with the school mean performance S6NE (R=0.724, p<0.05). The coefficient of determination (R²=0.524) indicates that the money schools got from parents’ contributions accounted for
52.4% of the school mean performance in S6NE. This implies that schools which received a lot of money as teachers’ allowance performed better than schools that received little or no money.

The findings in table 4.27 further indicate the amount of the money schools receive from the government in form of capitation grant also correlates with the school mean performance in S6NE (R=.488, p<.05). The coefficient of determination (R²=.238) reveals that 23.8% of the school mean performance in S6NE was accounted for by the amount of money schools got from the government in form of capitation grant. This presupposes that schools which received more money performed better than schools which received less money. According to UNESCO (2005) the value that the government gives to education is reflected by the percentage of the national budget that that government allocates to education.

A final look at table 4.27 reveals that the amount of money got from donors or income generating projects does not correlate with the school mean performance in S6NE (R=.349, R²=.122, p>0.5) and (R=.337, R²=.114,p>.05) respectively. This is because as it was previously shown in table 4.17 only 1.03% and 0.45% of the total school incomes come from donors and school income generating activities respectively. These percentages are therefore, insignificant of affect the school mean performance.
e) Total school income
This study went further to highlight the extent to which the total school incomes correlate with the school mean performance in S6NE. Table 4.28 presents the correlation coefficient for the link between the two variables.

Table 4.28: Total school incomes and school mean performance

<table>
<thead>
<tr>
<th>Independent variable</th>
<th>R</th>
<th>$R^2$</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>School income</td>
<td>.886</td>
<td>.785</td>
<td>.000*</td>
</tr>
</tbody>
</table>

* P<.05

The Pearson product moment correlation coefficient presented in table 4.28 indicates that the total school incomes of the school highly correlates with its mean performance in S6NE ($R=.886$, p<.05). The coefficient of determination ($R^2=.785$); indicates that 78.5% of the school mean performance in S6NE was accounted for by the total school incomes. This implies that schools with higher incomes performed better than schools with lower incomes. This has been expressed by Figlio (1997) who associated poor students’ performance with reduced financial incomes in education.

4.5 Determinants of educational output
In our previous section, we discussed the correlation between different independent variables and the dependent variable which was measured in terms of school mean performance and students’ performance in S6NE. Through the square of correlation coefficient that is also referred to as the coefficient of determination ($R^2$) it was possible to show a direct estimate of the amount of variation in the dependent variable that is explained or accounted for by each
independent variable. However, this is not enough to show how important each independent variable is in predicting the dependent variable. Therefore, there is need to compute the regression weight which is also referred to as the standardized partial regression coefficient (usually abbreviated as beta (β) weight. It is in this regard that the third objective of this study sought to find out the determinants of educational output by showing how much school mean performance and students’ performance were affected by the predictor variables.

4.5.1 Determinants of school mean performance

The regression analysis was computed to show the key determinants of school mean performance in S6NE in public secondary school in Nyamasheke and Nyarugenge Districts. Table 4.29 gives the summary of the findings on the determinants of school mean performance in S6NE.

Table 4.29: Determinants of school performance

<table>
<thead>
<tr>
<th>Predictors</th>
<th>Standardized (β) Beta weight</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teacher characteristics</td>
<td>.642</td>
<td>.011*</td>
</tr>
<tr>
<td>Student-classroom ratio</td>
<td>-.462</td>
<td>.035*</td>
</tr>
<tr>
<td>Student teacher ratio</td>
<td>.293</td>
<td>.200</td>
</tr>
<tr>
<td>Student textbook ratio</td>
<td>-.492</td>
<td>.024*</td>
</tr>
<tr>
<td>Student computer ratio</td>
<td>-.643</td>
<td>.002*</td>
</tr>
<tr>
<td>Availability of key physical resources</td>
<td>.374</td>
<td>.015*</td>
</tr>
<tr>
<td>Recurrent expenditure</td>
<td>.754</td>
<td>.000*</td>
</tr>
<tr>
<td>School income</td>
<td>.488</td>
<td>.025*</td>
</tr>
</tbody>
</table>

* p<.05

Dependent variable School mean performance in S6NE

$R^2 = .392$ (39.2%)  
Adjusted $R^2 = .389$ (38.9%)
As it can be seen in table 4.29 teacher characteristics is a significant predictor of students’ performance in S6NE (Standardized β=.642, P<0.5). The β value tells that one unit increase in teachers’ characteristics (i.e. a year of experience, further training, etc.) increases school mean performance by .642. This is true when other factors are held constant. This gains support from the findings of a research of Abraham and Morrison (2006) who found that teachers’ characteristics were key determinant of the school internal efficiency. Furthermore, this finding gains support from the finding of Darling-Hammond (2000) who found that among the teacher characteristics, the key determinant of school mean performance is the academic qualification of the teachers. Darling-Hammond further emphasizes that at high school students benefit much from teachers with Bachelor’s or Master’s degrees in the subjects they teach.

Likewise, the finding that teacher characteristics are the key determinant of the school mean performance was voiced by Ijaiya (1998) who found that the professional training of the teaching staff is the key determinant of students’ academic performance and the overall school mean performance in any education system. In the same way, Hanushek, Kain and Rivkin (1998) found that a positive relationship exists between teachers’ experience and students’ academic performance.
A further look at table 4.29 indicates that another predictor of school mean performance is the students-classroom ratio. The value of the standardized β weight (β = -.462, p < .05) indicates that as student-classroom ratio increases school mean performance in S6NE decreases by 0.462. The implication for this is that students from small class size that is classes with a small ratio performed better than classes with a big ratio. This is because with small classes the teacher is able to take care of individual differences of each learner.

To this end, Angrist and Lavy (1999) found that students from small classes learn better and hence their performance is better than that of their counterparts from large classes. This this finding that student classroom ratio is a key determinant of school mean performance in S6NE therefore goes hand in hand with the finding of Kweku (1979) who found that student-classroom ratio is a significant factor that affects performance and it can therefore be used to predict students’ performance. However, this finding contradicts that of Goldhaber and Brewer (1997) who in their study found that students from large classes perform better than students from small classes. Similarly, the study conducted by Hoxby (1998) found that there is not significant relationship between class size and students’ academic performance.

Table 4.30 also reveals that another determinant of students’ performance in S6NE is the student textbook ratio. The standardized β value (β = -.492, p < .05) indicates that as the student textbook ratio increases, school mean
performance in S6NE decreases by .492. This implies that schools which have many textbooks performed better than schools with few books, that is where many students share one book. This finding was previously supported by White (2004) who revealed in his study conducted in Ghana that improved provision of the recommended textbooks was a significant factor in improving academic success.

A further look at table 4.30 reveals that another predictor of students’ performance is the student computer ratio. The value of the standardized $\beta$ ($\beta=-.643$, $p<.05$) indicates that a one unit increase in student computer ratio decreases school mean performance in S6NE by .643. The implication for this is that school with more computers performed better those schools with few computers. This is because students learn better as an individual student uses his or her own computer or very few students use one computer. To this end, in the study conducted by Aloraini (2012) it was found that computer is a key determinant of students’ academic achievement when it is correctly used for teaching/learning purposes.

Another look at table 4.29 reveals that availability of physical resources (library and laboratories) is another key determinant of school mean performance in S6NE. The table indicates that there is a statistically significant difference between the schools that do not have physical resources and those with physical resources as shown by the coefficient of availability of the physical resources
which was statistically significant. ($\beta=.374, p<.05$). This implies that schools
with library or laboratory or both performed better than schools without library or
laboratory or both. This was partially voiced by Akinfolarin (2008) who states
that the availability of the key physical facilities in a school is a key factor that
affects academic performance in the school system.

Table 4.29 further indicates that another key predictor of school mean
performance in S6NE is school recurrent expenditure. This is shown by the value
of the standardized $\beta$ weight ($\beta=.754, p<000$) which means that one unit of
increase in the school recurrent expenditure increases its performance by .754.
This presupposes that schools which have undergone higher recurrent
expenditure performed better in S6NE than schools which have undergone less
recurrent expenditure. This was partially expressed by Figlio (1997) who found
that the school recurrent expenditure is a key determinant of the school
performance.

A final look at table 4.29 reveals that the total school incomes, is another key
predictor of the school mean performance in S6NE. This is shown by the
standardized $\beta$ value ($\beta=.488, p<.05$) which tells that a one unit of increase in the
total school incomes, increases performance by .488. This implies that schools
which got more incomes performed better than schools which received less
income. This finding corroborates the finding of Hanushek (1981) who found that
the total school budget is a key determinant of its mean performance. However,
Hanushek emphasizes that the school as well as the national incomes only
produce good results when educational system has the ability to utilize them efficiently.

4.5.2 Determinants of students’ performance
This study went further to establish the key determinants of students’ performance in S6NE in Nyamasheke and Nyarugenge districts. To this end, the regression analysis was computed. Table 4.29 gives the summary of the findings on the determinants of students’ performance in S6NE.

Table 4.30: Determinants of students’ performance

<table>
<thead>
<tr>
<th>Predictors</th>
<th>Standardized Beta (β) weight</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student’s boarding status</td>
<td>.311</td>
<td>.000*</td>
</tr>
<tr>
<td>Distance from home to school</td>
<td>-.102</td>
<td>.264</td>
</tr>
<tr>
<td>Parenthood status</td>
<td>.116</td>
<td>.072</td>
</tr>
<tr>
<td>Family size</td>
<td>-.209</td>
<td>.001*</td>
</tr>
<tr>
<td>Parental education level</td>
<td>.384</td>
<td>.000*</td>
</tr>
<tr>
<td>Parental employment status</td>
<td>.357</td>
<td>.000*</td>
</tr>
<tr>
<td>Prior performance</td>
<td>.658</td>
<td>.000*</td>
</tr>
</tbody>
</table>

* p<.05

Dependent variable: Students’ performance in S6NE

*R² = .568 (56.8%)
Adjusted R² = .541 (54.1%)

As it can be seen in table 4.30 student boarding status is a statistically significant predictor of students’ performance in S6NE. The table indicates that there a significant difference between the performance of students who are boarding and that of students who are day as shown by the standardized beta coefficient of the students boarding status which is statistically significant (β=.311, P<0.5). The β value indicates that students are boarding
perform better than day students as shown by the positive coefficient of .311. Therefore, if a student becomes boarding his/her performance is expected to increase by .311, of course this is when other factors in the model are held constant. This finding corroborates the finding of Behaghel, Chaisemartin, and Gurgand (2015) who in their study conducted in France found that students boarding status is a key determinant of their performance in French and Mathematics. They found that boarding students perform better than day students.

A further look at table 4.30 indicates that another predictor of student’s performance in S6NE is the size of the family a student comes from. The value of the standardized β weight (β=-.209, p<.05) indicates that for every one unity of increase in the family size, student’s performance decreases by 0.209. This therefore implies that students from small families performed better than their counterparts from large families. This is because students from small families receive more parental care and learning materials than students from large families. This finding therefore concurs with the finding of Onyeabo as cited in Nwachukwu (2002) who confirmed that students from large families do not perform better as their counterparts from small families. Likewise, Majoribanks (1996) has previously found that students from small families perform better than students from large families. Finally Eamon (2005) who found that family size is a key determinant of student’s performance in favour of those come from small families.
Table 4.30 also reveals that there is a statistically significant difference between the performance of students whose parents are educated and the performance of students whose parents are not educated as shown by the standardized beta coefficient of the parental education level which was statistically significant ($\beta=0.384$, $p<.05$). Students whose parents are educated were seen to perform better than their counterparts whose parents are not educated. Therefore, an increase in the level of education of the student’s parents, is expected to increase the student’s performance increases by 0.384. This is because educated parents are highly employed and are in good position to provide care, encouragement and school materials to their children. This was previously supported by Hasan (2009) who found parental education level to be a key determinant of students’ performance where students from educated parents perform better than students from uneducated parents.

Another look at table 4.30 reveals that another key predictor of students’ performance is parental employment status. The table clearly shows that a statistically significant difference exists between the performance of students whose parents are employed and the performance of students whose parents are not employed as shown by the standardized $\beta$ coefficient of the parental employment status ($\beta=0.357$, $p<.05$). Students from employed parents were seen to perform better than their counterparts from unemployed parents as shown by the positive coefficient. This finding corroborates with the finding of Hassan (2009) who found that the employment status of parents is a key determinant of
the performance of their offspring. Hassan concluded that students from employed parents perform better than their counterparts from unemployed parents. This was however contradicted by finding of Osuafor and Okonkwo (2003) who found that parental employment status is not a key predictor of student’s performance.

Another look at table 4.30 indicates that the distance walked by day students is not a significant predictor of the students’ performance in S6NE as shown by the standardized beta coefficient which was not statistically significant (β=-.102, p>.05). Likewise, students’ parenthood status was not found to be a key determinant of the students’ performance in S6NE as shown by the standardized beta coefficient which was not statistically significant (β=.116, p>.05). Therefore, students who have parents were not seen to perform better than their counterparts who are orphan.

A final look at table 4.30 indicates that another key predictor of students’ performance in S6NE is the student’s prior performance in Tronc Commun Exam (S3NE). The value of the standardized β (β=.658, p<.05) tells that a one unit increase student’ prior performance in S3NE, increases his/her performance in S6NE by .658. This was previously voiced by Reynolds (1991) who found that a strong relationship exists between students’ prior academic performance and their future performance. In the same vein, this finding has recently gained support from the research conducted by Aubrey, Dahl and Godfrey (2006) who found that
students’ previous performance in mathematics is a key determinant of their future in mathematics subject.

4.6 Strategies adopted by DEOs to improve the quality of education in Nyamasheke and Nyarugenge districts

This section presents the result from interviews conducted with district education officers. The interviews were conducted with the purpose of knowing the strategies that the two districts have adopted or intend to enhance the quality of education in public secondary schools in Nyamasheke and Nyarugenge district. First, District Education Officers (DEOs) were first asked to describe the quality of both educational inputs and output in the schools under their responsibilities. They had all confirmed that there is still a big gap that needs to be filled in the quality and quantity of both educational inputs and output. Furthermore, District Education Officers were asked to describe whether a relationship exists between educational inputs provided in public schools located in their districts and the performance in S6NE. The all agreed that a strong relationship exists, although they added that sometimes exams are not properly set.

The main concern of the interviews was to know the strategies they have adopted to improve the quality of both educational inputs and output in schools located in their districts.

4.6.1 Strategies to enhance provision of educational inputs

To improve the provision of quality educational inputs, the District Education Officers revealed the following:
4.6.1.1 Partnership with the private sector

All the District Education Officers responded that the provision of educational inputs should not be the responsibility of the government only. Private sector and other stakeholder should also be concerned. In this perspective they have opted to developing partnership with the private sector to boost the provision of educational inputs.

4.6.1.2 Mobilizing and sourcing from local and international donors

Another strategy that District Education Officers in Nyamasheke and Nyarugenge Districts have adopted to enhance the provision of educational inputs is to sources from various local and international NGOs that operates in their districts. According to them this is because while NGOS are willing to donate materials to schools, their level of involvement is very low due to lack of mobilization. This goes hand in hand with the recommendation of UNESCO (2010) which states that donors and private investors should be mobilized and encouraged to get involved in financing schools in their surroundings for quality education.

4.6.1.3 Involving parents in the construction of schools and other physical facilities.

The third strategy that District Education Officers have adopted to accelerate the provision of educational inputs in schools, is to involve parents in the construction of school physical facilities through community works ‘Umuganda’. This is because, according to them, it has produced good fruits and it is line with the national policy.
4.6.1.4 Encouraging improvisation and use of multimedia

The fourth and last strategy that District Education Officers have adopted to boost the provision of education inputs in their districts is to encourage teachers to use improvised teaching materials and multimedia where there is no laboratory or where there are insufficient teaching and learning materials. According to Aloraini (2012) The best solutions to solve the problem of unproductivity of education system due to over-population, lack of staff, and insufficient instructional materials among many others, is mainstreaming technology especially multimedia technology within education system.

4.6.2 Strategies to improve the quality of educational output

The final question asked during the interview with the District Education Officers was about the strategies that they have adopted to improve the quality of educational output with specific reference to performance in S6NE. They have revealed that they have adopted the following strategies:

4.6.2.1 Training teachers

During the interview, District Education Officers revealed that to boost students’ performance in S6NE in schools under their responsibility, they should train more qualified teachers to enhance their pedagogical skills. This is because, according to them, teacher plays an important role the teaching and learning process. For this Bali and Alvarez (2003) found that the level of skills that teachers possess affect students’ performance. They further added that students
who attend schools with highly skilled teachers perform better than those schools with less skilled teachers.

4.6.2.2 Providing more quality educational inputs

The District Education Officer in Both Nyamasheke and Nyarugenge Districts had also revealed that for quality educational output provision and effective utilization of paramount importance. This is why they have adopted some strategies to boost the provision of educational inputs. To this end, Hanushek (1979) insists that in production function, the amount of output depends on the amount of inputs given the constraints imposed by the underlying technical process.

4.6.2.3 Retaining more qualified and experienced teachers

Another strategy that was adopted by District Education Officers in the two districts to improve students’ performance in S6NE is to retain qualified teachers who are already in service. They do this by increasing their allowances that are paid by parents to supplement teachers’ salaries. It is to be noted that UNESCO (2014) recommends that one of the means to end the ‘global learning crisis’ is to ensure equitable access to well-trained teachers and to ensure there is attraction and retention of highly qualified, experienced and committed teachers. To do all these, UNESCO calls for governments to improve teacher education, provide the right incentives to teachers and ensure good governance of teachers.
4.6.2.4 Preparing students by organizing general exams at district level before the national exams.

Another strategy that was adopted in one of the districts under investigation is preparing S6 students by administering a test at the district level. This would, according to District Education Officer, remove fear for exams and prepare students for the national exams.

4.6.2.5 Conducting mass school inspection and supervision.

Another strategy adopted by the District Education Officers in the two districts under investigation is to conduct mass inspection and supervision. According to them, these involve inspection or supervision by a team of education officers and some head teachers to ensure that teaching and learning are taking place in they way they should take place.
CHAPTER FIVE
SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction
This chapter presents the summary of the findings, conclusions and recommendations. The purpose of this study was to determine whether and to what degree a relationship exists between various educational inputs and output in public secondary schools located in Nyamasheke and Nyarugenge districts of Rwanda. From this broad purpose four objectives were stated as follows:

i) To find out educational inputs provided in public secondary schools in Nyarugenge and Nyamasheke districts; ii) To establish the extent to which each educational input provided correlates with educational output public secondary schools in Nyarugenge and Nyamasheke districts; iii) To find out the key determinants of educational output in public secondary schools in Nyarugenge and Nyamasheke districts; and iv) To explore strategies adopted by the managers to improve educational output in Nyarugenge and Nyamasheke districts. These objectives were further narrowed down into six research questions to guide this study. The research questions were stated as follows: i) What are the educational inputs provided in public secondary schools in Nyarugenge and Nyamasheke districts? ii) To what extent do endogenous inputs correlates with school mean performance in public secondary schools in Nyarugenge and Nyamasheke districts? iii) To what degree do exogenous inputs correlate with students’ academic performance in public secondary schools in Nyarugenge and Nyamasheke districts? iv) To what level do financial inputs correlate with school
mean performance in public secondary schools in Nyarugenge and Nyamasheke districts? v) What are the key determinants of educational output in public secondary schools in Nyarugenge and Nyamasheke districts? vi) What are the strategies adopted by school managers to improve educational output in Nyarugenge and Nyamasheke districts?

In order to answer these questions deriving from the aforementioned objectives, a correlational research design was used. Questionnaire and interview schedule were used to collect data from a sample consisting of 241 students, 21 head teachers, and 2 district education officers. Data were analyzed using frequencies and percentages, means, Pearson product moment correlation coefficient, and the regression analysis. Thematic analysis was used to analyze qualitative data. In tandem with the objectives and research questions, the findings were presented in graphs, tables and texts. Therefore, in this chapter the findings are summarized, and conclusions as well as recommendations are made accordingly.

5.2 Summary of the findings
In tandem with objectives and research questions of this study, the findings were presented, interpreted and discussed in chapter four. This section therefore summarizes the findings of this study in accordance with the objectives and research questions that guided this study.
5.2.1 Provision of educational inputs

5.2.1.1 Provision of endogenous inputs
The findings indicated that the majority (62.21%) of teachers in public secondary schools under this study have at least bachelor’s degree.

The findings further indicated that the majority (63.81%) of teachers in public secondary schools in Nyamasheke and Nyarugenge districts is professionally trained, that is, they have undergone pedagogical courses.

It was further found that more than a half (56.05%) of teachers in public secondary schools have a teaching experience of more than three years of experience and almost all teachers (97.3%) in the public schools under this study teach the recommend hours per week.

It was found that 61.9% of the public schools are equipped with science laboratories, 57.1% have a library, 47.62% have dormitories, 57.14% have refectories, 76.2% have computer lab, 85.71% have computers without internet, 90.48% have staffrooms, 85.71% have access to electricity, and 95% have piped water.

It was finally revealed more than two students sit on a desk, 17 students use one computer, and the student-classroom ratio is 38 to 1.

5.2.1.2 Provision of exogenous inputs
It was found that the proportion of day and boarding students in public schools under this study is almost equal and 49.8% and 50.2% respectively.

The findings revealed that the majority (69.7%) of students in public secondary schools under this study have both parents.
It was further found that the majority (67.63%) of students in Nyamasheke and Nyarugenge districts come from large families (families with more than 5 children).

It was also found that the majority (91.7%) of students in public secondary schools in Nyamasheke districts come from families which are literate, and the majority (57.7%) of them come from families whose main activity is farming.

This study also revealed that the majority (63.10%) of students in public secondary schools under this study come from households which are endowed with electricity.

### 5.2.1.3 Provision of financial inputs

It was found that the key financier of public secondary schools in Nyamasheke and Nyarugenge districts is the parents who contribute 80.97% of the school budget in form of school fees or teachers’ allowances. The government comes the second and contribute only 17.55% in form of capitation grant.

The findings of this study have also revealed that educational input that claim a big share of the school recurrent expenditures in the public secondary schools located in Nyamasheke and Nyarugenge districts are boarding and payment of staff which consume 44.81% and 15.56% of the school recurrent expenditure respectively.
5.2.2. Correlation between educational inputs and output

5.2.2.1 Endogenous inputs and school mean performance
It was found that among endogenous inputs, student-qualified teacher ratio, student-textbook ratio, student-classroom ratio, and student-computer ratio significantly correlate with the school mean performance in S6NE. Each of them explained between 20.2% and 43.5% of the school mean performance in S6NE.

The findings also revealed that teacher characteristics such as teacher qualification, professional training, and teaching experience highly correlate with school mean performance. Each the teachers characteristics explained between 41.2% and 62.7% of the variations in school mean performance in S6NE.

The findings further revealed that availability of the key physical facilities such laboratory, library and staffroom significantly correlate with school mean performance. The Availability each of the key facilities in a school accounted for between 14% and 53.6% of the school mean performance in S6NE.

5.2.2.2 Exogenous inputs and students’ performance
The findings revealed that among exogenous inputs, students’ family size, parental literacy level, parental education level, parental occupation, type of energy used for writing significantly correlate with the students’ performance in S6NE. Each of these exogenous inputs accounted for between 4.4% and 17.2% of the students’ performance.

The findings further revealed that students’ boarding status and students’ prior performance were associated with students’ performance in S6NE. They explained between 9.7% and 43.3% of the students’ performance.
5.2.2.3 Financial inputs and school mean performance
The findings revealed that among the financial inputs, expenditure on teaching staff, expenditure on boarding, and the recurrent expenditure are the financial inputs that highly correlate with the school mean performance in S6NE. They explained between 61.6% and 78.8% of variations in school mean performance in S6NE.

Furthermore the study revealed that the total school incomes highly correlate with school mean performance in S6NE. The amount of school financial resources accounted for 78.5% of the school mean performance in S6NE.

5.2.2.4 Determinants of educational output
It was found that the key determinants of school mean performance are: teacher characteristics, student-classroom ratio, student textbook ratio, students-computer ratio, availability of physical resources, school recurrent expenditure and school total incomes as they had statistically significant coefficients.

It was also found that the key determinants of students’ performance are: students boarding status, family size, parental education level, parental employment status, and students’ prior performance as their coefficients were statistically significant.

5.2.3 Strategies adopted by DEOs to enhance the quality of education.
It was revealed that strategies such as partnership with private sector, involving parents in construction of classrooms and sourcing from donors to enhance provision of inputs in schools have been adopted by public secondary school managers to enhance the provision of educational inputs in schools under investigation.
It was also found that strategies such as training teachers, providing more quality inputs, improving the life standards of teachers and head teachers, increasing inspection and supervision, and organizing competitive exams at the district level, among many others have been adopted by public secondary school managers to boost the quality of educational output.

5.3 Conclusions
In view of the objectives and research questions that were set, the discussion of the findings summarized in section 5.2, it is clear that some educational inputs are not adequately provided in public secondary schools located in Nyamasheke and Nyarugenge districts. Furthermore, the correlation coefficient indicated that some educational inputs do not significantly explain students’ academic performance in S6NE. In this regard, the following conclusions and generalizations were made:

5.3.1 Provision of educational inputs
Firstly, based on the findings that only 61.15% of teachers in public secondary schools under this study have a bachelor’s degree, 63.81% have done a course related to education, 56.05% have an experience of more than three years, it is logical to conclude and generalize that public secondary schools in Nyamasheke and Nyarugenge districts are moderately equipped in terms of educational inputs related to teacher characteristics.

Secondly, from the findings that only 61.9% of public secondary school under this study are endowed with science laboratories, only 57.1% have library,
57.14% have refectories 76.2% have computer room, 14.28% have access to internet connectivity, 85.71% have electricity, 80.95% have piped water and only 42.86% have a vehicle, it is ordered to come to the conclusion and generalization that public secondary schools in Nyamasheke and Nyarugenge districts are not sufficiently provided with educational inputs related to physical facilities.

Thirdly, the findings that student-desk ratio is above two students to one desk, student to computer ratio is 17 students to one computer, student classroom ratio is 38 students to 1 classroom, and the textbook to student ratio is 1 book for 4 student, serve the basis to draw a conclusion that teaching/learning resources are not sufficiently provided in public secondary schools in Nyamasheke and Nyarugenge districts.

Fourthly, based on the findings that slightly more than half (53.6%) of students in public secondary schools under this study come from parents whose literacy level is limited at most to reading and writing in their mother tongue, and 57.7% are children of farmers, 63.1% of students come from households endowed with electricity and that only 54.4% of students were classified in the first and second division in S3NE, there is a very good reason to conclude and generalize that most of students in public secondary schools in the two districts come to school with a humble and moderate family background. Therefore, the provision of exogenous inputs is moderate in public secondary schools in Nyamasheke and Nyarugenge districts.
5.3.2 Correlation between endogenous inputs and school mean performance

Firstly, based on the findings that student textbook ratio, student-classroom ratio, student qualified teacher ratio and student-computer ratio significant correlate with school mean performance and they can account for between 20 and 44% of variations in school performance, there is a very good reason to conclude and generalize that school mean performance in performance in S6NE in public secondary schools in Nyamasheke and Nyarugenge districts is highly dependent on the quality of these inputs.

Secondly, from the findings that teacher qualification, teacher professional training and teacher experience highly correlate with school mean performance in S6NE and can explain between 41 and 63% of the variations in school mean performance, it is logical to draw conclusion and generalization that teacher school mean performance in S6NE in the two depends on the quality of teachers.

Thirdly, relying on the findings that availability of laboratories, library, and staffroom, in schools under this study highly correlates with school mean performance in S6NE and they can account for between 14 and 72% of the variations in school mean performance, it should be concluded and generalized school mean performance in S6NE in the two districts depends on the provision or improvement of those key facilities.
5.3.3 **Correlation between exogenous inputs and students’ performance**
Basing on the findings that parental education level, parental occupation, parental literacy level, students’ boarding status, family size, and students’ prior performance correlate with students’ performance in S6NE and they can account for between 9.7% and 57.3% of the variations in the student’s performance in S6NE, it is ordered to conclude and generalize that students’ performance in public secondary schools in the two districts depends on the quality of exogenous inputs.

5.3.4 **Correlation between financial inputs and school mean performance**
Based on the findings that expenditure on different categories of staff, expenditure on the provision of key educational inputs, the recurrent expenditure of a school, and the total school incomes highly correlate with the school mean performance in S6NE, and they can account for between 19% and 62% of variations in the school mean performance, there is a very good reason to conclude and generalize that school mean performance in the two districts highly depends on the quantity of the financial inputs.

5. 3.5 **Determinants of educational output**
From the findings that the key determinants of school mean performance in public secondary schools in Nyamasheke and Nyarugenge districts are teacher characteristics, student classroom ratio, student computer ratio, availability physical resources, recurrent expenditure, and school incomes, it is logical to conclude and generalize that school mean performance in the districts is a function of the provision, quality and quantity of these inputs.
Based on the findings that the key determinants of students performance in public secondary schools in the two districts are students’ boarding status, family size, parental education level, parental employment status, and the students’ prior performance, they is very reason to conclude and generalize that students’ mean performance in S6NE is function of the quality or quantity of these inputs.

5.3.6 Strategies adopted by DEOs to enhance quality of education
From the findings that partnership with private sector, involving community in construction of classroom through community work, sourcing from different donors as strategies to increase educational inputs provision, it is logical to conclude and generalize that if well implemented these strategies are good enough to ensure adequate provision of the educational inputs in public secondary schools in Nyamasheke and Nyarugenge districts.

From the findings that accelerating teacher professional training, improving life standards of teachers, providing more instructional materials, strengthening inspection and school supervision, among many others as the strategies adopted by DEOs to boost the quality of education, there is a very good reason to conclude and generalize that if well implemented, these strategies are effective to enhance the quality of educational output in public secondary schools in Nyamasheke and Nyarugenge districts.

5.4 Recommendations
From the findings of this study and the conclusions made, the following recommendations were made:
5.4.1 Policy Recommendations

Since it has been found that various educational inputs significantly affect educational output, the following recommendations were made to different policy makers:

i) The government and other stakeholders should therefore put more efforts in provision of endogenous inputs such as the professional training of teachers, textbooks, computers, classrooms, libraries, and laboratories to make sure that students’ performance is improved.

ii) School management should devise means to engage the private sector such surrounding factories, businessmen and the community in financing education at school level.

iii) Since socio-economic background of parents affects students’ performance, the government through the Ministry of local governance should improve the wellbeing of parents in order to improve students’ performance in S6NE.

iv) The government through Rwanda Education Board should make sure that quality education is provided from pre-primary school to lower secondary school in order to improve student’s performance in S6NE.

v) The government and other stakeholders should invest more in education to make sure students’ performance is improved.

vi) District Education Officers as public schools managers, should come up with effective mechanisms to implement the strategies they have adopted to improve the quality of educational output.
5.4.2 Recommendations for further research

The findings of this study are not exhaustive to improve educational output in public secondary schools in Rwanda. Therefore, the following recommendations were made for further research.

i) This study focused on educational inputs and their implications for output in public secondary schools only. Since predictors of educational output may be different across levels of education. Similar studies should be carried out in primary, and even at university level to determine whether educational inputs have the same implications.

ii) Since this study focused on educational inputs and their implications for output in public secondary schools, a similar study should be carried out in private secondary schools to establish whether the same educational inputs have the same implications for output in private secondary schools.

iii) This study limited itself in Nyamasheke and Nyarugenge districts only. A nationwide study should be carried out to establish whether educational inputs have the same implications for output.

iv) A similar study should be carried out in many countries with different educational systems to establish whether educational inputs have the same implications for output in different countries.

v) A study to establish the relationship between effective utilization of educational inputs and educational output should be carried out.
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Appendix I: Head teachers questionnaire on educational inputs

Dear Respondent,

I am a student at Kenyatta University, School of Education, Department of Educational Management, Policy and Curriculum Studies. I am currently undertaking research on “Educational Inputs and their Implications for Output in Public Secondary Schools in Nyamasheke and Nyarugenge Districts, Rwanda” in fulfillment of the requirements for the degree of Doctor of Philosophy in educational planning. Your school has been selected to be part of this research. You are kindly requested to honestly complete all parts of this questionnaire by ticking or filling in the right box/space.

I would also like to assure you that your answers will be treated with strict confidentiality and at no time will your information be passed on to a third party, rather it will be used only for the purpose of this academic research.

For any clarification on any aspect of this questionnaire, do not hesitate to contact me on +250788459421 or +254729391348, email: ntaphilos@gmail.com. I appreciate your collaboration.

Philothere Ntawiha

Department of Educational Management, Policy and Curriculum Studies,

Kenyatta University
SECTION A: General Information on school

1. Type of the school: a) 12YBE
   Secondary school

   b) Boarding
   Day
   Both Boarding and day

   c) Girls’ school
   Mixed school

2. Location of your school: Rural
   Urban

SECTION B: Information on Staff and students

3. What is the number of your staff by gender?
   a) Teaching staff: Male:  
      Female: 
      **Sub-total:**
   
   b) Administrative staff: Male: 
      Female: 
      **Sub-total:**
   
   c) Support staff: Male: 
      Female: 
      **Sub-total:**

**GRAND TOTAL:**
4. What is the number of the teaching staff with the following qualifications in your school?
   a) S6 certificate  __________  
   b) Diploma  __________  
   c) Bachelor’s Degree  __________  
   d) Master’s Degree  __________  
   e) Any other, please mention  __________  

5. What is the number of teachers with the following types of degrees?
   a) Bed.  __________  
   b) BA with Education  __________  
   c) BSc. With education  __________  
   d) B.A.  __________  
   e) Bsc.  __________  
   f) Med.  __________  
   g) M.A, MSc. MBA, and others  __________  

6. What is the number of teachers whose teaching experience falls into the following ranges?
   a) 0-3 years  __________  
   b) 4-6  __________  
   c) 7-9  __________  
   d) 10-12  __________  
   e) 13 and above  __________  

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7. What is the number of teachers whose Weekly teaching load falls within the following ranges of hours?
   a) Less than 18 hours
   b) 18-22 hours
   c) 23-27 hours
   d) 28-32 hours
   e) 33 hours and above

8. What is the number of your student population according to their gender?
   a) Female:
   b) Male:
   Total:

9. What is the number of student population according to the year of study?
   Senior 1:
   Senior 2:
   Senior 3:
   Senior 4:
   Senior 5:
   Senior 6:
**SECTION C: Information on physical facilities and teaching/learning resources**

10. What of the following items are available and how many are they if available?

   **Note:** indicate the number only for quantifiable items.

<table>
<thead>
<tr>
<th>Item</th>
<th>Availability</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Desks</td>
<td>Yes □ No □</td>
<td>□ □ □</td>
</tr>
<tr>
<td>2. Tables for teachers</td>
<td>Yes □ No □</td>
<td>□ □ □</td>
</tr>
<tr>
<td>3. Chairs for teachers</td>
<td>Yes □ No □</td>
<td>□ □ □</td>
</tr>
<tr>
<td>4. Laboratory/laboratory Kits a) Chemistry</td>
<td>Yes □ No □</td>
<td>□ □ □</td>
</tr>
<tr>
<td>b) Physics</td>
<td>Yes □ No □</td>
<td>□ □ □</td>
</tr>
<tr>
<td>c) Biology</td>
<td>Yes □ No □</td>
<td>□ □ □</td>
</tr>
<tr>
<td>5. Library/Books a) Entrepreneurship</td>
<td>Yes □ No □</td>
<td>□ □ □</td>
</tr>
<tr>
<td>b) Economics</td>
<td>Yes □ No □</td>
<td>□ □ □</td>
</tr>
<tr>
<td>c) Computer science</td>
<td>Yes □ No □</td>
<td>□ □ □</td>
</tr>
<tr>
<td>d) English</td>
<td>Yes □ No □</td>
<td>□ □ □</td>
</tr>
<tr>
<td>e) French</td>
<td>Yes □ No □</td>
<td>□ □ □</td>
</tr>
<tr>
<td>f) Kinyarwanda</td>
<td>Yes □ No □</td>
<td>□ □ □</td>
</tr>
<tr>
<td>g) History</td>
<td>Yes □ No □</td>
<td>□ □ □</td>
</tr>
<tr>
<td>h) Mathematics</td>
<td>Yes □ No □</td>
<td>□ □ □</td>
</tr>
<tr>
<td>i) Physics</td>
<td>Yes □ No □</td>
<td>□ □ □</td>
</tr>
<tr>
<td>j) Biology</td>
<td>Yes □ No □</td>
<td>□ □ □</td>
</tr>
<tr>
<td>k) Chemistry</td>
<td>Yes □ No □</td>
<td>□ □ □</td>
</tr>
<tr>
<td>l) Religion</td>
<td>Yes □ No □</td>
<td>□ □ □</td>
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<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>6. Computer room</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>7. Computer connected to internet</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>8. Computers without connection</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>9. Classrooms</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>10. Staff room</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>11. Toilets</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>12. Dormitory</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>13. Refectory</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>14. Playgrounds a) Football</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>b) Basketball</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>c) Handball</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>d) Volleyball</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>e) Others</td>
<td>Yes</td>
</tr>
<tr>
<td>15. Electricity a) Hydro-power</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>b) Solar</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>c) Generator</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>d) Bio-gas</td>
<td>Yes</td>
</tr>
<tr>
<td>16. Water a) EWSA</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>b) Underground</td>
<td>Yes</td>
</tr>
<tr>
<td>17. Vehicle</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>
SECTION D: Information on the financial inputs

11. What is the source of your school’s financial resources and the amount from them in 2014?

<table>
<thead>
<tr>
<th>Source</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Government</td>
<td></td>
</tr>
<tr>
<td>Donations</td>
<td></td>
</tr>
<tr>
<td>User fees</td>
<td></td>
</tr>
<tr>
<td>Income generating projects</td>
<td></td>
</tr>
<tr>
<td>Parents’ contributions</td>
<td></td>
</tr>
</tbody>
</table>

12. What is the amount of money spent on each of the following items in 2014 school year?

<table>
<thead>
<tr>
<th>Item</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Teachers</td>
<td></td>
</tr>
<tr>
<td>b) Administrative staff</td>
<td></td>
</tr>
<tr>
<td>c) Support staff</td>
<td></td>
</tr>
<tr>
<td>d) Casual staff</td>
<td></td>
</tr>
<tr>
<td>e) Boarding (foods, beddings, etc)</td>
<td></td>
</tr>
<tr>
<td>f) Stationeries (chalks, ink, printing papers, pens, pencils, etc)</td>
<td></td>
</tr>
<tr>
<td>g) Textbooks, exercise books</td>
<td></td>
</tr>
<tr>
<td>h) Laboratory expenses</td>
<td></td>
</tr>
<tr>
<td>i) Transport expenses</td>
<td></td>
</tr>
<tr>
<td>j) Computer repair and maintenance</td>
<td></td>
</tr>
<tr>
<td>k) Games and other extracurricular activities</td>
<td></td>
</tr>
<tr>
<td>l) Maintenance of physical facilities</td>
<td></td>
</tr>
<tr>
<td>m) Water and energy bill (electricity, firewood)</td>
<td></td>
</tr>
</tbody>
</table>
n) Fuel and maintenance of the vehicle

o) Communication bill

p) Any other not mentioned

GRAND TOTAL:
Appendix II: Student Questionnaire on educational inputs

Dear Respondent,

I am a student at Kenyatta University, School of Education, Department of Educational Management, Policy and Curriculum Studies. I am currently undertaking research on “Educational Inputs and their Implications for Output in Public Secondary Schools in Nyamasheke and Nyarugenge Districts, Rwanda” in fulfillment of the requirements for the degree of Doctor of Philosophy in educational planning. You have been selected to be part of this research. You are kindly requested to honestly complete all parts of this questionnaire by ticking or filling in the right box/space.

I would also like to assure you that your answers will be treated with strict confidentiality and at no time will your information be passed on to a third party, rather it will be used only for the purpose of this academic research.

For any clarification on any aspect of this questionnaire, do not hesitate to contact me on +250788459421 or +254729391348, email: ntaphilos@gmail.com. I appreciate your collaboration.

Philothere Ntawiha

Department of Educational Management, Policy and Curriculum Studies,

Kenyatta University
SECTION A: General information on student and school

1. Sex: Male: [ ] female: [ ]

2. Location of the school: Rural: [ ] Urban: [ ]

3. Type of the school: a) 12YBE [ ]
   Secondary school [ ]
   b) Boarding [ ]
   Day [ ]
   Both Boarding and day [ ]
   c) Girls’ school [ ]
   Mixed school [ ]

4. Are a boarding student?
   Yes [ ] No [ ]

   If you are a day student, what distance do you walk from your home to school?
   a) 1-2 Km (1-24 minutes) [ ]
   b) 3-4 Km (25-48 minutes) [ ]
   c) 5-6 Km (49-1h10 minutes) [ ]
   d) 7-above (more than 1:10 minutes) [ ]

SECTION B: Information on family Background

5. What is your parenthood status?
   Total Orphan [ ]
   Only mother is alive [ ]
   Only Father is alive [ ]
   Both parents are alive [ ]

6. What is the number of children in your family? [ ]
7. What is the literacy level of your parents/guardians?
   a) None of my parents can or could read & write in Kinyarwanda
   b) Both could read and write in Kinyarwanda
   c) One of them can or could read and write in Kinyarwanda
   d) None of my parents can read and write in French or English
   e) Both my parents can or could read and write in French or English
   f) One of them can or could read and write in French or English

8. What is the highest level of education reached your parents/guardians?
   a) Never went to school
   b) Went to primary school but never completed
   c) Completed primary school
   d) Went to secondary school but never completed
   e) Has a S6 certificate
   f) Never completed University or has Diploma
   g) Has Bachelor’s degree
   h) Did a postgraduate course (Master/DEA, PhD)

9. What is the occupation of your parents/guardians?
   a) Farming
   b) Business
   c) Teaching
   d) Fishing
   e) Others:
10. What type of energy used in your parents/guardians’ house for lighting?
   a) Electricity [ ]
   b) Solar panel [ ]
   c) Biogas [ ]
   d) Kerosene [ ]
   e) Any other source of energy, please indicate: [ ]

SECTION C: Information on student’s prior performance

11. What was your performance class in Tronc commun exam results?
   Division I: [ ]
   Division II: [ ]
   Division III: [ ]
   Division IV: [ ]
   Division v: [ ]

12. What was your performance mark in the following subject? E.g. 1,2,3,4,5,6,7,8,9
   a) Math [ ]
   b) English [ ]
   c) Kinyarwanda [ ]
   d) Biology [ ]
   e) Chemistry [ ]
   f) Physics [ ]
   g) Geography [ ]
   h) History [ ]
Appendix III: Interview with District Education Officers

How do you judge the quality of educational inputs and output in schools located in your district?

As the DEO, do you see any relationship between educational inputs (resources) provided in schools and the students performance? Describe that relationship.

Describe how you intend to increase the provision of different educational inputs in schools located in your district and how you ensure good utilization and maintenance of the existing ones?

As the DEO, what strategies did you or you intend to put in place to improve students’ performance in schools located in your district?

Thank you very much.
Appendix IV : Translated instruments
Questionnaire pour les directeurs des Ecoles Secondaires

SECTION A : Information générale sur l’école

1. Type de l’école a) Enseignement de base de 12 ans

   - Ecole secondaire

   b) Internat

   - Externat

   - Internat&externat

   c) Ecole des filles

   - Ecole Mixte

2. Emplacement de l’école : Rural

   - Urbain

SECTION B : Information sur le personnel et étudiants

3. Quel est l’effectif de votre personnel par genre?

   a) Le personnel enseignant : Masculin

      - Féminin

      - Total :

   b) Personnel de bureau : Masculin

      - Féminin

      - Total

   c) Le Personnel d’appui : Masculin

      - Féminin

      - Total

   Grand Total :

217
4. Quel est l’effectif du personnel ayant les qualifications suivantes ?
   a) A2 ________
   b) Baccalauréat/Graduat ________
   c) Licence ________
   d) Maitrise ________
   e) Autres non-mentionnés ________

5. Quel est l’effectif du personnel ayant les catégories de diplômes suivants ?
   a) License en éducation ________
   b) License en Lettres/Sciences humaines avec éducation ________
   b) License en sciences avec éducation ________
   c) License en lettres/Sciences humaines ________
   d) License en sciences ________
   e) Maitrise en éducation ________
   f) Maitrise en lettres, sciences, Administration des Affaires, etc. ________

6. Quel est l’effectif du personnel enseignant dont l’expérience professionnelle tombe dans les catégories suivantes ?
   a) 0-3 ans ________
   b) 4-6 ans ________
   c) 7-9 ans ________
   d) 10-12 ans ________
   e) 13 et plus ________

7. Quel est l’effectif du personnel enseignant dont la charge horaire tombe dans les catégories suivantes
   a) Moins de 18 heures
   b) 18-22 heures ________
c) 23-27 heures  ________
d) 28-32 heures  ________
e) 33 et plus  ________

8. Quel est le nombre de votre population estudiantine par genre ?
Féminin  ________
Masculin  ________
Total  ________

9. Quel est le nombre de la population estudiantine par année d’étude ?
a) Première année  ________
b) Deuxième année  ________
c) Troisième année  ________
d) Quatrième année  ________
e) Cinquième année  ________
f) Sixième année  ________

SECTION C : INFORMATION SUR LES INFRASTRUCTURES ET MATERIELS DIDACTIQUES

10. Parmi les éléments suivants, Quel sont dans votre école et combien sont-ils ?

N.B. Indiquez le nombre pour les articles quantifiables seulement

<table>
<thead>
<tr>
<th>Article</th>
<th>Disponibilité</th>
<th>Quantité</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Pupitres</td>
<td>Oui [ ]</td>
<td>Non [ ]</td>
</tr>
<tr>
<td>2. Tables des enseignants</td>
<td>Oui [ ]</td>
<td>Non [ ]</td>
</tr>
<tr>
<td>3. Chaises des enseignants</td>
<td>Oui [ ]</td>
<td>Non [ ]</td>
</tr>
<tr>
<td>4. Laboratoire/Matériels de Labo a) Chimie</td>
<td>Oui [ ]</td>
<td>Non [ ]</td>
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<td></td>
<td></td>
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</tbody>
</table>

b) Physique  Oui [ ]  Non [ ]  ________
<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>c) Biologie</td>
<td>Oui</td>
<td>Non</td>
</tr>
<tr>
<td>5. Bibliothèque/livres a) Entreprenariat</td>
<td>Oui</td>
<td>Non</td>
</tr>
<tr>
<td>b) Économie</td>
<td>Oui</td>
<td>Non</td>
</tr>
<tr>
<td>c) Informatique</td>
<td>Oui</td>
<td>Non</td>
</tr>
<tr>
<td>d) Anglais</td>
<td>Oui</td>
<td>Non</td>
</tr>
<tr>
<td>e) Français</td>
<td>Oui</td>
<td>Non</td>
</tr>
<tr>
<td>f) Kinyarwanda</td>
<td>Oui</td>
<td>Non</td>
</tr>
<tr>
<td>g) Histoire</td>
<td>Oui</td>
<td>Non</td>
</tr>
<tr>
<td>h) Mathématique</td>
<td>Oui</td>
<td>Non</td>
</tr>
<tr>
<td>i) Physique</td>
<td>Oui</td>
<td>Non</td>
</tr>
<tr>
<td>j) Biologie</td>
<td>Oui</td>
<td>Non</td>
</tr>
<tr>
<td>k) Chimie</td>
<td>Oui</td>
<td>Non</td>
</tr>
<tr>
<td>l) Religion</td>
<td>Oui</td>
<td>Non</td>
</tr>
<tr>
<td>6. Salle d’informatique</td>
<td>Oui</td>
<td>Non</td>
</tr>
<tr>
<td>7. Ordinateurs connectés à internet</td>
<td>Oui</td>
<td>Non</td>
</tr>
<tr>
<td>8. Ordinateurs sans connexion</td>
<td>Oui</td>
<td>Non</td>
</tr>
<tr>
<td>9. Salle de classes</td>
<td>Oui</td>
<td>Non</td>
</tr>
<tr>
<td>10. Salle de professeurs</td>
<td>Oui</td>
<td>Non</td>
</tr>
<tr>
<td>11. Toilettes</td>
<td>Oui</td>
<td>Non</td>
</tr>
<tr>
<td>12. Dortoir</td>
<td>Oui</td>
<td>Non</td>
</tr>
<tr>
<td>13. Réfectoire</td>
<td>Oui</td>
<td>Non</td>
</tr>
<tr>
<td>14. Terrains a) Football</td>
<td>Oui</td>
<td>Non</td>
</tr>
<tr>
<td>b) Basketball</td>
<td>Oui</td>
<td>Non</td>
</tr>
<tr>
<td>c) Handball</td>
<td>Oui</td>
<td>Non</td>
</tr>
</tbody>
</table>
d) Volleyball  
Oui ☐ Non ☐ ———

e) Autres  
Oui ☐ Non ☐ ———

15. Electricité  
a) Hydro-électricité  
Oui ☐ Non ☐ ———

b) Energie solaire  
Oui ☐ Non ☐ ———

c) Générateur  
Oui ☐ Non ☐ ———

d) Bio-Gaz  
Oui ☐ Non ☐ ———

16. Eau  
a) EWSA  
Oui ☐ Non ☐ ———

b) Sous-terrain  
Oui ☐ Non ☐ ———

17. Véhicule  
Oui ☐ Non ☐ ———

SECTION D : INFORMATION SUR RESSOURCES FINANCIERES

11. Quelle est la source de ressources financières de votre école et le montant en provenance de ces sources ?

<table>
<thead>
<tr>
<th>Source</th>
<th>Montant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gouvernement</td>
<td>———</td>
</tr>
<tr>
<td>Dons</td>
<td>———</td>
</tr>
<tr>
<td>Minerval</td>
<td>———</td>
</tr>
<tr>
<td>Projets générateurs de revenus</td>
<td>———</td>
</tr>
<tr>
<td>Contributions des parents</td>
<td>———</td>
</tr>
</tbody>
</table>

12. Quel est le montant d’argent consacré pour les articles suivants au cours de l’année scolaire 2014 ?

<table>
<thead>
<tr>
<th>Article</th>
<th>Montant</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Professeurs</td>
<td>———</td>
</tr>
<tr>
<td>b) Personnel de bureau</td>
<td>———</td>
</tr>
<tr>
<td>c) Personnel d’appui</td>
<td>———</td>
</tr>
<tr>
<td>d) Personnel journalier/temporaire</td>
<td>———</td>
</tr>
</tbody>
</table>
e) Internat (Repas, matériel de couchage, etc)  

f) Fournitures de bureau  

g) Manuels scolaires/livres  

h) Frais de laboratoire  

i) Frais de transport  

j) Frais de maintenance et réparation d’ordinateurs  

k) Jeux et autres activités extrascolaires  

l) Maintenance des infrastructures  

m) Facture de l’eau et énergie (électricité, bois de chauffage, etc)  

n) Facture du Carburant et maintenance du véhicule  

o) Frais de communication  

p) Autres non-mentionnés  

**GRAND TOTAL :**
QUESTIONNAIRE POUR LES ÉLÈVES

SECTION A: INFORMATION SUR L’ÉLÈVE ET L’ÉCOLE

1. Sexe: Masculin   [ ]   Féminin   [ ]
2. Emplacement de l’école: Rural   [ ]   Urbain   [ ]
3. Type de l’école:
   a) Enseignement de base de 12 ans   [ ]
   b) École secondaire   [ ]
   c) Internat   [ ]
   d) Externat   [ ]
   e) Internat & externat   [ ]
   f) Ecole des filles   [ ]
   g) Ecole Mixte   [ ]
4. Es-tu interne?
   Oui   [ ]   Non   [ ]
      Si non, quelle est la distance entre l’école et votre résidence (marche à pieds)?
   a) 1-2 Kms (1-24 minutes)   [ ]
   b) 3-4 Kms (25-48 minutes)   [ ]
   c) 5-6 Kms (49-1h10 minutes)   [ ]
   d) 7 Kms et plus (plus de 1h10 minutes)   [ ]

SECTION B: INFORMATION SUR LA SITUATION FAMILIALE

5. Quel est votre situation parentale?
   Orphelin total   [ ]
   Orphelin du père   [ ]
   Orphelin de mère   [ ]
   Tous les deux parents sont vivants   [ ]
6. Quel est le nombre d’enfants dans votre famille ? ________

7. Quelle est la capacité de lire et d’écrire de vos parents/tuteurs ?
   a) Nul ne peut ou pouvait lire et écrire en Kinyarwanda
   b) Tous les deux peuvent ou pouvaient lire et écrire en Kinyarwanda
   c) L’un d’eux peut ou pouvait lire et écrire en Kinyarwanda
   d) Aucun ne peut ou pouvait lire et écrire en français ou anglais
   e) Tous les deux peuvent ou pouvaient lire et écrire en français ou anglais
   f) L’un d’eux est ou était capable de lire et écrire en français ou anglais

8. Quel est le plus haut niveau d’étude qu’a atteint vos parents/tuteurs ?

   Père                      Mère
   a) N’a jamais fréquenté l’école
   b) N’a pas terminé l’école primaire
   c) A terminé l’école primaire
   d) N’a pas terminé les études secondaires
   e) Détient d’un diplôme des humanités
   f) Bachelor ou n’a pas terminé l’université
   g) Détient d’un diplôme de licence
   h) A fait les études de troisième cycle (Maitrise, Doctorat, etc)

9. Quelle est la profession de vos parents/tuteurs
   a) Agriculture
   b) Homme d’affaires
   c) Enseignement
   d) Pêche
   e) Fonction publique/privée
   f) Autres
10. Quel est le type d’énergie utilisée dans votre famille pour éclairage ?

a) Electricité  

b) Panneau solaire  

c) Biogaz  

d) Pétrole  

e) Autres source d’énergie, indiquez, SVP………

SECTION C : INFORMATION SUR LA PERFORMANCE PRECEDENTE DES ELEVES

11. Quelle a été votre division des résultats de votre examen de tronc commun ?

1ère division :  

2ème division :  

3ème division :  

4ème division :  

5ème division :  

6ème division :  

12. Quelle a été votre grade dans chacun des examens suivants ? Par exemple, 1,2,3,4,5,6,7,8,9.

a) Math  
b) Anglais  
c) Kinyarwanda  
d) Biologie  
e) Chimie  
f) Physique  
g) Geographie  
h) Histoire  

PROTOCOLE D'INTERVIEW AVEC LE DIRECTEUR DE L'EDUCATION AU DISTRICT

1. Comment jugez-vous la qualité des entrants éducatifs ainsi celle des extrants dans les écoles secondaires se trouvant dans votre district ?

……………………………………………………………………………………
……………………………………………………………………………………
……………………………………………………………………………………
……………………………………………………………………………………

2. En tant que Directeur de l'Education, quel rapport établissez-vous entre les intrants éducatifs et la performance des élèves ? Décrivez cette relation………………………………………………………………………………

……………………………………………………………………………………
……………………………………………………………………………………
……………………………………………………………………………………
……………………………………………………………………………………

3. Décrivez votre intention d'augmenter l'approvisionnement des intrants éducatifs dans les écoles sous votre responsabilité et comment assurez-vous la bonne gestion/utilisation et maintenance de ceux qui sont là……………………………………………………………………………………

……………………………………………………………………………………
……………………………………………………………………………………
……………………………………………………………………………………
……………………………………………………………………………………

4. En tant que directeur de l'éducation, quelles stratégies avez-vous adopté ou avez-vous l'intention d'utiliser pour améliorer la performance des écoles se trouvant dans votre district ?…………………………………….

……………………………………………………………………………………
……………………………………………………………………………………
……………………………………………………………………………………
……………………………………………………………………………………

Merci beaucoup.
Appendix V: The informed consent for respondents

My name is Ntawiha Philothère, a PhD Student at Kenyatta University, School of Education, Department of Educational Management, Policy and Curriculum Studies. I am conducting a study on “Educational Inputs and their Implications for Output in Public Secondary Schools in Nyamasheke and Nyarugenge Districts, Rwanda” The findings will be used by different stakeholders in education to Improve the quality of education system in Rwanda.

Participation in this study will require that you answer questions from the questionnaire or during interview and the information you will give will be strictly kept confidential by the researcher and will only be used for the purpose of this study. Therefore, for the sake of anonymity, don’t write your name on the questionnaire.

Please remember that participation in the study is voluntary and you have the right to refuse participation in this study. You may refuse to answer questions that you will find embarrassing. You may also stop being in the study at any time without any consequences in future. You may ask any questions related to the study at any time.

If you participate in this study you will help us and the country to improve educational output in public secondary schools.

If you have any questions you may contact me on +250788459421/+254729391348 or my supervisors: Dr. Mary A. Otieno on +254722756657, Dr. Levi I. Libese on +254721109963, and Prof. Wenceslas Nzabalirwa from University of Rwanda on +250788428454.
**Participant’s Statement**

The above information regarding my participation in the study is clear to me. I have been given a chance to ask questions and my questions have been answered to my satisfaction. My participation in this study is entirely voluntary. I understand that my records will be kept confidential and that I can leave the study at any time. I understand that my decision to leave or to stay will not affect my job.

Name of participant: ________________________________

___________________________________________
Signature or thumb print                      Date

**Researcher’s statement**

I, the undersigned, have explained to the volunteer in a language s/he understands the procedures to be followed in the study and the risks and benefits involved.

Name of the researcher: Ntawiha Philothère

___________________________________________
Researcher’s signature                      Date
Appendix VI: Research authorization letter from KU graduate school

KENYATTA UNIVERSITY
GRADUATE SCHOOL

E-mail: dean-graduate@ku.ac.ke
Website: www.ku.ac.ke

P.O. Box 43844, 00100
NAIROBI, KENYA
Tel: 87710901 Ext. 37530

Our Ref: E83/CTY/26901/2011

DATE: 8th October 2014

The Principal Secretary,
Higher Education, Science & Technology,
P.O. Box 30040,
NAIROBI

Dear Sir/Madam,

RE: RESEARCH AUTHORIZATION PHILO THERE NTAWIHA—REG. NO.
E83/CTY/26901/2011

I write to introduce Mr. Philothere Ntawih a who is a Postgraduate Student of this University. He is registered for Ph.D degree programme in the Department of Educational Management, Policy & Curriculum Studies.

Mr. Ntawih intends to conduct research for a Ph.D Proposal entitled, “Educational Inputs and their Implications for Output in Public Secondary Schools in Nyarugenge and Nyamasheke Districts Rwanda”.

Any assistance given will be highly appreciated.

Yours faithfully,

MRS. LUCY N. MBAABU
FOR: DEAN, GRADUATE SCHOOL
Appendix VII: Research Permit

REPUBLIC OF RWANDA

MINISTRY OF EDUCATION
P.O. BOX 622 KIGALI

Re: Permission to carry out research in Rwanda - No: MINEDUC/SRT/257/2014

The Permission is hereby granted to Mr. Philibere NTAWIHA, PhD student in Educational Planning, Kenyatta University, Nairobi, Kenya, to carry out research on: “Educational inputs and their implications for output in Public Secondary Schools in Nyamasheke and Nyarugenge Districts, Rwanda”.

The research will be carried out in all sectors of Nyamasheke and Nyarugenge Districts. The researcher will interview the sample of District Education Officers, Head teachers and Students, and Planning Unit in the Ministry of Education.

The period of research is from 15th September 2014 to 17th September 2015. It may be renewed if necessary, in which case a new permission will be sought by the researcher.

Please allow the above mentioned researcher, any help and support he might require to conduct this research.

Yours sincerely,

Marie-Christine GASINGIRWA (PhD)
Director General,
Science, Technology and Research
Ministry of Education
Appendix VIII: Nyarugenge District's permission to conduct research

**REPUBLICA Y'U RWANDA**

**UNDWI WA KIGALI**

**AKARERE NA NYARUGENGE**

**Buzima NTAWIBA Philippe**

C/O University of Rwanda College of Education

**IMPAMYU:** Kwenerega gukora ubusakashata

Buwati.

Ndireguye ku ibarura y'ye 12/09/2014, wandlese rutara gukora ubusakashata mu muhuri y'Imbuti ko mu Kigali ku Nyarugenge.

Nguraye ku kubandikira ngira ngo kumugyanye ku wusukwa gukora ubusakashata kiriri "Educational Inputs and their Implications for Output" midibere by'amukora y'umugyanye Riherere mu Kigali ku Nyarugenge ibikiza wabonkurye mu ibarura y'ye.

Ugicirwa umugyanye.

**KALISA Pierre**

Umugyanye w'Akare akangiranye mu Kigali ku Nyarugenge mu Kigali y'Akare y'ubukuru

**Bukaresarewe**

Umugyanye w/Liho cy'Izabaga cy'Ubarazi (BUH)

**ILP 1092 Kigali E-mail nyarugenge@minedu.gov.rw Wabe: www.nyarugenge.gov.rw**
Appendix IX: Nyamasheke District’s permission to conduct research

REPUBLIKA Y’U RWANDA

INTARA Y’IBURENGERA ZUBA
AKARERE KA NYAMASHEKE
Tel. +250785419140/0785899619
Email : nyamashkeledistrikt@minako.gov.rw
nyamashkeledistrikt@yahoo.fr
Website : www.nyamashke.gov.rw
B.P : 72 NYAMASHEKE

Nyamashke, kawa...
25 SEP 2014

NW....Sec. Ex/2014

Bwana NTAWILA Philotheire

Impamvu: Ibarura yawe yo kuba 22/09/2014

Bwana,

Nahingiye ku ibarura yawe yo kuba 22/09/2014 wanda mu ushubi gikorera ubushakasabati mu bigo by’umashinde bye mu Karere ku Nyamashke mu rwego rwe gikora these ya doctorat, ndakumunyonsa ko ubu busshakasabati abovumerye;

Ugire amahoro.

HABIYAREMYE Pierre Célestin
Umunyamahanga Nshingwahikwa
Nyamashke

Bimenyeshejiya:
- Bwana Umugwobirinda w’Akare re
- Madiyana, Bwana Umugwobirinda w’Akare re w’Hirwiga (Boze)
- Bwana Umurindi w’Akare re ubuhere Uburezi
- Madiyana, Bwana Umunyamahanga Nshingwahikwa w’Umurege (Boze)
NYAMASHEKE
**Appendix X: Work plan**

<table>
<thead>
<tr>
<th>Activity</th>
<th>Time duration in months</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>December-June</td>
</tr>
<tr>
<td>Proposal writing</td>
<td></td>
</tr>
<tr>
<td>Submission and defense of proposal at the department +corrections</td>
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</tr>
<tr>
<td>Pilot study</td>
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</tr>
<tr>
<td>Data collection</td>
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</tr>
<tr>
<td>Data analysis report writing, thesis submission &amp; defense</td>
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</tr>
</tbody>
</table>
Appendix XI: Budget

<table>
<thead>
<tr>
<th>Item</th>
<th>Unit cost</th>
<th>Number of items</th>
<th>Total Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Printing papers</td>
<td>500</td>
<td>6</td>
<td>3,000</td>
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<tr>
<td>Toner</td>
<td>8,000</td>
<td>2</td>
<td>16,000</td>
</tr>
<tr>
<td>Tape recorder</td>
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<td>1</td>
<td>5,000</td>
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<tr>
<td>Typing</td>
<td>10,000</td>
<td></td>
<td>10,000</td>
</tr>
<tr>
<td>Binding</td>
<td></td>
<td></td>
<td>6,000</td>
</tr>
<tr>
<td>Transport expenses</td>
<td></td>
<td></td>
<td>30,000</td>
</tr>
<tr>
<td>Other stationeries</td>
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<td></td>
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</tr>
<tr>
<td>Printer</td>
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<td>25,000</td>
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<tr>
<td>Communication</td>
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<td></td>
<td>10000</td>
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<tr>
<td>Internet services</td>
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<td></td>
<td>5000</td>
</tr>
<tr>
<td><strong>Total amount</strong></td>
<td></td>
<td></td>
<td><strong>123,000</strong></td>
</tr>
</tbody>
</table>
Appendix XII: The map of Rwanda