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Exploring the Effect of School Management Functions on Student's Academic Performance: A Dilemma from Public Senior High Schools in Ghana

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ABSTRACT

In every aspect of life, management has become a crosscutting tool and the axis of performance. There is a broad and ongoing discussion in our academic institutions about the impact of effective management on academic performance. This study, therefore, sought to analyze the effects of school management functions on the likelihood to enhance the academic performance of students in Public SHSs in Ghana. The study used Teacher Professional Development, monitoring and evaluation, Provision of Infrastructure outcomes, Teachers Input, Student Input, P.T.A support and Parental Involvement as variables measuring school management functions. In this study, the descriptive research design was adopted and data of 480 respondents were collected through a questionnaire survey for analysis. With the application of logistic regression analysis as the main statistical tool, the study based on Wald test values, p-values and odds ratio values identified Teacher professional development, Monitoring and evaluation, Provision of infrastructure, Teachers input, Students effort, PTA support, and Parental involvement as school management functions that significantly contributes to the likelihood (probability) of enhancing students academic performance. The study recommended that school management functions with the exception of democratic management should be intensified in various public SHSs so as to enhance students academic performance.

Keywords: Management functions, academic performance, public senior high schools, Ghana.
JEL classification: I21, I23

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1. Introduction

Education is the process of facilitating learning, or the acquisition of knowledge, skills, values, beliefs, and habits and also it is the field of study that deals mainly with methods of teaching and learning in schools. Education is the key towards development of a nation as a whole and the utmost operative channel to bring about the prosperity in a society (Ahmed and Qazi, 2011). Economic and social progress of a country does not just depend upon the richness of its natural resources or monetary capital but the human capital has always been considered as the ultimate source to speed up the pace of a country's development with formal education system being the basic mechanism behind developing this human capital (Nsubuga, 2003). The quality of human resource of every nation is determined by the number of educated individuals living in the country. Education helps a nation to attain growth and development hence there is a necessity to emphasise on management of schools

School management aims to promote organization, mobilization and expression of both human and material conditions essential to school instructive processes that endorse the learning activities of students. There is a growing body of information from various scholars and educationists which have made an attempt to scrutinize the effect of school management and the academic performance of students. Management of education particularly in secondary schools takes into deliberation the application of management policies in designing, developing and producing resources towards achievement of educational goals (Hopkins, 2015). According to Hopkins (2015), this efficiency is judged by the degree to which schools generally meet the expectations of the society within which they are established.

According to Canterll et al (2008), the understanding and capability of teachers are the limited in-puts that certainly affect the academic functioning of students. There are other factors that researchers and management systems in schools point out when describing quality schools and features of schools that have made improvement in effectiveness. Such features according to Zepeda (2016) include; management commitment to the success for all, flexibility and responsiveness; shared vision, climate of challenging and stimulation teaching, as well as strong and fair disciplinary climate. The most effective program to ensure a balanced teacher and student's relationship according to Bird (2017) includes proper monitoring and evaluation of students, provision of infrastructure and the practice of democratic management lifestyle. A report by the World Bank (2008), points out that, most researches have demonstrated that the retention and the quality of education primarily depend on the way schools are managed more than the abundance of availability of resources. Research conducted by Day et al (2016) gives the indication that the capacity of schools to improve teaching and learning is strongly influenced by the management style provided by the schools.

Adopting the method of education production function, if we assume that education industry relative to its production technology is relatively rigid Hanushek, 1979, then the same large differences between schools results can be explained by differences in practice management. According to the theory of industrial organization, the distribution of the enterprise management personnel and the scale of the factory within an industry is directly related to the relationship and management technology influencing input and output of productivity related Lucas, 1978. This will show that while maintaining the quantity and quality of the same circumstances, different methods of management, may lead to different results. The latest literature, by Nicholas Bloom and John van Reenen on leadership, with this topic as the theme, put forward about the management practice of different industries and the results of the relationship between the experimental and theoretical model and the experimental evidence. In fact, some empirical studies have found that management practices and the productivity of the company are strongly correlated as well as the correlation amid profitability, growth and survival, together with transnational and domestic TFP (Bloom et al., 2014).

This current research therefore is uniquely positioned to address gaps with regards to school management functions issues in relation to students' academic performance in Senior High Schools in Ghana. Research and discussions with regards to the effect of school management functions on students' academic performance are only when educational issues crop up. Concerted effort to improve management in secondary schools is one of the most promising points of intervention to raise retention, the quality and efficiency of secondary education in Ghana. The educational delivery system in Ghana is uptight with numerous challenges. These challenges include deficits of teachers, inadequate

infrastructure, swaying policies of education and high cost of quality education. Upon all these mentioned challenges, stakeholders have always focused on academic performance of students more without spotting on other processes through which excellent students' academic performance is achieved. These processes that are mostly overlooked in include the relation between the school and the community, as well as management styles which are very important rules that reflect the academic performance of schools. With respect to the education history in Ghana, it is clear that school management existed in schools before independence. Management of senior high schools (SHS) has become a newsworthy as many people have made an attempt to draw a strong relationship between effective school management functions and academic performance of students. Discourse in management roles of school managers for instance headmasters have been conducted in schools but none of them touched on the role of its effectiveness on the academic performance of senior high schools in Ghana, particularly Ashanti Region. It is therefore against this background and its associated consequences that this study was undertaken by employing a stepwise logistic regression analysis in order to determine school management functions that significantly enhance the academic performance of students specifically in public senior high schools in Ashanti region of Ghana. To the best of our knowledge, such an analysis has not been conducted to determine management functions that significantly affect the academic performance of students in various public senior high schools in the region under study.

This current research adopted the descriptive survey research design to give a response to one hypothesis. Since the data used in the study was based on a primary source, structured questionnaires were designed for four hundred and eighty (480) respondents which including teaching staff, head teachers, parents of wards and members of the PTA for various schools sampled for the study. The study employed both the simple random sampling and purposive sampling techniques in selecting respondents as well as schools for the study within the region. The data obtained from the respondent were then organized and analyzed using the stepwise logistic regression analysis to estimate the effect of school management functions on the likelihood to enhance student's academic performance.

The main research findings include no multicollinearity exist among explanatory variables employed in a stepwise multiple logistic regression model as school management functions. Again, with the aim of examining the effect of school management functions on the likelihood of enhancing students' academic performance, estimation of a proposed stepwise logistic regression reported Teacher professional development, Monitoring and evaluation, Provision of infrastructure, Teachers input, Students effort, PTA support, and Parental involvement significantly as school management functions that significantly triggers the enhancement of students' academic performance. Finally, various goodness of fit test which includes Omnibus test as well as the Hosmer and Lemeshow tests revealed that our estimated logistic regression model is significant and can as well predict the likelihood (probability) of enhancing students' academic performance in various public senior high schools.

The structure of the paper is therefore as follows, literature review is presented Section 2, Section 3 outlines the methodology which includes research methodology and details of empirical results and discussions are posted in Section 4 where Section 5 which is the last section gives the concluding remarks and as well suggest some recommendations.

2. Related literature

According to Bloom et al (2015) management is a broad term that includes standardized procedures for control of production and even elements related to the administrator's characteristics. This complexity brings difficulties in measuring management and assessing how the administration affects the results. However, in the context of this study, the school management is defined as the role of a body set up by the relevant authority to manage and implement decisions in public SHS in Ghana. Given that, the literature seeks to identify whether management practices can be universal or if efficiency is derived from the specificities of each organization and the environment in which they are inserted. Kyriakides et al (2015) considers that school management encompasses not only the director but also all stakeholders. The author considers that a democratic management also includes the active participation of teachers on co-leadership pedagogical responsibilities, parents/communities, students' representatives as well as non-teaching representatives. According to Lee (2014) the quality of

leadership in the school is a relevant factor in evaluating schools and thus their educational results or students' performance. However, in research related to the field of education, few studies prioritize school management as explanation for the improvement in the academic performance of students. Bush and Glover (2016) states that due to the difficulty of defining the quality of school management and, due to the lack of high-quality data in which empirical strategies may be based, the literature on the influence of school managers on the academic success of students is scarce.

Coleman Report (1966) as cited by Downey and Condron (2016) initiated the debate and research on the relationship between school management and the academic performance of students in high schools. In this report, it is shown that the school environment of the child which is provided by the school management consists of many elements ranging from the table on which the student sits, the colleague next to him and the teacher in front of the class. The most prominent point in the study was the maximization of the role of the school management with regards to students attaining higher academic performance. From the Coleman Report, several authors have sought to study and prove the existence of positive relationships between school management and students' performance. However, not all studies achieved the expected results and explanations have been proposed to justify the weak relationship between school management and students' learning. Among them is that investments in school inputs by school management benefit students' learning only to some extent, after this maximum point, more inputs do not affect the performance of the students (Epstein, 2018). Other studies have also addressed other roles of school management that influence students' academic performance in high schools. According to Allen et al (2015) the main significant variable for explaining improvement in students' academic performance levels is by the democratic management style of school management. This refers to a situation whereby the school management involves all stakeholders including representatives of the students, parents/community and the administrative staff in making decisions about the school. Masci et al (2016) indicated that an improvement in students' performance system could be obtained by increasing the role of school management committees. For instance, Valente and Berry (2017) opined that there began a process of diffusion of innovations in school management and this had different intensities in different state education systems of Brazil, especially with regards to the direct transfer of resources to the schools. A study by Lewin and Stuart (2016) revealed that educational results are persistently below average, especially in developing countries which arouse interest about what are the inputs that affect students' academic performance in high schools so that effective public policies could be implemented. It was indicated in their findings that, one of the hypotheses that exist to justify this low students' academic performance is school management practices. To understand the role of school managers, that is, the role of directors, principals, parents, teachers etc in the performance of the students, it is possible to determine school management practices that can be applied in schools with low academic performance. If the role of the school managers is really important, ways to manage the schools in order to maximize student learning should be considered a priority in educational discussions. Since the 1980s, studies in the economics of education began to highlight the leading role of school managers Verger and Curran (2014). It was found in these studies that the role of school directors as leaders of school management would be critical to the creation of conditions necessary for academic development of the students. In order to examine which attributes of educational leaders influence students' learning, Csikszentmihalyi and Wong (2014) observed a positive effect of the experience of directors, as well as a positive association between years of teaching experience of directors and the performance of students. In general, the investigators found that the behavior of directors as leaders of school management influenced the performance of the students.

According to Orphanos and Orr (2014) school management exert positive influence on students' grades. Schools management that practice democratic management style such is where headmasters were chosen by the teachers and parents or who entered through public service exams offer better performance than the schools where the headmasters were nominated by administrative organs. The profile of a school management team is related to students' academic performance. Csikszentmihalyi and Wong (2014) point out that the experience of a school headmaster in a school management team has positive impacts on students' grades. Student learning is greater in institutions in which the management team gives greater importance to the participation of teachers in elaborating

the pedagogical plan and is more open to suggestions from the school community. In the view of Harris and Jones (2015) the school management teams may affect the results of the students in various ways. As leaders in the schools, they influence aspects such as supervision and retention of teachers, introduction and development of pedagogic projects, the discipline of students, and allocation of students and teachers in classes. Hallinger (2018) examined the performance of students according to three profiles of school management; management, traditional and democratic. They conclude in their studies that strongly democratic principles contribute not only to better student performance but also to fairness in relation to their socio-economic levels. Focusing on the practices of good management, Hallinger (2018) analyzed the impact of a pilot program of educational management in state schools of Sao Paulo. The author finds evidence that there are positive and significant impacts on students' grade in mathematics, arising from the participation of the school in the school management program deployed in them. In addition, these positive effects influence, especially students with great learning deficiencies. Performance monitoring and goal setting, combined with the bonus policy for school teams are the management practices that impact positively on the students' results.

Different from previous studies, this empirical research focuses on estimating the effect of school management functions which includes teachers' professional development, monitoring and evaluation, democratic management, provision of infrastructure, teachers input, students' effort, PTA support, and parental involvement on the likelihood to enhance students academic performance in a multivariate framework using a stepwise logistic regression model. This study therefore is expected to contribute much into body of knowledge on the management functions that are implemented by various senior high school managers in Ghana as a whole. In summary, the review of related works featured in this study attempted to make a survey of the effect of school management functions on students' academic performance in senior high schools.

3. Research methodology and model specification

3.1 Research methodology

A research design is a logic that connects data to be collected and conclusions drawn to the initial question from a study. Thus, it can be regarded as a basic plan for performing the data collection and analysis phase. This study therefore employs the descriptive research design. The descriptive research design according to Orodho (2012) is used in preliminary and exploratory research to allow the researcher to gather information, summarize, present and as well interpret for the purpose of clarification. It also noted in the literature that, the aforementioned research design is envisioned to produce statistical information about aspects of education that interest educators and policy makers in education. The population on the other hand describes the entire group of people the researcher wishes to investigate. Thus based on the preceding view about population, the population of study was made up of all head teachers, teachers and students of all the public senior high schools in Ashanti region. Statistically, the region is estimated to have about 150 public senior high schools, 7,900 teaching staff including head teachers and 152, 879 students. According to Punch (1998), one cannot study every one, everywhere, doing everything, thus sampling decisions are required not only about which people to interview or which event to observe but also settings and processes. In view of this, the study employed both probability and non-probability sampling techniques which includes simple random sampling and purposive sampling techniques respectively. Specifically, the purposive sampling technique was used in selecting the schools and head teachers whilst the teaching staff as well as the students were on the other hand chosen base on the simple random sampling. In all 30 public senior high schools as well as 480 respondents were respectively selected for the study. The total number of respondents (480) comprised of 10 students, 4 teaching staff, 1 head teacher and 1 P.T.A member from each of the public senior high schools selected for the study. Specifically, in terms of gender distribution of respondents regarding the sample selected for the study, twenty (20) of the head teachers were males whereas ten (10) were females; sixty-two (62) of the teaching staff too were males' whist fifty-eight (58) were females; two hundred and six (206) of the students were males, ninety-four (94) were females whilst on the side of PTAs fourteen (14) out of thirty (30) respondents represented males with the remaining representing females (16). In totality, the study comprised of

three hundred and two (302) males and one hundred and seventy-eight (178) females. The above statistics are outlined in Table 1 and further supported by Figure 1;

Table 1

Respondent and gender cross-tabulation

Respondent	Gender		
	Male	Female	Total
Head teacher	20	10	30
Teachers	62	58	120
Students	206	94	300
PTAs	14	16	30
Total	302	178	480

Data was collected from the aforementioned respondents in various selected public senior high schools using a structured questionnaire. Questionnaires were chosen and considered appropriated because; they would cover a large sample of respondents, thereby allowing a reasonable degree of

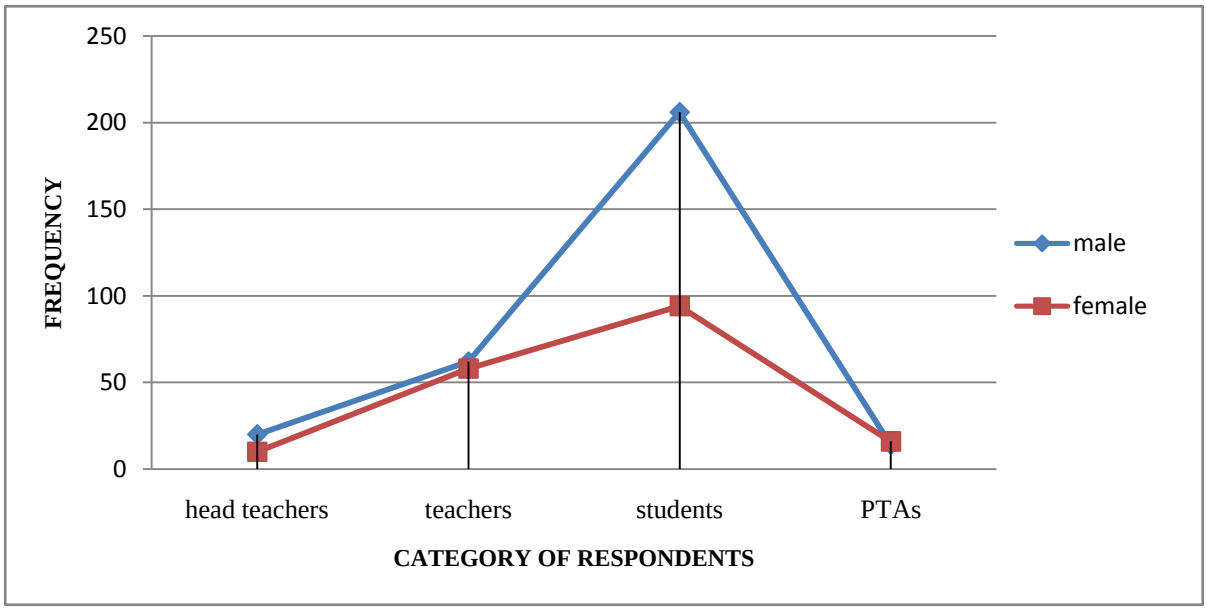

Figure 1. Distribution of respondents base on gender and respondent category

generalizability of the findings. In view of Emery and Cooper (2003), the raw data obtained for a study is not useful unless it is transformed into information for the purpose of the research. Hence after the data was collected from the various groups of respondents involved in the study, data cleaning was firstly done in order to improve the quality of the responses. The data obtained based on the responses from respondent were then coded and entered using the Statistical Package for Social Sciences (SPSS) version 22.0. The qualitative data was then analysed using correlation analysis to assess the influence of management functions on students' academic performance as well as a stepwise logistic regression analysis to examine management functions that significantly enhances academic performance of students in public senior high schools. Before conducting further analysis regarding the correlation analysis and the stepwise logistic regression analysis, a reliability test using the Cronbach's Alpha was used to assess the extent of internal consistency of variables or items in the questionnaire. Since the questionnaires were answered by various categories of respondents, the reliability test was based on the categories. This was fundamentally placed into two groups which include: students as one group then headteacher and teachers also in another group. Per the findings of Howitt and Cramer (2005) an Alpha value which is greater than 0.8 is considered to be satisfactory. Base on this assertion, responses on the items teachers professional development and academic performance from the side of teachers and head teachers as well as teachers input, and PTA support from the side of both groups (students inclusive) received satisfactory reliability since their respective Alpha values were above 0.80. The remaining items from Table 2 had high scored but not satisfactory thus above 0.5.

Table 2
Testing the consistency of variables used in the questionnaire

Variable	Cronbach's Alpha	
	Teachers and Head Teachers	Students
Teacher professional development	0.88	
Monitory and evaluation	0.79	
Democratic management	0.60	
Provision of infrastructure	0.52	
Academic performance	0.90	
Teachers input	0.84	0.80
Students effort		0.62
PTA support	0.88	0.68
Parental involvement		0.53

3.2 Model specification

With the main aim of determining the management functions that significantly enhances the academic performance of students in public senior high schools, this study as earlier mentioned utilized a stepwise logistic regression model. Generally, the stepwise logistic regression model has become an integral component of any data concerned with the relationship between a dichotomous response variable with one or more explanatory variables. The stepwise logistic regression model is a type of generalized linear model (GLM) with two components which includes the random component and systematic component. The random component represents the response variable which in this study is academic performance defined as;

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$$AP = \begin{cases} 1, & if\ students'\ academic\ performance\ is\ enhanced\ by\ school\ management\ functions \\ 0, & if\ students'\ academic\ performance\ is\ not\ enhanced\ by\ school\ management\ fucntions \end{cases}$$

where AP represents academic performance of students.

In this case, the study is interested in the probability that $AP_i = 1$ that is $P(AP_i = 1)$ indicating the probability that students' academic performance will be good follows the binomial distribution. The systematic component on the other hand is linear combination of the explanatory variables and their respective parameters to be estimated which takes the form:$\beta_0 + \beta_1 x_1 + \beta_2 x_2 + \cdots + \beta_m x_m$. The explanatory variables may be quantitative (continuous), qualitative (categorical) or even both (mixture).

The general logistic regression model is formulated as;

$$logit(\pi_i) = log_e\left(\frac{\pi_i}{1-\pi_i}\right) = X_i^T\beta$$

where X_i is a vector of continuous measurements corresponding to covariates and β is the vector consisting of parameter estimates.

For binary response variable AP with multiple explanatory variables $x_1, x_2, \ldots, x_m$ the model in Equation (2) becomes;

$$\pi(x) = \frac{exp(\beta_0 + \beta_1 x_1 + \beta_2 x_2 + \cdots + \beta_m x_m)}{1 + exp(\beta_0 + \beta_1 x_1 + \beta_2 x_2 + \cdots + \beta_m x_m)}$$

With regards to this study, the dependent variable as mentioned is Academic performance which is binary. The dependent variable "Academic performance" from Equation (1) has two levels; 0 if academic performance of students cannot be enhanced by school management functions and 1 if the

academic performance of students can be enhanced by school management functions. The factors assumed to be contributing to academic performance are used as explanatory variables. The explanatory variables used in the model includes; Teacher professional development, Monitoring and evaluation, Democratic management, Provision of infrastructure, Teachers input, Students effort, PTA support, and Parental involvement.

The logistic regression model therefore used is formulated as;

$$P(if\ students'\ academic\ performance\ is\ enhanced\ by\ school\ management\ functions) = \pi(x) = \frac{e^{g(x)}}{1+e^{g(x)}}$$

and

$$P(if\ students'\ academic\ performance\ is\ not\ enhanced\ by\ school\ management\ function) = 1-\pi(x) = \frac{1}{1+e^{g(x)}}$$

Where $g(x)$ represents the function of the linear combination of the independent variables and their respective parameter estimates. This is called the logit function and is specified in terms of the variables used in the study as;

$$g(x) = \beta_0 + \beta_1 tfd + \beta_2 me + \beta_3 dm + \beta_4 poi + \beta_5 ti + \beta_6 se + \beta_7 PTAs + \beta_8 pi + \varepsilon$$

where tfd ,me, dm , poi , ti , se , $PTAs$, and pi are the explanatory variables already defined and ε represents the error term.

3.3 Hypothesis

Considering the logistic regression model formulated in the previous section, this current seeks to test the following hypothesis at 5% level of significance as follows:

H_0: there exist no significant relationship between students' academic performance and its determinants

H_A: there exist significant relationship between students' academic performance and its determinants.

4. Results and discussions

4.1 Summary of descriptive statistics

A brief summary of the descriptive statistics is presented in Table 1. With respect to our findings, the most important refers to the actual deviation from the mean value for the variables used in the study. To be more specific, the value of the standard deviation of the dependent variable (academic performance) is equal to 1.91. Furthermore, the same statistics for teacher professional development, monitoring and evaluation, democratic management, provision of infrastructure, teachers input, student's effort, PTA support and parental involvement are respectively equal to 0.21, 2.39, 1.59, 1.55, 1.88, 0.26, 1.55 and 0.26. Additionally, Table 1 gives values on skewness, kurtosis as well as the Jarque-Bera test which helps to identify as to whether the data with respect to the variables follows a normal distribution. It can therefore be deduced that the dependent variable together with independent variables monitoring and evaluation, democratic management, provision of infrastructure, teachers input and PTA support are negatively skewed, flattering to the left as compared to the normal distribution. Also, the variables teachers' professional development and students' effort are positively skewed, flattering to the right. The kurtosis value of the dependent variable is observed to be greater than the normal value (3). This indicates that, the shape of this distribution is leptokurtic. The explanatory variables which includes monitoring and evaluation, provision of infrastructure and PTA support are deduced to be mesokurtic in terms of shape since they respectively have kurtosis values which are approximately 3 whereas the remaining variable including parental involvement, students' effort, teachers input and democratic management are identified to be platykurtic in terms of shape since they respectively have their kurtosis to be approximately less than 3. Generally, the normal value of the skewness is "zero" and that of kurtosis is "three" when the observed series is normally distributed. The result per kurtosis and skewness for various variables used in the study is in line with Jarque-Bera test statistics in which all its values are not approximately zero or exactly zero. The JB test is used to determine whether the given series is normally distributed or not, with the null hypothesis that the series follows a normal distribution against the alternative hypothesis that the series is not

normally distributed. The result from the JB test therefore rejects the null hypothesis that the series is normally distributed. Therefore, the series is not normally distributed.

Table 3

Summary of descriptive statistics

Variable	Mean	Std. Dev.	Skewness	Kurtosis	J-B test
Dependent variable					
Academic performance	7.63	1.91	-2.41	10.48	329.93 ***
Independent variable (management functions)					
Teacher professional development	5.84	0.21	0.75	1.64	16.83***
Monitory and evaluation	9.56	2.39	-0.49	2.46	5.22**
Democratic management	6.34	1.59	-1.32	2.38	30.64***
Provision of infrastructure	6.19	1.55	-1.63	2.53	45.20***
Teachers input	7.52	1.88	-1.83	2.20	58.98***
Students effort	2.22	0.26	1.18	2.04	27.05***
PTA support	6.18	1.55	-1.97	2.61	65.32***
Parental involvement	2.54	0.64	1.13	2.32	23.21***

Note:*** and ** indicates the rejection of the Jarque-Bera (JB) null hypothesis of normality at 1% and 5% level of significance.

4.2 Multicollinearity test

This study further test for multicollinearity among the independent variables using the VIF and Tolerance. Table 4 therefore shows the multicollinearity test results with respect to the independent variables used in the study. The VIF values are much less than 10 whilst the values of the tolerance on the other hand are also more than 0.2. This therefore implies that, there exists no multicollinearity among the variables within the multiple logistic regression model in Equation (6) when students' academic performance is used as the dependent variable.Since there exists no multicollinearity in the multiple logistic regression specified in the study we went further to estimate the determinants of students' academic performance in the subsequent section.

Table 4

Multicollinearity test using VIF and Tolerance

Independent variables (management functions)	VIF	Tolerance
Teacher professional development	8.25	0.47
Monitory and evaluation	5.21	0.76
Democratic management	1.77	0.83
Provision of infrastructure	1.89	0.88
Teachers input	4.28	0.82
Students effort	9.17	0.75
PTA support	6.44	0.56
Parental involvement	4.37	0.95

Note: the values of both the VIF and Tolerance are based on the dependent variable (students' academic performance). The VIF values are expected to be below 10 and that of Tolerance to be more than 0.2.

4.3 Estimating the effect of school management functions on students' academic performance

4.3.1 Model summary

The model summary provides information on the usefulness of the model. The model summary results as shown in Table 5 gives the respective value of the Cox and Snell R-square as well as Negelkerke R-square which depicts the amount of variations in the response variable explained by the model from a minimum value of 0 to a maximum value of approximately 1. The aforementioned statistics are described as a Pseudo R-square statistic value than the R-square value that is used in a multiple linear regression analysis output. Findings from the analysis pertaining Cox and Snell R-square

together with Negelkerke R-square gives the values 0.581 and 0.785 respectively suggesting that, between 58.1% and 78.5% of the variability in the response variable (students' academic performance) has been explained by the set of explanatory variables used in the model. This further indicates that a substantial amount of variation in the response variable has been explained. Table 4 additionally reports a -2log-likelihood value of 22588.164 which comparatively is smaller than that of an empty model (model at the initial stage (step 0) consisting of only the constant) from the logistic regression output, indicating that, the final model will be very useful in predicting the likelihood of students' academic performance being good or bad.

Table 5

Results from the Model Summary

Step	-2log-likelihood	-2log-likelihood
1	22588.164	22588.164

4.3.2 Omnibus test of model coefficients

The Omnibus test of model coefficients reveals the overall indication of how well the model performs over and above an empty model (model with no predictor variable entered). This is referred to as the goodness of fit test. The results from Table 6thus gives a p-value of the model as 0.000 which is less than the level of significance of 0.05 with a Chi-square value of 133.042 and a degree of freedom (df) of 27. This suggests that the model is significantly fit better than an empty model (model in step 0) which as a results leads to the rejection of the null hypothesis. This therefore brings out the indication that, there exist a significant relationship between students' academic performance and management functions due to the fact that the model expressed as a function of management functions is significant (p-value<0.000).

Table 6

Results from the Omnibus test of model coefficients

	Chi-square	df	Prob. Value
Step	133.02	27	0.000
Block	133.042	27	0.000
Model	133.042	27	0.000

4.3.3 Hosmer and Lemeshow test

The Hosmer and Lemeshow test on the other hand is used in testing the significance of the model and also used to support the model as being worthwhile. This test is interpreted very differently from the Omnibus test of model fit in the previous section. For the Hosmer and Lemeshow goodness of fit test, poor fit is indicated by a probability value less than 0.05. Hence in order to support the model as significantly fit in relation to the Omnibus test, a probability value greater than the level of significance 0.05 is needed. The results from the Hosmer and Lemeshow test as Table 7 depicts gives a Chi-square value of 8.883 with a probability value of 0.352. This probability value is greater than the level of significance of 0.05, therefore indicating support for the model as worthwhile or very significant. This outcome is in line with the findings of Isaac et al (2015) for the factors affecting maternal mortality and some related factors using logistic regression analysis.

Table 7

Results from the Hosmer and Lemeshow Test

Step	Chi-square	df	Prob. value
1	8.883	8	0.352

4.3.4 Model estimation results

After affirming the significance of the logistic regression model, it is of interest to pin down to estimate the effect of the various management functions on the academic performance of students within public senior high schools in Ghana specifically in the Ashanti region of Ghana as a study case. Table 8 thus outlines the results based on the estimates of the logistic regression model for the association of school management functions assumed to be enhancing the academic performance of students in public senior high schools. Results given in Table 8 are based on the parameter estimates, standard error values, Wald test, odds ratios and p-values of the various variables used in the study. The parameters estimates are interpreted in terms of the p-values, Wald test values as well as the odds ratio

($\exp(\beta)$). The p-values and the Wald test helps to identify the variable that makes significant contribution to the response variable whereas the odds ratio ($\exp(\beta)$) reflects the multiplicative effect of the various variables in the model assumed to be enhancing students' academic performance. From Table 8, the intercept with parameter estimate of 0.850 and a p-value of 0.000 as well as Wald test value of 68.562 is statistically significant and different from zero at 1% level of significance. Among the explanatory variables (management functions) assumed to enhance the performance of students in public senior high schools, only democratic management is identified to be statistically insignificant. This therefore gives the indication that; the enhancement of students' academic performance in the various public senior high schools does not rely on democratic management. This variable (democratic management) is reported to have a p-value of 0.140 which is greater than all the standard levels of significance (1%, 5% and 10% respectively). Concerning the significant variables, the estimated results further reveals that, improvement in teachers' professional development in various public senior high schools has important effect on increasing the likelihood of enhancing students' academic performance. This is in supported by the odds ratio of 1.179 indicating that, progress in improving teacher's profession development is 1.179 times likely to enhance students' academic performance in public senior high schools. Also, monitoring and evaluation is reported to be statistically significant at 1% level with a Wald test and odds ratio value of 7.716 and 1.122 respectively. This therefore suggests that upsurge in monitoring and evaluation in public senior high schools is 1.122 times more likely to enhance students' academic performance. At 5% level of significance, provision of infrastructure had statistically significant p-value of 0.021 and odds ratio of 1.162 indicating that, the aforementioned variable is 1.162 times more likely to enhance the academic performance of students in public senior high schools with no doubt. Interestingly and as expected, the input of teachers had the highest Wald test value (26.910) signifying its level of contribution to the enhancement of students' academic performance with an odds ratio of 1.392. This thus justifies that, effort from teachers in terms teaching is 1.392 times more likely to improve the academic performance of students in public senior high schools. Results from the estimations moreover show that students also have a significant role to play when it comes to academic performance. This evidenced from the fact that, students' effort from the results in Table 8 has a statistically significant impact on academic performance with a positive parameter estimate of 0.331 and an odds ratio of 1.392 suggesting that upsurge with respect to efforts from students will 1.392 times more likely to enhance academic performance in public senior high schools. Finally, support from PTA and parental involvement in the same manner shows a statistically significant contribution to the enhancement of students' academic performance with positive parameter estimates and odds ratios of 1.357 and 1.212 respectively. This finding without doubts supports that, improvement parental support and parental involvement will 1.357 and 1.212 times likely to enhance the academic performance of students in public senior high schools inevitably.

Depending on the results per the significant explanatory variables, the logit function ($g(x)$) from Equation (6) can be estimated as;

$$g(x) = 0.850 + 0.165tpd + 0.115me + 0.150pi + 0.173ti + 0.331se + 0.305PTAs + 0.192pi$$

Thus ceteris paribus the probability that students' academic performance can be enhanced is estimated using the fitted logistic regression model;

$$\pi(x) = \frac{e^{0.850+0.165tpd+0.115me+0.150pi+0.173ti+0.331se+0.305PTAs+0.192pi}}{1+e^{0.850+0.165tpd+0.115me+0.150pi+0.173ti+0.331se+0.305PTAs+0.192pi}}$$

where $\pi(x)$ represents the probability the students' academic performance can be enhanced by management functions.

Table 8

Results from the logistic regression Model estimation

Variable	Parameter estimates	Wald test value	Std. error	Exp(Beta)	Prob.value
Intercept	0.850***	68.562	0.103	2.339	0.000
Teacher professional development	0.165***	11.014	0.050	1.179	0.001
Monitory and evaluation	0.115***	7.716	0.043	1.122	0.007
Democratic	0.002	2.174	0.001	1.002	0.140

management					
Provision of infrastructure	0.150**	5.355	0.065	1.162	0.021
Teachers input	0.173***	26.910	0.033	1.189	0.000
Students effort	0.331***	13.168	0.090	1.392	0.000
PTA support	0.305***	10.165	0.096	1.357	0.001
Parental involvement	0.192**	5.864	0.079	1.212	0.015

Note: ** and *** represents the significance levels at 5% and 1% respectively

5. Conclusion

Management of senior high schools (SHS) has become a newsworthy as many people have made an attempt to draw a strong relationship between effective school management functions and academic performance of students. Discourse in management roles of school managers for instance headmasters have been conducted in schools but none of them touched on the role of its effectiveness on the academic performance of senior high schools in Ghana, particularly Ashanti Region. This current study therefore investigated the effect of school management functions assumed to be contributing to the enhancement of students' academic performance in various public senior schools in the Ashanti region of Ghana. With the help of a stepwise multiple logistic regression, Teacher professional development, Monitory and evaluation, Democratic management, Provision of infrastructure, Teachers input, Students effort, PTA support, and Parental involvement were used as explanatory variables conforming to management functions whereas students' academic performance on the other hand was employed as a dichotomous response variable. Various goodness of fit test which includes Omnibus test as well as the Hosmer and Lemeshow tests revealed that, our estimated logistic regression model is significant and can as well predict the likelihood (probability) of enhancing students' academic performance in various public senior high schools. With regards to the estimated results it was evidenced that based on the Wald test values, p-values and odds ratio values Teacher professional development, Monitoring and evaluation, Provision of infrastructure, Teachers input, Students effort, PTA support, and Parental involvement significantly contributed to the likelihood (probability) that students' academic performance can be enhanced. Only democratic management as school management did not appear to be significant. With respect to the findings obtained from this current study, we recommend that school management function with the exception of democratic management should be intensified in various public senior high schools in the Ashanti region of Ghana so as to enhance students' academic performance.

References

Ahmed I and Qazi TF (2011) A look out for academic impacts of Social networking sites (SNSs): A student based perspective. African Journal of Business Management 5(12): 5022-5031.

Allen, N., Grigsby, B., & Peters, M. L. (2015). Does Leadership Matter? Examining the Relationship among Transformational Leadership, School Climate, and Student Achievement. International Journal of Educational Leadership Preparation, 10(2), 1-22.

Bird, D. O. (2017). Relationship between teacher effectiveness and student achievement: an investigation of teacher quality: Ball State University.

Bloom, N., Lemos, R., Sadun, R., & Van Reenen, J. (2015). Does management matter in schools? The Economic Journal, 125(584), 647-674.

Bloom, N., Lemos, R., Sadun, R., Scur, D. & Reenen, J. V. (2014). The new empirical economics of management National Bureau of Economic Research Working Paper Series, No. 20102.

Cantrell, S., Fullerton, J., Kane, T. J., & Staiger, D. O. (2008). National board certification and teacher effectiveness: Evidence from a random assignment experiment. National Bureau of Economic Research Working Paper Series, No. 14608.

Csikszentmihalyi, M., & Wong, M. M.-h. (2014). Motivation and academic achievement: The effects of personality traits and the quality of experience Applications of flow in human development and education (pp. 437-465): Springer.

Day, C., Gu, Q., & Sammons, P. (2016). The impact of leadership on student outcomes: How successful school leaders use transformational and instructional strategies to make a difference. Educational Administration Quarterly, 52(2), 221-258.

Downey, D. B., & Condron, D. J. (2016). Fifty years since the Coleman Report: Rethinking the relationship between schools and inequality. Sociology of Education, 89(3), 207-220.

Emery, S., Cooper, L. P. (2003). A research agenda to reduce risk in new product development through knowledge management: a practitioner perspective. Journal of Engineering and Technology Management, 20(1-2), 117-140.

Epstein, J. L. (2018). School, family, and community partnerships: Preparing educators and improving schools: Routledge.

Hallinger, P. (2018). Surfacing a hidden literature: A systematic review of research on educational leadership and management in Africa. Educational Management Administration & Leadership, 46(3), 362-384.

Hanushek, E. A. (1979). Conceptual and empirical issues in the estimation of educational production functions. The Journal of Human Resources, 14(3), 351–388.

Harris, A., & Jones, M. (2015). Transforming education systems: comparative and critical perspectives on school leadership. Asia Pacific Journal of Education, 35(3), 311-318.

Hopkins, D. (2015). Improving the quality of education for all. A handbook of staff development activities: Routledge.

Howitt, D., & Cramer, D. (2005). Introduction to SPSS in Psychology: with supplements for releases 10, 11, 12 and 13. Pearson education.

Isaac, A. M., Wallace, A., &Boateng, K. (2015). Assessing The Occurrence Of Maternal Mortality And Some Related Factors At Komfo Anokye Teaching Hospital. International Journal of Scientific and Technology Research. Vol. 4, Issue 12,ISSN 2277-8616.

Kyriakides, L., Creemers, B. P., Antoniou, P., Demetriou, D., &Charalambous, C. Y. (2015). The impact of school policy and stakeholders' actions on student learning: A longitudinal study. Learning and Instruction, 36, 113-124.

Lewin, K. M., & Stuart, J. S. (2016). Educational innovation in developing countries: case-studies of changemakers: Springer.

Lucas, R. E., Jr. (1978). On the size distribution of business firms. The Bell Journal of Economics, 9(2), 508–523.

Masci, C., De Witte, K., & Agasisti, T. (2016). The influence of school size, principal characteristics and school management practices on educational performance: An efficiency analysis of Italian students attending middle schools. Socio-Economic Planning Sciences.

Orodho, J.A. (2012). Elements of Education and Social Science Research Methods. Bureau of Educational Research. Institute of Research and Development. Ph.D Dissertation, Kenyatta University, Nairobi Kenya

Orphanos, S., & Orr, M. T. (2014). Learning leadership matters: The influence of innovative school leadership preparation on teachers' experiences and outcomes. Educational Management Administration & Leadership, 42(5), 680-700.

Punch, K. F. (1998). Introduction to Social Research: Quantitative and Qualitative Approaches (1st ed.). London, Thousand Oaks California, New Delhi: SAGE Publications.

Verger, A., & Curran, M. (2014). New public management as a global education policy: its adoption and re-contextualization in a Southern European setting. Critical studies in education, 55(3), 253-271.

World Bank (2008), The Road Not Travelled: Education Reform in the Middle East and North Africa: http://siteresources.worldbank.org/INTMENA/Resources/EDU_Flagship_Full_ENG.pdf