DETERMINANTS OF STUDENTS' PERFORMANCE IN BASIC EDUCATION CERTIFCATE EXAMINATION (BECE) IN THE UPPER EAST REGION OF GHANA: A CASE STUDY OF KASSENA-NANKANA WEST DISTRICT (KNWD)

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ABSTRACT

This research was designed to identify some of the determinants of poor performance of students (PPS) in BECE in the Kassena-Nankana West District (KNWD), and to design a statistical model for predicting students' performance in BECE using the linear multiple regression method. The data was collected through a structured questionnaire as well as semi-structured interviews for some opinion leaders and other stakeholders at the KNWD. Purposive sampling, simple random sampling and accidental sampling techniques were used for selecting the participants for the study. Multiple linear regression model, descriptive analysis and diagnostic tests such as the Shapiro-Wilk test for normality of data were used. The study revealed that Age of students (*AGE*), Disciplinary Level of Students (*DL*) and Parents Educational Level (*PE*) significantly contribute to the academic performance of students at BECE. A linear model was used for the prediction of students' performance at BECE, based on this, it is recommended that more disciplinary measures should be implemented as well as reinforcing all the existing rules and policies regarding students' behaviour in all the Junior High Schools.

Keywords: Determinants, Poor Performance of Students (PPS), Kassena-Nankana West District (KNWD), Basic Education Certificate Examination (BECE), Multiple Linear Regression Model.

INTRODUCTION

The issue of the falling standard of students' performance in the basic level in Ghana is quite alarming. Age 4-15 is defined as "the minimum period of schooling needed to ensure that children acquire basic literacy, numeracy and problem solving skills as well as skills for creativity and healthy living" (Anon., 2015). It is divided into Kindergarten, Primary school and ends with the Junior High School (JHS), where students are assessed based on a requisite examination called the Basic Education Certificate Examination. The Basic Education Certificate Examination (BECE) is an external examination usually organised by the West African Examination Council (WAEC) for all students completing the eleven (11) years of the basic education for West Africa English Speaking Countries (Nigeria, Ghana, Sierra – Leone, Gambia and Liberia). The following are the subjects for the Basic Education Certificate Examination in Ghana: English Language, Ghanaian Language and Culture, Social Studies, Integrated Science, Mathematics, Basic Design and Technology, Information and Communication Technology, French (optional) and Religious and Moral Education. The BECE becomes the transition process through which successful students are admitted into various second cycle institutions such as Senior High Schools or Vocational and Technical Schools to pursue different courses of their choices. Students' performance at the BECE gives a clear picture of the type of basic educational foundation students acquire at the basic level in the country. The external examinations measure the success in our educational institutions based on the performance of students and are also means to declare a student being qualified or not qualified for the next stage in the academic field. This is therefore, important because a better foundation at the basic level gives more room for students to exploit higher levels in education and other essential areas in life.

Students in the three Northern regions do not perform extremely well at BECE as compared to their fellow counterparts in the Southern part of Ghana. Bridging the gap between the Southern and Northern parts of the country in terms of education has over the years been the hope of many stakeholders but all plans and methods seem to fail and the gap is now becoming so widened. However, the burden of how to bridge the gap does not lie in the hands of only the stakeholders or few individuals, but is a soul responsibility of all citizens in the three northern regions.

Statistics shows that education at the basic level in the northern part is quite low as compared to the southern part in Ghana; this is based on results from the Basic Education Certificate Examination (BECE). Many students after their unsuccessful completion of the Junior High School (JHS) turn to be discouraged and some go to the urban cities in search of non-existing jobs. Many of such students also turn to go into other social vices such as armed robbery and commercial sex workers which at the end retard the economic development of the country. Figure 1 shows the performance of students in English Language at BECE 2012. One can be able to compare the three northern regions with the other regions in Ghana.
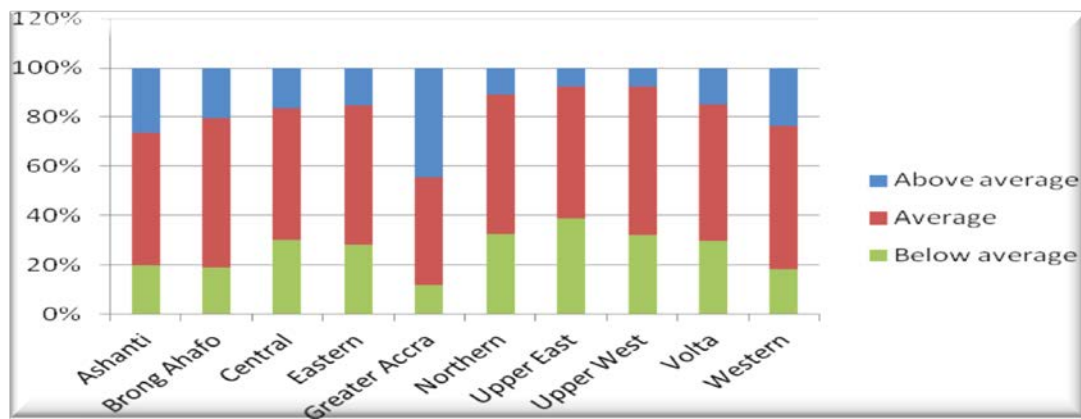
Figure 1: Distribution of English BECE results by region, 2012 (Source: Anon., 2013).

Figure 1 shows that the performance in the three northern regions went far below average compared to the other regions. The situation in other subjects is not different.

Interestingly, students' academic performance can be measured through several ways like the test results of students, grades of some subjects of recent and previous years. At the job market, performance is evaluated based on productivity. Academic performance in a sense describes the ability to accomplish a given assignment, test or task successfully within a specified period of time at his or her disposal. Adani (2013) defined academic achievement as performance on task with measures including comprehension, quality and accuracy of answers of tests, quality and accuracy of problem solving, frequency and quantity of desired outcome, time or rate to solution,

time on task, level reasoning and critical thinking, creativity, recall and retention, and transfer of tasks.

The performance of pupils in basic schools has been a matter of serious concern to the Government, the Ministry of Education and the Ghanaian public who look up to an effective basic education as the child's first step towards further training, a good job and eventual success in life which should therefore evokes the passion of parents and the general public Nsiah-Peprah and Kyiiliyang-Viiru (2005).

Assessment of students' academic performance enables one to know whether students' performance is up-to the required standard set at a given time. Any performance that falls below the set requirement mark is described being poor at that particular time. This therefore means that poor academic performance is relative since it is always subjected to a particular standard that could vary from time to time. The priority of everyone pursuing academic work is to be able to excel despite the numerous challenges that he/she encounters in the academic field. Students' academic performance measurement therefore has to receive considerable attention since there are several factors that lead to students' poor performance in Ghana, most especially in rural areas like KNWD. Among others, the factors that are said to affect pupils' performance in school are the socio-economic status of parents, especially the family size, the occupational status and educational level of parents. Others include qualification of teachers, quality of teaching, adequacy of staff and accommodation, efficiency of school management and supervision and adequacy of textbooks, equipment and other school infrastructure. Nsiah-Peprah and Kyiiliyang-Viiru (2005)

Provision of better education in terms of students' performance in Ghana is dependent on several determinants which also vary from one place to another. Some of these factors can either have a positive or negative effect on students' performance depending on how they are identified and addressed at a particular period of time. When these factors are therefore identified by researchers and all necessary plans and procedures are fully implemented by government and stakeholders, then students turn to perform far better than when those factors are identified and not implemented.

STUDY AREA

The Kassena-Nankana West District Assembly is one of the districts in the Upper East Region which was carved out of the then Kassena-Nankana District Assembly, established by the Legislative Instrument (L.I) 1855 in 2007 and inaugurated on 29th February, 2008, located approximately between latitude $10°57'32''N$ and $01°06'48''W$ and the district has total land area of approximately 1004 km^2 and the population as indicated by the 2010 Population and Housing Census was 70667 [Males-34747 (49.2%) and Females-35920 (50.8%)] with a growth rate of 1% and a population density of 70 persons per km^2 with the district sharing closed neighbouring boundaries with Burkina-Faso, Bongo District, Bolgatanga Municipal, Kassena-Nankana Municipal, Builsa District and Sissala East to the North, North-East, East, South, South-West and West respectively (Anon., 2014a).

Kassena-Nankana West District consists of eleven (11) circuits with each circuit consisting of at least three Junior High Schools. There are forty-three (43) Junior High Schools (both government and private schools) in the district. Out of these schools, majority are government schools. The district assembly is the highest political, administrative and planning authority in which the traditional council is subjected to it in terms of issues regarding chieftaincy, culture, land, and traditions. Farming is the main activity in the district with about 95% practicing subsistence farming and most of the crops grown are biennial crops. The literacy rate is quite low and this therefore affects the socio-economic development of the district. The current educational system in the district is quite disturbing due to the number of Junior High Schools recording low performance in the BECE over the past years. This leads to low number of students gaining admission into second cycle institutions. The situation therefore needs to be addressed with stringent measures by all concerned persons in and around the district to prevent such further occurrences in the district.

METHODOLOGY

The population for this research was guardians, teachers and students (above JHS) from schools, offices, households and market places and other appropriate places in the KNWD.

Questionnaires were administered to all the focused groups and were either collected later or that moment of administering. A semi-structured interview questions for some opinion leaders and other stakeholders were also carried out. Purposive sampling and simple random samplings coupled with accidental sampling techniques were used for selecting the participants for the study.

Three-hundred (300) questionnaires were designed for administering but only two-hundred and sixty-three (263) questionnaires administered were returned for analysis. Sample size refers to the total number of independent, random sample units drawn from the research population. This sample size used was due to the sampling method adopted and the administrative concerns of this research work. Respondents were given the questionnaire to fill in by themselves except those who needed to be guided by the researcher in explaining certain things to ensure that the right information was obtained from the respondents. Respondents were from the eight major traditional areas which include; Paga, Chiana, Katiu, Nakong, Kayoro, Mirigu, Sirigu and Kandiga. The nature of the data and model were verified through many methods and tests to establish the normality of the data, validity of results and usefulness of the final model obtained.

In real life cases, most problems assume a normally distributed population so as to be able to fit linear models. The Multiple Linear Regression Models (MLRM) can often be an adequate representation of more complicated structures such as the cubic polynomial model in one regressor variable and models that include interaction effects are transformed and analysed within certain ranges of the independent variables. The Multiple Linear Regression Model (MLRM) is an extension of the simple linear regression model in that it describes a linear relationship between one response variable and at least two predictor variables. In order to be able to predict an important response in any research that involves regression analysis, then a multiple regression model is needed in most cases. When this model is linear in the coefficients, it is called a multiple linear regression model.

The Multiple linear regression models for the jth sample unit have the general form as $Y = \beta_j + \beta_1 X_{j1} + \beta_2 X_{j2} + \cdots + \beta_m X_{jm} + \varepsilon_j$. Where $\boldsymbol{\varepsilon_j}$ is a random error term and $\beta_j = 0, 1, \ldots, m$ are unknown (and fixed) regression coefficients, $X_{j1}, X_{j2}, \ldots, X_{jm}$ be a set of jm predictors

believed to be related to the response variable Y_j and β_0 is the intercept of the model and interpreted as the expected value of the dependent variable (Y) when there is no independent variable (X_{jm}). The regression coefficient β_1 is interpreted as a change in the response variable per unit change in X_{j1} when all other terms are held constant. $\beta_2, \beta_3, \ldots \ldots, \beta_m$ can all be interpreted in similar manner.

The generalized model for students' performance is given as $SP = \beta_0 + \beta_1 SL + \beta_2 TS + \beta_3 FS + \beta_4 PM + \beta_5 BN + \beta_6 DL + \beta_7 SPS + \beta_8 AF + \beta_9 PE + \beta_{10} RA + \beta_{11} IT + \beta_{12} SA + \beta_{13} AG + \beta_{14} ERT + \varepsilon$,   where β_0 is the intercept, $\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6, \beta_7, \beta_8, \beta_9, \beta_{10}, \beta_{11}, \beta_{12}, \beta_{13}$ and β_{14} are the coefficients of the independent variables and ε is the error term. Information from questionnaire was coded to enable the R-software to run the multiple regressions. The model parameters are as follows;

- Age (AG) entered the model as the age of the respondent and is ranked as 1 for "15-24", 2 for "25-40", 3 for "41-60" and 4 for 61 and above.

- School attended (SA) is the JSS/JHS the respondent attended. It entered the model as 1 for "Government school" and 2 for "Private school". It effect can either be positive or negative in this model.

- Rate of Attendance (RA) entered the model as 1 for "Very regular", 2 for "Regular", 3 for "Irregular", and 4 for "Truant".

- Disciplinary level (DL) is about rate at which the respondent was disciplined. It entered the model as 1 for "Very high", 2 for "High", 3 for "Moderate" and 4 for "Quite indiscipline".

- Student Pattern of Studies (SPS) is how the respondent benefitted from a particular mode of studies. It entered the model as 1 for "Group studies", and 2 for "Personal studies". Its effect can either be positive or negative.

- Effective and Regular Tuition (ERT) for students. This is to find out whether the tuition given is up to standard for students' performance.

- Little or no supervision (SL) on the part of some teachers. This talks about the effect of supervision on students' performance. It effect can ether either be negative or positive.

- Little or no Teaching Skills (TS) by some teachers. This is to know whether teaching skills is a contributing factor to students' performance.

- Lack of Interest in Teaching (IT) by some teachers. Are some teachers in the classroom because they considered it as the last resort?

- Insufficient Financial Support (FS) by parents to some students. This is to know the role financial support plays on students' performance.

- Little or no Proper Monitoring (PM) by parents on their wards. This is to know whether proper monitoring on wards actually leads to improvement on their performance.

- Lack of some Basic Necessities (BN) such as electricity.

- Lack or Inadequate Academic user Facilities (AF) in the schools.

- Level of Parents' education (PE). How does parents level of education influences the performance of their wards.

Remarks: Students' performance (SP) entered the model as a dependent variable which was coded as 1 for "good", 2 for "quite good", 3 for "satisfactory" and 4 for "unsatisfactory".

Section C of the questionnaire followed a particular format, and the coding was done as 4 for "Strongly Agree", 3 for "Agree", 2 for "Disagree" and 1 for "Strongly Disagree".

DISCUSSION OF RESULTS

The analysis therefore captured the following areas of the respondents: Occupation, Age, Sex, Marital Status, Years spent in JHS and School Attended. Information was obtained from two-hundred and sixty-three (263) respondents which comprise of one-hundred and fifty-four (154) males representing 58.56% and one-hundred and nine (109) females representing 41.44%. Fifty-two (52) representing 19.77% were married, two-hundred and ten (210) representing 79.85% were single and one (1) representing 0.38% was divorced. The study shows that majority of the respondents spent three (3) years in Junior High School (JHS).
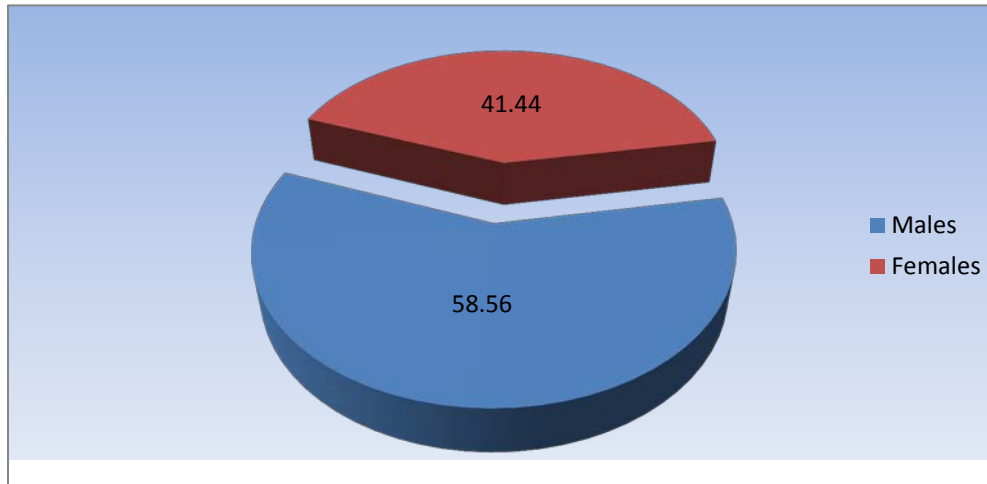
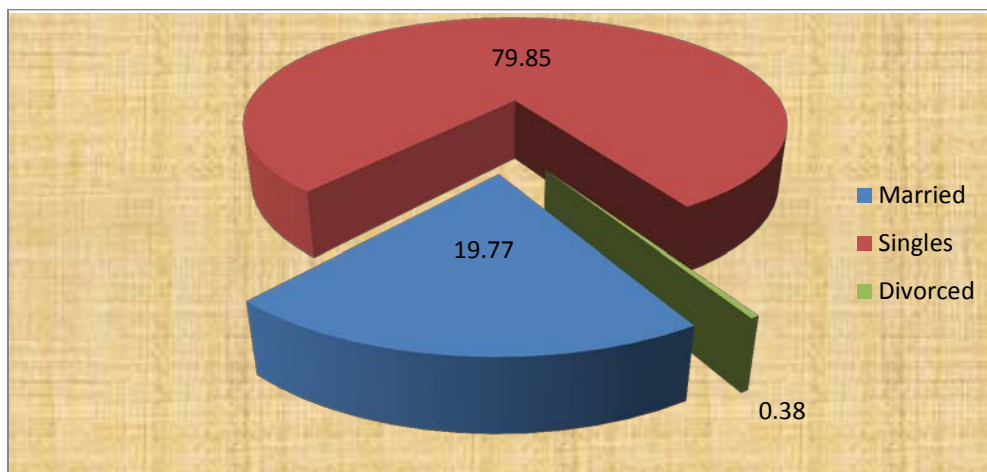**Figure 2: Sex wise Classification of respondents.**

Figure 3: Marital Status of respondents.

Occupational status of respondents

Much attention was turned to students (after JHS), teachers and parents who have some amount of educational experience as well as stakeholders and other classes of persons with educational experience. The analysis of the data therefore shows that majority of the respondents were students, followed by teachers with pensioners being the least number of respondents. Analysis indicated that, 73% were students, 17.49% were teachers, 3.04% were farmers, 2.28% were traders/artisans, 1.15% was pensioners, 1.52% was unemployed and others not specified were 1.52%. The graphical representation is shown in Figure 4.
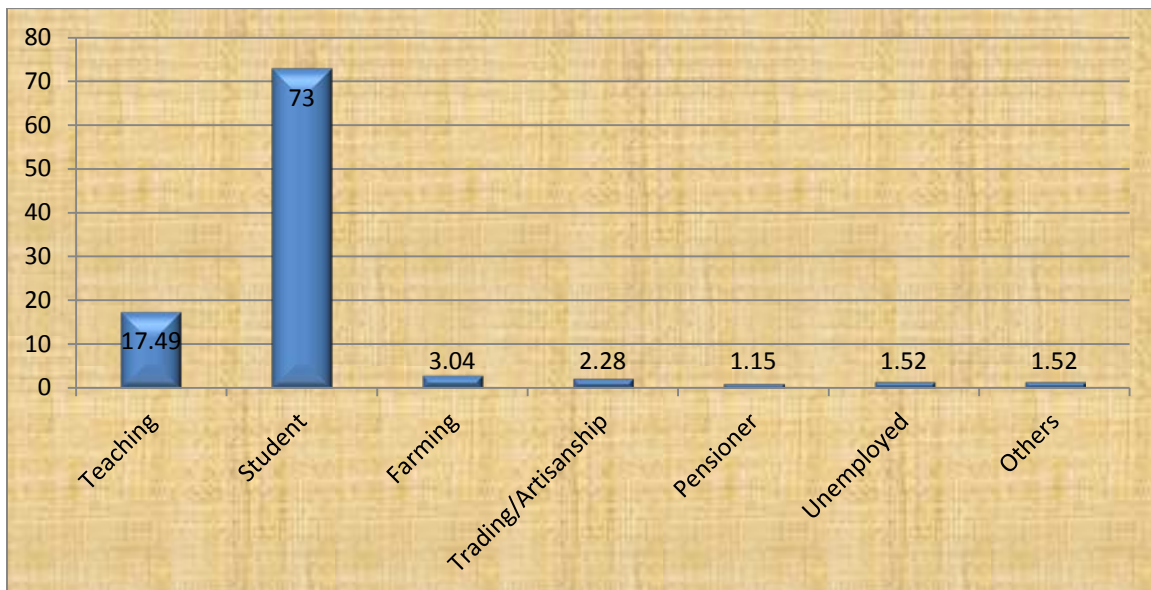

Figure 4:   Occupational status of respondents (Source: Author's Construct, May 2015).

Guardians/Teachers and Students Satisfaction of BECE Results

The graphical representation (Figure 5) of the data was examined to determine the level of satisfaction of both guardians/teachers and students at the current BECE in the KNWD. The study also compared (Figure 5) the satisfactory level of respondents (guardians/teachers with students) at their own performance at the BECE. Statistical analysis of satisfaction on students' performance at BECE helps to assess whether school systems satisfy the state, stakeholders as

well as individuals. Better improvement on students' academic performance will only be needed if research shows that parents, teachers, students, stakeholders and the general public as a whole are not satisfied with the performance at that particular period of time.

Guardians/Teachers

From Figure 5, the analysis on their own (Guardians/Teachers) performance at BECE shows that, fifty-three (53) respondents representing 74.65% were satisfied at their own performance at the BECE against eighteen (18) respondents representing 25.35% who were not satisfied at their own performance at BECE. This shows that students' performance in those years was satisfactory.

On the current BECE performance (Figure 5), ten (10) respondents representing 14.08% were satisfied at the current performance at BECE against sixty-one (61) respondents representing 85.92% were not satisfied at the current students' performance at BECE. This also shows that guardians/teachers are not satisfied at the current BECE performance.

Students

From the comparative analysis shown in Figure 5, sixty-seven (67) respondents representing 34.90% were satisfied at their own (students) performance at the BECE against one hundred and twenty-five (125) respondents representing 65.10% were not satisfied at their own performance at BECE. This is a clear confirmation of the fact that, the current students' performance is unsatisfactory because most of the respondents were in the first and second years of the Senior High Schools (SHS)/Technical Institutes who are the immediate past students with the current BECE results.

On the current BECE performance (Figure 5), thirty-four (34) respondents representing 17.71% were satisfied at the current performance at BECE against one hundred and fifty-eight (158) respondents representing 82.29% were not satisfied at the current students' performance at BECE. This is also another indication that, the current students' performance is unsatisfactory.
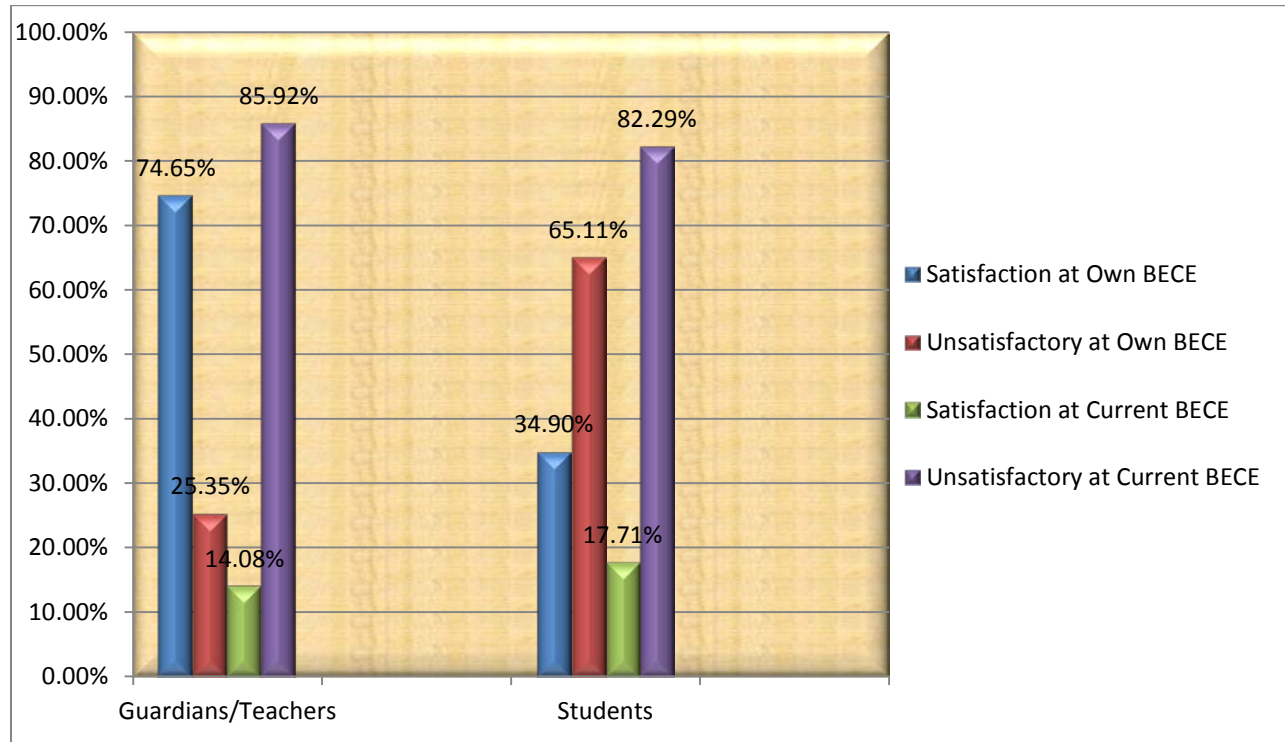
Figure 5: Level of Satisfaction at BECE (Source: Author's Construct, May 2015).

Model Development for Determinants of Students' Performance (SP)

Hypothesis Testing

H_0: All the parameters of the Linear Multiple Regression Model are statistically insignificant at 5%

H_1: Some of the parameters of the Linear Multiple Regression Model are statistically significant at 5%

$$SP = 1.183352 + 0.387084\textbf{AGE} + 0.871696\textbf{SA} + 0.020008\textbf{RA} - 0.184080\textbf{DL} +$$
$$0.086132\textbf{SPS} + 0.153592\textbf{ERT} - 0.008031\textbf{SL} - 0.026950\textbf{TS} + 0.080780\textbf{IT} +$$
$$0.111226\textbf{FS} + 0.130651\textbf{PM} + 0.023194\textbf{BN} + 0.064061\textbf{AF} - 0.135152\textbf{PE} \dots (\textbf{4.1})$$

Table 1: Linear Multiple Regression Model for Predicting Students' Performance

VARIABLE	COEFFICIENT	STANDARD ERROR	F-VALUE	Pr(>│Chi│)
Constant	1.1834	0.8812		0.18054
Age	0.3871	0.1236	9.4800	0.00195
School Attended	0.8717	0.4881	2.5675	0.07533
Rate of Attendance	0.0200	0.1144	1.1070	0.86131
Disciplinary Level of Students	-0.1841	0.0853	5.5919	0.03195
Students Pattern of Studies	0.0861	0.1297	0.4559	0.50725
Effective and Regular Tuition	0.1536	0.1292	1.5465	0.23581
Lack or No Supervision	-0.0080	0.0783	0.0003	0.91840
Teaching Skills	-0.0270	0.0783	0.0001	0.73100
Interest in Teaching	0.0808	0.0734	0.1793	0.27218
Financial Support	-0.1112	0.0722	3.3095	0.12465
Little or no Proper Monitoring	0.1307	0.0835	2.5836	0.11872
Basic Necessities at Home	0.0232	0.0688	0.0251	0.73645
Academic User Facilities	0.0641	0.0736	1.0653	0.37874
Parents' Level of Education	-0.1352	0.0564	5.7385	0.01734

For the proposed model, Age (AGE), Disciplinary level of students' (DL) and Parents' Level of Education (PE) were significant with P-values 0.00195, 0.03195 and 0.01734 respectively, each less than $\alpha = 0.05$.

Table 2: Regression Statistics

R Square	0.1195
Adjusted R Square	0.06977
Standard Error (SSR)	1.032
F-statistic	2.404 on 14 and 248 Degrees of Freedom
P-value	0.003623
Shapiro-Wilk test P-value	0.00001773
Mean Square Error (MSE)	0.00416

The **Age of student (AGE)** is the strongest predictor of students' performance with a positive effect when the ages of students range from 15 – 24 and a negative effect when ages are above 24 years. This shows that the performance of a student decreases as the age of a student increases after 24 years. The age bracket (15-24) which was coded '1' turns to give a better performance of students in BECE. This implies that students who sit for BECE with ages above 24 years turn to perform less as compared to students who are within 15 - 24 years.

The **Disciplinary level of students' (DL)** was presented in terms of disciplinary level as 1 for "Very high", 2 for "High", 3 for "Moderate" and 4 for "Quite indiscipline". This simply implies that a student who has a very high disciplinary level will perform far better than a student who is quite indiscipline (since slope is negative) when all other factors are kept constant in the model. This therefore means that a student who is much disciplined will automatically work hard in terms of his/her academic work to achieve academic success. Indisciplinary level of students has a negative effect on students' academic performance. Indiscipline students will therefore turn to perform poorly in BECE.

Parents' Level of Education (PE) plays an important role in students' academic performance and the effect is negative (since slope is negative) if all other factors (predictors) are not considered. It was expected that the relationship between students' academic performance and parents' level of education be positively related since parents with little or much experience in education would be in a good position to provide all that a student needs. But the result could not prove this relation, because coefficient value is -0.135152 which shows that there is an inverse relation in this model. This means that parents who are educated can only have their children performing if they consider and treat other predictors in academic performance higher than merely assuming that their level in education will automatically lead to academic success of their wards.

CONCLUSION

The following conclusions are drawn from the study conducted:

1. The age of students (AGE), the disciplinary level of students (DL) and parents' educational level (PE) are contributing factors towards the academic performance of students in Junior High School at BECE.

2. Parents are not satisfied with the performance of their wards at the BECE in the KNWD.

3. A model for predicting students' performance in the KNWD has been developed;

$$SP = 1.183352 + 0.387084AGE - 0.184080DL - 0.135152PE……(5.1)$$

RECOMMENDATIONS

The following recommendations were made based on the findings and conclusions drawn from the results of the research work:

1. More disciplinary measures should be implemented as well as reinforcing all the existing rules and policies regarding students' behaviour in all the Junior High Schools;

2. The government of Ghana should ensure that there is effective supervision by circuit supervisors on both teachers and students to ensure that teaching and learning is always effective in the government basic schools;

3. Sensitisation programs should be organised for parents on "the need for better education for all those under school-going-age" despite parents' educational level;

4. Motivational programs such as best students' awards should be integrated in the basic schools;

5. The ideal age bracket for the registration of BECE candidates should be 15 – 24 years;

6. Finally, more researches should be conducted separately on factors inside and outside the school that influence students' academic performance.

REFERENCES

1. Adani, L.O. (2013), "Factors Affecting Low Academic Achievement of Pupils in Kemp Methodist Junior High School in Aburi", *Unpublished MSc Project Report*, University of Ghana, Accra, 123 pp.

2. Anon, (2010), "World Data on Education", *www.ibe.unesco.org,* Accessed: March, 10, 2015.

3. Anon, (2013), "Education Sector Performance Report", Ministry of Education, Accessed: February, 15, 2015, 43 pp.

4. Anon, (2014a), "Composite Budget of the Kassena-Nankana West District Assembly (KNWDA)", *www.ghanadistricts.com.* Accessed: October 14, 2014.

5. Anon, (2014b), "Basic Education Certificate Examination, Ghana", *www.waec.com*, Accessed: October, 14, 2014.

6. Anon, (2015), "Ministry of Education", *wikipedia.org/wiki*. Accessed: January 20, 2015.

7. Appiah-Adjei, S. (2014), "Households' Willingness to Pay For Solid Waste Management Services in Tarkwa Area Council, Ghana", *Unpublished BSc Project Report*, University of Mines and Technology, Tarkwa, 42 pp.

8. Farooq, M. S., Chaudhry, A. H., Shafis, M. and Berhanu, G. (2011), "Factors Affecting Students' Quality of Academic Performance: A Case of Secondary School Level", *Journal of Quality and Technology Management*, Vol.7, No.2, pp. 01-14

9. Frempong, E. (2011), "Factors Contributing to poor Performance of Students in the Basic Education Certificate Examination in Selected Public Junior High Schools in Effutu Municipality, *Unpublished MSc Project Report*, University of Education, Winneba, 96 pp.

10. Idu, A. P. and Ojedapo, D. O. (2011), "Indiscipline in Secondary Schools: A cry to All Stakeholders in Education", *Journal of Educational and Social Research*, Vol.1, No.5, pp.81-87.

11. Mushtaq, I. and Khan, S. N. (2012), "Factors Affecting Students' Academic Performance", *Global Journal of Management and Business Research*, Vol.12, No.9, pp.17-22.

12. Nsiah-Peprah,Y. and Kyiiliyang-Viiru, L., (2005), "Assessment of the Factors Affecting the Standard of Education in Junior High Schools in the Kassena-Nankana District in the

Upper East Region of Ghana", *Journal of Science and Technology*, Vol.25, No.1, pp. 43-57.

13. Raychaudhuri, A., Debnath, M., Sen, S. and Majumder, B.G., (2010), "Factors Affecting Students' Academic Performance: A case Study in Agartla Municipal Council Area", *Banglandesh e-journal of Sociology*, Vol. 7, No.2, pp. 34-41.

14. Walpole, R.E, Myers, R.H., Myers, S.L. and Ye, K., (2007), *Probability and Statistics for Engineers and Scientists*, Pearson Prentice Hall, 8th Edition, Pearson Educational Inc., pp. 445-459.