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Working Together to Improve the Quality of Mathematics Education and Students Achievements: Exploring the Views of Ghanaian Parents

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Abstract

Parental involvement in their children's education and for that matter mathematics education has become one of the main areas of research interest. The purpose of this study is to explore the attitudes of Ghanaian parent-students towards their children's education and the factor that influence their participation. An exploratory survey approach was used in this study, and a 38 item semi-structured questionnaire was used for collecting data. A total of 130 parent-students from enrolled in diploma and degree programmes in three universities took part in the study. Similar to the findings from other similar studies, the majority of these parents acknowledged the importance of parental involvement and indicated their willingness to be involved in their children's education. It was, however, interesting to note that majority of these parents have never seen or had access to the two main mathematics resources used in their children's schools: the mathematics syllabus and the mathematics textbook. In addition, the majority of these parents see the teacher as the custodian of knowledge and seem to rely over on them for the success of their children. It is recommended that school and teachers have to be proactive in designing Maths Clubs and other activities to get parents actively involved.

Key words: Parents; mathematics education; perception; school climate; involvement

Introduction

Improving the quality of education has become the hallmark of every government's development agenda for some time now. Because of the pivotal role played by mathematics in the school curriculum, improving the quality of mathematics education and students' achievement in mathematics has become a global debate over the past three decades (Keith, 2000). It is worth noting the following view of mathematics in the society: "mathematics is widely recognised not only as a core component of the curriculum but also a critical filter to many educational and career opportunities" (Leder, Pehkonen, and Torner, 2002, p. 1).

The need for reforms in mathematics education began in the early 1980s in response to a "back to basics" call to address societal concerns about the state of mathematics education (Van de Walle, 2004). Despite the numerous reforms in mathematics education, research (e.g. Ball, Lubienski, Mewborn, 2001; and, Baker, 2008) have shown that students' performances in both national and international examinations have not reached the needed levels. It is for this reason that there have been numerous public outcries for a critical examination of how mathematics is taught and learned, and how to improve students' achievements in mathematics. In response to this demand, stakeholders in the education sector have conducted empirical research into the issue and the way forward (e.g. Ball, Lubienski, Mewborn, 2001; Jita , 2002;

Stigler, Gallimore, and Hiebert, 2002; Baker 2008; Chambers, 2008). These researchers have identified varying factors that influence student's achievement in mathematics and the quality of mathematics education. For example, according to Stigler, Gallimore, and Hiebert (2002, p.324), "attitudinal and affective variables such as self-concepts, confidence in learning mathematics…interests and motivation have emerged as salient predictors of achievement in mathematics". According to Murillo and Roman (2011), "improving the quality of education requires relevant and high-quality physical conditions and educational resources to allow for efficient teaching and learning processes" (p. 46).

McMahon (2001:1) also argues that classroom ethos has considerable potential for supporting or denying students access to the mathematical concepts that they have to learn and apply in their daily activities. Pezdek, Tiffany, Paul and Reno (2002) in their analysis of home time factor on students' mathematics performance found that increasing the accuracy of parents' awareness of their children's mathematical skills may be a first step toward enhancing the performance of students in mathematics. Despite the importance of the factors mentioned above, Henderson and Berla (2004) in their study concluded that the most accurate predictor of students' achievement in schools and for that mathematics is not income or social status, but the extent to which families can create a home environment that supports learning. It is for this reason that increasing or enhancing parental involvement in the education of their children has become a central component in most educational policies and reforms across the world (Desforges and Abonochaar, 2003).

Similarly, Hoover-Dempsey, Walker and Sandler (2005) examined parents' motivations for involvement in their children's education and concluded that parental involvement in their children's education should be a critical component of the school curriculum. To them, a collaboration between parents and stakeholders in the school revolves around the provision of a platform that encourages collaboration and shared responsibility. That is, engagement is contingent upon the belief that goals are attainable and a belief that participation in an activity increases the likelihood that a goal will be met (Bruning, Schraw, Norby, & Ronning, 2004).

There is a broad literature that students' learning is maximized when there are strong educational partnerships between the school and home (Cai, 2003; Anthony & Walshaw, 2007). According to Cai (2003), parental involvement is a statistically significant predictor of their children's mathematical achievement and also promotes positive behaviours and emotional development. Bishop and Forgasz (2006) argue that indirect parental influence such as parental encouragement, parental expectation and parents' attitudes towards mathematics have a significant impact on students' attitudes towards mathematics and achievement. According to Peressini (1998), "calls for

parental and community involvement have been at an abstract level and not closely examined" (p. 557). Despite the vast research on parental involvement in their wards education in general, parents' views and attitudes regarding their involvement in mathematics education are not extensively documented especially within the Ghanaian context. This article examines Ghanaian parents views and attitudes toward their involvement in the area of mathematics education.

Literature Review

Parents and Mathematics Education Reforms

As rightly pointed out by Van de Walle (2004), the momentum for reforms on how mathematics is taught and learned started in the early 1980s with the view of designing innovative methods of teaching that can help improve students' performance. This has brought some restructuring in the school curricular across countries. One of the significant changes in almost all school curricula is a shift from a teacher-centred approach of teaching to a more student-centred approach to teaching. However, improving students achievement in schools and for that matter in mathematics has become a collective responsibility of both the school and the child's home. It is for this reason that parental involvement has become the hallmark of most school improvement strategies.

According to Epstein (2001; p. 3), "no topic about school improvement has created more rhetoric than 'parent involvement.' Everyone says that it is important". As rightly pointed out by Epstein (2005) parents who are well informed about the school curriculum and their children's activities in school are more likely to have positive feelings and be able to share them with their children leading to greater achievement. However, as pointed out by Marshall and Swan (2010), it is also important to acknowledge the tension that exists between how mathematics is taught today compared with how parents learned it. For example, Quintos, Bratton & Civil (2005) in their research established that there is an inverse relationship between what parents value in mathematics as compared to that of their wards. They argued that whilst parents value their own form of doing mathematics, children value the school of mathematics, and this makes it difficult for parents to support their children effectively.

Perception about School Climate and Parental Involvement

The National School Climate Council (2007, p. 4) defined school climate as "patterns of people's experiences of school life and reflects norms, goals, values, interpersonal relationships, teaching and learning practices, and organizational structures". The kind of perceptions that parents have about the children school plays a critical role in their levels of involvement. Research by McKay, Atkins, Hawkins, Brown, and Lynn (2003)

have shown that there is a positive relationship between parental perceptions of their children's school climate and their involvement.

That is, parents are more likely to become more involved in the children's school if the school climate is more caring and supportive. Spera, Wentzel, and Matto (2009) in their study on the relationship between school climate perceptions and parental aspirations for their children's educational attainment established that parents who have negative views about their children's schools or who do not experience encouragement from their children's schools for participation are unlikely to be involved. It is for this reason that Spera, Wentzel and Matto (2009) further added that despite, the important role that parental involvement plays in our quest for improving the quality of teaching and learning in our school, the school climate can make or mar the important role that parents play. That is, parental belief about the child's school can act as barriers for effective involvement.

Factors Inhibiting Parents' Involvement

Review of the literature has shown that factors inhibiting parental involvement in their children's education can be classified into three broad categories: parent-related factors; school-related factors and student-related factors. Parent-related factors continue to influence parental involvement in their children education. According to Jafarov (2015), parental involvement can be affected by a number of socio-political factors ranging from the economic condition of the parents and school experiences. Of these factors, parental school experiences or level of education continues to be one of the major factors influencing their involvement. For example, Lee and Brown (2006) in examining parent involvement, cultural capital, and the achievement gap among elementary school children, established that parents with higher college degrees showed more enthusiasm in getting involved with issues pertaining to the development of their children as compared to their colleagues with low or no formal education, did not feel confident enough to contact the school regarding the progress of their wards or participate in activities organised by the school.

Similarly, Smith, Stern, and Shatrova (2008) also report that parents level of education and school experiences continue to be one of the main obstacles to parental involvement, as many parents are not able to communicate effectively with the school to know how their children are doing and what kind of support they require. However, Pena (2000) in examining factors influencing parental involvement and their implications, established that parents with a low level of education were more willing to volunteer to participate in school activities as compared to their educated counterparts. According to Pena (2000), educated and less educated parents ascribed positively to the importance of parental involvement in the children's education. However, it was interesting to note that all the parents were of the view that they were

not doing enough to actively get themselves involve in the children's education due to lack of time on the part of the educated parents and limited knowledge on the part of the less educated parents.

Apart from parent-related factors, school related factors also influence parents involvement in the children's education. As highlighted by LaRocque, Kleiman, and Darling (2011) one of the main school-related factors that influence parental involvement is the issue of communication. The use of academic language by schools to communicate with parents has over the years impacted negatively on parents' involvement in their children's education. Especially when parents are not well educated, they find it difficult understanding their roles as parents in helping to improve the quality of education for their wards (LaRocque, Kleiman, and Darling, 2011). There is, therefore, the need for school administrators and teachers to be proactive in using language that parents may understand and also providing parents with information as to what their roles are.

Like teachers and school administrator, students also expect their parents to be involved in their education. Student-related factors that influence parental involvement in their children's education have been argued from different perspectives. Review of the literature has revealed that these factors may vary from one parent to the other. Hornby and Lafaele (2011) identified the following as the main student factors that influence parental involvement in the children's education: age, learning difficulties, disabilities, gifts, and talents. As highlighted by Hornby and Lafaele (2011) one of the main student-related factors that are distinguishable in the literature is the age of the child. They established that parental involvement decreases as children grow older and are at its lowest level for children of secondary school age.

To Hornby and Lafaele (2011) there is a direct relationship between parental desire to be involved in the children's education and the desire of students for their parents to be involved in their education. They concluded that younger children prefer to see their parents actively involved in the education as compared to their older siblings. Similarly, according to Thapa, Cohen, Guffey, and Higgins-D'Alessandro (2013), younger students have more positive experience of school climate as compared with older students, and this can be attributed to the nature of parental involvement at the different levels.

Despite the acknowledge of the potential benefits of parental involvement in improving students learning outcomes and self-confidence, little research has been conducted to assess parental involvement in mathematics education in schools, especially within the Ghanaian context. In addition, although a number of reasons have been identified in regard to why parents become involved or not in their children's education in Ghana (see Donkor, 2010; Nyarko, 2011; Chowa, Ansom, and Osei-Akoto, 2012) limited

research has been carried out to investigate parents involvement in improving the quality of mathematics education. The present study aims at exploring Ghanaian parents' views about their involvement in improving the quality of mathematics education in schools. The study is guided by the following research questions:

1. What are parents' views about the accessibility of mathematics resources in their children's school?
2. What are parents' perceptions of the nature of their children's school climate?
3. What role do parents see for themselves in their child's mathematics education?
4. How often do parents get involve in supporting their children in mathematics?
5. Is there any relationship between school type and parents level involvement?

Methodology

The exploratory survey approach was considered appropriate since the study aims at establishing how parents perceive their involvement in mathematics education (Bryan, 2004). Also, as highlighted above, very little is known especially within the Ghanaian context when it comes parental involvement in improving the quality of mathematics teaching and learning. The use of this approach, therefore, provides quantitative data for mapping out the perceptions of parents regarding their involvement in teaching and learning of mathematics.

The sample for this study was made up of 130 parents from three university campuses. The participants are enrolled in different diploma and undergraduate programmes from these universities. Sixty parent students each were randomly selected from the three university campuses, and the condition for inclusion was that the said student should be a parent.

A semi-structured questionnaire was developed by the research team was administered to these parents. The questionnaire had 38 questions in all grouped under four sections. Section A was used to elicit parents background information. Section B had seven items aimed at eliciting information about parents perception of their children's school climate. In section C, there were six questions aimed at examining how often parents support their children with their mathematics work. Section D had 20 items, and the first 11 items were used to gather information about sources of information and accessibility of mathematics resources for parents. The last nine questions made up of three open-ended questions and six closed questions were used to elicit information

from parents about how the quality of mathematics education can be improved in schools. A total of 180 questionnaires were administered, and 130 questionnaires were returned fully completed.

The reliability of the questionnaire used was confirmed (*Alpha Cronbach = 0.7).* The quantitative data from the survey was analysed descriptively using SPSS 22 to generate percentages and inferential statistics. The qualitative data from the open-ended questions was analysed using thematic analysis to generate common themes to help produce a holistic picture of the situation under consideration.

Results

Research Question 1

The purpose of research question 1 was to ascertain whether parents have access to the main mathematics resources used in schools. In Ghana, like in most developing countries, the mathematics resources normally used are the mathematics syllabus and the textbook used in schools. Parents were asked to indicate whether they have a copy of these resources or if they have seen a copy before. Figure 1 below depicts the results obtained from parents.

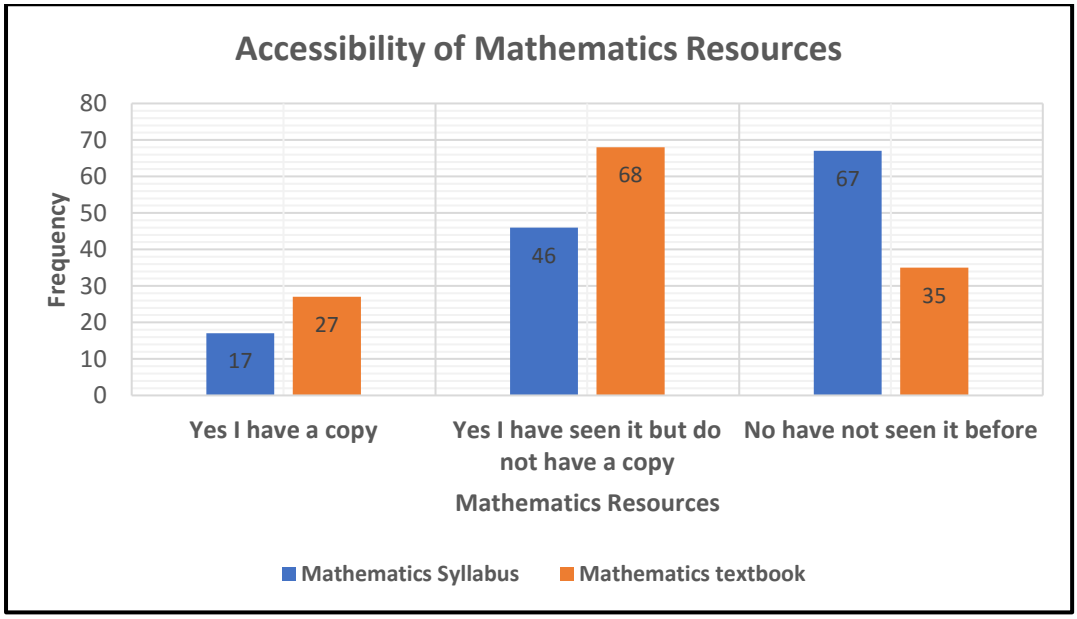

Figure 1: Accessibility of Mathematics Resources

From Figure 1, it is clear that only 17 (13.1%) and 27 (20.8%) of the parents have copies of the mathematics syllabus and textbooks respectively. It is also interesting to note that more than half of the respondents (51.1%) have not seen the mathematics syllabus before 52.3% have seen a copy of the textbook used by the school, but do not have a copy. The results, therefore, show that accessibility of mathematics resources may be another factor that can influence parental involvement in mathematics education. That is to say, inasmuch as parents may be willing to play an active role in improving the teaching and learning of mathematics in their children's school, access to these materials would be an added advantage.

Research Question 2

In order to understand parents' perceptions of the nature of the children's school climate, the respondents were asked to indicate the extent to which they agree or disagree to seven items relating to school climate using a four-point Likert scale (strongly agree, agree, disagree and strongly disagree). For the purpose of easy interpretation and analysis, agreed and strongly agreed responses were merged together, and disagree and strongly disagreed merged together. The results are depicted in Figure 2.

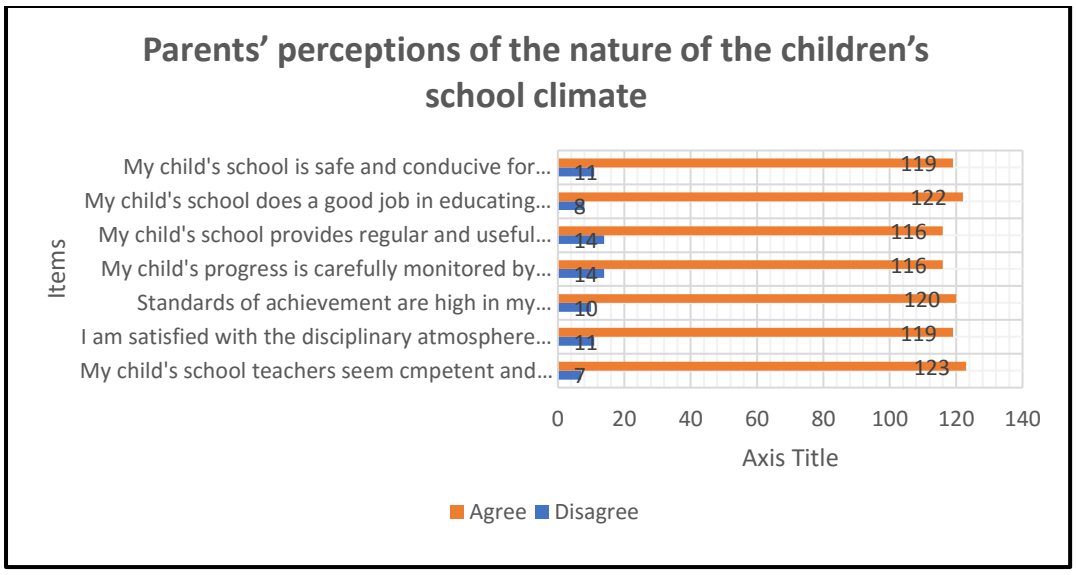

Figure 2: Parent's perceptions of the nature of their children's school climate

From Figure 2, it is clear that an overwhelming majority of the respondent ascribed positively to the nature of the children's school climate. In all the seven items, the parents expressed the confidence in the school and what they are doing to improve the

quality of teaching and learning. For example, 122 (93%) of the respondents reported that their child's school does a good job in educating students. With the exception of items three and four where more than 10% of the respondents disagreed with the statement, all the respondents are happy with the nature of their child's school climate. These positive perceptions are good for active parental involvement in the mathematics education of their children and education in general.

Research Question 3

To answer the third research question which aimed at understanding parents views regarding their role in mathematics education and education in general. The respondents were asked to indicate their agreement or disagreement to nine questions relating to their role and involvement in their children's education. Table 1 presents the results from the respondents.

Table 1: The role of parents in mathematics education

Item	Agree	Disagree	Mean
I assume my child/children is/are doing all right when I don't hear anything from the school.	77 (59.2%)	53 (40.8%)	2.69
The teacher has to let me know about a problem before I can do something about it.	74 (56.9%)	56 (43%)	2.68
I get most of my information about my child's/children progress from report cards.	81 (62.3%)	49 (37.7%)	2.83
My child's/children learning is mainly up to the teacher and my child/children.	41 (31.5%)	89 (68.4%)	2.08
I expected the school to notify me if my child/children had a problem.	106 (81.5%)	24 (18.4%)	3.09
I expected my child/children to do his or her homework at school.	25 (19.2%)	105 (80.8%)	1.80
I relied on the teacher to make sure my child/children understand(s) his or her assignments.	68 (52.4%)	62 (47.6%)	2.65
I exchanged phone calls or notes with my child's/children teacher	104 (80%)	26 (20%)	3.05
It's my job to make sure my child understands his or her assignments.	97 (74.6%)	33 (25.4%)	3.05

From Table 1, it is very clear that inasmuch as parents value their involvement in their children's education, they still consider the role of the teacher and school as vital in the education of their children. This is evident from the table as the majority of the respondents ascribed positively to the statement 'I assume my child/children is/are doing all right when I don't hear anything from the school.' In addition, the majority of the respondents 106 (81.5%) indicated that they expected the school to notify him/her if the child/children have any problem. It is also interesting to note that an overwhelming majority of the respondents 97 (74.6%) of the respondents were of the view that it is their job to make sure their child understands his or her assignments. This notwithstanding, a greater proportion (62.4%) of the respondents were of the view that they rely on the teacher to make sure their child/children understand his or her/their assignments.

In addition, it was evident from the responses from the open-ended questions that parents see the teacher as the custodian of knowledge and relied mostly on the teacher to improve the academic performance of their children. For example, when the respondents were asked to indicate how they think their children can improve their understanding and performance in mathematics, most of them indicated that there is the need to ask for private tuition from these teachers. It was interesting to note that some of the parents indicated that the teachers are those who have been trained to help their children to understand and do well in mathematics, so there is the need to rely on the teacher for support and the necessary assistants.

Research Question 4

The fourth research question aimed at eliciting information from the participants regarding how often they get involve in supporting their children in mathematics. In order to understand how often parents support their children, parents were asked to indicate how often they perform certain activities relating to their children learning mathematics in school. Figure 3 depicts the results from the respondents.

From Figure 3 above, it is interesting to note that most of the respondents indicated that they perform the above activities every day or once or twice a week. For example, 82 (63.1%) of the respondents indicated that they often discuss how their children are performing in mathematics and majority of the respondents (73.8%) were of the view that they discuss how well their children are doing at school. The importance of mathematics resources of improving the quality of mathematics education cannot be underestimated. It is therefore not surprising to note that majority (70.1%) of the respondents indicated that they obtain mathematics materials for their wards.

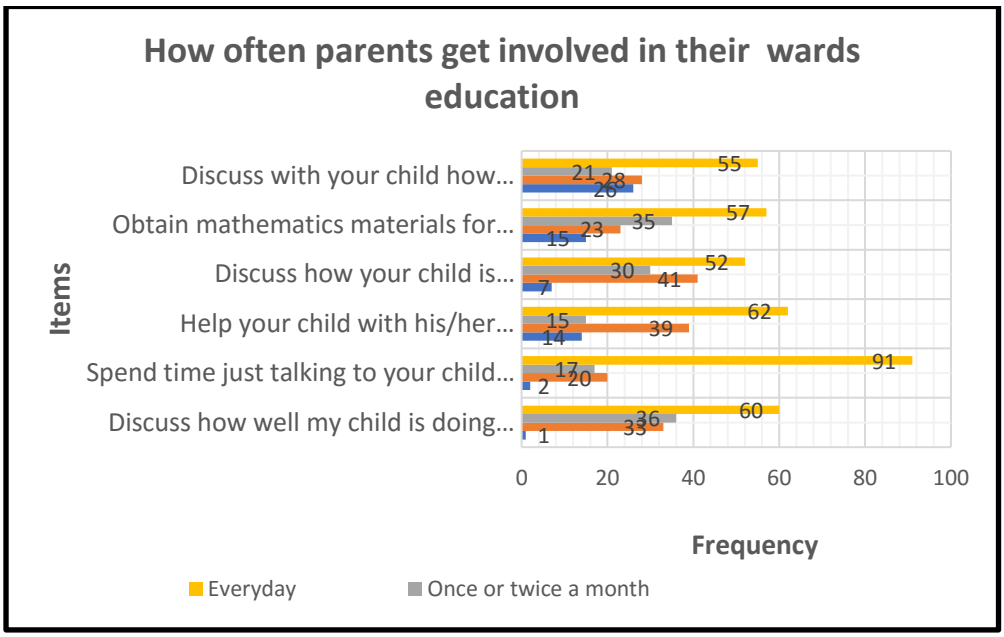

Figure 3: How often Parents get Involved in their Wards Education

Research Question 5

The last research question aimed at ascertaining if there is any relationship between school type (private and public) and parents' views regarding their perception of their involvement in their wards mathematics education. In Ghana like in most developing countries, the quality of education in public schools have become an issue of immense concern and this has led to the establishment of many private schools. Table 2 below shows the results for the independent t-test examining the relationship among parental perceived involvement and school type.

Table 2: Comparison of Public and Private School Pupils' Parental Involvement

School Type	Number	Mean	Standard Deviation	T-Value	Sig.
Private	99	2.98	0.99	1.26	0.32
Public	31	3.10	0.97		

From Table 2, it is clear that there is no significant difference between parental involvement and school type. However, it is interesting to note that parents whose

children attend public school ascribed more positively about their involvement in their children's mathematics education than their counterparts in the private schools. This can be attributed to the fact that after paying huge sums of monies as fees for their children to attend private schools, it becomes the responsibility of the teacher to make sure that the child attains all the skills and knowledge he/she require in mathematics. This confirms the earlier results where the majority of parents indicated their over-reliance on the school and teachers to provide the quality of education that we are all yearning for.

Conclusions and Implications

Consistent with other researches (e.g., Sheldon & Epstein, 2005; Spera, Wentzel and Matto, 2009) the participants for this study showed that they were willing to participate in their children's mathematics education and education as a whole. It was, however, interesting to note that despite parents' willingness to participate in the education of their wards, most parents still see the school and the teacher as the custodian of knowledge and people who have been trained to nurture the child. This suggests that majority of the respondents have not developed the confidence that they need to be able to play an active role in their children's mathematics education. As pointed out by Muir (2009; 2011) schools and teachers should establish an effective working relationship with parents to empower them to develop the confidence that they need to enable them contribute to their child's numeracy development.

As highlighted by LaRocque, Kleiman, and Darling (2011) three main factors affect or contribute to parental involvement in their children's mathematics education development, the results from the study also established that the issue of availability and accessibility of mathematics resources also play an important role. It was evident from the results that majority of parents have not seen or do not have access to the two main mathematics resources used in schools: the syllabus and textbooks. It is believed that the availability and accessibility of these resources will not only serve as a means of increasing parental involvement but as a reference material for parents to learn the new mathematics their children are introduced to. As highlighted by Swan (2010) the tension that exists between how mathematics is taught today compared with how parents learned it is well documented in the literature and parents having these resources will help them to be abreast with the current trends.

Another important observation from the results is the role of parents in mathematics education. The results established that parents' perception of their role in enhancing mathematics education is complex. There are instances where parents ascribed more positively to some of the roles (see Table 1). It is, therefore, imperative for individual schools to develop resources that spell out the various roles that parents should play in enhancing the teaching and learning of mathematics. One way of enhancing parental

involvement in developing the numeracy skills of their wards is for the schools to empower parents through the use of innovative strategies such as at home programmes and Maths Clubs as suggested by Muir (2009; 2011).

As highlighted by Hoover-Dempsey, Walker, and Sandler (2005) parental involvement in their children's education should be a critical component of the school curriculum. In conclusion, as parents become more informed and exposed to mathematics education issues and sound approaches to mathematics teaching and learning, they are more likely to be involved in their children's mathematics education. It is recommended that teachers, schools, and other school administrators should take the lead in providing parents with the needed materials and information to help them understand their role in promoting the quality of mathematics education for all children. The inclusion of parental involvement in the school curriculum is something that is long overdue, and schools ought to be proactive in finding ways of getting parents more involved

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