



Teachers' Behaviour as Correlate of Students' Performance in Mathematics in Ondo State Secondary Schools

M. S. Omirin ^a & S. B. Fasoranti ^b

^aInstitute of Education, Faculty of Education Ekiti state University Ado-Ekiti

^bIndependence Grammar School Ondo Ondo State

Corresponding Author: frebukgeone@gmail.com

Abstract

The study examined teachers' behaviour as correlate of students' performance in Mathematics. This study adopted the correlational design. The population for this study consisted of all 43,019 Senior Secondary School One students in public secondary schools in Ondo State. The sample consisted of 450 students selected using multi stage sampling procedure. Mathematics Teachers' Behaviour Questionnaire (MTBQ) and Mathematics Performance Test (MPT) were used to collect data for the study. The data collected through the instruments were analyzed using descriptive and inferential statistics. The results revealed that the behaviour of Mathematics teachers such as their attitude, utilization of instructional materials, classroom management and content knowledge were related students' performance in Mathematics. Utilisation of instructional materials has the highest predicting strength of students' performance in Mathematics. It was recommended among others that Mathematics teachers should ensure the utilisation of available instructional materials and improvise where necessary in the teaching of Mathematics

Keywords: Teachers, Behaviour, Students, Performance, Mathematics

Introduction

Mathematics is one of the key subjects in secondary school education system in Nigeria. Mathematics liberates the mind and also gives individuals an assessment of the intellectual abilities by pointing towards direction of improvement (Olofin & Kolawole, 2020). Popoola and Olofin (2020) concluded by saying that Mathematics is the basis of all sciences and technology and therefore of all human endeavours, hence, application of Mathematics cut across all areas of human knowledge. Despite these wide generality and importance of Mathematics, many students are not finding their feet in the subject as a result of their perennial failure in the subject.

The performance of some students in Mathematics at West African Secondary School Certificate Examination (WASSCE) level is as a result of weak foundation of Mathematics. The unimaginable dwindling performance of students in Mathematics in Nigeria has become an issue of great concern to stakeholders in the educational sector in recent times. West African Examination Council (WAEC) recorded the average performance of candidates in Mathematics from 2016 – 2020 where an average of 51% of the candidates who sat for the examination failed Mathematics (Examiners' report in Olofin & Olojo, 2022). It is obvious that the continuous poor performance of students in Mathematics is an indicator of unhealthy status of the education of learners.

Subsequently, the low accomplishment in Mathematics external examinations for instance Senior Secondary Certificate Examination conducted by West Africa Examination Council as

well as National Examination Council had been traced to several teachers' features such as teachers' manners, teachers' recommendation workload, age, experience, income, content knowledge, attitude and self-motivation and so on. A lot of studies show that some teachers add more to the academic growth of their students than other teachers. Teachers have been revealed to have a vital control on students' academic performance and also play a critical role in educational achievement as the teacher is finally accountable for interpreting policy into values based on teaching content during communication with the learners (Agharuwhe & Nkechi, 2009).

Teaching and learning rely on teachers: no doubt a teacher with a good knowledge of the subject matter has been conceptualized as one who generated desired outcomes in the course of his responsibility as a teacher (Ajayi, 2016). Conversely, the knowledge of the subject matter infatuated by the teacher even as interacting with the learners could be accountable for the experiential poor performance of learners in Mathematics. In modern years, the behaviour of the teacher has engrossed increasing interest from policymakers.

The teachers' role at all levels of education is stressed in the National Policy on Education (FRN, 2013) which expresses that; no educational system may go up beyond the feature of its teachers. Teachers' behaviour towards Mathematics plays a vital function in the teaching and learning processes. It appears that the problem of Mathematics teachers' behaviour in secondary school today includes attitude to teaching Mathematics, utilization of instructional materials,

classroom management and knowledge of Mathematics content.

According to Adeyemo (2012), attitude is the magnet which forces or induced a teacher to positively or negatively react to an exacting stimulus. Instructional materials are educational resources that are employed to aid Mathematics teaching and learning in the classroom situation. Instructional materials are objects or devices, which aid the educator to make a lesson much lucid to the student (Isola, 2010). The use of instructional materials is very vital since its position in effecting students' performance in Mathematics. Instructional materials converse information efficiently, endorses the gaining and longer preservation of knowledge, when they are methodically intended, reproduced, utilized and evaluated.

Nakpodia (2015) viewed classroom management as the action a teacher takes to build a setting that supports and aids instructions and learning. It denotes the process of creating constructive situation to ease instructions as well as that of modifying attitudes of the students. Classroom management plays an imperative role in the teaching and learning route as it is a genuine tool in the means of sending instructions from the teachers to the learners. Content knowledge covers theoretical and technical knowledge and understanding of the personality and arrangement of the subject (Grossman, 2012). Conceptual knowledge denotes the understanding of facts, values and hypotheses. Content knowledge is the quantity of information and thoughtfulness that the teachers have on a subject matter. The problem of this study therefore is to investigate if Mathematics teachers' behaviour contributes to students' performance in Mathematics in Ondo State secondary schools.

The purpose of the study was to examine teachers' behaviour as determinant of students' performance in Mathematics in Ondo State secondary schools. The study specifically examined

1. the level of students' performance in Mathematics;
2. the behaviour of teachers toward the teaching and learning of Mathematics;
3. the relationship between teachers' attitude and students' performance in Mathematics;
4. the relationship between utilization of instructional materials and students' performance in Mathematics;
5. the relationship between classroom management and students' performance in Mathematics;

6. the relationship between teachers' content knowledge and students' performance in Mathematics; and
7. if teachers' behaviour variables will significantly predict students' performance in Mathematics

Research Questions

The following research questions were raised for the study

1. What is the level of students' performance in Mathematics in Ondo State secondary schools?
2. What is the behaviour of teachers toward the teaching and learning of Mathematics in Ondo State secondary schools?

Hypotheses

These hypotheses were generated for the study.

1. There is no significant relationship between teachers' attitude and students' performance in Mathematics.
2. There is no significant relationship between utilization of instructional materials and students' performance in Mathematics.
3. There is no significant relationship between classroom management and students' performance in Mathematics.
4. There is no significant relationship between teachers' content knowledge and students' performance in Mathematics.
5. None of teachers' behaviour variables will significantly predict students' performance in Mathematics.

Methodology

This study adopted the correlational research design. The population for this study consisted of all 43,019 Senior Secondary School One (S.S.S. I) students in all public secondary schools in Ondo State as at the time of this study (Planning Research and Statistics Department, Ondo State Ministry of Education, 2022). The sample consisted of 450 Senior Secondary School One students selected using multi stage sampling procedure. Stage one involved the selection of six Local Governments among the 18 Local Governments in Ondo State using stratified random sampling technique. Stage two involved the selection of three secondary schools from each selected Local Government with the use of simple random sampling technique making a total of eighteen secondary schools. Stage three involved the use of stratified random sampling technique to select 25 students from SSS I class in each of the schools.

Mathematics Teachers' Behaviour Questionnaire (MTBQ) was used to collect data on Mathematics teachers' behaviour towards the

teaching and learning of Mathematics. The second instrument was Mathematics Performance Test (MPT). Mathematics Teachers' Behaviour Questionnaire (MTBQ) consisted of two sections. Section A sought for demographic information of the respondents while section B consisted of sixteen items which elicited information on how the students perceive Mathematics teachers' behaviour such as attitude, utilisation of instructional materials, classroom management and content knowledge, worded in a 4-point Likert type rating scale of Strongly Agree (SA), Agree (A), Disagree (D) and Strongly Disagree (SD). These were scored as follows 4, 3, 2 and 1 for SA, A, D and SD respectively for positively worded items and the scores were reversed for negatively worded items.

Mathematics Performance Test (MPT) consisted of two Sections. Section A sought for the demographic information about the respondent's school, gender, and identification number while section B consist of 50 multiple choice questions in Mathematics with four options (A to D). The questions were drawn from the topics they have covered in the syllabus.

The instruments MTBQ and MPT were subjected to thorough screening by experts of Mathematics Education and Tests & Measurement. For the face validity, the experts determined at face level, the appropriateness of the instruments in measuring what they purported to measure. Test blue print was used to determine the content validity of the MPT. The experts checked the extent to which items of the instruments represented the content of MTBQ and suitability of the items being measured.

The reliability of MTBQ and MPT was determined through the internal consistency method. In doing this, the instruments were administered on respondents in 2 secondary schools outside the research area. The data collected on the two administrations were collated and analyzed

using the Kuder Richardson 20. Co-efficient values of 0.78 and 0.82 were derived for MTBQ and MPT respectively, and these values were high enough to make the instruments reliable and useful for the study.

The researcher personally visited each of the school sampled to administer the instruments with the help of research assistants. The researchers sensitized the research assistants on how to distribute the questionnaire. The data collected through the instruments were analyzed using descriptive and inferential statistics. The research questions were answered using frequency counts, means, standard deviation and percentages. The hypotheses raised were tested using Pearson Product Moment Correlation and Multiple Regression analysis at 0.05 level of significance.

Results

Table 1: Performance of students in Mathematics
($\bar{x} = 27.18$)

Performance of Students	No of Respds	%
Low (1 – 25)	241	53.6
Moderate (26 – 35)	168	37.3
High (36 – 50)	41	9.1
Total	450	100

Table 1 reveals the performance of students in Mathematics. The result shows that out of 450 respondents, 241 respondents representing 53.6 percent had low performance in Mathematics. Those who have moderate performance were 168 respondents representing 37.3 percent while 41 respondents representing 9.1 percent had high performance in Mathematics. The mean mark of 27.18 shows that the mean performance of students is at average level but more than half of the students scored below the average mark. Figure i further reveal the performance of students in Mathematics at a glance.

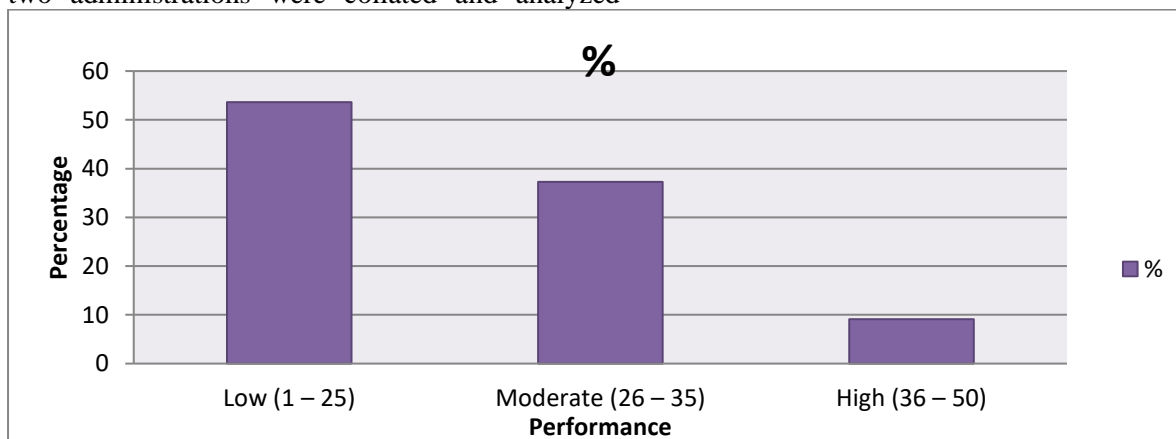


Figure i: Bar Chart showing performance of students in learning Mathematics



Table 2: Summary of the behaviour of Mathematics teachers toward the teaching and learning of Mathematics

S/N	ITEMS	N	X	SD	Rank
1.	Attitude	450	9.81	1.53	3 rd
2.	Utilisation of Instructional Materials	450	6.12	1.61	4 th
3.	Classroom Management	450	10.83	1.21	1 st
4.	Content Knowledge	450	9.90	1.63	2 nd

Table 2 summarises the behaviour of Mathematics teachers toward the teaching and learning of Mathematics with classroom management having the highest mean value of 10.83 closely followed by content knowledge ($\bar{x} = 9.90$), attitude ($\bar{x} = 9.81$), and utilisation of instructional materials ($\bar{x} = 6.12$). This implies that teachers have least behaviour towards utilisation of instructional materials in the teaching and learning of Mathematics. The figure below shows graphical representation of the behaviour of Mathematics teachers toward the teaching and learning of Mathematics.

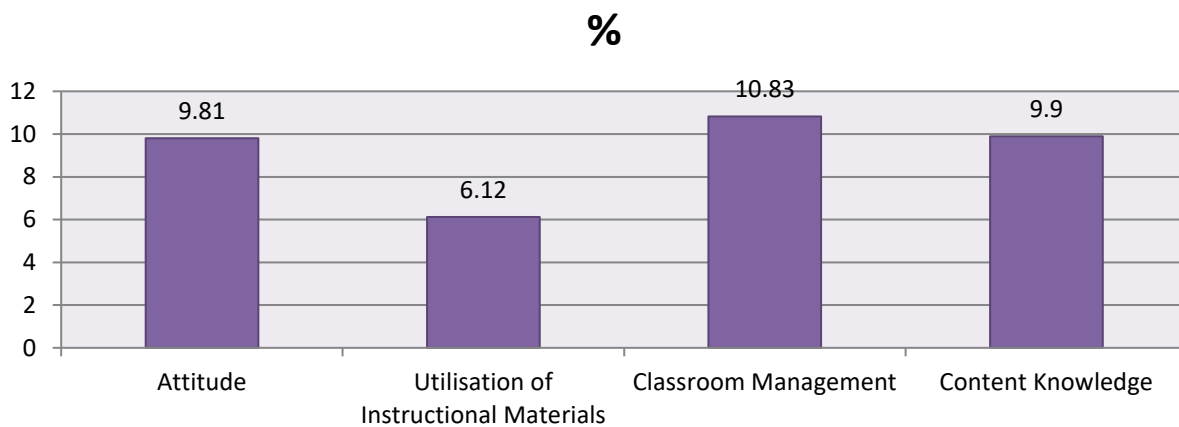


Figure ii: Bar Chart showing the behaviour of Mathematics teachers toward the teaching of Mathematics

Table 3: Relationship between teachers' attitude and students' performance in Mathematics

Variables	N	Mean	Stand Dev	r-cal	P
Teachers' Attitude	450	9.81	1.53		
Students' Performance in Mathematics	450	27.18	4.15	0.563*	0.000

*P<0.05

Table 3 showed that the r-cal value of 0.563 is significant because the p-value (0.000) < 0.05 level of significance. The null hypothesis is rejected.

This implies that there is significant relationship between teachers' attitude and students' performance in Mathematics.

Table 4: Relationship between utilization of instructional materials and students' performance in Mathematics

Variables	N	Mean	Stand Dev	r-cal	P
Utilization of Instructional Materials	450	6.12	1.61		
Students' Performance in Mathematics	450	27.18	4.15	0.729*	0.000

*P<0.05

Table 4 showed that the r-cal value of 0.729 is significant because the p-value (0.000) < 0.05 level of significance. The null hypothesis is rejected.

This implies that there is significant relationship between utilization of instructional materials and students' performance in Mathematics.

Table 5: Relationship between classroom management and students' performance in Mathematics

Variables	N	Mean	Stand Dev	r-cal	P
Classroom Management	450	10.83	1.21		
Students' Performance in Mathematics	450	27.18	4.15	0.401*	0.000

*P<0.05



Table 5 showed that the r-cal value of 0.401 is significant because the p-value (0.000) < 0.05 level of significance. The null hypothesis is rejected.

This implies that there is significant relationship between classroom management and students' performance in Mathematics.

Table 6: Relationship between teachers' content knowledge and students' performance in Mathematics

Variables	N	Mean	Stand Dev	r-cal	P
Teachers' Content Knowledge	450	9.90	1.63	0.614*	0.000
Students' Performance in Mathematics	450	27.18	4.15		

*P<0.05

Table 6 showed that the r-cal value of 0.614 is significant because the p-value (0.000) < 0.05 level of significance. The null hypothesis is rejected.

This implies that there is significant relationship between teachers' content knowledge and students' performance in Mathematics.

Table 7: Multiple regression analysis of the contribution of teachers' behaviour on students' performance in Mathematics

Variables	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
(Constant)	19.981	2.994		8.674	.000
Attitude	.524	.158	.408	3.316	.002
Utilisation of Instructional Materials	.902	.151	.636	5.974	.001
Classroom management	.554	.136	.313	4.073	.000
Content Knowledge	.831	.145	.581	5.731	.000

($F_{(4, 445)} = 27.181$; $p < 0.05$).

Table 6 showed that the combination of the independent variables (Mathematics teachers' behaviour) accounted for 43.3% of the variance on students' performance in Mathematics ($R^2 = 0.669$). The analysis of variance of the multiple regression data yielded an F-ratio value which was found to be significant at 0.05 alpha level ($F_{(4, 445)} = 27.181$; $p < 0.05$). This implies that the null hypothesis was rejected.

Mathematics teachers' behaviour (attitude, utilisation of instructional materials, classroom management and content knowledge) significantly contributed to students' performance in Mathematics as Attitude ($\beta = 0.408$; $t = 3.316$; $p < 0.05$), Utilisation of Instructional Materials ($\beta = 0.636$, $t = 5.974$; $p < 0.05$), Classroom Management ($\beta = 0.313$, $t = 4.073$; $p < 0.05$), and then Content Knowledge ($\beta = 0.581$, $t = 5.731$; $p < 0.05$). Hence, there was significant influence of teachers' behaviour on students' performance in Mathematics. Utilisation of instructional materials has the highest predicting strength closely followed by content knowledge while classroom management has the least predicting strength of students' performance in Mathematics.

Discussion

The findings of the study revealed that there was significant relationship between teachers' attitude and students' performance in Mathematics. There was also significant relationship between utilization of instructional materials and students' performance

in Mathematics. The findings further revealed that there was significant relationship between classroom management and students' performance in Mathematics. It was also revealed that there was significant relationship between teachers' content knowledge and students' performance in Mathematics.

The study also revealed that teachers' behaviour variables significantly predicted students' performance in Mathematics. Utilisation of instructional materials has the highest predicting strength closely followed by content knowledge while classroom management has the least predicting strength of students' performance in Mathematics. The probable cause for this finding could be due to the importance of instructional materials and teachers who had mastery of the subject matter had a richer background of knowledge to drive from. This finding is in consonance with the work of Owoyemi and Adesoji (2012) who concluded in separate studies, that the content knowledge of teachers and use of instructional materials were key determinant of performance of the students. According to Popoola (2014), good mastery of the subject matter and utilisation of instructional materials assist the teacher to train the students accurately in Mathematics.

Conclusion

Sequel to the findings of this study, it was concluded that the behaviour of Mathematics



teachers such as their attitude, utilization of instructional materials, classroom management and content knowledge were related students' performance in Mathematics. Utilisation of instructional materials has the highest predicting strength closely followed by content knowledge while classroom management has the least predicting strength of students' performance in Mathematics.

Recommendations

Based on the findings of this study, the following recommendations were made

1. Government should ensure adequate supply of instructional materials for the teaching of Mathematics in secondary schools
2. Mathematics teachers should ensure the utilisation of available instructional materials and improvise where necessary in the teaching of Mathematics.
3. Mathematics teachers should exhibit positive attitude and put more effort in management of classroom during teaching-learning process.

References

- Adeyemo, S. A. (2012). The Relationship among School Environment, Students Approaches to Learning and their Academic Achievement in Senior Secondary School Physics. *International Journal of Educational Research and Technology*, 3(1), 21 – 26
- Agharuwhe, A.A. and Nkechi, M.U. (2009). Teachers' Effectiveness and Students' Academic Performance in Public Secondary Schools in Delta State, Nigeria. *Stud Home Comm Sci*. 3(2),107-113
- Ajayi, O. V. (2016). Effect of hands-on activities on senior secondary chemistry students' achievement and retention in stoichiometry in Zone C of Benue State. Unpublished M.Ed dissertation, Benue State University, Makurdi.
- Federal Republic of Nigeria (2013). *National Policy on Education*. Lagos: Federal Government Press.
- Grossman, S. (2012). Craft Knowledge and the Education of Teachers, *Review of Research in Education*, 18(1), 59-74.
- Isola, O.M. (2010). *Effects of Standardized and Improvised Instructional Resources on Student academic Achievement in Secondary School Physics* M.Ed Thesis, A.B.U, Zaria.
- Nakpodia, E.D. (2015). *Educational Administration: A New Approach (2nd Ed)*, Warri: Jonokase Publishers
- Olofin, S.O. and Kolawole, E.B. (2020). Effect of Kolawole's Problem-Solving Teaching Strategy on the Academic Performance of Secondary School Students in Mathematics in Nigeria. *Advances in Social Sciences Research Journal*, 7(2) 68-77. DoI:10.14738/assrj.72.7749.
- Olofin, S.O. and Olojo, J.O. (2022). Effect of brain-based strategy on senior secondary school students' performance in Mathematics in Ekiti State. *International Journal of Education, Learning and Development*, 10(2) 1-15.
- Popoola, A.A. (2014). Secondary School Mathematics Teachers' skill and Students' Achievements using Innovative and Model Teaching Approaches. *Journal of Research & Method in Education (IORS-JRME)*. 4(3), 06-15
- Popoola, A.A. and Olofin, S.O. (2020). Influence of Teacher Characteristics on Academic Performance of Senior Secondary School Students in Mathematics in Three Geo-Political Zones of Nigeria. *Euro Afro Studies International Journal*, 1(2), 13 – 23. DOI: www.doi.org/10.5281/zenodo.3700220
- Owoyemi, T. E., & Adesoji, F.A.(2012). Isolation of Teaching Effectiveness Factors from Nigeria Senior Secondary School Chemistry Students' Point of View. *British Journal of Arts and Social Sciences*. 9 (11), 168-182.