

Impact of Teachers' Motivational Indices on Science Students' Academic Performance in Nigerian Senior Secondary Schools

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Received: November 6, 2012 Accepted: November 23, 2012 Online Published: December 16, 2012

doi:10.5539/ies.v6n2p49

URL: <http://dx.doi.org/10.5539/ies.v6n2p49>

Abstract

The impact of science teachers' motivation on science students' academic performance in Senior Secondary Schools in Ondo and Ekiti States of Nigeria was investigated in this study. This was a descriptive survey research which was questionnaire based and past WAEC O/L ((May/June 2008 and 2009) student results on the science subjects. The population of the study was all public Secondary Schools (science teachers and students) in Ekiti and Ondo States, Nigeria. A stratified random sampling was used to select a total of five hundred and ten (510) science teachers (male and female) from Ekiti and Ondo States from the selected schools for the study. And a total six thousand eight hundred (6,800) Science Students (male and female) from the selected schools was also considered in the study. In each of the school selected for the study, only teachers of Biology, Chemistry and Physics were involved in the sample and the students that registered and wrote Biology, Chemistry and Physics WAEC examination of May/June 2008 and 2009 in Ekiti and Ondo states of Nigeria. The data collected for the study were analyzed using descriptive analysis, Multiple Regression analysis and Pearson Product Moment Correlation. All the hypotheses were tested at 5 % level of significance. Among others, the study revealed that; there was significant relationship between regular payment of science teachers' allowance and academic performance of science students; there was significant relationship between regular teachers' participation in seminars/ workshops and academic performance of science students. Also, there exist statistical significant relationship between granting of study leave with pay to science teachers and academic performance of science students. As a result of the findings, it was recommended that the adequate science allowance should be regularly paid to the science teachers to enhance their excellent performance.

Keywords: motivation, science subjects, science teachers' allowance, academic performance, training and re-training

1. Introduction

Education is adopted as an instrument for effective national development and growth so as to produce citizens that are dynamic both in thought and deeds, self-sufficient, effective, united and show civil responsibility (Federal Government of Nigeria, 2004). The increasing awareness of the importance of education to the upliftment of the individual and societal standards has awakened in people and nations a conscious effort at devoting their meager resources to acquiring qualitative education (Ekundayo, 2008).

Educational administrators and managers are interested in the optimization of every sphere of education for efficient co-ordination and management. The Impact of Science teachers' motivation on science students' academic performance in Public Senior Secondary Schools in Ekiti and Ondo States of Nigeria is one of the grey areas of education that deserves the attention of all stake holders in education. Development of any nation is a measure of her development in the area of Science and Technology. America, Russia, Japan and China are typical examples of developed nations as a result of their stability in the area of Science and Technology. Science Subjects are the bed-rock upon which the Science and technological advancement of any nation is built. Science is the theory upon which the technology is built, without Science; there cannot be intuition for technology (Ogungbemi, 2005). Nigeria as a nation needs tremendous improvement in the area of Science and Technology. Science teachers are very important in turning out highly needed and skilled manpower which form the bed-rock of national development. This implies that the technological development of the nation depends on

the quality of Science education obtained from schools and Science classrooms (Konmm Owuazor, 1993). But unfortunately, reports from WAEC Chief Examiners (1998-2007, 4) as expressed in table 1 and personal experience of the researchers have also revealed that very many students do perform poorly every year in their final examination result and many students show lack of interest in Science subjects. From table 1, 1,238,163 Biology students sat for the examination in 2007, only 33.37% of the population had Credit pass; 422,681 Chemistry students wrote the examination in 2007, only 45.96% of the population had Credit pass and with 418,593 Physics candidates, only 43.19% only of the population had Credit pass in 2007 also. Also in year 2006, out of 1,137,181 candidates that sat for Biology, only 49.23% of the population that had credit pass, while out of 380,104 candidates that wrote Chemistry, only 44.90% had Credit pass and out of 375,824 candidates that sat for Physics, only 58.05% of the population that had credit pass. Moreover, in year 2005, 1,051,550, 349,936, 344,391 candidates that wrote Biology, Chemistry, and Physics, only 35.74%, 50.94%, 41.50% of the population had Credit pass respectively. The table 1 shows ugly trend of academic performance of students in the three major Science subjects.

Table 1. Performances of students in senior secondary certificate Examination science subjects (credit and above) (1998-2007)

Year	Biology		Chemistry		Physics	
	Total sat	% credit pass	Total sat	% credit pass	Total sat pass	% credit pass
1998	626,894	34.44	182,659	21.39	169,657	11.33
1999	745,102	27.81	223,307	31.08	210,271	30.57
2000	518,001	19.19	160,933	32.02	154,808	30.14
2001	995,345	23.25	301,740	36.25	287,993	34.46
2002	882,119	31.52	262,824	34.42	254,188	47.51
2003	909,101	43.14	282,120	50.98	275,369	47.56
2004	821,966	30.83	269,774	38.97	270,028	51.02
2005	1,051,550	35.74	349,936	50.94	344,391	41.50
2006	1,137,181	49.23	380,104	44.90	375,824	58.05
2007	1,238,163	33.37	422,681	45.96	418,593	43.19

Source: West African Examinations Council (WAEC) annual report 2007

With this gloomy situation, it is imperative for the Science Subjects educators and educational managers to look for a better way of improving the situation. Since the researcher believed that better input would bring desirable output (in line with the system theory first proposed in 1928 by Ludwig Von Bertalanffy (David Walonick, 1993, 89) hence, teachers' motivation and improvisation of learning materials may be a panacea towards better learning outcome and performance in the Science subjects.

Science Subjects are essential subjects for scientific and technological development of a Nation. The development of a country is determined by the type of educational system that operates in that country. In the world today science and technology have become a dominant culture factors. The contributions that science knowledge and skills have made to economic and industrial progress of our modern society are too obvious to require any documentation (Ogungbemi, 2005). At this point however, one only needs to mention the significance and immense contributions of science subjects to medicine and the synthesis of a vast number of professions like Architecture, Engineering, Surveyor, Computer, Town and Regional Planning, among others.

The importance of Science subjects cannot be overemphasized as it forms the basis for technological advancement of any nation. Its study can lead to several scientific fields and profession as it has been mentioned earlier on like Engineering, Manufacturing, Mining and Construction industries. Apart from this, the knowledge of Science plays a very significant role in the economic development of any nation. The promotion of Science subjects has turned out to be the 'sine qua non' for rapid acquisition of technological knowhow in most countries of the world.

Information Technology, which has turned the world into a global village through the use of GSM, satellite and computers has to do with the use of principles of sciences. Moreover, a wide range of application of science is used in industrial development for improvement of materials useful to the wellbeing of human race. Furthermore,

in the entertainment industry science has contributed to the refinement of sound and colour mixing to create special effects in stage presentations.

Motivation is the incentive(s) given to a worker to attract him towards his job. That is, it is the encouragement given to workers in an organization in order to put in their best. It is a condition under which an organization can induce its members to combine their participations and contribution in various ways, as well as to ensure that organizational survive in the midst of all odds. Motivation is can also be referred to the way urges aspirations, drives and need of human beings directs or control their behavior. Motivation factors could be intrinsic or extrinsic. So many things motivate workers such as study leave with pay, payment of allowance, attending conferences/ workshop/seminar, and prompt payment of salaries among others and different things motivate individuals within an organization.

Adu (2002) holds the view that a good system of motivation should be able to induce workers to work effectively and such must be flexible in order to account for varying requirement of people and have security on the job. A consideration of motivation would then involve finding out what awakens the organism and energizes him to action. It is believed that motivating a worker would propel him to perform better.

Nwadiani (1998) quoted in Ofoegbu (2004) that schools in Nigeria are fast decaying. The "rot" in the system ranges from shortage of all teaching and learning resources, except students, to lack of effective leadership and proper motivation of teachers. Ozigi (1992) also quoted in Ofoegbu (2004) pointed out that teachers in Nigeria were unhappy, frustrated, uninspired and unmotivated. Against this backdrop, the this paper is set to determine the impact of teachers' motivational indices on Science Students' academic Performance in Nigerian Senior Secondary Schools. To this end, this paper would focus on five factors; payment adequate science allowance to science teachers, granting of study leave with pay to science teachers, availability of teaching materials, payment of teachers' salary, and attending conferences/workshops/seminar.

2. Research Hypotheses

The following null hypotheses were generated for the study:

HO₁: Motivational composite indices (payment of science teacher allowance, exposure to science conferences/seminars, granting of study leave, availability of teaching and payment of teachers' salaries) will not significantly predict science students' academic performance in Ondo and Ekiti States.

HO₂: There is no significant relative influence of:

- a) payments of adequate science allowance to science teachers
- b) regular exposures of science teachers to seminar/workshop
- c) granting of study leave with pay to science teachers
- d) prompt payment of teachers' salary, and
- e) availability of teaching materials on science students' academic performance.

3. Methodology

This was a descriptive survey research which was questionnaire based and past WAEC O/L results (May/June 2008 and 2009) of the students involved in the study within Ekiti and Ondo States of Nigeria. The population of the study was all public Secondary Schools (science Teachers and science students) in Ekiti and Ondo States, Nigeria.

A stratified random sampling was used to select a total of five hundred and ten (510) Science Teachers (male and female) from Ekiti and Ondo States from the selected schools for the study. And a total six thousand eight hundred (6,800) Science Students (male and female) from the selected schools was also considered in the study. In each of the school selected for the study, only teachers of Biology, Chemistry and Physics were involved in the sample and a result format was developed to collect the students' results that registered and wrote Biology, Chemistry and Physics WAEC examination of May/June 2008 and 2009 in Ekiti and Ondo states of Nigeria.

A set of questionnaire items was structured to collect data for the study and result format was used to collect Past WAEC O/L results of the selected science students in science subjects; Biology, Physics and Chemistry. A pilot study was carried out to validate the instrument and the reliability of the instrument was tested using the test-retest method to establish the stability principle and the co-efficient is 0.81. The data was subjected to statistical test and analysis, using descriptive statistics, Correlation and Regression analysis at 5% level of significance.

4. Results

Research Hypothesis One

Motivational composite indices (payment of science teacher allowance, exposure to science conferences/seminars, granting of study leave, availability of teaching and payment of teachers' salaries) will not significantly predict science students' academic performance in Ondo and Ekiti States.

Table 2. ANOVA

Model	Sum of Squares	Df	Mean Square	F	Sig.	R	R ²	Adj. R ²	SE
Regression	106079.31	5	21215.862						
Residual	3395.448	504	6.737	3149.049	.000 ^a	.987 ^a	.975	.975	2.596
Total	109474.758	509							

*P < 0.05

Table 2 reveals that the joint effect of the independent variables that is, the motivational composite indices (payment of science teacher allowance, exposure to science conferences/seminars, granting of study leave, availability of teaching and payment of teachers' salaries) will significantly predict science students' academic performance in Ondo and Ekiti States with $p < 0.05$. Hence, the null hypothesis rejected. R² which is the co-efficient of determination shows that the independent variables that is, the motivational indices account for a high proportion of about 97% of science students' academic performance in science subjects. Also, the standard error of the estimated means is 2.596. This implies that the factors are relevant towards the determination of the dependent measure. This is in line with the research outcome of Yara & Otieno (2010) that, the composite factors can predict the academic performance of the science students.

Also, this finding is in consistent with Kieschke & Schaarschmidt, (2008) that teachers have proven to be the primary variable affecting students' academic performance.

Research Hypothesis Two

Table 3. Coefficients

Model	Unstandardized Coefficients		Standardized Coefficients	t-value	Sig.
	B	Std. Error	Beta		
Constant	2.502	1.026		2.440	0.015
Prompt payment of Science Teachers' Salary	-0.179	1.401	0.405	3.336	0.001
Exposure to Science Conf/Seminars	0.992	0.031	0.239	31.578	0.000
Granting of study leave	0.576	0.633	0.121	1.910	0.036
Availability of teaching materials	1.731	0.581	0.372	2.981	0.003
Payment of teachers' allowance	-0.179	1.401	-0.042	-0.128	0.898

Dependent variable: Students' academic performance

There is no significant relative influence of:

- a) payments of adequate science allowance to science teachers

- b) regular exposures of science teachers to seminar/workshop
- c) granting of study leave with pay to science teachers
- d) prompt payment of teachers' salary, and
- e) availability of teaching materials on science students' academic performance.

Table 3 reveals the relative influence of the motivational indices on science students' academic performance. The result shows that only payment of teachers' allowance that has no statistical influence on science students' academic performance in science subjects with $p > 0.05$, and beta weight of -0.42.

Results do accord with Jesus and Lens (2005) that a teacher's professional engagement constituted the best index of teacher motivation. The level of teacher engagement has strong implications not only for professional growth and the quality of instruction but also for student achievement.

5. Discussion

The results of the study were discussed based on the hypotheses stated:

Table 2 shows that payment of teachers' salaries is the single best predictor of students' academic performance with a beta weight of .405 (41%). This is closely followed by availability of instructional materials with a beta weight of .372 (37%), attendance of science conferences/seminars is with beta weight of .239 (24%), granting of study leave has .121 (12%) beta weight, while payment of science teacher allowance is the least predictor of students' academic performance with a beta weight of -.042 (-4%)

The composite influence of predictor variables on science students' academic performance is high, positive and statistically significant at 0.05 level ($F = 3149.049$, $P < 0.05$). The coefficient of determination (R^2) is .975. This implies that about 98% variation in students' academic performance is jointly explained by variation in the predictor variables. The remaining 2% unexplained variation is largely due to variation in other variables which are not included in the regression model but otherwise constitute the stochastic error term.

Testing the effect of the relative predictor variables on science students' academic performance, the result shows that only the impact of science conferences/ seminar ($t = 31.578$, $P < 0.05$), availability of learning materials ($t = 2.981$, $P < 0.05$), granting of study leave ($t = 1.910$, $P < 0.05$), and payment of teachers' salaries ($t = 3.336$, $P < 0.05$) on science students' academic are significant at 95% confidence level in each case. However, the impact of payment of science teachers' allowance ($t = -.128$, $P > 0.05$) and on students' learning outcomes is not statistically significant at 0.05 level. But the regression model is statistically significant in terms of overall goodness of fit ($F = 3149.049$, $P < 0.05$). The results also agree with the findings of Ukeje (1991), INNE (2002) and Ofoegbu (2004).

The secondary school system being an open system is cyclic in nature, and just like any other social organizations, it absorbs inputs from the environment and discharges output to the environment. However, this system is expected to be self-regulatory. There is feedback of information to detect any shortfall in educational development so as to specify corrective measure(s) for planners for quality teaching process. Akinture (2001) posited that if educational inputs are inferior, the output will also be inferior and this will affect the performance of the system. In this case, teachers and their teaching activities are the agents of transformation. If the transformation is not properly effected may be as a result of the agents not adequately motivated or lack of necessary impetus, the outputs will be defective.

6. Conclusion

Teachers are the most important factor in determining the quality of education that children receive. As such, governments have a responsibility to ensure that teachers perform to the best of their abilities. To do this, governments must pay attention to number of factors that affect teachers' performance (INEE, 2005)

Motivation is only likely when clearly perceived and usable relationship is seen as a means of satisfying needs. If a science teacher is provided with adequate incentives, there is tendency of him performing well while teaching thereby enhancing better academic performance of students in science subjects. As a result of the finding of this study, it is concluded that motivation of science teachers is very important for the nation technological advancement.

Hayden (2011) concluded in his research that low teacher morale and poor motivation has become a major problem at the South Florida School District, particularly at ABC Middle School. His qualitative study was designed to examine ABC Middle School mathematics teachers' motivation and its impact on student

achievement on the mathematics standardized achievement test, the Florida Comprehensive Assessment Test (FCAT).

Recommendations

Based on the findings of this study, the following recommendations were made: adequate science teachers' allowance should be given to the science teachers regularly; science teachers should be regularly exposed to science seminar/workshop to refresh their memory for their better delivery in the classroom and science teachers should be given study leave to advance their studies for their better performance to aid students' better academic performance.

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