

Principals' Management Style as Predictors of Students' Achievement in Mathematics in Afikpo Education Zone of Ebonyi State

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Abstract

The study investigated the Principal's Management Styles as predictors of students' motivation and achievement in Mathematics in Afikpo education zone. The study was guided by ten research questions and ten hypotheses. The study adopted a correlation survey research design. The population of the study was 2857 which comprises 2777 SS II students from 80 public schools and 80 Mathematics teachers, in Afikpo Education zone in Ebonyi State. Systematic random sampling technique was used. Sample size of 880 respondents will be used for the study. The sample comprises 80 mathematics teachers and 800 SSII students from the 80 secondary schools in Afikpo Education Zone. Two instruments were used for the data collection in this study which include; Principal's Management Style Questionnaire, PMSQ and Student Achievement in Mathematics' Proforma SAMP. The reliability index of PMSQ, was obtained as 0.95. Regression analysis was used to provide answers for the research questions and hypotheses 1- 4 at 0.05 level of significance. The result of the study revealed that principals' autocratic, democratic, and transformational management styles, were good predictors of student's achievement in Mathematics. The findings also revealed that laissez-faire management style negatively predictor of students' achievement in Mathematics. Based on these findings, the researcher recommended that Government should adequately encourage Principals in developing strategic plan to enhance management skills across the secondary schools.

Key words:

mathematics, Management Styles, achievement.

Background of the study

In other to achieve the developmental goals of any society, scientific and technological advancement is very important. This technology spans literally on every human activity including the teaching and learning of Mathematics. For the teaching and learning, if Mathematics to be effective students need to be motivated to have high levels of mathematics achievement. Student achievement in mathematics is still poor despite effort made by the government and school administrators. Like mathematic curriculum planning, provision of mathematics instructional materials, provision of incentives and awards. Mathematics is a subject area that deals with numbers, shapes, quantity, creativity, logical reasoning, and decision-making. It is the study of quantifications, structural patterns, and properties of shapes, locations of objects, and order. Mathematics seeks out patterns and uses them to formulate new conjectures (Nwaneri, 2020). For instance, bearings and distances in Mathematics can be used in solving problems in physics and geography, while the algebra of matrices can be used in solving problems in physics, chemistry, Economics, sociology, psychology, and statistics (Ayeni, 2021; Agom, 2021). Mathematics is the bond that tends to bind all scientific concepts to form a whole. The contribution of Mathematics to the overall development of a nation cannot be underestimated because of its role in social and economic development. Secondary school principal makes decisions and discharges various functions of mathematics goal-setting,

mathematics goal formulation, Mathematics goal implementation strategy, and corporate image building in mathematics, dealing with key stakeholders in mathematics education and other basic management styles.

Management resides in the principals' knowing exactly what he wants teachers and students to do and ensuring that they do it in the best and cheapest way. Management is the coordination of all the resources of secondary school through the process of planning, organizing, directing, and controlling in order to attain the goal of mathematics education. (Accariya, & Khalid, 2016). The management of the school rests on the principal. Principals are responsible for organizing school activities in order to align teaching and learning with the vision of the school. The principals' knowledge skill and attitude are essential for educational innovation. The principal in a bid to coordinate the resources, must adopt a particular measure or management style.

An effective management style is the extent to which the principals continually and progressively manages and directs teachers in the school to a predetermined destination agreed upon by the school system. It is the manner of approach to issues by the principal towards achieving the goals of mathematics education by transforming various resources available in the school into outputs through the functions of management. Management style is the distinctive way in which a secondary school principal makes decisions and discharges various functions of mathematics goal-setting, mathematics goal formulation, mathematics goal implementation strategy, and corporate image building in mathematics education. Management consists of participative, paternalistic, exploitative, and consultative management styles. Burn and Stalker (1961) identified organic and mechanistic styles of management. Management styles can be autocratic, participative, democratic, paternalistic, and persuasive and laissez faire, (Glynnis, 2019). Management style as authoritarian, visionary, transactional, servant leadership, pace setting democratic, laissez-fair;

other scholars classified management style under authoritative, consultative, democratic or participative, laissez fair or deligative, persuasive, transformational, collaborative. For the sake of this project work the researcher classified pri

ncipals' management style under the following : autocratic, democratic, laissez fair, transformational.

The principal does not consult mathematics teachers, neither are mathematics teachers allowed to give any input. The premise of the autocratic management style is the belief that in most cases students and teachers cannot make contributions on their own to meet their mathematics goals. This type of management style tends to focus more on the mathematics task and not on the human resources needed to get the task done. An autocratic style of management works on a top down, hierarchical model. If goals and objectives are shared, rarely is there a defined plan to accomplish them. In transformational management style the principal decides what is best for the students as well as the teachers, school, and the community at large. The suggestions and feedback of the subordinates are taken into consideration before decision is taken. In this type of management style the teachers feel attached and loyal towards their school management.

Achievement in mathematics is a crucial feature of mathematics education. It is considered to be the center around which the whole mathematics education system revolves. The achievement of students in mathematics determines the success or failure of any secondary school system. Narad and Abdullah (2016) argued that the achievement of students has a direct impact on the socio-economic development of a country. According to Danjuma (2015), it is the measure of students' acquisition of certain skills at the end of teaching and learning activities. Achievement is seen as a test for the measurement and comparison of skills in various fields of academic studies. It involves the determination of the degree of attainment on individual tasks, courses or programs to which the individuals were sufficiently exposed. Achievement is the measure of the student's level of attainment of a specific mathematics task. It is the measure of students' level of acquisition of certain mathematics skill at the end of teaching and learning activities. Many research findings have shown that a number of factors affect student's motivation and achievement in mathematics. Farooq and Ahmed (2021) discovered that classroom discipline management had a significant effect on learner's academic achievement. This study

only considers the practice of discipline in the classroom not the school in general also it did not tell us how this classroom discipline management can influence the student's motivation to learn mathematics. This present study is going to address this gap. Palmer et al., (2018) agreed that leadership practices can enhance mathematics pass rates of students. This study did not show how this leadership practices is related to student motivation. However, there is no consensus on influence of discipline practices on student's motivation and achievement in mathematics. Therefore, this study is aimed at investigating the principals' management styles as predictor of student's motivation and achievement in mathematics?

Statement of the Problem

In a space of technological trending which have high distractive index in the student's learning of mathematics, many at times students are driven away from the norms and lack of discipline. Therefore, the problem of the study in question form is can principals' principals' management styles predict students' motivation and achievement in mathematics.?

Purpose of the Study

The main purpose of the study is to determine Principals' management styles as predictor of students' motivation and achievement in Mathematics. Specifically; the study seeks to determine the:

1. predictive power of principals' autocratic management style on students' achievement in mathematics
2. predictive power of principals' democratic management style on students' achievement in mathematics.
3. predictive power of principals' 'liaises-faire management style on students' achievement in mathematics.
4. predictive power of principals' transformational management style on students' achievement in mathematics.

Methods

This study adopted a correlation survey research design. A correlation research design according to Nworgu (2015) establishes the relationship that exists between variables.

Correlation research design is a general approach to research that focuses on assessing the co-variation among naturally occurring dependent and independent variables. The study will be conducted in Afikpo education zone which has five Local Government Areas which are Afikpo North, Edda Ivo, Ohaozara, Onicha. The zone has 80 public secondary schools. The population of the study is 2857. This comprises of 2777 SS II students from 80 public schools and 80 Mathematics teachers, in Afikpo Education zone in Ebonyi State. A sample size of 880 respondents was used for the study. The sample comprises of 80 mathematics teachers from all the public secondary schools in Afikpo zone and 80 SSII students from the 80 public secondary schools in the Education Zone. Since all the 80 Mathematics teachers will be used for the study, ten (10) students will be systematically selected from each school. Two instruments were used for the data collection in this study which include; Principal's management style Questionnaire PMSQ, and Student achievement in Mathematics' proforma SATP. The reliability coefficients of 0.94, and 0.78 were obtained for PMSQ, and SMRS respectively. Simple linear regression analysis was used to answer research questions 1 and 2. Analysis of Variance (ANOVA) was used to test the null hypotheses at alpha level of 0.05. The decision rule was based on the fact that a correlation coefficient of 0.30 and below is low, from 0.31 to 0.70 is moderate while from 0.71 and above is high (Nworgu, 2018). Any P-value that is less than 0.05 is significant and therefore the null hypothesis of no significant relationship was rejected. Any P-value that is equal to or greater than 0.05 is not significant and therefore the null hypothesis of no significant relationship was not rejected.

Results.

Research Question one:

What is the predictive power of principals' autocratic management style on students' achievement in Mathematics?

Table 7: Regression analysis of the predictive power of principals' autocratic management style on students' achievement in Mathematics

Model	N	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	80	.942 ^a	.887	.886	9.22532

- a. Predictors: (Constant), Principals’ Autocratic Management Style
- b. Dependent Variable: Achievement

The result of the data analysis in Table 7 shows the predictive power of principals’ autocratic management style on students’ achievement in Mathematics. It reveals that the correlation coefficient (r) between principals’ autocratic management style and achievement among mathematics students in Ebonyi State is 0.942, indicating a high and positive predictive power (correlation) with associated coefficient of determination (r²) of 0.887. The positive predictive power implies that as principals’ autocratic management style increases, achievement increases among Mathematics students in Ebonyi State and vice versa. Also, the coefficient of determination

(r²) shows that 88.7% of the variance in achievement among Mathematics students in Ebonyi State can be attributed to principals’ autocratic management style while 11.3% of the variance in achievement among Mathematics students in Ebonyi State can be attributed to other variables not considered by this study.

Hypothesis one

There is no significant predictive power of principals’ autocratic management style on students’ achievement in Mathematics

Table 8: ANOVA result on the predictive power of principals’ autocratic management style on students’ achievement in Mathematics

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	52331.491	1	52331.491	614.894	.000 ^b
	Residual	6638.309	78	85.107		
	Total	58969.800	79			

- a. Dependent Variable: Achievement
- b. Predictors: (Constant), Principals’ Autocratic Management Style

The result of the data in Table 8 is on the predictive power of principals’ autocratic management style on students’ achievement in Mathematics. An F-ratio of 614.894 was obtained. Since the p-value of 0.000 obtained is less than 0.05 level of significance set for decision making, the null hypothesis is rejected. Thus, principals’ autocratic management style is a significant predictor of

achievement among Mathematics students in Ebonyi State.

Research Question four:

What is the predictive power of principals’ democratic management style on students’ achievement in Mathematics?

Table 11: Regression analysis of the predictive power of principals’ democratic management style on students’ achievement in Mathematics

Model	N	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	80	.964 ^a	.928	.928	7.35419

a.Predictors:(Constant),Principals’ Democratic Management Style

b.Dependent Variable: Achievement

The result of the data analysis in Table 11 shows the predictive power of principals’ democratic management style on students’ achievement in Mathematics. It reveals that the correlation coefficient (r) between principals’ democratic management style and achievement among mathematics students in Ebonyi State is 0.964, indicating a high and positive predictive power (correlation) with associated coefficient of determination (r²) of 0.928. The positive predictive power implies that as principals’ democratic management style increases, achievement increases among Mathematics students in Ebonyi State and vice versa. Also, the coefficient of determination (r²) shows that 92.8% of the variance in

achievement among Mathematics students in Ebonyi State can be attributed to principals’ democratic management style while 7.2% of the variance in achievement among Mathematics students in Ebonyi State can be attributed to other variables not considered by this study.

Hypothesis three:

There is no significant predictive power of principals’ democratic management style on students’ achievement in Mathematics

Table 12: ANOVA result on the predictive power of principals’ democratic management style on students’ achievement in Mathematics

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	54751.235	1	54751.235	1012.334	.000 ^b
	Residual	4218.565	78	54.084		
	Total	58969.800	79			

a.Dependent Variable: Achievement

b.Predictors:(Constant),Principals’ Democratic Management Style

The result of the data in Table 12 is on the predictive power of principals’ democratic management style on students’ achievement in Mathematics. An F-ratio of 1012.334 was obtained. Since the p-value of 0.000 obtained is less than 0.05 level of significance set for decision making, the null hypothesis is rejected. Thus, principals’ democratic management style is a significant predictor of

achievement among Mathematics students in Ebonyi State.

Research Question three:

What is the predictive power of principal’s liaise-faire management style on students’ achievement in Mathematics?

Table 15: Regression analysis of the predictive power of principals liaise-faire management style on students’ achievement in Mathematics

Model	N	R	R Square	Adjusted Square	R	Std. Error of the Estimate
1	80	-.328 ^a	.108	.096		25.97079

a. Predictors: (Constant), Principals Liaise-Faire Management Style

b. Dependent Variable: Achievement

The result of the data analysis in Table 15 shows the predictive power of principals liaises-faire management style on students’ achievement in Mathematics. It reveals that

the correlation coefficient (r) between principals liaises-faire management style and achievement among Mathematics students in Ebonyi State is -0.328, indicating a moderate but negative predictive power (correlation) with associated coefficient of determination (r²) of 0.108. The negative predictive power

implies that as principals liaises-faire management style increases, achievement decreases among Mathematics students in Ebonyi State and vice versa. Also, the coefficient of determination (r^2) shows that 10.8% of the variance in achievement among Mathematics students in Ebonyi State can be attributed to principals liaises-faire management style while 89.2% of the variance in achievement among Mathematics students in Ebonyi State can be attributed to other variables not considered by this study.

Hypothesis three:

There is no significant predictive power of principals liaise-faire management style on students' achievement in Mathematics.

Table 16: ANOVA result on the predictive power of principals liaise-faire management style on students' achievement in Mathematics

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	6360.211	1	6360.211	9.430	.003 ^b
	Residual	52609.589	78	674.482		
	Total	58969.800	79			

a. Dependent Variable: Achievement

b. Predictors: (Constant), Principals Liaise-Faire Management Style

The result of the data in Table 16 is on the predictive power of principals liaises-faire management style on students' achievement in Mathematics. An F-ratio of 9.430 was obtained. Since the p-value of 0.003 obtained is less than 0.05 level of significance set for decision making, the null hypothesis is rejected. Thus, principals liaises-faire management style is a significant predictor of

achievement among Mathematics students in Ebonyi State.

Research Question four:

What is the predictive power of principals' transformational management style on students' achievement in Mathematics?

Table 19: Regression analysis of the predictive power of principals' transformational management style on students' achievement in Mathematics

Model	N	R	R Square	Adjusted Square	R	Std. Error of the Estimate
1	80	.965 ^a	.932	.931		7.16834

a. Predictors: (Constant), Principals

Transformational Management Style

b. Dependent Variable: Achievement

The result of the data analysis in Table 19 shows the predictive power of principals' transformational management style on students' achievement in Mathematics. It reveals that the correlation coefficient (r) between principals' transformational management style and achievement among Mathematics students in Ebonyi State is 0.965, indicating a high and positive predictive power (correlation) with associated coefficient of

determination (r^2) of 0.932. The positive predictive power implies that as principals' transformational management style increases, achievement increases among Mathematics students in Ebonyi State and vice versa. Also, the coefficient of determination (r^2) shows that 93.2% of the variance in achievement among Mathematics students in Ebonyi State can be attributed to principals' transformational management style while 6.8% of the variance in achievement among Mathematics students in Ebonyi State can be attributed to other variables not considered by this study.

Hypothesis four:

There is no significant predictive power of principals' transformational management style on students' achievement in Mathematics

Table 20: ANOVA result on the predictive power of principals' transformational management style on students' achievement in Mathematics

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	54961.760	1	54961.760	1069.604	.000 ^b
	Residual	4008.040	78	51.385		
	Total	58969.800	79			

a. Dependent Variable: Achievement

b. Predictors: (Constant), Principals' Transformational Management Style

The result of the data in Table 20 is on the predictive power of principals' transformational management style on students' achievement in Mathematics. An F-ratio of 1069.604 was obtained. Since the p-value of 0.000 obtained is less than 0.05 level of significance set for decision making, the null hypothesis is rejected. Thus, principals' transformational management style is a significant predictor of achievement among Mathematics students in Ebonyi State.

Findings of the study

The findings of the study indicated a high and positive predictive power of principals' autocratic management style on students' achievement in mathematics. The positive predictive power means that as principals' autocratic management style increases, achievement increases among Mathematics students in Ebonyi State and vice versa. Further analysis shows that principals' autocratic management style is a significant predictor of achievement among Mathematics students in Ebonyi State. The level of ensuring adherence to instruction by the principal could be the reason. The findings of this study is in support of Oguiyi and Gogo (2018) who reported that autocratic leadership style accounted for student academic performance. The finding of the study showed that autocratic management style accounts for students' achievement in mathematics. The findings suggest that principal's should sometimes be autocratic in management.

The findings of the study indicated a high and positive predictive power of principals' democratic management style on students'

achievement in mathematics. The positive predictive power implies that as principals' democratic management style increases, achievement increases among Mathematics students in Ebonyi State and vice versa. Further analysis showed that principals' democratic management style is a significant predictor of achievement among Mathematics students in Ebonyi State. The reason for this result could be as a result of the level of intimacy between the principals and the subordinates. The finding of this study is support of Okon and Isong (2016) who accounted that democratic leadership style has a positive relationship between participation management styles and employee's performance in small scale business in Akwalbom state. The finding is also in line who establishes that established that democratic leadership style accounted for 37.4% of variation in student academic. The finding suggests that democratic management style should be encouraged.

The findings of the study revealed a moderate but negative predictive power of principals' 'liaises-faire management style on students' achievement in mathematics. The negative predictive power implies that as principal's liaises-faire management style increases, achievement decreases among Mathematics students in Ebonyi State and vice versa. Further analysis indicates that, principal's liaises-faire management style is a significant predictor of achievement among Mathematics students in Ebonyi State. The reason for this result could be as the principal's level of seriousness to enforce the teaching and learning of mathematics. The finding of this study is support of Okon and Isong (2016) who accounted that There is negative relationship between laissez-fair management style and employee performance in Akwalbom

State. The finding is also in line with Oguiyi and Gogo (2018) who revealed that laissez-fair management style accounted for 15.7% of variation in students' academic performance. The findings suggest that laissez-fair management style alone may not improve students' achievement in mathematics.

The findings of the study indicated a high and positive predictive power of principals' transformational management style on students' achievement in mathematics. The positive predictive power implies that as principals' transformational management style increases, achievement increases among Mathematics students in Ebonyi State and vice versa. Thus, principals' transformational management style is a significant predictor of achievement among Mathematics students in Ebonyi State. This finding could be due to the principal's ability to adopt different disciplinary strategies. The finding of this study is support of Okon and Isong (2016) who accounted that There is a positive relationship between paternalistic management style and employee's performance in small scale business in Akwalbom State. the finding is also in line with Lin & Chuang, 2014 who revealed that the correlations between the transformational leadership styles and the learning achievement of students is moderate. The finding suggest that transformational management style may improve students' achievement in mathematics.

Conclusions

Conclusively, principals' autocratic management style, democratic management style, transformational management style, are all good predictors of student achievement in mathematics. On the other hand, laissez-faire management style alone is not a good predictor of students' achievement in mathematics.

Educational Implications

Since the finding of the study also indicates high positive predictive power means that as principals' autocratic management style increases, achievement increases among Mathematics students in Ebonyi State. This implies that principals should see autocratic management style is one of the management styles that predict student's achievement in Mathematics. The finding of the study also indicates a high and positive predictive power

of principals' democratic management style on students' achievement in mathematics. This implies that principals should see democratic management style is one of the management styles that predict student's achievement in Mathematics. The study indicates a moderate but negative predictive power of principals' 'liaises-faire management style on students' achievement in mathematics. The negative predictive power implies that as principal's liaises-faire management style increases, achievement decreases among Mathematics students in Ebonyi State and vice versa. This implies that principals should be careful of the way they use laissez-faire management style.

Recommendations

From the findings of the research the following recommendations were made: principals should practice management styles to enhance student achievement in mathematics. Laissez-faire management style should not be used in administering a school if it must be used it must be with others. All the components of management styles if being used will have a better prediction of students' achievement in Mathematics. So principals should use diverse management styles.

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