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A statistical analysis on O level students' performance in Dodoma Secondary Schools

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Abstract

This study focused on O level performance of students in Dodoma. The study employed mixture research design whereby 294 respondents from seven schools in Dodoma municipal were involved. Data were collected through printed questionnaires and documentary reviews. Tables, bar charts, and logit model were used to analyze data collected through Microsoft office excel 2013 version and SPSS IBM 21. The findings indicated that the factors leading Form IV students in Dodoma to perform better in their national examination and upgraded are private schools, hostels, libraries, sufficient teachers, teachers' competence and using subject language during learning. The study recommends that the Government and other educational stakeholders should create conducive climate that facilitates learning such as making sure hostels are available in schools including those that have high enrolment. Governments should also employ teachers immediately after schooling. Also, should on job training for their teachers' capacity building and propose a policy that can make teachers use relevant subject language during teaching.

Keywords: Performance, O level, school status

Introduction

The role of education is to lay the foundation for future and if a good foundation is laid at the early levels of education of learners, there are likely to be no problem at subsequent levels. Education has been identified worldwide as an important component that determines character and social economic development of any nation, ^[1]. A country that is unable to invest in education to develop knowledge and skills of her people and utilize them effectively in national economy will be unable to develop anything else, ^[2]. In worldwide any developed country has a stock of skilled human resources. The skilled human resources make the country use the local natural resources effectively and everything within the country to produce benefit to the country ^[3]. In this regard, Secondary school education is an essential component in generating development. Worldwide, any country has its own Education System (ES) that makes achieve its desired mission and vision. The USA for example, after the nursery education, mostly at the age five (5), depending on the state, some of states at the age of four (4) and others at six (6) of the elementary (primary) education starts up to secondary education which comprises 12 learning years mostly at the age of 16 up to 18 depending on the state. The elementary education is 5 to 6 years depending on the state whereby students are kept in one classroom with the same teacher most of the day but with secondary school learners, things usually change from class to class each session, with new teachers and a new mix of students in each of the classes. In secondary education the basic six-subjects namely, English, science, social studies, visual arts, mathematics, and physical education are added each year with subjects in related disciplines. The school year is about 180 days, and the school day averages 6.5 hours. Hence, this is the compulsory education for all. After that level of education, the student can be accepted to pursue a university education ^[4]. Similarly, the UK ES is classified into four main categories. These are Pre-school and primary education, secondary education, further education and high education. Normally pre-school is nursery school in which parents are responsible for this and in most cases, over children at the age of 1.5 up to 4 are involved. Hence, at the age of 5 up to 16, it is compulsory for every child to get education. At the age of 5, the child starts primary education and has to go to Infant School for two years in which she or he learns through experiences such as drawing, painting, musical activities, and play in which case, parents are

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also allowed to assist their children. After two years of Infant School children join the junior school for four (4) years. At this level of education, they learn English, mathematics, science and technology, geography and religions through project or topic work under same teacher through the year for all lessons. Then at age of 11 students join the secondary school in which the general education is provided up to the age of 16. During the age of 14 students have to learn technology, modern foreign language and physical education plus either history or geography whereby the successful students are promoted to further education^[5]. Also, in context of Tanzania, the Education System of Tanzania (ESoT) is made of main five (5) stages. (a) Nursery stage, which can take not less than two (2) years of learning (b) Primary stage which takes the duration of seven (7) years of learning, (c) Ordinary level, is middle stage which students are accepted to join various education institutions for specialization in several professions. Like technical and vocational colleges, health education colleges, business education colleges, teacher education colleges and universities. This stage is covered by four learning years, (d) Advanced level, in this stage, learner gets high advanced secondary education for two years, (e) University level, a student gets a degree for profession studied and where the impact of performance is real seen^[6]. However, different people at different times have heaped blames of poor performance in secondary schools on the students like communication, learning facilities, proper guidance and family stress are the factors that affect the student performance^[7].

These factors are categorised national, regional, and district, hamlet, group and even school.

The performance of any educational institution is always assessed by examinations and concentrates on achievements of students in such examinations. Examinations are very essential tools for measuring the performance of the students^[8]. Delivery of good quality education requires suitable physical facilities such as classrooms, laboratories, libraries, human resource in form of teachers, support staffs, counselors, financial means and many others source. Poor supply of these resources leads to low quality achievements of students in examinations results. Therefore, with this in mind, this study sought to find out the impacts of school based factors, that is physical resources, human resources and financial resources on students' academic achievement in O level secondary schools in Dodoma municipality.

Statement of the Problem

Tanzania like other countries in Africa has a persisting problem of performance of students mainly at the last level of compulsory schooling for all. It has always been the case that the number of registered students who sit for national examination is always bigger compared to that of those who are selected to join higher levels of schooling. This indicates that there is problem of academic performance in Tanzania. Any Education Institution cannot develop and be fruitful unless three main stakeholders are aware on the leading of that institution. These stakeholders are the teachers, students and community.

Therefore, in this context of the educational problems highlighted above, this study intended to analyze statistically O level students' performance in Dodoma municipal.

General Objective

The main objective of this research was to do statistical analysis on O level students' performance in Dodoma secondary schools.

Specific Objective

The following were the specific objectives of the study.

- To analyse the O level students' performance by sex in Dodoma Secondary schools.
- To analyse the O level students' performance of private and public secondary Schools in Dodoma.
- To analyse the O level students' performance of urban and rural secondary schools in Dodoma.
- To examine the learning factors which are most satisfied in Dodoma secondary schools.

Research Hypothesis

Before constructing research questions, or hypothesis the researcher must decide what she/he wants to find about concerning the problem^[9]. Hence, in this research the following hypotheses were formulated.

- There is no difference in O level students' performance by Sex in Dodoma Secondary schools.
- There is no difference in O level students' performance in Private and Public Secondary Schools in Dodoma.
- There is no difference in O level students' performance by locality of Dodoma Secondary Schools.

Significance of the Study

The findings of this study are essential to all aspects because education is the key driver to any countries' development. Therefore, when the level of performances in education in Dodoma municipality is known, that means it may be good performance or bad performance due to several strategies or hindrances and obstacles. The findings of this research were expected clearly show those factors that influence good performance to be maintained and those which influence bad performance to be eliminated or look for solutions.

Hence, the learning environment is the backbone of all educationists. The learning may be shaped or may exist naturally. Therefore, the findings of this study are crucial to all educational stakeholders to make right allocations as to where a school will be, such as rural or urban so as to advance performance of the students. Also this study will help to identify the major factors that many influence high performance of students of Dodoma secondary schools as well those factors that have low contribution to academic performance.

Literature review

Thus, performance is assumed to be passing tests in coursework and performance of students in examinations^[10]. Hence, the student's performance indicates the crucial part of preparing and producing the high quality and competent graduates^[11].

Many studies have been conducted worldwide concerning the performance of students at several levels of education, such as nursery school, primary schools, secondary schools and even higher level learning. This is contributed to by different points of view of researchers and in dissimilar situation with respect to time.

In Phillipine, it found that, there are four influencing factors in students' performance: socio-economic, aptitude, learning facilities and teacher characteristics^[12].

In Malaysia, many studies have been done concerning the factors that influence students' performance such as demographic, active learning, student attendance, extracurricular activities, and peer influence and course assessment. These Studies have shown that demographic characteristics can influence academic excellence. Among these characteristics are: parents' income, parent's education and English result ^[11].

Therefore, from the foregoing it can be argued that the level of education of the parents is not always of factor to foster academic achievement of the child. There is significant gradient between each parent's education level and their child's educational attainment. With regard to a parent with no qualifications, mother's education has a stronger association with her child's educational attainments than the education of the father ^[13]. That research indicated that the mother's education always influences the child's performance compared to the father's education.

In South Africa, school management, monitoring of student progress, teacher quality, interaction with students' socio-economic background are all factors that determine performance ^[14].

In Kenya, it was proposed that parents in Paidha town council needed to improve their own level of education so as to improve pupils' performance in schools ^[15]. Also, entrepreneurship unit needed to be introduced to the student so as to raise their attitude and lead them to perform well ^[16].

Within in the schools, Tanzania context, several researches have been conducted concerning Students' performance. For instance, performance can be promoted by administration style, availability of physical resources like classrooms, laboratories and dormitories, student's attitudes towards education also cultural and social economic background, teacher's attitudes and adequate teaching staff ^[17]. Also, lack of trained teachers, poor infrastructural facilities in schools, and insufficient books in the school library, economic situation and frequent changes in the curriculum make students in Tanzania pass at low percent ^[18]. Indeed, Lack of interest, practice, lack of drive and keenness for teachers, perception and attitude towards the subject and lack of qualified subject teachers motivate failure of students in secondary school in Tanzania ^[19]. Never the less, society, family, school and student are the determinant of good performance ^[20].

Finally, many researchers have examined the performance of students, but most of them concentrated on the factors that affect performance of learners in examination and looked both bad and good performance. Basing on this, this research examined factors fostering good performance of learners. These are internal and external factors such as student-related factors, teacher-related factors, school-related factors and family-related factors.

Research gap

Many previous researches on the performance of students concentrated on continuing students as respondents and even existing school environment to examine the previous students which is actually not acceptable, because probably those students were in different learning environment, and the continuing students were not known whether they performed well or not because they had not sat for National

Examination at the time when those studies were being conducted. So, in this research, the respondents were students who had previously done their National Examinations.

Methodologies

Research methods may be understood as all those methods/techniques that are used when conducting a research. Research methods or techniques, thus, refer to the methods the researchers use in performing research operations ^[21]. So the term Research methodology is a way to systematically solve the research problem ^[21]. The methodology that was used includes selection of the target population, sampling of the target population, technique for sampling selection, research design, and areas of the study, data collection, data analysis and output.

Research Design

Research design is compulsory due to its impacts. It accelerates the smoothly several research operations. This can make the research to be more accurate and therefore best data with low energy, time and money.

Hence, the design of this research was a mixed research design because it involved both qualitative and quantitative design. Similarly, in the mixed procedures, the researcher normally provides identical priority to both quantitative and qualitative data. In the mixed procedures, the researcher gathers both quantitative and qualitative data parallel to or all together during the study, equates the results and evaluates them to determine if the two databases produce alike or unlike results ^[22].

Study Population

The population is the entire aggregation of items from which samples can be drawn in order to conduct research, in which the researcher wants to generalize for one's findings ^[23]. The population was FV students in Dodoma municipality in both Public and Private Schools (PSs). This is because; the main measure of the academic performance is on secondary schools and not on high learning institutions.

Sampling Technique

A sample technique is the technique used to select sample to represent the entire population ^[21]. Also, it is difficult to comprise the whole population for the proposed study area due to time, accuracy and financial constraints ^[24]. There are two types of sampling technique/procedure which are probability and non-probability Sampling ^[25]. Hence, in this research, both procedures were involved in the sample selection. Using both techniques in the sample selection makes the collection of data easier in the sense that the weakness of one technique is supplemented by other technique ^[24]

The sample of this study was obtained by Stratified random sampling (proportion to school). Therefore, the strata were five (5) Private and three (3) Public secondary schools of 450 and 803 students respectively.

The formula used to give the sample size needed to estimate the population proportion when the stratified random sampling technique was used was ^[26]

$$n = \frac{\sum_{i=1}^L N_i^2 P_i (1 - P_i)}{\frac{N^2 e^2}{z^2} + \sum_{i=1}^L N_i P_i (1 - P_i)} \tag{1}$$

Where
 n is sample size
 P_i is subpopulation proportion for stratum
 N is population size
 Z is inverse of standard normal distribution to the corresponding level of significance
 L is total number of strata
 N_i is size of stratum
 W_i is estimated proportion N_i to N

Also, the sample procedure that was used to select the sample size within stratum was proportional sampling which was governed by this formula:

$$n_{ij} = n P_{ij} \tag{2}$$

Where

$$P_{ij} = \frac{N_{ij}}{N}$$

Where

n_{ij} = number of sample size within the ith stratum in jth stratum

P_{ij} = probability proportion within the ith stratum in jth stratum

N_{ij} = size ith stratum in jth stratum

N = Population size

P_i = probability of ith stratum in the population

Hence beside the schools stratified random sampling (proportion) technique used to find the sample size of the schools which governed by equation (1). Similarly the students from respective schools selected by using random sampling.

Sample Size

Sample is the subset of universal population [27]. It is cost fully to conduct research for all the target population. Therefore, it is the task of researcher to select few

respondents from the entire population to participate in the study [24].

From the equation below:

$$n = \frac{\frac{803^2 \times 0.5(1-0.5)}{803} + \frac{450^2 \times 0.5(1-0.5)}{450}}{\frac{1253^2 \times 0.05e^2}{1.96^2} + 803 \times 0.5(1-0.5) + 450 \times 0.5(1-0.5)} \approx 294$$

Hence the % n = $\frac{n}{N}$

$$\%n = \frac{294}{1253} \times 100\% \approx 23.5\%$$

Therefore the sample size in this research was 294 students which represented the population which approximately 23.5%.

Hence, the sample size from each stratum (Private and Government) was obtained by using the equation (2)

$$\text{Sample size of private } n_p = \frac{450}{1253} \times 294 \approx 106$$

$$\text{Also } \%n_p = \frac{106}{450} \times 100\% \approx 23.5\%$$

Similarly sample from government secondary schools was conducted as follows:

$$\text{Sample size of Government } n_g = \frac{803}{1253} \times 294 \approx 188$$

$$\text{Also, } \%n_g = \frac{188}{803} \times 100\% \approx 23.4\%$$

Then the sample size from each substratum from the respective stratum i.e the sample size of students from each school in both Private and in Government was calculated from the formula in equation (2). After putting the values in that equation (2) where the following results were displayed as highlighted in Table 1 below

Table 1: Population and Sample Size Selected from each School

Schools									
	Private					Government			
Population N _i	450					803			
Sample size n _i	106					188			
School names	A	B	C	D	E	F	G	H	TOTAL
School population N _{ij}	54	270	46	28	52	503	216	84	1253
School Sample size n _{ij}	13	63	11	7	12	118	50	20	294

Where alphabet A, B, C, D, E, F, G, and H are names of selected schools which are Huruma, Jamhuri, Maria De Mathias, Merriwa, Salesian, Bihawana, Dodoma and Msalato respectively.

Data Collection

This study comprised of both quantitative and qualitative data collection methods. So, in this research, data were collected through displayed questionnaires and secondary data from Dodoma Municipal.

Data analysis

Data analysis refers of checking, transforming, and shaping data according to objectives to show useful information, and therefore lead the researcher to recommend or make decision. This study used several ways of analyzing data

such as, Editing, Coding, Classification, Tabulation and Regression analysis.

$$\log it(\pi = 1) = \beta_0 + \beta_i X_i$$

β₀ is the constant; X_i is the independent variable; i = 1,2,3, ..., n; β_i is the gradient

Variables

A variable is the character that is not constant. A variable is any characteristic or element of the body or of an individual that can be altered from one time to another or from one

individual to another [28]. So in this study, the variables that were involved were: Sex, School status (SSTAT), Laboratory (Lab), library (Lib), Hostel (Host), School Class Room (SCR), Enough Teacher (ET), Teacher’s Competence (TC), Subject Language (SLNG), and School Location (SLOC)

Logistic Regression

A statistical method for analyzing a dataset in which there are one or more independent variables that determine a categorical outcome is called Logistic regression, or logit regression, or logit model.

Types of Logistic Regression

Logistic regression is classified into three types depending to the nature of outcome. Namely:

1. Binary logistic regression,
2. Multinomial logistic regression,
3. Ordinal logistic regression.

Binary Logistic Regression

If the response variables take only two values, such as pass/fail, win/lose, alive/dead or healthy/sick then this is called binary logistic regression. It is used to estimate the probability of a binary response based on one or more predictor (or independent) variables.

Multinomial Logistic Regression

If the response variables take more than two categories, they are referred to as multinomial logistic. Example win/lose or draw, single/ married/divorced/separated or cohabitated also nursery/primary/secondary or college and etc.

Ordinal Logistic Regression

If the response variables take more than two ordered categories, the model is called ordinal logistic model. Example fair, good, very good, excellent.

In Logistic Regression, the set of explanatory variables can be discrete (categorical) and/or continuous. In linear regression, the expected values of the response variable are modeled based on the combination of values taken by the predictors. In logistic regression, Probability or Odd of the response taking a particular value is modeled based on combination of values taken by the predictors.

Odds

Odd is defined as ratio of probability of the particular case to occur given another case does not occur. The logistic regression model for univariate variable can be constructed as follows:

Let y be the dependent outcome which follows binomial distribution (B) $y \sim B(\pi)$ where $y = 0,1$

$$y_i = \beta_0 + \beta_i X_i + \varepsilon_i$$

where $\varepsilon_i = i^{th}$ error term

$$E(y_i) = \beta_0 + \beta_i X_i$$

$$E(y_i) = \log_e \left(\frac{\pi(X_i)}{1 - \pi(X_i)} \right) = \text{logit}(\pi(X_i))$$

$$\text{logit}(\pi(X_i)) = \beta_0 + \beta_i X_i,$$

$$\ln \frac{\pi(X_i)}{1 - \pi(X_i)} = \text{logit}(\pi(X_i))$$

$$\ln \frac{\pi(X_i)}{1 - \pi(X_i)} = \beta_0 + \beta_i X_i$$

$$\frac{\pi(X_i)}{1 - \pi(X_i)} = e^{\beta_0 + \beta_i X_i}$$

$$\pi(X_i) = (1 - \pi(X_i)) e^{\beta_0 + \beta_i X_i}$$

$$\pi(X_i) = e^{\beta_0 + \beta_i X_i} - \pi(X_i) e^{\beta_0 + \beta_i X_i}$$

$$\pi(X_i) + \pi(X_i) e^{\beta_0 + \beta_i X_i} = e^{\beta_0 + \beta_i X_i}$$

$$\pi(X_i)(1 + e^{\beta_0 + \beta_i X_i}) = e^{\beta_0 + \beta_i X_i}$$

$$\pi(X_i) = \frac{e^{\beta_0 + \beta_i X_i}}{1 + e^{\beta_0 + \beta_i X_i}}$$

Interpretation of β 's

For each estimated coefficients for the independent variables in the model which represent the slope (i.e., rate of change) of a function of the dependent variable per unit of change in the independent variable, all these tell us about the research question. Thus, interpretation of the slopes involves two tips:

1. Determining the functional relationship between the dependent and the independent variable.
2. Appropriately defining the unit of change for the independent variable [29]. That is:
 - a. If $\beta_i > 0$, it indicates that the value of $\pi(X_i)$ will increase with increase in X_i
 - b. If $\beta_i < 0$, it indicates that the value of $\pi(X_i)$ will decrease with increase in X_i
 - c. If $\beta_i = 0$, it indicates that the value of $\pi(X_i)$ will remain constant whatever change there is in the value of X_i . This means that there is no association between response variable and explanatory variable.

Odd Ratios

Case i: For categorical explanatory variable.

Let X_i be categorical explanatory variable.

$$\text{So, } X_i = \begin{cases} 1 & \text{for case} \\ 0 & \text{for noncase} \end{cases}$$

$$\text{Since, } \ln \frac{\pi(X_i)}{1 - \pi(X_i)} = \beta_0 + \beta_i X_i$$

For case, $X_i = 1$. Then it implies that

$$\ln \frac{\pi(1)}{1 - \pi(1)} = \beta_0 + \beta_i \tag{3}$$

For noncase, $X_i = 0$. Then it implies that

$$\ln \frac{\pi(0)}{1 - \pi(0)} = \beta_0 \tag{4}$$

Then (3)-(4) will be:

$$\ln \frac{\pi(1)}{1 - \pi(1)} - \ln \frac{\pi(0)}{1 - \pi(0)} = \beta_0 + \beta_i - \beta_0$$

$$\ln \frac{\pi(1)}{1 - \pi(1)} - \ln \frac{\pi(0)}{1 - \pi(0)} = \beta_i$$

$$\ln \left(\frac{\frac{\pi(1)}{1 - \pi(1)}}{\frac{\pi(0)}{1 - \pi(0)}} \right) = \beta_i$$

$$\frac{\frac{\pi(1)}{1 - \pi(1)}}{\frac{\pi(0)}{1 - \pi(0)}} = e^{\beta_i}, \text{ this is called Odd Ratio (OR)}$$

$$\text{odd ratio} = e^{\beta_i}$$

Interpretation of Odd Ratios.

- a. If $\beta_i = 0$. This implies that odd ratio = 1 this means that there is no association between dependent variable and independent variables.

- b. If $\beta_i > 0$. This implies that odd ratio > 1 this indicates that the chance of making effects of certain parameter on a case is high compared to nonecase.
- c. If $\beta_i < 0$ This implies that odd ratio < 1 this indicates that the chance of making effect of certain parameter on a case is high compared to nonecase.

Assumptions of Logistic Regression.

The following are the assumptions on the Logistic Regression model:

1. Normal distribution is not necessary or assumed for the dependent variable.
2. Homoscedasticity is not necessary for each level of the independent variables.
3. Normally distributed descriptions of errors are not assumed.
4. Assumes a linear relationship between the logit of the Independent variables and Dependent variables.
5. The minimum number of cases per independent variable is 10.
6. There should be no outliers in the data.
7. There should be no high intercorrelations (multicollinearity) among the predictors.

If $S.E > 2.0$ there is presence of multicollinearity.

Testing the Model

The goodness fit of the model can be mainly measured by several tests to check if the independent variables fit the model or not. So, in categorical data, Hosmer & Lemeshow Test plays a great duty to test. The model is considered to fit the data if its p value is greater than 0.05.

In this study, the dependent variable was performance and categorised into high performance for those passed division one or two and low performance for those passed division three in their Certificate for Secondary Education Examinations (CSEE). So, according to the nature of the data, Binary Logistic Regression was applied. Hence in this study, several models created regarding the variables satisfied that model. These models are:

- a) **Female Model:** In this model, the probability of O'level students to perform high satisfied by the variables as shown in model equation below:

$$\text{Logit}(\pi = 1) = \beta_0 + \beta_1 \text{SSTAT} + \beta_2 \text{Lab} + \beta_3 \text{Lib} + \beta_4 \text{Host} + \beta_5 \text{SCR} + \beta_6 \text{TC} + \beta_7 \text{SLOC}$$

- b) **Male Model:** This model is slightly difference with Female model above whereby the probability for males in O'level to perform high satisfied by only variables shown in the model equation below:

$$\text{logit}(\pi = 1) = \beta_0 + \beta_1 \text{Lib} + \beta_2 \text{Host} + \beta_3 \text{ET} + \beta_4 \text{SLNG} + \beta_5 \text{SLOC}$$

- c) **Public Model:** The probability for O'level students in public schools to perform high depended on variables shown in the model equation below:

$$\text{logit}(\pi = 1) = \beta_0 + \beta_1 \text{sex} + \beta_2 \text{Lab} + \beta_3 \text{Host} + \beta_4 \text{Scr} + \beta_5 \text{ET} + \beta_6 \text{TC}$$

- d) **Private Model:** Hence the expectation of O'level students in private schools to perform high depended on few variables as compared to public schools as shown in the equation below:

$$\text{Logit}(\pi = 1) = \beta_0 + \beta_1 \text{Sex} + \beta_2 \text{Lib} + \beta_3 \text{Host} + \beta_4 \text{SLNG}$$

- e) **Rural Model:** It depended only by four variables, so, the probability for O'level students in rural schools to

perform high influenced by sex, library, hostel and teacher's competence only as equation below indicates.

$$\text{logit}(\pi = 1) = \beta_0 + \beta_1 \text{Sex} + \beta_2 \text{Lib} + \beta_3 \text{Host} + \beta_4 \text{Tc}$$

- f) **Urban Model:** The learning environments in urban are different to rural, thus, the expectation for O'level students in urban to perform high influenced only by hostels and teachers competence as shown in model equation below:

$$\text{logit}(\pi = 1) = \beta_0 + \beta_1 \text{Host} + \beta_2 \text{Tc}$$

- g) **General Model:** Learning situations in Dodoma secondary schools seemed to be influenced firmly by the variables as shown in the model equation below:

$$\text{logit}(\pi = 1) = \beta_0 + \beta_1 \text{Sex} + \beta_2 \text{Sct} + \beta_3 \text{Lib} + \beta_4 \text{Host} + \beta_5 \text{Scr} + \beta_6 \text{ET} + \beta_7 \text{TC} + \beta_8 \text{SLNG}$$

Hence, for each simple model, the variables appeared to alter, indicate that not all the learning variables acceptable in circumstances

Reliability

Reliability indicates the extent to which measurement methods and procedures yield consistent results in a given population in different circumstances [28]. Hence, in this research the data were collected and checked well before being statistically manipulated.

Validity

A study will be valid if one can draw meaningful and useful inferences from scores on the instruments [22]. Also validity is the extent to which differences found with a measuring instrument reflect true differences among those being tested [21]. Also, validity refers to the degree to which a study and its results correctly lead to, or support, exactly what is claimed [28]. Generally, validity refers to the appropriateness, meaningfulness, correctness, and usefulness of the inferences a researcher makes. Validation is the process of collecting and analyzing evidence to support such inferences.

Therefore, in this research consideration was taken on sampling, appropriate instrumentation and appropriate statistical treatments of the collected data.

Data Analysis and Discussion.

Descriptive Statistics

The descriptive statistics just indicates the overview of the data recorded to identify how many respondents were recorded, the frequency of each variables and its mean.

This research report comprises of ten (10) variables which satisfied general model as shown clearly in the Table 2.

Hence, 98 (33.3%) were Girls and 196 (66.67%) were Boys, 136 (46.3%) were in PSs and 158 (53.7%) were in Government Secondary Schools (GSS). Also only 56 (19%) schools have no laboratories and 238 (81%) have laboratories, 135 (45.9%) schools have no libraries while 159 (54.1%) have libraries, 158 (53.7%) were days student and 136(46.3%) were boarding students whereby 230 (78.2%) respondents had sufficient class rooms, 16 (5.4%) had not qualified teacher, 126 (42.8%) respondents had insufficient teachers and respondents had competent teachers were 234 (79.5%), this implies that, 208 (70.7%) respondents performed high and only 86 (29.3%) performed low.

Table 2: Frequency of the Study Variables

Variables	Categorical	N (%)
1 Sex	Female	98(33.3)
	Male	196(66.7)
2 School ownership status	Private	136(46.3)
	Public	158(53.7)
3 Presence of laboratory	No laboratory	56(19.0)
	Laboratory	238(81.0)
4 Presence of library	No library	135(45.9)
	Library	159(54.1)
5 Hostel	Day	158(53.7)
	Boarding	136(46.3)
6 Number of Classroom	Not enough	64(21.8)
	Enough	230(78.2)
7 Qualification teacher	Not qualified	16(5.4)
	Qualified	278(94.6)
8 Number of teachers	Not enough	126(42.9)
	Enough	168(57.1)
9 Teacher's Competence	Not competent	60(20.4)
	Competent	234(79.6)
10 Performance	Low	86(29.3)
	High	208(70.7)

Inferential Statistics

This section gives details on the propositions about a population are taken from the data drawn in the population by suitable correlation measure and models used. Hence, in this project, Chi square and binary logistic models were used.

Objective 1: To analyze the O'level Students' Performance by Sex in Dodoma Secondary schools
Female Model

This model showed the variables which are only significant for girls' studying in Dodoma Secondary Schools as shown in Table 3. The univariate analysis of female model indicated that, laboratory (p = 0.6), enough class room (p = 0.827) and school location (p = 0.406) were insignificant due to their p values being greater than 0.05.

Hence public schools ($\beta_1 = -2.039$, OR = 0.3) and laboratories ($\beta_2 = -0.329$, OR = 0.72) seemed to reduce the performance by 2.039 and 0.329 for every increasing unit respectively. Also competent teachers ($\beta_6 = 2.506$) had high contribution on high performance by 2.406 and school class room ($\beta_5 = 0.1116$, OR = 1.12) had least contribution for every unit increased. Hence, in multivariable analysis, Public schools ($\beta_1 = -1.89$, OR = 0.15), laboratory ($\beta_2 = -2.38$, OR = 0.09) and sufficient class room ($\beta_5 = -2.55$, OR = 0.08) were statistically significant but reduced the high performance by 1.89, 2.38 and 2.55 respectively. Also, library ($\beta_3 = 1.63$, OR = 5.1), hostels ($\beta_4 = 2.71$, OR = 15.03), teachers' competence ($\beta_6 = 3.07$, OR = 21.5) and Urban ($\beta_7 = 2.38$, OR = 10.76) were statistically significant whereby competent teachers had great risk to perform high while library had low risk to perform high.

Table 3: The variables significant only for Female Respondents.

Variables	Cases	Univariate analysis		Multivariable analysis			
		β	p	OR	β	OR	p
School status	Private	Reference					
	Public	-2.039	≤ 0.001	0.13	-1.89	0.15	0.010
Laboratory	No Laboratory	Reference					
	Laboratory	-0.329	0.60	0.72	-2.38	0.09	0.036
Library	No Library	Reference					
	Library	1.182	0.008	3.26	1.63	5.09	0.023
Hostel	Day	Reference					
	Boarding	2.205	≤ 0.001	9.07	2.71	15.04	≤ 0.001
School class room	Not enough	Reference					
	Enough	0.116	0.827	1.12	-2.55	0.08	0.009
Teacher competence	Not competent	Reference					
	competent	2.406	0.001	11.09	3.07	21.50	0.005
School location	Rural	Reference					
	Urban	0.357	0.406	1.43	2.38	10.76	0.004
Constant					-0.12	0.89	0.934

Note: β stands for Coefficient, OR stands for Odd Ratio and p stands for p value

The equation generated by this model is given below where:

$$\text{Logit}(\pi = 1) = -0.12 - 1.89 \text{SSTAT} - 2.35 \text{Lab} + 1.63 \text{Lib} + 2.71 \text{Host} - 2.55 \text{SCR} + 3.07 \text{TC} + 2.38 \text{SLOC}$$

The Hosmer and Lemeshow test of p value 0.906 indicated that the goodness fit of the model was strong.

Male Model

In male model, the univariate analysis as shown in the Table 4 indicated that library ($\beta_1 = 1.41$, p = 0.00), hostel, ($\beta_2 = 1.8$, p ≤ 0.001), enough teachers ($\beta_3 = 1.15$, p = 0.001), subject language ($\beta_4 = 0.97$, p = 0.003), and school location ($\beta_5 = -0.74$, p = 0.025) were statistically significant in which hostel had high risk to rise the high performance by 1.8 and least is subject language by 0.97 for every unit change increased. Hence, hostel was 6.25 times

likely to perform higher than not boarding schools, schools in rural areas 3.35 times likely to perform higher than urban schools. Hence in multivariable analysis, all variables in univariate are statistically significant in which hostel ($\beta_2 = 1.3$, p = 0.007), had great contribution to high performance by 1.3 for every hostel increase and which in this, was 3.67 times likely to perform higher compared to day school followed by sufficient teachers ($\beta_3 = 1.1$, p = 0.024), library ($\beta_1 = 1.01$, p = 0.01), subject language ($\beta_4 = 0.86$, p = 0.024) which increased its performance by 1.1, 1.01, 0.86 for every unit change increased respectively and least one is school location ($\beta_5 = -1.21$, p = 0.003) which reduces the high performance by 1.21 for every school increased in urban schools. The general equation is shown below as follow:

$$\text{logit}(\pi = 1) = -0.26 + 1.01 \text{ Lib} + 1.30 \text{ Host} + 1.10 \text{ ET} + 0.86 \text{ SLNG} - 1.21 \text{ SLOC}$$

Hence the Hosmer and Lemeshow test indicated the goodness fit of the model was strong due to reason that p value = 0.536.

Table 4: The Univariate and Multivariable of Male Model

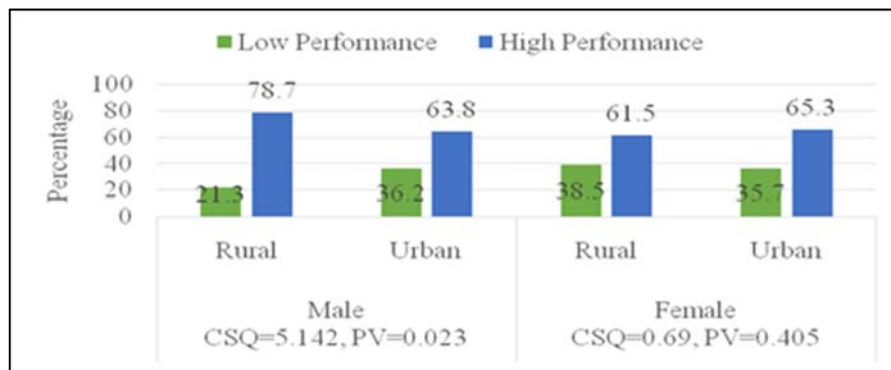
Variables	Cases	Univariate analysis		Multivariable analysis			
		β	p value	OR	β	p value	OR
Library	No Library	Reference					
	Library	1.412	≤ 0.001	4.10	1.01	0.010	2.754
Hostel	Day	Reference					
	Boarding	1.833	≤ 0.001	6.25	1.30	0.007	3.657
Enough Teacher	Not enough	Reference					
	Enough	1.154	0.001	3.17	1.10	0.010	3.013
Subject Language	Not using	Reference					
	Using	0.972	0.003	2.64	0.86	0.021	2.368
School location	Rural	Reference					
	Urban	-0.744	0.025	0.48	-1.21	0.003	0.298
constant					-0.26	0.445	0.768

Note: β stands for Coefficient, OR stands for Odd Ratio.

Genders Performance with Respect to School Location

With regard to chart 1 shows that, the performance on boys in rural and urban schools were statistically different whereby boys in rural performed high for 78.7% and 63.8% in urban settings. This is also indicated by chi square =

5.142 and its p value = 0.023 < 0.05 which are statistically significant. But for girls in both rural and urban schools due to chi square = 0.69 and its p value = 0.405 > 0.05 which is statistically insignificant, indicated to be equal and their difference is ignored.



Note: CSQ stands for Chi square and PV stands for p value

Chart 1: Male and Female Performance with Respect to School Location

Objective 2: To analyze the O level Students' Performance on Private and Public Secondary Schools in Dodoma

Public School Model

The result from Table 5 shows the public model analysis. This indicated that, laboratory ($\beta_2 = -0.487, p = 0.21$), enough teachers ($\beta_5 = 0.604, p = 0.071$), Sufficient class room ($\beta_4 = -0.278, p = 0.434$), were statistically insignificant in univariate analysis while sex ($\beta_1 = 0.915, p = 0.013$), hostel ($\beta_3 = 1.114, p = 0.006$), teacher's competence ($\beta_6 = 0.896, p = 0.011$) were statistically significant whereby Hostel, male and teacher's competence contributed to high performance for 1.114, 0.915 and 0.896 for every increased unit change respectively. While in multivariable analysis the variables existing in univariate, were all statistically significant, such that laboratory ($\beta_2 = -0.92, p = 0.041$) and school class room ($\beta_4 = -0.92, p = 0.034$)

were seen to reduce performance by 0.92 for each increased laboratory. Hence sex ($\beta_1 = 1.44, p = 0.001$), hostel ($\beta_3 = 1.27, p = 0.006$), teacher's competence ($\beta_6 = 1.11, p = 0.007$), and enough teachers ($\beta_5 = 0.83, p = 0.046$) appeared to increase high performance by 1.44, 1.27, 1.14 and 0.83 for every increased unit respectively. Consequently, males is 4.22 times likely to perform higher than females, hostels were 3.5 times likely than day students and sufficiency was 2.29 times likely to make students perform better than insufficient teachers.

The goodness fit for the model seemed to strong due to Hosmer and Lemeshow Test has Chi square = 3.167 and its p value = 0.869

The equation that generated this model is:

$$\text{logit}(\pi = 1) = -0.83 + 1.44 \text{ sex} - 0.92 \text{ Lab} + 1.3 \text{ Host} - 0.92 \text{ SCR} + 0.83 \text{ ET} + 1.14 \text{ TC}$$

Table 5: Univariate and Multivariable Public Model

Variables	Cases	Univariate analysis		Multivariable analysis			
		β	p	OR	β	OR	p
Sex	Female	Reference					
	Male	1.412	0.013	2.49	1.44	4.239	0.001
Presence Laboratory	No Laboratory	Reference					
	Laboratory	1.833	0.21	0.62	-0.92	0.399	0.041
Hostel	Day	Reference					
	Boarding	1.154	0.006	3.05	1.27	3.55	0.006
Number of Teacher	Not enough	Reference					
	Enough	0.972	0.071	1.83	0.83	2.26	0.046
Number of class room	Not enough	Reference					
	Enough	-0.744	0.434	0.76	-0.92	0.400	0.034
Teacher competence	Not competent	Reference					
	Competent	.896	0.011	2.45	1.14	3.125	0.007
Constant					-0.83	0.435	0.143

Note β stands for coefficient OR stands for Odd ratio and p stand for p value

Private School Model

Hence, the private model was slightly different to the public school model even for the number of factors used for students under private schools under study. The data in Table 6 indicated that, only sex ($\beta_1 = 0.413$ p = 0.416) is insignificant in univariate analysis while Library ($\beta_2 = 1.91$ p ≤ 0.001), Hostel ($\beta_3 = 1.81$, p = 0.001) and subject language ($\beta_4 = 1.076$, p = 0.037) were statistically significant whereby in multivariable analysis, all those variables were statistically significant such that library ($\beta_2 = 1.9$, p = 0.003),

Sex ($\beta_1 = 1.91$, p = 0.046), Hostel ($\beta_3 = 1.674$, p = 0.01) and subject language ($\beta_4 = 1.4546$, p = 0.034) in which library had high contribution on high performance by 1.9 for every one, it increased and students under library were 6.69 times likely to perform high compared to those studying without the library service. Also, Sex had least contribution on high performance by 1.29 for every increased boy which implies that boys were 3.65 times to perform higher compared to girls.

Table 6: Univariate and Multivariable Private School Model

Variables	Cases	Univariate analysis		Multivariable analysis			
		β	p	OR	β	OR	p
Sex	Female	Reference					
	Male	.413	0.416	1.51	1.29	3.65	0.046
Presence of Library	No Library	Reference					
	Library	1.91	≤ 0.001	6.74	1.900	6.69	0.003
Hostel	Day	Reference					
	Boarding	1.81	0.001	6.14	1.674	5.33	0.01
Subject language	Not using	Reference					
	Using	1.076	0.037	2.93	1.454	4.29	0.034
Constant					-1.643	.193	0.054

Note β stands for coefficient OR stands for Odd ratio and p stands for p value

This model is generated by the equation:

$$\text{Logit}(\pi = 1) = -1.643 + 1.29 \text{ Sex} + 1.9 \text{ Lib} + 1.674 \text{ Host} + 1.454 \text{ SLNG}$$

The Hosmer and Lemeshow Test with Chi square = 2.996 and p value = 0.70 witnessed the goodness fit of the data that they were good.

Hence the chart 2 shows the overview of the frequencies of sex and performance among private and GSs. It indicated

that, girls were more dominant academically in PSs for 19% in overall respondents while in public boys were dominant by 39.5%. Hence, in term of performance private dominated for 40.1% and 6.1% for high and low performance respectively while public led in low performance for 23.1% and only 30.6% for high performance.

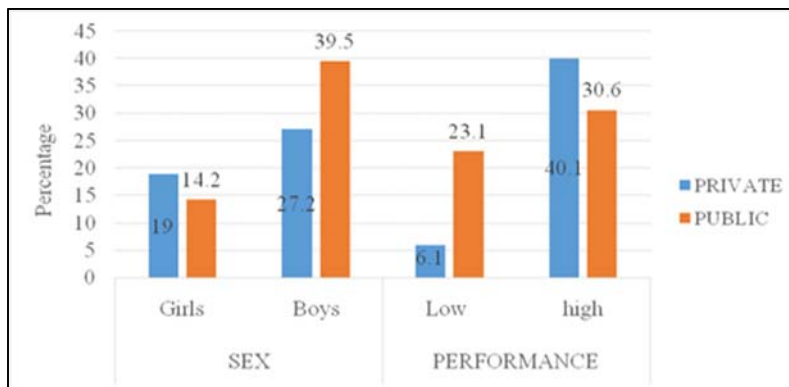


Chart 2: Comparison between PSs and GSs in term of Sex and Academic Performance

Objective 3: To analyze the O level students' performance of urban and rural secondary schools in Dodoma.

Rural Model

This model indicated learning variables which were satisfactory for students in rural schools. Table 7 indicates the results for rural model in which sex ($\beta_1 = 0.839, p = 0.019$), library ($\beta_2 = 1.983, p \leq 0.001$), hostel ($\beta_3 = 1.552, p \leq 0.001$) and teachers competence ($\beta_4 = 1.74, p \leq 0.001$) were statistically significant in univariate analysis. Similarly, multivariable analysis was statistically significant

whereby boys had high contribution in high performance by 2.035 for every boy that increased and 7.65 times likely to perform high rather than girls. Hence, presence of library had least contribution to perform high by 1.336 for every library increased while hostel and teachers competence had 1.557 and 1.529 for every unit change increased respectively. These variables appeared to fit the model hence Hosmer and Lemeshow Test had Chi square= 5.24 and p value = 0.513 and generated by the equation:

$$\text{logit}(\pi = 1) = -2.56 + 2.035 \text{ Sex} + 1.336 \text{ Lib} + 1.557 \text{ Host} + 1.529 \text{ Tc}$$

Table 7: Univariate and Multivariable for Rural Model

Variables	Cases	Univariate analysis		Multivariable analysis			
		β	P	OR	β	OR	P
Sex	Female	Reference					
	Male	0.839	0.02	2.32	2.035	7.65	0.000
Library	No Library	Reference					
	Library	1.983	≤ 0.001	7.26	1.336	3.81	0.003
Hostel	Day	Reference					
	Boarding	1.552	≤ 0.001	4.72	1.557	4.74	0.003
Teacher competence	Not competent	Reference					
	Competent	1.740	≤ 0.001	5.70	1.529	4.61	0.002
Constant					-2.56	0.08	≤ 0.001

Note: β stands for coefficient OR stands for Odd ratio and p stands for p value.

Cross Tabulation between Dependent and Independents Variables for Rural Model.

The results in Table 8 indicates that, the performance in rural schools in sex (p value = 0.018), Library (p value ≤ 0.001), hostel (p value ≤ 0.001) and teachers' competence (p

value ≤ 0.001) are statistically different due to their p values greater than 0.05. This means that boys and girls, in those schools under presence of library and no library, hostel and day schools as well as those whose teachers were competent and not competent had different performance.

Table 8: Cross Tabulation between Dependent and Independents Variables for Rural Secondary Schools

Variable	Cases	Performance		Chi square	p value
		Low N (%)	High N (%)		
Sex	Female	20(38.5)	32(61.5)	5.638	0.018
	Male	27(21.30)	100(78.7)		
School library	No library	36(46.8)	41(53.2)	29.318	≤ 0.001
	Library	11(10.8)	91(89.2)		
School hostel	No hostel	37(38.9)	58(61.1)	16.838	≤ 0.001
	Hostel	10(11.9)	74(88.1)		
Teachers competence	Not enough	23(54.8)	19(45.2)	23.028	≤ 0.001
	Enough	24(17.5)	113(82.5)		

Urban Model

Learning variables for students in urban secondary schools in Dodoma which were statistically significant as presented in Table 9 were hostels ($\beta_1 = 2.132, p \leq 0.001$) and teachers' competence ($\beta_2 = 1.075, p = 0.04$) in univariate analysis. Hence, in multivariable analysis hostel ($\beta_1 = 1.766, p = 0.001$) had high contribution on raising performance of

students in Dodoma by 1.766 while teachers' competence by 1.288 for every increasing unit change. Meanwhile, the goodness fit of the model was strong due to Hosmer and Lemeshow test of p value 0.99 and the model equation was:

$$\text{logit}(\pi = 1) = -0.76 + 1.766 \text{ Host} + 1.288 \text{ Tc}$$

Table 9: Univariate and Multivariable Rural Model

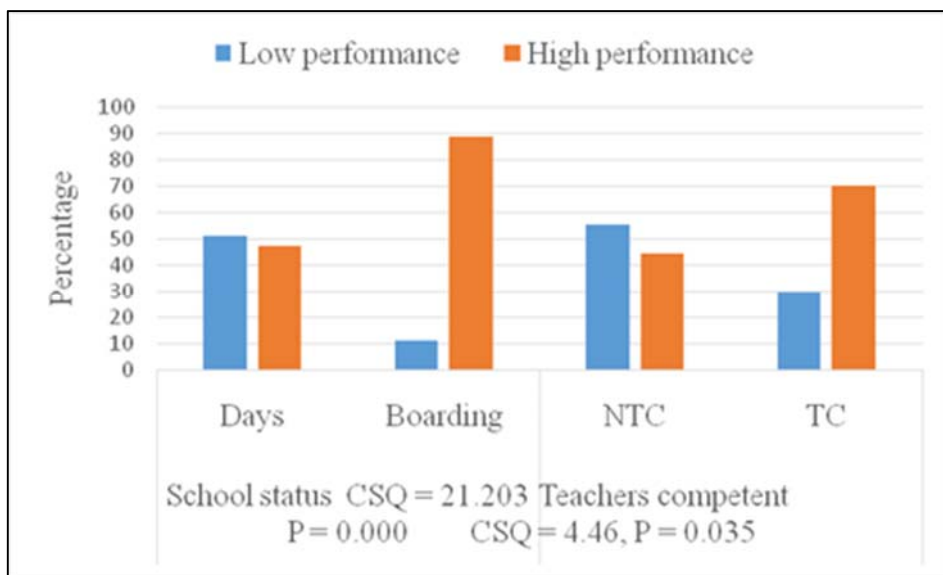
Variables	Cases	Univariate analysis		Multivariable analysis			
		β	p	OR	β	OR	p
Hostel	Day	Reference					
	Boarding	2.132	≤ 0.001	8.43	1.766	5.847	0.001
Teacher competence	Not competent	Reference					
	competent	1.075	.040	2.93	1.288	3.625	0.006
Constant					-0.76	0.467	0.036

Note: β stands for coefficient OR stands for Odd ratio and p stands for p value.

Relationship between Dependent and Independent Variables for Urban Students

From chart 3 it is indicated that the performance of students in urban was statistically different in terms of school

ownership status and teachers' competence as shown by the chi square = 21.203 and 4.46 with respect to their p value ≤ 0.001 and 0.035 respectively.



Note: CSQ stands for Chi square, P stands for p value, NTC stands for not competent teachers.

Chart 3: Dependent and Independent Factors for Urban Students

Objective 4: To Examine a Learning Factors which are most Satisfying in Dodoma Secondary Schools

Resulted from Table 10 indicated all learning factors (independent variables) that were significant in one of the models created in this project. Hence, hostels acted to fit in all learning situations in Dodoma secondary schools. Consequently, for every increasing unit change in hostel increased the high performance by 1.3, 2.71, 1.674, 1.27,

1.56, 1.77 and 1.425 in boys, girls, private, public, rural, urban and general model respectively. In addition to that, library seemed to fit well in most of the model except the public and urban model which tended to raise the high performance for every library increased by 1.01 for boys, 1.63 for girls, 1.9 for private, 1.34 for rural and 0.926 for general model.

Table 10: Coefficients with Respect to the Model in Multivariable

Variables	Model coefficients						
	Male	Female	Private	Public	Rural	Urban	General
School status	**	-1.89	*	*	**	**	-1.00
Sex	*	*	11.29	1.44	2.04	**	1.37
Laboratory	**	-2.38		-0.92	**	**	**
Library	1.01	1.63	1.900	**	1.34	**	0.926
Hostel	1.30	2.71	1.674	1.27	1.56	1.77	1.425
Class room	**	-2.55	**	-0.92	**	**	-1.17
Competent teachers	**	3.07	**	1.14	1.53	1.29	**
Enough teachers	1.10	**	**	0.83	**	**	0.898
Subject language	**	**	1.454	**	**	**	0.93
School location	0.86	2.38	**	**	*	*	**

Note: ** Implies that the factor is not significant to that model
 * Implies that the model name is the case of the variable

From chart 4, it indicates that, private secondary schools dominated with high performance by 86.8% followed by rural, male, urban, female, and public schools by 73.7%, 73.5%, and 66.1%, 65.3% and 57% respectively. Moreover school status (chi square = 31.368, p value ≤ 0.001) was

statistically significant that means there was difference in O level students' performance in Private and Public Schools in Dodoma. Hence sex (chi square = 2.104, p value = 0.147) and school location (chi square = 1.983, p value = 0.159) resulted in accepting null hypotheses.

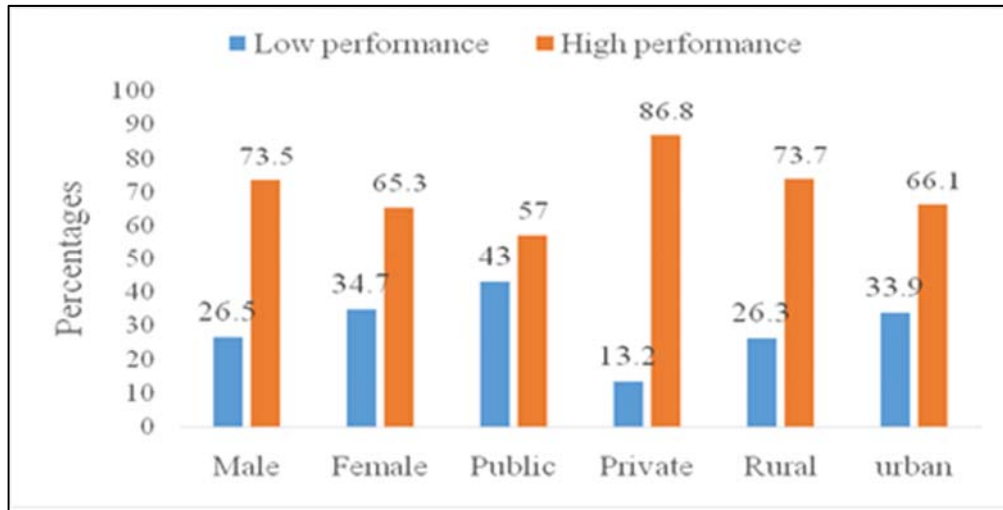


Chart 4: Level of Performance with Respect to each Model

General Models

In this project, the researcher planned to use several explanatory variables in order to know their prepositions to dependent variables. But, during testing the data in the model, only variables in Table 11 satisfied the models and others failed. This is why statistically, these satisfied variables, their effects are considered and the others are ignored. Table 11 displays univariates and multivariable general logistic models out of all variables tested to fit the model and satisfied the goodness fit of the model. The model indicated that if these satisfied variables are

interacted and taken under consideration, then they would influence high performance differently. The univariate of the general model as shown in Table 11 indicated that sex ($\beta_1 = 0.386, p = 0.148$) and SCR ($\beta_5 = 0.215, p = 0.479$) were statistically insignificant while school status ($\beta_2 = -1.6, p \leq 0.001$), Hostel ($\beta_4 = 1.786, p \leq 0.001$), enough teachers ($\beta_6 = 1.159, p \leq 0.001$) and subject language ($\beta_7 = 0.693, p = 0.009$) were statistically significant, where school status seemed to reduce the high performance by 1.6 for every one public school increased.

Table 11: Univariate and Multivariable General Logistic Models

Variables	Cases	Univariate analysis		Multivariable analysis			
		β	p	OR	β	OR	p
Sex	Female	Reference					
	Male	0.386	0.148	1.47	1.366	3.92	≤ 0.001
School status	Private	Reference					
	Public	-1.600	≤ 0.001	.202	-1.004	.366	.006
Presence of Library	No Library	Reference					
	Library	1.334	≤ 0.001	3.79	.926	2.524	.004
Hostel	Day	Reference					
	Boarding	1.786	≤ 0.001	5.97	1.425	4.158	≤ 0.001
Number of class room	Not enough	Reference					
	Enough	0.215	0.479	1.24	-1.169	.311	.004
Number of Teacher	Not enough	Reference					
	enough	1.159	≤ 0.001	3.19	0.929	2.531	.007
Subject Language	Not using	Reference					
	using	0.693	0.009	1.99	0.898	2.456	.007
Constant					-0.455	0.634	0.405

Note: β stands for coefficient, OR stands for Odd ratio and p stands for p value.

As a consequence, the multivariable analysis showed that sex ($\beta_1 = 1.366, p \leq 0.001$), school status ($\beta_2 = -1.004, p = 0.006$), presence of library ($\beta_3 = 0.926, p = 0.004$), hostel ($\beta_4 = 1.425, p \leq 0.001$), number of school class rooms ($\beta_5 = -1.169, p = 0.004$), number of teachers ($\beta_6 = 0.929, p = 0.007$), and subject language ($\beta_7 = 0.898, p = 0.007$) were statistically significant whereby school status and school class room seemed to reduce the high performance by 1.004 and 1.169 for every one public schools and class room increased respectively, hence public school appeared to perform likely higher by 0.366 times than private schools. But sex, library, hostel, enough teachers and subject language resulted in increase of high performance for every

unit increase by 1.366, 0.926, 1.425, 0.929 and 0.898 respectively. On the other hand, male students had high likely to perform higher by 3.92 times than female students, hostel by 4.158 times than non-boarding schools, presence of library by 2.52 times than lack of library, enough teachers by 2.531 times than insufficient teachers and using subject language by 2.456 times than not using subject language. Therefore, in this task, the model is fit due to Hosmer and Lemeshow Test of chi square = 4.703 and p value = 0.789 > 0.05. The general model equation is given below as follow:

$$\begin{aligned} \text{logit}(\pi = 1) = & -0.829 + 1.387 \text{ Sex} - 0.968 \text{ Sct} \\ & + 0.790 \text{ Lib} + 1.408 \text{ Host} - 1.192 \text{ Scr} \\ & + 0.779 \text{ ET} + 0.715 \text{ TC} + 0.829 \text{ Sblg} \end{aligned}$$

Conclusion

The goals of any struggle can be achieved under concrete strategies. Therefore, the researcher retrieved several elements in educational sectors that can be used to motivate the performance of the learners in secondary schools in Dodoma municipality. General, the performance of students in Dodoma municipality was seen to be good because 1302 (23.9%) of the total students set for national examinations in 2015 in Dodoma municipality and were selected to advanced level, 1973 (36.2%) awarded certificate only which implies 3275 (60.1%) passed.

The data indicated that learning environment of O'level students in Dodoma secondary schools between boys and girls are the same alongside library, hostels and school location since girls preferred more urban while boys rural. Hence, other variables varied like school status, laboratory, school classroom and teachers' competence satisfied by girls whereby boys preferred more enough teachers using subject language during learning. Also public schools, laboratory and school class room seemed to reduce the performance by 1.89, 2.38 and 2.55 for every unit change increased respectively.

Similarly, students in public secondary schools were satisfied with presence of laboratory with sufficient competent teachers, staying in hostels with enough class rooms but if laboratory and school class room increased seemed to reduce the high performance by 0.92 for each where the Private schools seemed to prefer more under presence library staying in hostels with teachers using subject language during teaching. Thus, boys performed high in both public and private schools while girls performed low in both.

Also, the O'level students' performance in rural setting influenced highly by male staying in hostel under presence of library with competent teacher while in urban only schools staying in hostel with competent teachers. as well as private and public is different. This means that boys and girls, in those school under presence of library and no library, hostel and day schools as well as those whose teachers were competent and not competent had different performance.

Also hostels is the most learning factor satisfied in all learning circumstances in Dodoma secondary schools followed by library which did not fit in the public and urban model. Consequently, for every increasing unit change in hostel increased the high performance by 1.3, 2.71, 1.674, 1.27, 1.56, 1.77 and 1.425 in boys, girls, private, public, rural, urban and general model respectively. While library tended to raise the high performance for every library increased by 1.01 for boys, 1.63 for girls, 1.9 for private, 1.34 for rural and 0.926 for general model.

Hence, in general, the results of this research showed that among those variables mentioned by researcher, the following elements were raising the performance in Dodoma municipality. These are hostels, PSs, libraries, sufficient teachers, teachers' competences and use of subject language during teaching. That is, boarding schools appeared 4.088 times likely to perform higher compared to non-boarding schools, private schools 2.63 times than government schools. Using subject language during

teaching was 2.29 times than not using, competent teachers was 2.204 times than incompetent, and sufficient teachers was 2.178 times not enough.

Also PSs had many factors which increased the performance that is why the boy model conformed that. Generally, boys seemed to lead in academic performance compared to girls where they were 4.002 times likely to perform higher compared to girls.

Recommendations

GSs have a big number of students and mainly those from poor families or even from low economic status. And because the GSs lead in low performance due to lack of hostels, libraries, insufficient teachers, incompetent teachers and even misused subject language during teaching, therefore, the researcher recommends the following tips so to improve the education sectors:

- a) Government and other educational stakeholders should create climates to make hostels available in many schools or even for those schools that have high enrolment (population).
- b) Governments should employ teachers immediately after schooling.
- c) Government and PSs owners should periodically expose their teachers to in-service training.
- d) Government should propose a policy that can make teachers use the specific subject language during teaching.
- e) Further research should be conducted to examine the effects of single sex schools (girls' schools or boys' schools) on performance with mixed sex schools.

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