

## Determinants of Students' Performance in Selected Public Secondary Schools in Rwanda

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### Abstract

*The purpose of this study was to examine key determinants of students' performance in selected public secondary schools in Rwanda. Specifically, it described background status and the determinants of students' performance. The study was premised on the theory of Education Production Function and correlational design was used. While the target population was 2248 students, 241 students were sampled through simple random and stratified sampling techniques. Data were gathered through questionnaire and document review guide and they were analysed using frequencies, percentages and regression analysis. Findings were presented in tables. The study revealed that 50.2% of students are day students, 30.3% orphans, 67.62% come from large families, 68.7% from less educated parents and 57.7% are from unemployed households. The study found that the determinants of students' performance in selected public secondary schools in Rwanda include boarding status, family size, parental educational level, employment status, and students' prior performance. The study recommended to improve parental background in order to increase the performance of their children.*

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**Key words:** *Determinant, performance, students' background, Rwanda*

### Background Information

Education is widely believed to be a fundamental sector for any nation to develop economically, politically, and socially. To this end, Maichibi (2005) emphasizes that education contributes to the development of the country in that it increases productivity of workers, reduces criminal activities, reduces mortality rates, and controls birth rates. Likewise, education is the key powerful instrument that can be used to reduce inequality, poverty and as a basis to sustain economic growth (Barbara, Alain and Ramahatra, 2003). Emphasizing the importance of education in improving the country's wealth, UNESCO (2014) state that education greatly contributes to poverty reduction, increases new job opportunities, and accelerates the country's economic growth and sustainable development. This has been voiced by Woodhall (2004) who points out that as other forms of investment, education is an investment in human capital which generates financial returns. She emphasizes that by increasing the productivity of people, education raises the country's economic growth.

Due to the benefits that accrue from investment in education, UNESCO (2014) recommends countries to invest heavily in education. It is in this regard that UNESCO recommends that at least 20% of the total government expenditures and at least 6% of the country's GNP should be allocated to education. This is because lack of enough funds to provide various resources to the education sector is the major challenge facing quality of education. In the same vein, in order to have better student's outcomes in any education system, sufficient funds should be availed to supply direct resources to schools (World Bank, MINEDUC & UNESCO-BREDA, 2011). To this end, Hanushek

(2007) states that in education production function process, output quality depends on the amount and quality of inputs as well how effectively they are utilized in an education system. Here, inputs refer to resources such as students and teachers' characteristics, instructional resources, school physical facilities, and financial resources, among others and output refers to both school and students' academic performance. However, according to ICAI report (2012) and UNICEF (2013) the quality of education in Rwanda is worsening because most of students perform poorly in both national and international examinations. For instance, while the target was that at least 90% and 95% of students who sit for Senior Six National Exams (S6NE) should at least have the pass mark in 2012 and 2014 respectively, only 88.2% passed in 2013 (Mineduc, 2014). In view of this, there is need to carefully analyse students' background as a key exogenous input public secondary schools in Rwanda with the purpose of finding the degree to which students' background status determines their performance as one of the measures of educational output.

### **Statement of the problem**

In the education production function process, the quality of educational output is a result of the magnitude and quality of educational inputs as well as how they are utilized in the technical process they go through. Therefore, students' performance as one of the indicators of educational output depends on the quality of inputs and how they are utilized in education system. However, reports have revealed that students in Rwanda are not performing as well as they might in both national and international examinations (ICAI, 2012; UNICEF, 2013; MINEDUC, 2013). Would this performance be the result of the students' background factors or other factors that are not related to their background? This study has therefore sought to analyse students' background status in selected public schools in Rwanda in order to find out whether the students background status determines their performance. The ability to establish the key determinants of students' performance will enable policy makers to know which inputs to put more focus on to improve students' performance in Rwandan public secondary schools.

### **Purpose and Objectives**

This study aimed at establishing among student background factors, the key determinants of students' performance within selected Rwandan public secondary schools. Specifically, it sought:

1. To describe the students' background status in selected Rwandan public secondary schools.
2. To find out whether students' background status determines student's performance in selected public secondary schools in Rwanda.

### **Review of the Related Literature**

Students' performance as one of the indicators of educational output has been the focus of many researchers. Several studies have been carried out to find out the key factors determining the performance of students. For instance, in the study conducted by Behaghel, Chaisemartin, and Gurgand (2015) to explore the effects of boarding

schools on disadvantaged learners in France, it was found that students' boarding status is a key determinant of their performance in both French and Mathematics whereby students boarding perform better than day students. In another study conducted to examine whether family background has an impact on students' academic performance, Onyeabo as cited in Nwachukwu (2002) found that the size of the family a student comes from determines his/her performance where students from large families do not perform better as their counterparts from small families. This may be because students from small families receive more parental care and learning materials than students from large families. Likewise, this finding corroborates the finding of the study carried out by Eamon (2005) to investigate how parenting influences academic achievement of Latino young adolescents. This study revealed that family size influences the academic achievement of early adolescents of Latinos in favour of those who come from small families. This has been voiced by Majoribanks (1996) who found that family size affects students' performance whereby those coming from small families perform better than their counterparts from large families.

In the study conducted by Hassan (2009) to explore the relationship between socio-economic standing of parents and the academic performance of their children, it was revealed that among the socio-economic factors, parental education level highly determines students' performance whereby students whose parents are highly educated perform better than their counterparts whose parents have less or no education. In the same study, Hassan also found that the employment status of parents is a key determinant of their offspring whereby the performance of students whose parents are employed in high positions was better than that of their colleagues whose parents are employed in lower positions or unemployed. However, this is in contradiction with the results of another study carried by Osuafor and Okonkwo (2003) to find out whether family background influences students' academic achievement in biology in secondary schools of Anambra State in Nigeria. The findings of this study revealed that parental employment status does not predict the performance of their offspring.

Finally, the findings of the research conducted by Reynolds (1991) revealed that another determinant of students' performance is their prior performance whereby students who performed better have greater chances to perform better in future than their counterparts who performed poorly. This finding was later voiced by Aubrey, Dahl and Godfrey (2006) who assert that students' prior performance in mathematics determines their future performance in mathematics subject.

The views from existing literature indicate that students' background characteristics influence their performance in one way or another. The research findings revealed that family size, students' prior performance, parental employment, parental educational level, and boarding status among others have determine or not students' performance.

### **Theoretical framework**

This study was guided by Education Production Function Theory (EPFT). In education production function, the quality and amount of output produced depends on the magnitude and quality of inputs and how they are combined in the

technical process (Hanushek, 1979). Production function is therefore a theoretical construct that permits to express mathematically the relationship between the maximum production of output and different inputs and how they are utilized in the production process (Pritchett and Filmer, 1997). To this end, the production function of any firm can therefore be expressed as:  $Q=f(X_1, X_2, X_3, \dots, X_n)$  Whereby **Q** means the quantity of output and  $X_1, X_2, X_3, \dots, X_n$  refer to the amount of factor inputs (e.g. the labor, land, capital and raw materials of the firm). To this end, the education production function for this study of determinants of students' performance can be expressed in a regression model as:  $SP= a+ \beta_1BS+ \beta_2PS+ \beta_3FS+ \beta_4PEL+ \beta_5PES+ \beta_6SPP$ .

Where: SP= Student Performance      a= Constant (Coefficient of intercept)

BS= Boarding status; PS=Parental living status; FS=Family size; PEL=Parental education level, PES=Parental employment status, SPP= Student's prior performance.

$\beta_1 \dots \beta_6$ : Regression coefficient of each student characteristic expressed above

### **Research Methodology**

This study adopted a quantitative approach and was guided by a correlational research design to describe whether and to what extent a relationship exists between dependent and independent variables (Amin, 2005). The target population involved 2248 students in 21 secondary schools selected from 70 urban and rural schools. Using Yamane's formula for sample size determination (Israel, 2008), 241 students were determined as the sample size. To select individual students, they were first stratified according to their gender and subject combinations and then from each stratum simple random sampling was applied. Students' questionnaire made of close-ended questions and document review schedule were used to gather relevant data. To check the content validity and reliability of the research instruments, expert judgment and test-retest methods were employed respectively. The students' background status was described using percentages and frequencies and regression analysis was performed to determine the key determinants of students' performance. The findings were presented in tables.

### **Findings and Discussion**

#### **Students' background status in selected secondary schools in Rwanda**

The first objective was to describe students' background status in selected public schools. This section presents the findings on this objective.

##### **a) Students' boarding status**

Table 1 below indicates that 50.2% of students in selected public secondary schools were day students while 49.8% were boarding. This may be due to the establishment of free secondary school education which is in line with the government policy of prioritizing day schools to reduce the government budget spent on education. This may have

impact on the performance of day students. This is supported by the findings of Behaghel, Chasemartin, and Gurgand (2015) who conducted a study to explore how students' boarding status affects the performance of disadvantaged learners. Their study found that there is a significant difference in the performance of boarding students and that of day students in favour of boarding students. These findings emphasize the importance of boarding schools.

**Table 1: Proportion of students by boarding status**

	Frequency	Percentage
Day students	121	50.2%
Boarding students	120	49.8%
<b>Total</b>	<b>241</b>	<b>100%</b>

#### b) Parental living status

Table 2 presents the findings on students' parental living status.

**Table 2: Proportion of students by parental living status**

	Frequency	Percentage
Total orphans	11	4.6%
Paternal orphan/ only mother is alive	50	20.7%
Maternal orphan/ only father is alive	12	5%
Both parents are alive	168	69.7%
<b>Total</b>	<b>241</b>	<b>100%</b>

Table 2 shows that 168 out of 241 students (69.7%) in selected secondary schools have both parents (mother and father), only 4.6% are total orphans, 5% have only the father, and 20.7% have only the mother. Students with both parents are likely to perform better than their counterparts who are orphans. This is because the former are likely to receive more financial, moral and material support than the latter. It is to be noted that in their study to find out what factors explaining differences in student performance at the internal level, Fuchs and Wößmann (2004) found that parenthood status influences student performance in favour of two-parented students. This is may be because single-parent students receive little care and encouragement from their parents due to absence of mutual supports between a wife and husband (Majoribanks, 1996).

#### c) Family size

Table 3 presents the proportion of students by family size in selected public secondary schools.

**Table 3: Proportion of students by family size**

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

Table 3 indicates that 7.47% of students in selected public secondary schools come from families with one or two children, 24.9% come from families with three or four children, 28.22% from families with five or six children, 26.97% from families with seven or eight children, and 9.54% from families with nine or ten students, and 2.89% come from families with more than 10 children. It is to be noted that research findings have revealed that the size of the family a student comes from significantly affects his/her academic performance. For instance, according to Eamon (2005) student academic achievement highly correlates with the family size whereby students from small family size have better performance than their counterparts from big family size. For Eamon, this may be due to the fact that the students from small family size receive more care and attention from their parents than those from families with a lot of siblings. Likewise, Majoribanks (1996) and Emejulu (2006) add that the performance of students from small family size may be better than the performance of students from large families because the former are likely to receive more resources and support such necessary textbooks and extra tutorials.

#### **d) Parental educational level**

As presented in table 4 below, the findings indicate that majority of parents of the sampled students have not completed secondary school education. Specifically, the table indicates that 67.2% of students' fathers have not completed secondary school while 70.2% of mothers have not completed secondary education. It is to be noted that research findings have revealed that students from less educated parents, that is, those who have not gone to or completed secondary education, are likely to perform poorer than those from highly educated parents (Emejulu, 2006). This is may be explained by the fact that highly educated families have the ability to provide their children with good and recommended textbooks as well as pay for extra tutorials as normally they are likely to be financially well

compared to uneducated or less educated. Furthermore, it may be explained by the fact that children whose parents have a high level of education are likely to be taken to better schools (Emejulu, 2006).

**Table 4: Educational level of parents**

Education level	Father		Mother	
	Frequency	Percentage	Frequency	Percentage
Parents who never went to primary school	40	16.6%	48	19.9%
Parents who never completed primary	49	20.3%	46	19.1%
Parents who completed primary	53	22%	51	21.2%
Parents who never completed secondary	20	8.3%	24	10%
Parents who have a S6 certificate (A2)	22	9.1%	25	10.4%
Parents with diploma (A1)	17	7.1%	14	5.8%
Parents with bachelor's degree (A0)	30	12.4%	27	11.2%
Parents who did a postgraduate course	10	4.1%	6	2.5%
<b>Total</b>	<b>241</b>	<b>100%</b>	<b>241</b>	<b>100%</b>

#### e) Parental employment status

Table 5 gives an overview of employment status of the students' parents from selected schools.

**Table 5: Parental employment**

Employment status	Frequency	Percentage
Not employed	139	57.7%
Employed in public/private sector	96	39.8%
Others	6	2.5%
<b>Total</b>	<b>241</b>	<b>100%</b>

The findings presented in table 5 indicates that the majority (57.7%) of students in selected public secondary schools are students whose parents are not employed in either public or private sectors. The table further indicates that only 39.8% of students' parents are employed either in public or private sector. Only 2.5% of students' parents have other employment status such as pastorship. It is to be noted that in his longitudinal research on parental background and academic achievement, Hassan (2009) found that a strong relationship exists between the

employment status of the parents and academic performance of their students in favour of those students from employed parents. Similarly, African American students from parents with low employment status score almost 10% lower than their counterparts from parents with higher employment status (Seyfried, 1998). This may be true because parents with high labour market status have the financial capacity to provide school materials and extra tutorials for their children. They are also able to take their children to quality schools with well-qualified teachers, well-equipped laboratories and libraries, as well as other necessary facilities (Emejulu, 2006).

#### f) Students' prior performance

According to REB (2014) students' performance in senior three national exams (S3NE) are classified into 5 divisions depending on their performance, division one being the highest and division five the lowest. Table 6 gives the proportion of students falling in each division.

**Table 6: Proportion of students by division**

<b>Division</b>	<b>Frequency</b>	<b>Percentage</b>
Division 1	85	35.3%
Division 2	46	19.1%
Division 3	65	27%
Division 4	44	18.3%
Division 5	1	0.4%
<b>Total</b>	<b>241</b>	<b>100%</b>

The details displayed in table 6 indicate that 35.3% of students fall into the first division of best performers, 19.1% fall into the second division, 27% into the third division, 18.3% into the fourth division, and 0.4% fall into the fifth and last division. This means that majority of students fall in division one and two, which implies that they have performed well in Senior 3 national examination. According to Vandiver (2011), Aubrey, Dahl and Godfrey (2006), Popoola (1990) prior performance of students affects their subsequent performance as students who performed better in prior tests are also expected to perform better in subsequent tests.

#### **Determinants of student's performance in selected secondary schools**

The second objective of this study was to find out whether students' background status determines their performance in national exams within selected public secondary schools. To this end, regression analysis was computed, and the findings in this regard are summarized in the following table:



**Table 7: Determinants of students' performance**

Predictors	Standardized Beta ( $\beta$ ) weight	P-value
Student's boarding status	.311	.000*
Parenthood status	.116	.072
Family size	-.209	.001*
Parental education level	.384	.000*
Parental employment status	.357	.000*
Prior performance	.658	.000*

\*  $p < .05$ *Dependent variable: Students' performance in S6NE* **$R^2 = .568$  (56.8%)      **Adjusted  $R^2 = .541$  (54.1%)****

The results regression analysis presented in table 7 indicates that there is a significant difference between the performance of boarding students and that of day students as shown by the standardized beta coefficient of the students boarding status which is statistically significant ( $\beta = .311$ ,  $P < 0.5$ ). The  $\beta$  value indicates that boarding students perform better than day students as shown by the positive coefficient of .311. Therefore, boarding status is expected to increase student's performance by .311 if other factors 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 determines their performance in French and Mathematics. They found that boarding students perform better than day students.

A further look at table 7 indicates that another predictor of student's performance in S6NE is the size of the family the student comes from. The value of the standardized  $\beta$  weight ( $\beta = -.209$ ,  $p < .05$ ) indicates that for everyone unit of increase in the family size, student's performance decreases by 0.209. This therefore implies that students coming from small families performed better than their counterparts from big families. This may be 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 learners coming from big families do not perform as well 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 determines the performance of students in favour of those who come from small families.

Table 7 also reveals that a statistically significant difference exists between the performance of students whose parents are educated and that of students whose parents are not educated as shown by the standardized

beta coefficient of the parental education level which was statistically significant ( $\beta=.384$ ,  $p<.05$ ). Students whose parents are educated were seen to perform better than their counterparts whose parents are not educated. Therefore, an increase in the parental level of education, is expected to increase the student's performance increases by .384. This may be 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 Hassan (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.

Furthermore table 7 reveals that another key predictor of students' performance is parental employment status. The table clearly shows that a significant statistical difference exists between the performance of students whose parents are employed and that of students whose parents are not employed as shown by the standardized  $\beta$  coefficient of the parental employment status ( $\beta=.357$ ,  $p<.05$ ). Students whose parents are employed 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 parental employment status is a key determinant of the performance of their offspring. Hassan concluded that students with 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 7 indicates that the distance walked by day students is not a significant predictor of the students' performance in S6NE. This is shown by the standardized beta coefficient which was not statistically significant ( $\beta=-.102$ ,  $p>.05$ ). 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 significant ( $\beta=.116$ ,  $p>.05$ ). Therefore, students who have parents were not seen to perform better than their counterparts who are orphan. A final look at table 7 indicates that another key predictor of students' performance in S6NE is the student's prior performance in ordinary level exam (S3NE). The value of the standardized  $\beta$  ( $\beta=.658$ ,  $p<.05$ ) shows that a unit that increased a student's 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 previous performance of students in mathematics determines their future in the same subject.

### **Conclusion and Recommendations**

The study that was reported in this article found that 50.2% of students in selected public schools are day students, 30.3% are either total or partial orphans, 67.62% come from large families, 68.7% have parents who have not

completed secondary school, and 57.7% come from unemployed households. These findings show that students in selected public secondary schools have a moderate socio-economic background.

Furthermore, these findings show that among the student background characteristics, the key determinants of performance in selected schools are boarding status, family size, educational level of parents, the employment status of parents, and students' prior performance. It is in these regards that this article concludes that students' performance within selected schools is a function of students boarding status, family size and parental education level, parental employment and students' prior performance. Therefore, the government and other education stakeholders should consider students' family background as an important factor to improve educational output. As boarding students were found to be key determinant of students' performance, educational stakeholders should also provide boarding services to increase students' performance in public secondary schools of the two districts in which this study was conducted.

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