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ORIGINAL ARTICLE

Influence of Principals' Leadership Styles on Senior Secondary School Students' Achievement in Chemistry

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ABSTRACT

The study explored the influence of principals' leadership styles on senior secondary school students' achievement in chemistry in the Kogi State of Nigeria. It was guided by one research question and three hypotheses. Correlation survey research design was used. The target population was Senior Secondary Class Three chemistry teachers and students in all the public secondary schools in Kogi State. The sampling technique used was multiple stage samplings which included purposive and simple random sampling techniques. Based on the sampling technique, 42 teachers of 264 and 420 students of 4100 were selected. Two instruments were used to collect data, namely a questionnaire titled "Principals' Leadership Style Questionnaire" (r = 0.88), and a pro forma designed to collect student's results from the principal's offices. Data were analyzed using mean, standard deviation, and Pearson product moment correlation coefficient. The results revealed that authoritarian leadership was the dominant leadership style used by the senior secondary school principals in Kogi State. In addition, chemistry students under the leadership of democratic principles performed better than their counterparts under authoritative and laissez-faire principals. It is recommended, among others, that principals of senior secondary schools adopt a democratic leadership style and that principals should be given orientation on the use of democratic leadership.

KEYWORDS: chemistry; leadership styles; principal; senior secondary; students' achievement

INTRODUCTION

Chemistry, in our opinion, is one of the most important science subjects that contribute to the development of any nation. The application of chemical knowledge has improved the life of humankind in the area of medicine, agriculture, transport, and food industry (Abunga et al., 2014). In spite of the importance of chemistry in the socioeconomic and technological development of any nation, in Nigeria, secondary school students have recently performed poorly in chemistry in Senior Secondary Certificate Examination conducted by West African Examinations Council (Adeyegbe, 1993; Njoku, 2007; Oloyede, 2010; Bamiro, 2015; Achimugu, 2016).

To this end, chemistry educators have continued to make efforts to identify the variables that are responsible for the persistent failure of chemistry students in external examinations to proffer solutions to the problem. It is in this direction that this study looked at the influence of principals' leadership style on students' academic achievement in chemistry. The principal, sometime referred to as the head teacher, is both the administrative and instructional leader of the secondary school. Hornby (2004) defined the principal as the highest in the order of the importance; the chief person on authority and the most important leader of a school or college. Uyanga (2008) defined the principal as someone who is vested with the responsibility of administering and running the affairs of a post-primary school. Mbipom (2000) pointed out that the school principal is the administrator and chief executive of the institution, community and public relation facilitator, curriculum and instructional supervisor or budget facilitator, a change agent, an evaluator, a counselor, conflict reconciler, students' personal organizer, and a leader, among others.

The focus is on the principal as a leader who in that capacity influences achievement by providing and ensuring efficient management of required resources for teaching and learning.

Hornby (2004) defined a leader as the person who leads a state in the position of being the head of an organization. On the other hand, Koontz and Weihrich (1990) defined leadership as the art or process of influencing people so that they will strive willingly and enthusiastically towards the achievement of group goals. Diakwa (2005) listed the qualities for good leadership to include:

Willingness to make decision for the community; a high degree of diplomacy; ability to maintain integrity in performance of one's duty; high degree of social sensitivity; willingness to integrate and be firm with subordinates; the ability to know the personal deficiencies of subordinates and dealing with them appropriately; and the ability to accept responsibilities. (p. 21)

Awunah (2011) observed that for a principal to succeed in the tasks of leadership, everyone in the school system has a very important role to play and must not be underrated by the principal; from students to teachers, departmental heads, deans,

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vice-principals, and all are important and must be carried along. From the discussion so far, it is clear that there must be leadership characteristics that a principal must exhibit to direct the activities of the staff and students toward the achievement of the school goals. These leadership characteristics of principals are sometimes referred to as leadership styles.

The three major types of leadership styles of a principal are authoritarian, laissez faire, and democratic styles of leadership. Authoritarian (autocratic) leadership styles focus on dominating attitude and as such do not recognize opposing or competing views. Indeed, no opportunities are provided for alternative views or interest other than those defined by the authoritarian leader as legitimate. Authoritarian (autocratic) leaders do not delegate responsibilities and they are always alienated from their subordinates. This type of leadership often engenders anger, frustration, despair, and in extreme cases withdrawal from school activities. Therefore, this type of leadership style affects effective teaching and learning of chemistry. For instance, Ogalo (2013) pointed out that principals who apply autocratic leadership have lower cooperation with their teachers in terms of lesson preparation, use of teaching aids, and effective classroom teaching and as such tend to produce lower students' achievement in any subject including chemistry.

The second leadership style is the laissez fair which gives up leadership and responsibilities to the subordinates. The teachers and students under the laissez-faire leadership are free to do whatever they like. For instance, lazy teachers may decide not to attend classes under the leadership of laissez-faire principal who may not correct or confront them. Indeed, another name that can be coined for this type of leadership is "anything goes leadership." Okumba (1998) in Igwe et al. (2017) pointed out that institutions where laissez-faire leadership style is practice, it is feared that teachers and students may relax since they do what they want, and this will affect teaching and learning including chemistry as a subject. This may, in turn, affect students' achievement negatively.

The third leadership style is democratic leadership which is the direct opposite of authoritarian (autocratic) leadership style. It is sometimes referred to as integrative or participatory leadership. This leadership style involves active participation of the subordinates in decision-making. According to Bello et al. (2016), democratic leadership emphasizes that the inputs and influences over any decision that affects the subordinate be jointly taken by the teacher and the students who are affected by those decisions. That is to say, the opinions and views of the subordinates who are affected by those decisions are actively sought to provide suggestions and recommendations in the decision-making process. They argued that democratic (or participatory) leadership encourages teachers and students to participate actively, thereby making them feel engaged and in the process, they are motivated and creative which, in turn, improves school goals and achievement of the students. Thus, democratic leadership is based on the principles of esprit de corps or "consultation from top to bottom." It promotes creative atmosphere and greater achievement of the subordinates (teachers and students). Ogalo (2013) and Ball (1987) in Igwe et al. (2017) pointed out that democratic leadership style motivates teachers who, in turn, could directly influence students' achievement. In particular, democratic leadership style ensures that teacher's individual needs are met and this encourages teachers to be at their best in their classroom interaction pattern, and hence, students are taught well and they perform well in their internal and external examinations.

Several education researchers hold conflicting views about the effects of leadership styles on students' achievement in schools. For instance, a study by Bello et al. (2016) revealed that there was no significant relationship between the three leadership styles and students' achievement in English Language and Mathematics. They concluded that none of the leadership styles was the best predictor of students' academic performance in the Taraba State of Nigeria. On the other hand, a study by Al-Safran et al. (1998) found that schools with democratic (integrative) principals achieved higher academic outcomes than schools with autocratic (authoritarian) principals in the United States of America (USA), but the same finding indicated that in Kuwait, the autocratic (authoritarian) leadership style promoted higher academic outcomes. They concluded that the appropriate leadership style that promotes the academic achievement of students depends on the country and culture of the people. Therefore, education researchers are challenged to probe into the influence of principals' leadership styles on their subject areas and in their localities. Thus, this study is focused on the influence of principals' leadership styles on students' achievement in Kogi State, Nigeria.

Purpose of the Study

The main purpose of this study was to investigate the influence of perceived principals' leadership styles on students' achievement in chemistry. Specifically, the objectives of this study were to find out:

1. The extent to which the use of authoritarian leadership style correlates with students' achievement in chemistry.
2. The extent to which the use of laissez-fair leadership style correlates with students' achievement in chemistry.
3. The extent to which the use of democratic leadership style correlates with students' achievement in chemistry.

Hypotheses

The following hypotheses guided the study:

1. There is no significant correlation between principals' use of authoritarian leadership style and students' achievement in chemistry.
2. There is no significant correlation between principals' laissez-fair leadership style and students' achievement in chemistry.
3. There is no significant correlation between principals' democratic leadership style and students' achievement in chemistry.

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METHODS

The study adopted a correlation survey research design to establish the relationship between the principals' leadership styles and academic achievement of students in chemistry.

The population of the study consisted of Senior Secondary Class Three (SS 3) chemistry teachers and students in all the senior secondary schools in Kogi State. There were 260 SS 3 chemistry teachers and 4100 SS 3 students in the 264 public secondary schools in the Kogi State. A multistage sampling technique was used in selecting the SS 3 chemistry teachers and students for this study.

In stage one, purposive sampling technique was used in selecting two senior secondary schools from each of the 21 local government areas of the Kogi State giving a total of 42 senior secondary schools. All the SS 3 chemistry teachers (one per school) in the 42 senior secondary schools constituted the sample. In stage two, simple random sampling technique was used in selecting 10 students from these 42 senior secondary schools, giving a total of 420 SS 3 chemistry students for the study. Furthermore, all the 42 principals of the senior secondary schools sampled were used for the study. Two instruments were used for the study. The first was a questionnaire titled "principals' leadership style questionnaire" (PLSQ). The second was a pro forma designed to collect students' results in the Kogi State transition examination for the year 2016. The Kogi State transition examination was considered because it was the only external examination taken by the 2017 SS 3 chemistry students when they were in their third term of their SS 2 in 2016. The PLSQ was validated by four research experts in the areas of chemistry education and educational measurement and evaluation. Test-retest method of reliability was adopted and Pearson product moment correlation was used to determine the reliability coefficient which stood at 0.88 for the PLSQ. Questionnaires were administered to the respondents by the researcher with the help of research assistants who were the researcher's professional colleagues in the Science Teachers' Association of Nigeria. Data were analyzed using Pearson product-moment correlation coefficient.

RESULTS

The results are presented according to the hypotheses.

Hypothesis 1

There is no significant correlation between principals' use of authoritarian leadership style and students' achievement in chemistry.

Table 1 shows the Pearson product-moment correlation coefficient of 0.038 with r (420) = 0.195 $\rho < 0.05$. This result indicates that no significant correlation exist between the use of authoritarian leadership style and the students' achievement in chemistry. Therefore, the null hypothesis is not rejected. This means that there is no significant correlation existing between the use of authoritarian leadership and students' achievement in chemistry.

Hypothesis 2

There is no significant correlation between principals' use of laissez-faire leadership style and students' achievement in chemistry.

Table 2 presents Pearson correlation coefficient analysis output which indicates that the correlation coefficient of 0.079 at r (450) = 0.195, $\rho < 0.05$, implying that there is no significant correlation existing between principals, practicing laissez-faire leadership style, and students' achievement in chemistry. Thus, the hypothesis is not rejected, implying that there is no significant correlation existing between the use of laissez-faire leadership style and students' achievement in chemistry.

Hypothesis 3

There is no significant correlation between the principals' use of democratic leadership style and students' achievement in chemistry.

Table 3 shows Pearson product-moment correlation coefficient analysis output which indicates correlation coefficient of 0.599 with r (450) = 0.195, $\rho < 0.05$, indicating that a positive and moderate linear correlation exists between the use of democratic leadership style and students' achievement in chemistry. Thus, the decision to reject the null hypothesis

Table 1: Correlation between principals' authoritarian leadership style and students' achievement in chemistry

Correlation	Authoritarian leadership style	Students' achievement in chemistry
Authoritarian leadership style	1.00	0.038
Students' achievement in chemistry	0.038	1.00

Correlation is not significant at the 0.05 level (as the two-tailed table value=0.195), n=420

Table 2: Correlation between the mean rating of laissez-faire leadership style and students' achievement in chemistry

Correlation	Laissez-faire leadership style	Achievement in chemistry
Laissez-faire leadership style	1.00	0.079
Achievement in chemistry	0.079	1.00

Correlation not significant at 0.05 level (as the two-tailed table value=0.195), n=450

Table 3: Correlation between the mean rating of democratic leadership style and students' achievement in chemistry

Correlation	Democratic leadership style	Achievement in chemistry
Democratic leadership style	1.00	0.599
Achievement in chemistry	0.599	1.00

Correlation is significant at 0.05 level (two-tailed table value=0.195), n=450

and conclude that there is significant correlation existing between the use of democratic leadership style and students' achievement in chemistry.

DISCUSSION OF FINDINGS

The results of data analysis show that no significant correlation exists between the use of authoritarian leadership style and students' achievement in chemistry. The reason for this finding might be that principals that use authoritarian leadership style might not sufficiently motivate teachers who come in direct contact with students, and thus, the teachers perform poorly in their classroom teaching which resulted to students' low achievement in chemistry. This finding is in agreement with the findings of Stronge et al. (2008), Ogalo (2013), and Al-Safran et al. (2014) who pointed out that students under principals who use authoritarian leadership style had a lower mean performance index than those who use democratic leadership style. However, the finding of this study is at variance with the finding of Waveru and Orondho (2014) and Igwe et al. (2017) who found that autocratic leadership style was positively correlated with students' academic performance.

The finding indicated that there was no significant correlation between principals who used laissez-faire leadership style and students' achievement in chemistry. The likely reason for the result may be that teachers and students governed by laissez-affair leadership style may not be serious with teaching and learning, respectively, since they are at freedom under this leadership style to do whatever they wish. Thus, this will affect students negatively. This finding is in consonance with the finding of Igwe et al. (2017) who found that Laissez-affair leadership style was negatively correlated with students' academic performance.

The finding further revealed that there was a significant positive correlation in chemistry students' achievement when they were administered by principals that practiced democratic leadership style. The reason for this finding could be as a result of active involvement of teachers and students in decision-making process which, in turn, might have enhanced cooperation and robust academic climate for the teachers and students to be at their best and this subsequently influenced student achievement in chemistry. This finding is in conformity with the findings of Adeyemi and Bolariwa (2013), Ogalo (2013), Speciosa (2013), and Obama et al. (2016) who affirmed that schools administer by democratic principles, achieve higher in academic outcomes than schools with authoritarian Laissez-affair principals. Furthermore, Al-Safran et al. (2014) pointed out that schools administrated by democratic or integrative principals, achieved higher in academic outcomes than schools with authoritarian (autocratic) principals in the USA. The reason for students who were under the leadership of democratic leadership performing better in their chemistry examinations could be as a result of active involvement of the teachers and students in decision-making process, thereby motivating teachers to be at their best and at the same time enhancing students' academic achievement.

CONCLUSION

The study revealed that senior secondary students administered by principals who used democratic leadership style achieve higher than those administered by authoritarian and laissez-affair leadership style. This paper concludes that senior secondary school principals in Kogi State are encouraged to use democratic leadership style to encourage teachers to work harder and subsequently influence students' academic achievement in chemistry.

RECOMMENDATIONS

The following recommendations are made:

1. Principals of senior secondary schools should endeavor to adopt the use of democratic leadership style in governing their schools so as to enhance students' academic achievement, especially in chemistry.
2. Principals should be trained and retrained through in-service, workshops, seminars, and conferences to make them more effective and efficient in the use of democratic leadership style.
3. The ministry of education officials should ensure that they strictly monitor and supervise the implementation of the use of democratic leadership style by the principals in senior secondary schools.
4. The state ministry of education and proprietors of private schools in Kogi State should ensure that they recruit professionally and academically qualified principals to promote the use of democratic leadership style which, in turn, promotes students' achievement in chemistry.
5. Principals using laissez-affair and authoritarian leadership styles should use the styles wisely by ensuring adequate supervision and non-dictatorial tendencies, respectively.
6. Given the scope and limitation of this study, the authors recommend a study on the combined use of the three leadership styles (authoritarian, laissez affair, and democratic) and students' achievement in chemistry.

REFERENCES

Abunga, H.E., Okere, M.I.O., & Walhanga, C.W. (2014). The effect of science process skills teaching approach on secondary school students' achievement in chemistry in nyando district Kenya. *Journal of Education and Social Research*, 4(6), 259-271.

Achimugu, L. (2016). Principals' instructional leadership qualities that enhance efficient teaching and learning of chemistry senior secondary schools from perspectives of students and teachers. *International Journal of Science and Research,* 5(7), 2229-2237.

Adeyegbe, S.O. (1993). The senior secondary school science curricular and candidates' performance: An appraisal of the first cycle operation. *Journal of Science Teachers' Association of Nigeria,* 28(1-2), 1-12.

Adeyemi, T.O., & Bolarinwa, R. (2013). Principal leadership styles and students academic performance in secondary schools in Ekiti state, Nigeria. *International Journal of Academic Research in Progressive Education and Development*, 2(1), 20-28.

Al-Safran, E., Brown, D., & Wiseman A. (2014). *The Effects of Principals'*

Leadership Style on School Environment and Outcome. Available from: http://www.eric.edu.gov. [Last retrieved on 2017 July 07].

Awunah, H. (2011). The principals' perception on leadership problem in junior and senior secondary education in Nigeria and the way forward. *The Nigerian Principal; Journal of All Nigeria Conference of Principal of Secondary Schools,* 18(1), 30-36.

Ball, S.J. (1987). *Politics and Policy Making in Education in Education: Exploration in Policy Sociology*. London, UK: Routledge and Kegan Paul.

Bamiro, A.O. (2015). Effects of guided discovery and think-share strategies on secondary school students' achievement in chemistry. Sage Open, 5(1), 1- 19. Avaliable from: http://www.sgo.sagepub.com/content/5/1/2158244014. [Last accessed on 2015 Apr 27].

Bello, S., Ibe, M.B., & Buka, I.B. (2016). Principals' administrative styles and students' academic performance in Taraba state secondary schools, Nigeria. *Journal of Education and Practice,* 7(18), 62-69.

Diakwa, H.D. (2005). Educational attainment and leadership: The Nigerian experience. *The Nigerian Principals Journal of ANCOPSS,* 12(1), 19-23.

Hornby, A.S. (2004). *Oxford Advance Learners' Dictionary of Current English.* 6th ed. London: Oxford University Press.

Igwe, N.N., Ndediamaka, M.O., & Chidi, A.F. (2017). Principal leadership styles and student academic performance in Enugu metropolice: A comparative survey of public and mission secondary schools. *Archives of Business Research,* 5(8), 7-30.

Koontz, H., & Weihrich, H. (1990). *Essentials of Management.* New York: McGraw Hill Publishing Co.

Mbipom, G. (2000). *Educational Administration and Planning.* Calabar, Nigeria: University of Calabar Press.

Njoku, Z.C. (2007). Comparison of students' achievement in the three categories of questions in SSCE practical chemistry examination. *Journal of the Science Teachers' Association of Nigeria,* 42(1), 67-72.

Obama, M.O., Eunice, L.A., & Orodho, J.A. (2016). Principal leadership style and students' academic performance in public secondary schools in Homabay country Kenya. *Research on Humanities and Social Sciences,* 6(7), 1-8.

Ogalo, E.A. (2013). *Influence of Principal Leadership Style on Students Achievement in Kenya Certificate of Secondary Education in Awendo District, Kenya. (Master of Education in Educational Administration Thesis, University of Nairobi, Nairobi, Kenya)*. Available from: http://www.eap.uonbi.ac.ke. [Last retrieved on 2019 Feb 27].

Okumbe, J. A. (1998). *Educational Management Theory and Practice*, Nairobi, Kenya: University Press.

Oloyede, O.I. (2010). Comparative effect of the guided discovery and concept mapping teaching strategies on SSS students' chemistry achievement. *Humanity and Social Science Journal,* 5(1), 1-6.

Speciosa, J.I. (2015). *The Influence of Leadership Style on Secondary School Students Academics Achievement in Secondary School in Morogoro Municipality, Tanzania. (Master of Education in Administration, Planning and Policies Studies Thesis, Open University Tanzania, Dar es Salaam, Tanzania)*. Available from: https://www.out.ac.tz. [Last retrieved on 2019 Feb 27].

Stronge, J.H., Richard, H.B., & Catano, N. (2008). *Qualities of Effective Principals.* Alexandria, VA, USA: Association for Supervision and Curriculum Development Publications.

Uyanga, R.E. (2008). Principal and education reform agenda of NEEDS and MDGs in Nigeria. In: Ngwu, P.N.C., (Ed.), *The Principals and Education Reform in Nigeria; 2007 Principal Year book*. Nsukka, Nigeria: ANCOPSS Press. p94-100.

Waveru, P.N., Orndho, J.A. (2014). Management practices and students academic performance in national examinations in public secondary schools in Kiamyu Kenya. *International Journal of Recent Scientific Research,* 5(6), 1126-1133.