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RESEARCH ARTICLE

CAUSES OF STUDENTS POOR PERFORMANCE IN MATHEMATICS. A CASE OF SEFWI BONWIRE D/A JUNIOR HIGH SCHOOL IN THE WESTERN REGION OF GHANA

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Abstract

This study sought to examine the causes of students' poor performance in Mathematics. A case of Sefwi Bonwire D/A Junior High School in the Western Region of Ghana. The study was a survey in which questionnaires were administered to 80 respondents. Data analysis and interpretation was conducted through frequency tables and percentages. The study revealed that, students' study habits was the major cause of their poor performance in Mathematics. It was also revealed that, problem-based learning was the main activity-based teaching method that could improve upon Mathematics education in the school. It was finally revealed that, teaching effectiveness was the major factor that affected Mathematics education in the school. Attainment of the goals of Mathematics education is largely dependent on the quality of teachers. Therefore, there should be quality teacher development. Opportunities to enrich teachers' practices and competencies through in-service training, conferences, seminars and workshops should be provided on a regular basis to help them keep abreast with recent developments in the field of Mathematics education and broaden their knowledge of the subject matter. There should be proper staffing of schools in terms of quality and quantity. Good practices for effective implementation of inquiry-based Mathematics education must be identified and properly implemented. There should also be provision of modern teaching-learning resources in terms of quality and quantity as students need a variety of materials to engage in inquiry-centered learning environment. Finally, if Mathematics courses are properly taught from the lower level, this will lay a sound foundation for Mathematics education at the higher level.

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Introduction:-

Bright future of a country depends upon the educational system that builds morality and behaviour of its citizens. To attain this, it requires attractive investment in education at the largest scale (Griffiths, Reuben & Riola, 2014). Education is considered as the optimal instrument that is used for integrating individuals' with the society for the sake of developing national goals and achieving high levels of progress, promotion of unity, self-actualization and

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strive for political constancy, social evolution, economic welfare, scientific standards, cultural consciousness and technological progress (Whelan & Mullins, 2010). For such multi tasks to be acquired, mathematics education cannot be ignored (Rayes, Ignatius & Bamba, 2013). Mathematics education is viewed as one of the most important fields in the worldwide. It is a field that has direct relationship with other fields, particularly the sciences (Borman & Motowidlo, 2010). According to Unameh, (2011) in Tshabalala and Ncube (2013), mathematics education is the bedrock and an indispensable tool for scientific, technological and economic advancement of any nation. In addition, Davies and Hersh (2012) saw mathematics education as an important area not only from the point of view of getting an academic qualification at school or college, but also prepares students for the future irrespective of which work of life they choose to be part of. Mefor (2014) summarized it all by saying that mathematics education relates to everything in the universe from the smallest to the largest.

As Unameh (2011) put it, mathematics education is intimately connected to daily life and everybody's life-long planning. Therefore, it is an area that human life cannot function effectively without it. Equally in Ghana, mathematics education is one of the core areas for all primary and secondary school children. According to Acheampong and Wilson (2008), mathematics education should be considered as a compulsory field of study that must be passed at credit level by students before getting admission into any secondary or tertiary institution in Ghana. Cited in Norbert, Amoah and Creswell (2013), mathematics education has the following objectives: to develop computational skills and foster the desire and ability to be accurate in a degree relevant to the problem at hand; to develop precise, logical and abstract thinking; to develop ability to recognize problems and to solve them with related mathematical knowledge; to provide necessary mathematical background for further education; and to stimulate and encourage creativity, originality and curiosity in the learner.

In spite of the significant role that mathematics plays, most students find it difficult to pass the subject and its related courses at the various levels of education. According to Pamford and Listowel (2015), students fail in mathematics and its related courses because of educators' poor attention towards it at the basic level. As indicated by Cook and Nixson (2009), the main reason for students' failure in mathematics is as a result of curriculum development and the ways teachers teach the subject. According to the authors, different teaching approaches, techniques, methods and ways can influence outcomes in mathematics. Adding to that of Cook and Nixson (2009), Aryeetey (2015) opined that, most teachers who teach mathematics in Ghanaian public schools have little or no knowledge in the subject, but because of the shortage of mathematics teachers in the system, they are been forced to handle the subject.

Also, most of the teachers do not make the teaching of the subject practical and exciting as they do not have the competencies to handle it dynamically (Parkar, Macpherson & Holt, 2014). Additionally, parents' desire of seeing their children with proper understanding and application of mathematical concepts does not come true because they directly put all the responsibility of the teaching on the shoulders of teachers and they themselves do not make much of their efforts to develop and draw their kid's interests towards the teaching and learning of subject. Thus, the kids automatically find mathematics as a daunting subject (Cambell, McCloy, Oppler & Sager, 2013). Finally, Hanson and Kingsford (2015) indicated other causes of the failure of students in mathematics as poor preparation, difficult questions, emotional problems and lack of necessary mathematical facilities. Whatever may be the case, students are at the receiving end of all educational plans and programmes. Hence, there is the need for proper measures to be instituted to help improve students' level of performance in mathematics. This study therefore sought to find out the main causes of students' poor performance in mathematics. A case of Sefwi Bonwire D/A Junior High School in the Western Region of Ghana.

Statement of the Problem

The 21st century is characterized by the advancement in technology. For Ghana to realize accelerated development in the 21st century, she needs quality mathematics education especially at the basic and second cycle level. Education is the total process of human learning by which knowledge is impacted, faculties trained and skills developed (Urevbu, 2011). Mathematics education is therefore a field of study that acquaints students with certain basic knowledge, skills and attitudes needed for future career advancements (Magher, 2016). According to Manfred, Agyin and Boateng (2015), the last two decades have seen repeated calls for reforms and innovations aimed at improving mathematics education in Ghana. This suggests that there are issues in mathematics education that needs to be addressed in the country. It is also disheartening to note that with all the importance attached to mathematics in Ghana's educational system, poor performances have been the issues of recent times. These poor performances in mathematics is one of the major reasons for the decline in technological advancement in the country. Therefore, to help reduce the level of

students' poor performances in mathematics, a study to unveil the major causes of such a canker was viewed as vital and necessary to be undertaken.

Objectives of the Study:-

The frequent drop in the performances of students in Sefwi Bonwire D/A Junior High School, where a handful of students that take part in final mathematics examinations, acquire the minimum requirements for admission into secondary institutions, formed the main rationale for the conduct of this study. Specifically, the study sought to;

1. Determine the actual causes of students' low performance in mathematics in the school.
2. Identify activity-based teaching methods that can improve students' performance in mathematics.
3. Identify the major factors that affect mathematics education in the school.

Research Questions

Based on the statement of the problem and the purpose of the study, the following research questions were formulated to help drive the focus of the study.

1. What are the actual causes of students' low performance in mathematics in the school?
2. What activity-based teaching methods can improve students' performance in mathematics?
3. What are the major factors that affect mathematics education in the school?

Significance of the Study

This study will help teachers, parents and school administrators to know the underlying issues that hinder students' high achievement in mathematics. This will help them to put in place measures to improve the level of students' performances in the subject for the betterment of the students and the nation as a whole. Findings of this study will also help students to identify the factors that actually cause their poor performances in mathematics. This will help them to make use of the suggested recommendations to prevent their future failure. The study finally adds to the existing knowledge of literature and serves as a reference material for further studies.

Research Methodology:-

Research Design

The research designed employed in the study was a descriptive survey. As indicated by Sincero (2013), a survey is the process of collecting data to answer questions concerning a topic under study. Surveys provide a high level of general capability in representing a large population. Due to the usual huge number of people who answer surveys, the data being gathered possess a better description of the relative characteristics of the general population involved in the study. As compared to other research designs, surveys are able to extract data that are near to the exact attributes of a larger population (Sincero, 2013). This type of design was used because it allowed the researcher to study a small sample and later generalize the findings to the whole population.

Population and Sampling

All students and teachers in Sefwi Bonwire D/A Junior High School formed the target population of the study. A sample totaling 80 was used for the study. This sample was selected through the stratified random sampling technique. The technique was used because the population was too large to be used and also the researcher wanted to avoid bias in the sampling process. In selecting the sample, the researcher divided the population into two strata (teachers' stratum and the students' stratum). A simple random sample was then selected from the two strata. The sample consisted of 64 students representing 80% of the sample or a within sampling fraction of 4/5, and 16 teachers representing 20% of the sample or a within sampling fraction of 1/5.

Data Collection Instruments

Questionnaires were used for data collection. According to Arong and Fullerton (2014), questionnaires are research instruments consisting of series of questions and options for the purpose of gathering information from respondents. Questionnaires have advantages over some other types of instruments in that, they are cheap, do not require as much effort from the questions as in verbal or telephone surveys and often have standardized answers that make them simple to compile data (Arong & Fullerton, 2014). Questionnaires were used for the study because they required very little time from the respondents and also took little time for the researcher to administer. The questionnaires consisted of four sections. Section A was on the background of the respondents, whilst Section B solicited for information on the causes of students' poor performance in mathematics. Further, Section C tackled the activity-based teaching methods that could improve students' performance in the school, whilst Section D was on the factors that affected the

effectiveness of mathematics education in the school. The questionnaires had both open and closed ended questions. The closed ended questions had options for the respondents to choose, whilst, the open ended questions had dotted spaces provided for the respondents to give their various opinions.

Data Collection Procedure

Data was obtained from both primary and secondary sources. In obtaining the primary data, the researcher wrote a formal letter to the head teacher of the school to seek for official permission for the conduct of the study. After a letter of authorization had been received, the researcher paid familiarization visit to the school. The purpose of the visit was to observe the place and also to select the sample that was to be used for the study. A week after the visit, the questionnaires were administered personally by the researcher to the respondents, after the researcher had taken the respondents through the items explaining some technical items in the questionnaires. The questionnaires were retrieved a day after they were administered. The researcher obtained secondary information from books, articles, journals and past studies that related to the topic under study. The books and the past studies were obtained from the University of Education, Winneba library whilst the articles and journals were obtained from the internet.

Data Analysis

Data obtained from the respondents was first edited. This was done with the aim of making data analysis easier for the researcher. The edited data was grouped and presented into frequency tables. With the open ended items, a short list was prepared from a master list of responses so as to arrive at key responses given by the respondents. Thus, the open ended items were grouped based on the similarity of responses given by the respondents. The analysis and interpretation of data was conducted in the order of background of the respondents, the actual causes of students' low performance in mathematics in the school, activity-based teaching methods that could improve students' performance in mathematics and major factors that affected mathematics education in the school. The researcher finally used percentages to analyze the data.

Empirical Results:-

Demographic Characteristics of the Respondents

This aspect of the chapter analyses and interprets data that relates to the gender, age educational background, working experience and marital status of the respondents. The results are shown as follows;

Table 1:- Gender Distribution of the Respondents.

Gender	Frequency (n)	Percentages (%)
Male	50	62.5
Female	30	37.5
Total	80	100

(Source: Field Survey, 2020)

As indicated in Table 1, 50 respondents representing 62.5% were males and 30 respondents representing 37.5% were females. The results show that, males dominated the sample.

Table 2:- Age Distribution of the Respondents.

Age(yrs)	Frequency (n)	Percentage(%)
10-19	63	78.75
20-29	0	0
30-39	7	8.75
40-49	7	8.75
50-above	3	3.75
Total	80	100
(Source: Field Survey, 2020)		

From Table 2, 63 respondents representing 78.75% fell within the age group of 10 to 19 years. Seven (7) respondents representing 8.75% were within the age group of 30 to 39 years. Another 7 respondents representing 8.75% were within the age group of 40-49 years and 3 respondents representing 3.75% were 50 years or more. The results from Table 2 show that, respondents who fell within the age group of 10 to 19 years dominated the sample. This number the students who formed part of the sample.

Table 3:- Educational Background of the Respondents.

Qualification	Frequency (n)	Percentages (%)
No Qualification	63	78.75
Diploma	7	8.75
First Degree	10	12.5
Second Degree	0	0
Other(s)	0	0
Total	80	100

(Source: Field Survey, 2020)

As depicted in Table 3, 63 respondents representing 78.75% had no qualification because they were the students who formed part of the sample. Seven (7) respondents representing 8.75% had diploma as their qualification and 10 respondents representing 12.5% had first degree as their qualification. None of the respondents had second degree or other qualifications in the school. The results from Table 3 show that, those who had no qualification dominated the sample.

Table 4:- Working Experience of the Respondents.

Working Experience	Frequency (n)	Percentage (%)
No Experience	63	78.75
1-5	7	8.75
6-10	7	8.75
11 years-above	3	3.75
Total	80	100

(Source: Field Survey, 2020)

As shown in Table 4, 63 respondents representing 78.75% had no working experience because they were students. Seven (7) respondents representing 8.75% had 1 to 5 years working experience in the school. Another 7 respondents representing 8.75% had 6 to 10 years working experience in the school and 3 respondents representing 3.75% had 11 or more years working experience in the school. The results from Table 4 showed that, majority of the respondents had no working experience in the school.

Table 5:- Marital Status of the Respondents.

Marital Status	Frequency (n)	Percentage (%)
Married	10	12.5
Single	63	78.75
Divorced	7	8.75
Widowed	0	0
Total	80	100

(Source: Field Survey, 2020)

According to Table 5, 10 respondents representing 12.5% were married. Sixty-three (63) respondents representing 78.75% were single because they were the students who formed part of the sample and 7 respondents representing 8.75% had divorced. The results from Table 5 showed that, majority of the respondents were single.

Causes of Students' Poor Performance in Technical Education

The researcher wanted to find out from the respondents whether they had any idea about the causes of students' poor academic performance in Mathematics and if so, what they thought were the various causes. On whether they had any idea about the causes of students' poor academic performance in Mathematics, a hundred percent response was recorded. When the respondents were asked to indicate those causes, the following results were obtained;

Table 6:- Causes of Students' Poor Performance in Mathematics.

Causes	Frequency (n)	Percentage (%)
Poor teaching methods	16	20
Teacher qualifications	8	10
Students' study habits	32	40
Parents' value attitudes	8	10
Peer group influence	16	20
Total	80	100
(Source: Field Survey, 2020)		

From Table 6, 16 respondents representing 20% indicated that, poor teaching methods were the causes of students' poor academic performance in Mathematics. Eight (8) respondents representing 10% showed that, teacher qualifications were the causes of students' poor performance in Mathematics. Thirty-two (32) respondents representing 40% highlighted that, students' study habits were the causes of students' poor performance in Mathematics. Another 8 respondents representing 10% indicated that, parents' value attitudes were the causes of students' poor performance in Mathematics and another 16 respondents representing 20% were of the view that, peer group influence was the main cause of students' poor performance in Mathematics education. The results from Table 6 indicated that, poor teaching methods, teacher qualifications, students' study habits, parents' value attitudes and peer group influence were all factors that caused students' poor performance in Mathematics, but students' study habits was the major cause of students' poor academic performance in Mathematics in the school.

Activity-Based Teaching Methods that can improve upon the Teaching and Learning of Mathematics in the School

The researcher wanted to find out from the respondents whether they had any idea about the activity-based teaching methods that can improve upon the teaching and learning of Mathematics in the school and if so, what they thought were those methods. On whether the respondents had any idea about the activity-based teaching methods that can improve upon the teaching and learning of Mathematics in the school, a hundred percent response was recorded. When the respondents were asked to indicate those methods, the following responses were recorded;

Table 7:- Activity-Based Teaching Methods that can Improve upon the Teaching and Learning of Mathematics in the School.

Teaching Methods	Frequency (n)	Percentage (%)
Cooperative learning	16	20
Problem-based learning	40	50
Discussions	4	5
Think-pair-share	8	10
Classroom experiments	12	15
Total	80	100
(Source: Field Survey, 2020)		

As shown in Table 7, 16 respondents representing 20% indicated that, cooperative learning was an activity-based teaching method that could improve upon Mathematics education in the school. Forty (40) respondents representing 50% were of the view that, problem-based learning was an activity-based teaching method that could improve upon Mathematics education in the school. Four (4) respondents representing 5% stated that, discussions was an activity-based teaching method that could improve upon Mathematics education in the school. Eight (8) respondents representing 10% indicated that, think-pair-share was an activity-based teaching method that could improve upon Mathematics education in the school and 12 respondents representing 15% postulated that, classroom experiments was an activity-based teaching method that could improve upon Mathematics education in the school. The results from Table 7 show that, cooperative learning, problem-based learning, discussions, think-pair-share and classroom experiments were all activity-based teaching methods that could improve upon Mathematics education in the school, but problem-based learning was the main activity-based teaching method that could improve upon Mathematics education in the school.

Factors that Affect Mathematics Education in the School

The researcher wanted to find out from the respondents whether they had any idea about the factors that affected Mathematics education in the school and if so, what they thought were those factors. On whether the respondents had any idea about the factors that affected Mathematics education in the school, a hundred percent response was recorded. When the respondents were asked to indicate those factors, the following responses were recorded;

Table 8:- Factors that Affect Mathematics Education in the School.

Factors	Frequency (n)	Percentage (%)
Infrastructure	20	25
Students' attitude	16	20
Teaching effectiveness	28	35
Quality of teachers	4	5
Extra-curricular activities	12	15
Total	80	100

(Source: Field Survey, 2020)

As indicated in Table 8, 20 respondents representing 25% were of the view that, infrastructure was a factor that affected Mathematics education in the school. Sixteen (16) respondents representing 20% stated that, students' attitude was a factor that affected Mathematics education in the school. Twenty-eight (28) respondents representing 35% indicated that, teaching effectiveness was a factor that affected Mathematics education in the school. Four (4) respondents representing 5% highlighted that, quality of teachers was a factor that affected Mathematics education in the school and 12 respondents representing 15% were finally of the view that, extra-curricular activities were factors that affected Mathematics education in the school. The results from Table 7 show that, infrastructure, students' attitude, teaching effectiveness, quality of teachers and extra-curricular activities were all factors that affected Mathematics education in the school, but teaching effectiveness was viewed as the major factor that affected Mathematics education in the school.

Summary, Conclusion and Recommendations:-

Summary

This study sought to examine the causes of students' poor performance in Mathematics. A case of Sefwi Bonwire D/A Junior High School in the Western Region of Ghana. Specifically, the study sought to determine the actual causes of students' low performance in mathematics in the school, identify activity-based teaching methods that can improve students' performance in mathematics and to identify the major factors that affect mathematics education in the school. This study was a survey. The survey research design was used because, it was cost-effective, prevented geographical dependence, was capable of collecting data from a large number of respondents, numerous questions could be asked about the subject giving extensive flexibility in data analysis, a broad range of data could be collected and was viewed as relatively free from several types of errors. All the teachers and students in the above mentioned school formed the population of the study. The researcher used a sample of 80 for the study. This sample

was selected through the simple random sampling technique. This technique was chosen because it reduced the potential for human bias in the selection of cases to be included in the sample. As a result, the simple random sample provided the researcher with a sample that was highly representative of the population being studied. Questionnaires were used to gather primary data for the study. Questionnaires were chosen because they were relatively cost effective and their results could also be quickly and easily quantified by the researcher. The researcher also obtained secondary data from past studies, articles, journals and books that related to the topic under study. Data obtained from the study was first grouped and presented into frequency tables. The researcher then used percentages to analyze and interpret the data. Firstly, the researcher analyzed and interpreted data on the gender, age, educational background, marital status and working experience of the respondents. Finally, data on the major causes of students' poor performance in Mathematics education, factors that affected Mathematics education in the school and activity-based teaching methods that could improve upon Mathematics education in the school were vigorously analyzed and interpreted.

The study revealed that, poor teaching methods, teacher qualifications, students' study habits, parents' value attitudes and peer group influence were all factors that affected students' poor academic performance in Mathematics education, but students' study habits was viewed as the major cause of students' poor academic performance in the subject. The study also disclosed that, cooperative learning, problem-based learning, discussions, think-pair-share and classroom experiments were all activity-based teaching methods that could improve upon Mathematics education in the school, but problem-based learning was the main activity-based teaching method that could improve upon Mathematics education in the school. The study finally uncovered that, infrastructure, students' attitude, teaching effectiveness, quality of teachers and extra-curricular activities were all factors that affected Mathematics education in the school, but teaching effectiveness was viewed as the major factor that affected Mathematics education in the school.

Conclusion and Recommendations:-

Based on the findings the researcher concludes that, students' study habits are the major cause of students' poor academic performance in Mathematics in the school. The researcher also concludes that, problem-based learning is the main activity-based teaching method that could improve upon Mathematics education in the school. It is finally concluded from the study that, teaching effectiveness is the major factor that affects Mathematics education in the school. Attainment of the goals of Mathematics education is largely dependent on the quality of teachers. Therefore there should be quality teacher development. Opportunities to enrich teachers' practices and competencies through in-service training, conferences, seminars and workshops should be provided on a regular basis to help them keep abreast with recent developments in the field of Mathematics education and broaden their knowledge of the subject matter. There should be proper staffing of schools in terms of quality and quantity. Good practices for effective implementation of inquiry based Mathematics education must be identified and properly implemented. There should also be provision of modern teaching- learning resources in terms of quality and quantity as students need a variety of materials to engage in inquiry-centered learning environment. Finally, if Mathematics courses are properly taught from the lower level, this will lay a sound foundation for Mathematics education at the higher level.

Suggestions for Further Studies:-

This study was confined to only Sefwi Bonwire D/A Junior High School in the Western Region of Ghana. The researcher suggests that, further studies should be expanded enough to cover many schools in the nation at large. The study was also limited to the major causes of students' poor performance in Mathematics education, activity-based teaching methods that could improve upon the teaching and learning of Mathematics in the school and factors that affected Mathematics education in the school. The researcher therefore suggests that, further studies should concentrate on the impact of Mathematics education on the performance of the educational sector of Ghana.

References:-

1. Acheampong, E., & Wilson, K. (2008). Students learning from professional development in elementary mathematics: Reciprocal relations between formative assessment and pedagogical content knowledge. *Science Education*, 96(2), 265-290.
2. Arong, G., & Fullerton, L. (2014). Examining the technological pedagogical content knowledge of Singapore pre-service teachers with a large-scale survey. *Journal of Computer Assisted Learning*, 26, 563-573.
3. Aryeetey, D. (2015). Enhancing pedagogical content knowledge in pre-service mathematics students. *Higher Education Studies*, 2(2), 66-71.

4. Borman, E., & Motowidlo, O. (2010). Course content analysis of students' academic performance in Mathematics education. *International Journal of Research*, 6(3), 1-5.
5. Cambell, Y., McCloy, T., Oppler, L., & Sager, P. (2013). Use of Body Shape Information in Technical Tools Selection, *Human Factors and Ergonomics Society Annual Meeting Proceedings*, 44, 715-718.
6. Cook, W., & Nixson, T. (2009). Can there be reliability without Reliability? *Journal of Educational and Behavioural Statistics*, Vol.29, pp.241-244.
7. Davies, E., & Hersh, Y. (2012). Creating sizing systems. In: Ashdown, S.P. (Ed.). *Sizing in technical education: developing effective sizing systems for ready-to-use materials*. New York: Woodhead Publishing.
8. Griffiths, R., Reuben, I., & Riola, P. (2014). An Alternative Approach to increasing female interest in mathematics education, *Technical Education Research Journal*, 24(2), 96-111.
9. Hanson, T., & Kingsford, Y. (2015). Gaining a competitive edge with top quality sizing. Paper presented at the American Society of Quality Congress Transactions. Toronto: 371-378.
10. Magher, R. (2016). Students' English language proficiency and academic performance in vocational education College of Education (Tech.), Lafiagi, Nigeria, *International Organization of Scientific Research, Journal of Research and Method in Education*, 4 (5); 63-66.
11. Mefor, T. (2014). *The impact of teacher-student interaction on student motivation and achievement*. London: Pearsons Publications.
12. Norbert, Y., Amoah, T., & Creswell, T. (2013). Enhancing pedagogical content knowledge in pre-service Science teachers, *Higher Education Studies*, 2(2), 66-71.
13. Pamford, H., & Listowel, A. (2015). Teacher quality and student achievement: A review of state policy evidence. *Education Policy Analysis Archives*, 8(1), 1-44.
14. Parkar, T., Macpherson, K., & Holt, J. (2014). Teaching about ozone layer depletion in Turkey: Pedagogical content knowledge of science teachers, *Public Understanding of Science*, 17(2), 261-276.
15. Rayes, T., Ignatius, K., & Bamba, Y. (2013). Perceived self-efficacy in cognitive development and functioning. *Educational Psychologist*, 28(2), 117-148.
16. Sincero, E. (2013). Students' proficiency in English language relationship with academic performance in science and technical education, *American Journal of Education Research*, 1(9), 355-358. DOI: 10:12691/education 1- 9 -2.
17. Tshabalala, T., & Ncube, Y. (2013). Effects of teachers' effectiveness on students' academic performance in public secondary school: Delta state, Nigeria, *Journal of Educational and Social Research*, 3(3), 105-111.
18. Umameh, Q. (2011). Resource provision and utilization and academic performance in pre vocational secondary school subjects in Osun State, Nigeria, (Unpublished doctoral thesis), University of Ibadan, Nigeria.
19. Urevbu, T. (2011). *Principles of operation management*. London: Pearson International edition.
20. Whelan, Q., & Mullins, I. (2010). *Functional Science, Technology and Technical Education for National Economic Empowerment and Development*. A Speech Delivered at the 2007
21. School of Science National Conference held at Federal College of Education, Zaria, and April 2-5.