

Teacher Variables As Predictors of Academic Achievement of Primary School Pupils Mathematics

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ABSTRACT

This study examined the relationship between Teacher self- efficacy, interest, attitude, qualification, experience and pupils' academic achievement in primary school mathematics. The participants of the study comprises of 254 primary school teachers and 120 primary school pupils. Data collected on the study were analysed using a stepwise multiple regression analysis. The results reveals that teacher self – efficacy and interest had significant correlation with pupils achievement scores. Teacher's self-efficacy being the best predictor of pupils' academic achievement in mathematics was followed by teacher's interest. Attitude, qualification and experience were not significant correlation with pupil's achievement in mathematics. The study recommended that it is high time for primary school mathematics teachers to have a change of attitude towards the teaching of the subject so that the achievement of universal basic education will not be hindered. Furthermore, primary school educational authorities were called upon to ensure that only teachers who are qualified to teach the subject are employed. Not these alone, their attention was also drawn to the fact that they should design educational programmes that will enhance the teacher self- efficacy for a better prediction of pupils' achievement in mathematics.

Keywords: *Teacher self-efficacy, interest, attitude, qualification, experience and pupils academic achievement in mathematics.*

Introduction

The importance of mathematics in most fields of human endeavor cannot be underestimated. Its usefulness in science, mathematical and technological activities as well as commerce, economics, education and even humanities is almost at par with the importance of education as a whole. Mathematics is one of the key subjects in both the primary and secondary school education system in Nigeria. Fajemidagba (1991) was

earlier of the opinion that the teaching of mathematics is very important to all human existence.

Mathematics is all about finding solutions to problems. All decisions taken are based on such questions as what and how these questions are best answered by converting every statement to a mathematical statement before a solution is sought. The depth of mathematical knowledge an individual has dictated the level of accuracy of his/her decision. This implies the fact that before an individual can function well in the society he/she must possess or have relatively good knowledge of mathematics especially in this era of technological age. The technological development is highly rooted in the study of mathematics. Okebukola (1992) opined that mathematics is referred to as a central intellectual discipline of the technological societies. Kerlinger (1985) describes mathematics as a language of science. Aminu (1990) argued that mathematics is not only the language of sciences, but an essential nutrient for thought, logical reasoning and progress. Mathematics liberates the mind and also gives individuals an assessment of their intellectual abilities by pointing towards a direction of improvement. He concluded by saying that mathematics is the basis of all sciences and technology and therefore of all human endeavours. Application of mathematics cuts across all areas of human knowledge. Despite its wide applicability and importance, many pupils and students still do not find their feet in the subject as a result of their perennial failure in the subject.

Mathematics educators and researchers like (Ohuche 1978; Ale, 1989; Oshibodu, 1984 and 1988; Akpan, 1987; Odogwu, 1994; Edwards and Knight, 1994; Alele –Williams 1988; Georgewill, 1990; Tella 1998) have over the years carried out researches on factors that are responsible for poor performance in mathematics at primary and secondary school. These factors range from shortage of qualified mathematics teachers, poor facilities, equipment and instructional materials for effective teaching, use of traditional chalk and talk methods, large pupils to teacher ratios and mathematics fright/phobia to mention but a few. Just a few of these studies, if at all, consider Teacher's variables such as Teacher self-efficacy, interest, attitude, qualification and experience.

Several factors have generally been identified as predictors of poor academic achievement. Agyeman (1993) reported that a teacher who doesn't have both the academic and the professional teaching qualification would undoubtedly have a negative influence on the teaching and learning of his/her subject. Apart from qualification, other teachers' variables still exist which can either positively or negatively predict pupils' mathematics performance. However, research particularly in the Nigeria context is being silent about them. It is against this background that this study critically examined teacher variables as predictors of mathematics achievement in primary school. The choice of primary school culminated from the fact that it is the bedrock/foundation of any advancement in the educational system. Teacher variables that the study focused on are teachers' self-efficacy, interest, attitude, qualification and experience.

on pupils' achievement in primary school mathematics. In other to achieve the purpose of this study, the following research questions were answered:

1. To what extents would the teacher self-efficacy, interest, attitude, qualification and experience when taken together predict mathematics academic achievement among primary school pupils?
2. What is the relative contribution of each the factors to the prediction?

Literature Review

In recent years a numbers of researches have sought to relate two dimensions of self-efficacy to an educational setting. In this context the term "teacher efficacy" (TE) is generally accepted as analogous to Bandura's "self-efficacy". In an attempt to determine two elements which corresponded with Bandura's two factors theoretical model of self-efficacy, Gibson and Dembo (1984) developed a scale to measure the two dimensions of TE. There is results indicated that teacher efficacy consisted of at least two clearly distinguishable factors. One factor (GTE) appeared to represent a sense of whether or not a teacher's ability to bring about change is limited by factors outside his/her control. The second factor (TSE), which is relevant to the present study, seemed to represent to a teacher's sense of whether or not he/she personally has the skills and abilities necessary to enhance pupils' learning. However, the teacher efficacy scales developed by Gibson and Dembo (1984) consisted of items which, with the exception of one which related to teaching a new mathematics concept, reflected beliefs about education in a general sense, whereas Bandura(1977) maintained that self-efficacy is situation specific and cannot be identified in general terms. Raudenbush, Rowan and Cheong (1992) assumed that TE was not a "global disposition" and that perceptions of TE may be situational. Summarily, Kennedy (1990), commented that the various definitions of self-efficacy, such as " a person beliefs about their performance capabilities in a particular domain" and "judgements about their ability to accomplish certain goals or tasks by their actions is specific situations", suggested that these implied " a relatively situational or domain- specific construct rather than a global personality trait" (p.844).

Teaching preparation and procedures

Quality teaching has been defined as "teaching that maximizes learning for all students" (Glatthorn& Fox, 1996, p.1). Teaching entails engaging pupils as active learners to induce positive, comprehensive changes in their pre-existing knowledge, skills, and attitudes. Comprehensive changes (growth) are achieved by teachers who are able to build on learners' experiences, abilities, interest, motivation and skills. Therefore teachers must have mastered the basic skills of teaching and possess the ability to continuously adjust their teaching strategies to meet the diverse needs of their pupils.

Knowledge of Subject-Academic Preparation

It is intuitively obvious that teachers must possess a professional knowledge base and exhibit knowledge of the subject matter. Successful teachers have a vast repertoire of instructional strategies and techniques that reflect their knowledge of the subject. According to Slick (1995), teachers are those that consciously reflect upon, conceptualize, and apply understandings from one classroom experience to the next. Teaching of mathematics requires continuous reflection and decision making before, during, and after classroom instruction (Berliner & Biddle, 1995; Colton & Spark – Langer, 1993, Costa, 1995; Lampert & Clark, 1990; Pultorak, 1996).

Personal Characteristic and Professional Responsibility

As previously indicated teachers have the ability to evaluate their own instructional effectiveness and be professionally responsible for teaching by accepting responsibility for pupils learning and behaviours (Porter & Bryophyte, 1988). Further, since “the essence of teaching is human interaction” (Dwyer & Villegas, 1993, p.10), all teachers must continuously refine and enhance their skills of communication and collaboration. Personal and professional attributes that have been identified as being representative of teachers include: the ability to show a genuine interest in teaching and enthusiasm for learning., a pride one’s personal appearance, Skills in adapting to change, accepting responsibility for actions both inside and outside the classroom, the desire to take a cooperative approach towards parents and school personnel, punctuality and regularity in attendance and the ability to establish a genuine rapport with pupils.

Teachers Variables / Characteristics

Teachers Qualification

Interest in student performance and teacher qualifications has intensified among education policymakers and researchers. During this time period, research has accumulated that links student achievement to the qualifications of teachers (see Ferguson 1991, 1998; Goldhaber and Brewer 2000; Mayer, Mullens, and Moore, 2000). Two central measures of elementary and secondary teacher qualifications are teachers' postsecondary education and their certification. To understand how many students are taught by teachers lacking specified levels of training, efforts have focused on mismatches between teacher qualifications and their teaching assignments (National Commission on Teaching and America's Future 1996; Ingersoll 1999). One of the main findings concerning teacher qualifications has been the relatively high incidence of teachers teaching subjects outside their areas of subject matter training and certification (see, e.g., Bobbit and McMillen, 1994; Ingersoll 1996, 1999, 2000; Neuschatz and McFarling 1999; Robinson 1985). Moreover, the incidence of out-of-field teaching has been shown to vary by subject and by grade level. Out-of-field teaching also has been shown to occur more often in the classrooms of low-income students (Ingersoll 1999). Goldhaber and Brewer's 1997 analysis of teachers' postsecondary degrees and students' mathematics performance found a positive relationship between these variables; with higher levels of performance among students whose teachers held a bachelor's or

master's degree in mathematics than among students whose teachers were out-of-field. Goldhaber and Brewer (2000) examined data on the postsecondary degrees and certification status of teachers and their students' performance in mathematics and science. They observed a positive relationship between teachers' degrees and student performance in mathematics consistent with earlier findings. They also found that students whose teachers were certified in mathematics but did not hold a postsecondary degree in mathematics did not perform as well as students whose teachers held a postsecondary degree in mathematics. These findings provide a foundation for further examinations of out-of-field teaching data. One of the most significant studies in this area was also performed by Hanushek (2000) who surveyed the results of 113 *studies* on the impact of teachers' qualifications on their students' academic achievement. Eighty-five percent of the studies found *no positive correlation* between the educational performance of the students and the teacher's educational background. Although 7 percent of the studies did find a positive correlation, 5 percent found a *negative impact*.⁴ Those that push for legislation requiring certain teacher qualifications for homeschoolers have no research to support the necessity of such standards. The results of these 113 studies are certainly an indictment on proponents of certain teacher standards for homeschoolers. Higher teacher qualification does not make better students.

Teachers Attitude

Attitudes are generally regarded as having been learnt. They predispose an individual to action that has some degree of consistency and can be evaluated as either negative or positive (Fishbein & Ajzen, 1975 in McMillen et al, 2000). Caraway's (1985) data revealed that mathematics competency and achievement were both positively correlated with attitude toward mathematics. This is also true for pre-service teachers, as is reported in the study by Rech, Hartzell, and Stephens (1993) who compared the mathematical competencies and attitudes of American pre-service elementary education students against a representative college population, over three years. The results supported Caraway's findings and also showed that the pre-service students possessed significantly more negative attitudes toward mathematics than the general college sample. Davies and Savell (2000), in a study of 53 New Zealand early pre-service childhood students found they entered their teacher preparation program feeling negative about mathematics. Grootenboer (2002) reported similar findings for 31 New Zealand pre-service primary teachers and there are Australian studies with similar results (e.g., Sullivan 1989). When exploring the attitudes of primary school teachers towards mathematics it is necessary not only to consider their attitudes towards mathematics but also their attitudes towards the teaching of mathematics. The significance of research involving the attitudes of primary teachers is important due to the potential influence of these people upon pupils. The experiences of teachers influence the formation of attitudes and these, in turn, influence their classroom practices. These attitudes and practices may sometimes be at variance with the main direction of their tertiary teaching methods courses. Thus it is crucial in understanding primary teachers that these attitudes are made explicit and examined in order to adapt

tertiary courses to the needs of these students. Research has argued that positive teacher attitudes contribute to the formation of positive pupil attitudes (Sullivan, 1989; Relich, Way, & Martin, 1994). Other studies have shown that classroom strategies used to teach a subject are influenced by teacher attitudes which, in turn, influence pupil attitudes (Carpenter & Lubinski, 1990). Research into attitudes to mathematics has explored the influence of a range of affective variables such as anxiety and self-image. Mathematics anxiety is usually defined as a feeling of tension and anxiety that interferes with mathematics performance. There is disagreement over whether it constitutes an independent affective construct or is really a reflection of some deeper attitude. Thus while Nisbet (1991) argued that anxiety and confidence in teaching mathematics were independent factors. Relich, Way, and Martin (1994) disagreed in their study of 212 Australian undergraduate pre-service teachers.

Teachers Experience

Teacher characteristics such as years of teaching experience have been investigated to determine their effect on student outcomes (Sanders and Rivers, 1996; Wright, Horn et al., 1997). A more recent analysis by Wenglinsky (2000) used multilevel structural equation modeling to analyze data from the NAEP and found that teachers with a major or minor in the subject area that they are assigned to teach produce greater gains in student achievement in both mathematics and science. This remained true even after controlling for teacher professional development, teacher classroom practices, class size, and student demographics. Interestingly, Hawk, Coble, and Swanson (1985), found that students with mathematics teachers assigned in-field scored higher and had greater gains than students with mathematics teachers assigned out-of-field which indicates a connection of content-knowledge, but not necessarily applying pedagogical knowledge to other content areas. However, teacher experience is a topic of potential concern to policymakers, because experienced teachers often try to move to districts, schools, and classrooms with a more privileged student body and higher resources. Thus, if teacher experience is related to student achievement, and more experienced teachers are able to some extent select the schools and districts in which they teach, or even their teaching assignments within a school, poor students and students at risk of educational failure may end up being doubly disadvantaged because they are more likely to be taught by inexperienced teachers. Greenwald, Hedges, and Laine (1996) found in their meta-analytical study that teaching experience had a positive and significant effect on student achievement. Hawkins, Stancavage, and Dossey (1998) found evidence that although teaching experience appears to be related to student achievement, the relationship may not be linear; students whose teachers had fewer than 5 years of experience had lower levels of mathematics achievement as measured by the NAEP mathematics assessment, but there were no differences in mathematics achievement among students whose teachers had more than 5 years of experience. Other researchers have disagreed with these findings. Hanushek (1997) wrote that 71 percent of the studies he reviewed did not find any results to support a relationship between teaching experience and student achievement.

Teacher Self-Efficacy

Self-efficacy as a teacher, on the other hand, is a powerful predictor of how and whether a teacher will act. Self-efficacy is the belief that one is capable of exercising personal control over one's behaviour, thinking and emotions. Effective teachers believe that they can make a difference in children's lives, and they teach in ways that demonstrate this belief. What teachers believe about their capability is a strong predictor of teacher effectiveness. People who hold strong self-efficacy beliefs tend to: i; be more satisfied with their job (Trentham et al 1985); ii, demonstrate more commitment (Trentham et al 1985); and iii, have lower absenteeism (McDonald & Siegall 1993). Teachers who have high self-efficacy tend to: persist in failure situations (Gibson & Dembo 1984); take more risks with the curriculum (Guskey 1988); use new teaching approaches (Gibson & Dembo 1984); make better gains in children's achievement (Brookover et al 1979); and have more motivated students (Midgely et al 1989).

Teachers Interest

It's been noted that teachers interest in the teaching of a particular subject usually go a long way to improve the performance of their learners. Teachers interest in the teaching of Mathematics could be describe as their feeling of wanting to teach the subject and learn more about it. No wonder that literature have reveal the fact that teachers interest promote learning outcomes in Mathematics particularly among the pupils. It is hope that the result in this study will confirm this fact.

In the context of this study, the following teacher variables are operationalized thus: Teachers' qualification means the highest educational certificate possessed by a teacher to teach mathematics. Attitude refers to a complex mental state involving beliefs, feelings and values and dispositions of a mathematics teacher. Teacher experience connotes the nature of the events a mathematics teacher has undergone in the teaching of the subject. This is usually measure in terms of years. Teacher self-efficacy indicates the capability or ability a mathematics teacher has in teaching the subject; and teacher's interest refers to a sense of concern with and curiosity a mathematics teacher has about the teaching of the subject.

Though, literature seems to confirm that most of the teachers' variables/characteristics have positive relations with pupils' performance. But researches have not confirmed this as much in a population of Nigerian primary school pupils.

Methodology

Research design

This is an Ex- post facto study. In this type of research the researcher does not have direct control on the independent variables since their manifestation have already occurred. The researcher was interested in examining the phenomena under investigation and data were collected after the phenomena had taken place.

Sample: The participants in this study were 120 pupils and 254 primary school teachers selected by stratified/ simple random sampling techniques from some primary schools in Ejigbo Local Government Areas of Osun State, Nigeria. Out of the 254 teachers 129 were females and 125 males.

Instruments: A modified instrument tagged **Teachers Variables Questionnaire** was used for the collection of data on this study. This instrument is divided into two sections. The first section required the participant demographic information. These include sex, age, level, qualifications, and years of teaching experience. The second section contains the items. This is sub-divided into three parts.

Part 1- Teachers Attitude Sub-scale: This part contains items that measured teacher's attitudes towards the teaching of mathematics. It comprises of ten items of likert type scale with response range from strongly agrees to strongly disagree. Items in this part were adapted from Southwell and White (2005) teacher's mathematics attitude survey. The reliability coefficient of this sub-scale was found to be $r = 0.78$. Cronbach alpha.

Part 2- The teachers Self- Efficacy Subscale: This part contains items that measured teacher's self-efficacy in the teaching of mathematics. It also contains ten items and of likert type format with responses ranges from not at all true, barely true, moderately true and exactly true. Items in this part were adapted from Schwarzer, Schmitz and Daytner (1999) Teacher Self-efficacy Scale and mathematics teaching efficacy Belief Instrument (MTEBI) by Riggs & Knochs (1990) The reliability coefficient of this sub-scale yielded an $r = 0.73$.

Part 3- Teachers Interest in Mathematics teaching Scale: This part measured teacher's interest in teaching mathematics. It contains ten items which are of likert type format. Response in this part range from strongly agrees to strongly disagree. Items in this part were adapted from Mitchel (1993) interest scale. The reliability of this part was found to be $r = 0.84$ cronbach alpha. The overall reliability coefficient of the scale return $r = 0.88$.

Mathematics Achievement Test (MAT) constructed by the researcher. This was used to gather respondent's academic achievement score in mathematics. MAT comprises of 15 items objective test based on what pupils have been taught in their various classes. MAT is meant for primary 3 to 6 where selection of teacher is done. MAT has a Cronbach Alpha reliability of 0.90 and concurrent validity of 0.76. Opinions of the teachers in primary schools were also sought concerning the test items and they confirmed that the test has content validity. In all 120 pupils were drawn to write the MAT.

Procedure

The three tests were group administered to the subjects in the schools involved in the study by the researcher with the help of some assistants who were teachers and friends

from schools under studied. The researcher explained the various sections of the questionnaire to the subject who were instructed not to leave any of the items unanswered. It took them about 50 minutes to complete the questionnaires of the questionnaires that were returned 254 were valid for the study. The researcher scored the inventories according to the instructions in their manuals. Pearson's Product Movement Correlation Statistical Procedure and multiple regressions analysis (stepwise). The criterion measure or dependent variable was academic achievement in mathematics while the predictor or independent variables were Teacher Self-efficacy, interest, attitude, qualification and experience.

Results

(a) Using a combination of independent variables to predict mathematics achievement.

Table 1 : Means, standards deviations and intercorrelations among predictor and mathematics achievement for total sample (N = 254)

	Variables					
	1	2	3	4	5	6
1. Teachers' qualification	1.000					
2. Teachers' attitude	-.090	1.000				
3. Teachers' experience	.018	-.131	1.000			
4. Teachers' Self-efficacy	-.036	-.191	.267*	1.000		
5. Teachers' interest	-.127	-.071	.149	.040	1.000	
6. Mathematics achievement	.023	-.027	.179	.313*	.308	1.000
Mean	1.508	16.25	102.815	35.996	1.472	33.899
Standard deviation	.501	8.50	11.751	6.745	.500	4.094

* Significant $P < .05$.

The correlation matrix means and standard deviations of the measured variables are presented in Table 1. Results on Table 1 showed that only Teacher self- efficacy and Teacher interest were significantly correlated with mathematics achievement outcomes ($r = .267$ and $.313$; $P < .05$, respectively); but other variables viz: Teachers attitude, qualification and experiences had very low insignificant correlations with mathematics achievement. This indicates weak relationships.

Table 2: Summary of Regression Analysis between the predictor variables and mathematics achievement

Regression analysis		Analysis of variance				
R	.42176	Source	DF	S.S	MS	F – ratio
R ²	.17789	Regression	5	754.258	150.851	
S.E	3.74912	Residual	248	3485.871	14.055	10.732*

*Significant at P < .0000

Table 2 above shows the values of the parameters of the regression analysis between the predictor variables and mathematics achievement. The results of the analysis showed that predictor variables predicted mathematics achievement of pupils in the primary school. The predictor variables taken against the criterion variable yielded a coefficient of multiple correlations (R) of .421 and adjusted multiple correlation square (R²) of 0.177. The R² value translated into 17.7% of the observed variance in the mathematics achievement scores. The analysis also gave a standard error (SE) of 3.75 and F-value of 10.732 significant at an alpha level of 0.05.

(b) Relative contributions of independent variables to the prediction.

Table 3: Relative contributions of predictor variables to the observed variance in mathematics achievement

Step	Variable	R	R ²	S.E.	F-value	Sign.	Remark
1.	Teacher Self Efficacy	.3130	.0979	30895	27.374	.0000	*
2.	Interest	.4100	.1681	3.748	25.369	.0000	*

* Significant at < .05.

Table 3 shows the relative contributions of Teacher’s self-efficacy and Teacher interest to the observed variance in the interior variable (mathematics achievement) as indicated by the R and R² values at the various steps of the regression analysis. It was found in Table 3 that Teacher self-efficacy had R and R² value of .313 and 0.979 respectively. Teacher’s interest entered the equation at step 2; and the cumulative R was .4100 and R² was .1681. The values corresponding to the two steps involved in the multiple regressions were significant at P. 05 level. The results in Table 3 confirm that Teacher self-efficacy is the best predictor of pupils’ mathematics academic achievement in primary school mathematics among the studied sample followed by Teacher’s interest. The other variables Teacher’s attitude, experience and qualification did not enter the equation at 0.05 levels. Hence, revealing that they are weak predictors of pupils’ academic performance.

Table 4: The Betas of the Predictor Variables to the Predictor of Mathematics Achievement

Variable	B	SEB	Beta	T	Sign. T.
Teachers' interest	2.1675	.4816	.2648	4.500	.0000*
Teachers' experiment	.1202	.1328	.0535	.0906	.3659
Teachers' attitude	.01107	.4772	.0013	.023	.9815
Teachers' qualification	.03184	.0209	.0914	1.522	.1293
Teachers' self-efficacy	.1575	.0371	.2596	4.245	.0000
Constant	19.675	3.609	5.452	.0000*	

* Significant at 0.05 level.

Table 4 gives the prediction variables in the regression equation, the Beta values, and significant T corresponding to the variables regressed against the dependent variable. A look at Table 4 reveals that the Beta values for Teacher's interest and Teacher's self-efficacy were found to be highly significant (teachers' interest $B = .2648$; $t = 4.500$ at .05) and teachers self-efficacy ($B = .2596$; $t = 4.245$, at .05). Looking at the results in table 3, the values pulled by these two variables were higher than the ones pulled by the other three variables, as revealed in table 4. This confirm the results in table 3 where teachers' self-efficacy and teachers interest were earlier revealed to be the best predictors of pupils mathematics academic achievement.

Discussion

The results on Table 2 indicated that 17.7% of the variance in mathematics achievement was accounted for by the predictor variables taken together. The relationship between mathematics achievement and the predictor variables taken together were moderately low as shown by the coefficient of multiple correlation ($R = .421$). Thus, the predictor variables investigated when taken together could, to some extent predict mathematics achievement among primary school pupils involved in this study.

The F-value (10.73) of the analysis which was significant at alpha level of 0.5 lend credence to the fact that the predictor capacity of the predictor variables of this study did not occur by chance even though a large proportion of the variance in mathematics achievement was unexplained by the current data. The results have confirmed previous finding by Hone (1970), by Mechling, Hedman and Donnelley, (1982) and by Cunningham and Blakenship (1979) that teachers gravitate toward performing those tasks that they feel most competent in performing and more importantly avoid areas of lesser competence- even when these areas are prescribed by curricula (Schoenberger, 1988). It is logical, as well as supported by previously cited research, that feelings of competency would be likely to translate into positive attitude toward teaching specific subjects. Also Gusky (1988), Smylie (1988), and Midgelly et al. (1990) have all found that teacher efficacy is correlated with student motivation and with innovative teaching practices. However, these results contradict those of Gusky and Passaro (1993) who found distinction between teaching efficacy and personal or self-efficacy.

The results contained in Table 3 and 4 are quite revealing and informative. All the predictor variables investigated were found to contribute differently to the prediction of mathematics achievement. In particular, only Teacher's self-efficacy and Teacher's interest contributed significantly to the observed variance in the criterion variable in that order. Teacher self-efficacy accounted for 9.8% of the variance in mathematics achievement while Teacher's interest combined with Teacher self-efficacy accounted for 17% of the variance in mathematics achievement. This means that 83% of the variance in mathematics achievement is accounted for by other variables unexplained by the data.

Surprising are the non-significant contributions of the other variables, viz: Teacher's qualification, attitude, and experience to the prediction of mathematics achievement. These findings suggest that other latent and observable variable that lie outside the realm of the present study should be included to provide a more comprehensive conceptualization of the variables determining the mathematics achievement of Nigeria primary school pupils Tella (1998). This also indicate that less emphasis should be placed on those weak variables and more attention focused on those variable that have direct influenced on the academic achievement of pupils in this subject area (mathematics).

Conclusion

The results of this study have revealed that of all the independent variables correlated and regressed with the criterion measure of mathematics achievement, teacher's self-efficacy was the best predictor. This was followed by Teacher's interest. The least predictor was Teacher's experience; attitude and qualification were not significantly correlated with mathematics achievement.

Implications

The implication of these findings is that a large proportion of the variance in mathematics achievement was unexplained by the current data. Therefore, other observable factors that have direct effects on the performance of pupils in mathematics should be included in future research on predictor of mathematics achievement in primary school. It is reasonable to suggest that such variables as locus of control, gender, age, self esteem, and self concept could be included in order to be able to understand other factors that could also predict pupils achievement in mathematic.

It should also be stressed at this point that teachers' interest in mathematics and self-efficacy are very important variables as the study revealed. Therefore, at the teacher training institutions, the would-be teachers need to scrutinize themselves very well to see if their interest for the subject will be continuous. The perception of anything sort of this should be discouraged and should result to discontinuation by shifting over to specialized and train in another subject. This is because failure to do so will be

detrimental to the teaching of the subject at the primary school. On the other hand, mathematics self-efficacy training can be introduced at the teacher training institutions. This is belief will go along way to strengthen teacher efficacy in the subject. Through such training, mathematics teachers who are self-efficacious in the subject can be easily identified and others who are not can be easily guided.

Another implication of the findings on this study is that, despite the low correlation obtained between most of other predictor variables, one cannot discountenance the importance on the achievement of pupils. Therefore, educational stakeholders should design and mount programme that considers the predictor variables that can enhance teacher's self-efficacy and teacher's interest. By so doing, they will be able to play their roles effectively in educational programmes that will eventually help the primary school pupils in mathematics. Primary schools mathematics teachers are called upon to have a change of attitude towards the teaching of the subject. When they do, it is belief that, this will go a long way to affects the performances of the pupils in the subject; bearing in mind that mathematics is important to whichever area of specialization one may think of majoring in the future. Since it is now glaring that every nation of the world are striving towards the millennium goal of achieving quality education by the year 2015, the teaching of mathematics and pupils performances in the subject should not be joke with, it must be enhanced because mathematics is the gateway to all discipline one can think of. The need to start building mathematician of the future for the achievement of quality education not to be a mirage is highly germane.

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