

Parental Involvement on Pupils' Performance in Mathematics in Public Primary Schools in Kenya

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Abstract

The Ministry of Education attempts to promote quality education in schools by developing and reviewing the curriculum and other learning materials. It also builds the capacity of teachers to implement the curriculum and organizes regular supervision of schools to check on quality standards. Despite these efforts, pupils continue to perform dismally in mathematics and by large science subjects. Over the years, the performance of pupils in mathematics at the National Kenya Certificate of Primary Examination (KCPE) years has been poor. Studies have shown that parental involvement directly affects their children's mathematics achievement. Students whose parents are involved in their education are more likely to perform better in mathematics and achieve more than other students. This paper makes a deductive inquiry into the claims that parental involvement contributes significantly to achievement students in mathematics.

Keywords: Parental, Performance, Mathematics, Students, Achievement

1. Introduction

The Gale Encyclopedia of Science (Lerner & Lerner, 2004) states that Mathematics, in the very broadest sense, is the systematic study of relationships in the physical world and relationships between symbols which need not pertain to the real world. In relation to the world, mathematics is the language of science. It operates within the laws and constraints of science as it examines physical phenomena. Henderson and Berla (2004) reviewed a wide range of studies on parent involvement (more than 51 research studies and literature reviews). The studies showed that students with involved parents, no matter what their income or background, were more likely to earn higher grades and test scores and enroll in higher-level programs; be promoted, pass their classes, and earn credits; attend school regularly; have better social skills, show improved behavior, and adapt well to school; and graduate and go on to postsecondary education.

A review by Henderson and Berla (2004) of sixty-six studies on the subject of parental involvement concluded that the most accurate predictor of students' achievement in school is not income or social status, but the extent to which families are able to create a home environment that supports learning; communicate high and reasonable expectations for their children's achievement; and become involved in their children's schools. Having recognized the importance of parental involvement in school and academic achievement, the United States government made a declaration in a federal Legislation enacted in 1994. The declaration tagged "The Goals 2000, Educate America Act" stated that "by the year 2000, every school will promote partnerships that will increase parental involvement and participation in the social, emotional and academic growth of children". A study that examined the effect of homework time specifically on mathematics achievement, (Pezdek, Tiffany, Paul and Reno, 2002), found that increasing the accuracy of parents' awareness of their children's mathematical skills may be a sensible first step toward enhancing the poor mathematics performance of children. Participation of both parents and teachers to help with homework was found to increase the depth and quality of learning. Providing greater motivation, responsibility, sense of purpose, and confidence, and all these factors could contribute to increase student achievement with homework completion.

Students whose parents are involved in their education are more likely to perform better in mathematics and achieve more than other students. Hatch (1998) agrees with this and claims that parental involvement contributes significantly to achievement of both primary and secondary school students in mathematics. He also claims that the higher the expectations parents have for their children's mathematics achievement the more the children achieve. He

further reiterated that research has shown that the more intensively parents are involved in the children's learning, the higher the achievement effects and that this position holds true for all types of parental involvement in children's learning and for all types and ages of students. Jeynes (2005) argued that the individual studies on parental involvement have a narrow focus that they had addressed.

In Kenya, Performance in Mathematics has remained lower than other subjects in the 8-4-4 system of education in the country. Initially this was blamed on too many subjects in the curriculum. Therefore in the year 1992 the Kenya Institute of Education (KIE) embarked on a thorough review of the 8-4-4 curriculum. During the curriculum review the scope of content of every subject including mathematics was reduced and reorganized. In the year 1999 the Kenya Institute of Education carried out another study on curriculum to find out if the objectives of primary school mathematics were being achieved, whereby they established that performance in mathematics was lower than other subjects.

Wasanga (1999) attests to the fact that governments in many parts of Africa are aware of the benefits of education (Particularly for girls) and its contributions in the goal of national development. Other studies have also shown that education leads to professional self development, high literacy rates which have a direct impact on development. From the research done and government policies on Free Primary Education (FPE), the issue of performance and quality education has been of concern to all. Parent's aspirations have been to send their children to school with the expectation that they would perform well in all subjects. However, their expectations are sometimes a mirage. For example over the years, the performance of pupils in mathematics in primary schools has been poor. The average mean score in the KCPE results nationally has been oscillating between 30 and 55 marks out of 100 over the years.

As Kenya moves towards achieving the Millennium Development Goals (MDGs), performance in mathematics and science subjects is critical in providing the job market with people who can effectively contribute to the technological innovations that the country needs to realize industrialization as projected. A study done in Kenya has identified major variables that are critical in the realization of good performance and quality education. They include: teacher quality, parental and community involvement, instructional materials, forms of testing and evaluation, policy translation/implementation, learning environments, quality insurance and curriculum relevance (MOE, 1999). These variables have been inadequately addressed in the dispensation of education in Kenya. They have been found to be contributory factors in lowering the standards of education in Kenya and predicating poor performance. This study is being undertaken in the interest of making effort to improve the performance in mathematics in primary schools. Mathematics is a very important subject in our daily life. Poor performance in mathematics undermines pupil's chances of pursuing courses like pharmacy and engineering and other career related fields, consequently resulting into poor opportunities in the job market.

2. Theoretical Bases

The study was based on the Resource Framework Theory by Brooks-Gunn (1995). In this theory, Brooks-Gunn (1995) describes a "resource framework" for studying child and adolescent development. This framework formalizes an emerging tradition of an integrated approach to analyzing the effects of socioeconomic status on child development and education. The resource framework can be viewed as unifying various overlapping theoretical arguments that have emerged to explain the relationship between socioeconomic status and educational outcomes: 1) "material resource" arguments that indicate that poor children suffer because their parents, communities and schools lack the financial resources that can aid learning and achievement, 2) "human capital" arguments that suggest that poor children suffer because of the poorer endowments and investments they receive from their parents (Becker, 1998), or, by extension, the poorer human resources in the schools that they attend; 3) "social capital/network" arguments which suggest that impoverished parents and children lack supportive social relationships and networks within and outside of the family necessary for aspiring to and achieving success (Coleman and Early, 1988) "cultural capital" arguments which suggest that children of historically disadvantaged groups suffer because they lack the cultural environment at home that would allow them to connect in the classroom (Brooks-Gunn 1995).

The Resource Framework theory was applicable to the study on the influence of parental involvement on mathematics performance in public primary schools because it explains how home environment factors and parental socioeconomic status influences academic performance of learners. In this study, the factors to be considered are home environment, parental provision of learning materials, parental follow-up on class work, and parental attendance of school activities. All these factors are related to the material resource, human capital, social capital, and cultural capital arguments of the resource framework theory in relation to academic performance. For example parents who are economically stable may provide extra learning materials to their children and this will enhance their academic

performance. However, the parents who do not provide their children with the appropriate learning materials and study environment, negatively affect the performance of their children.

3. Perception of Performance in Mathematics

Ernest (1996) noted that, negative perceptions and myths of mathematics (and mathematicians) are widespread among the public, especially in the developed countries. Ernest claims that, "the majorities of people today are scared of mathematics and feel powerless in the presence of mathematical ideas" (p.12). Many people's perceptions of mathematics represent mathematics negatively, such that mathematics is perceived to be "difficult, cold, abstract, and in many cultures, largely masculine". Sewell (1982) reported that half of the members of the public she stopped to interview on the street immediately declined and walked away when they learnt it were about mathematics, indicating a negative reaction. Sixteen years later, this similar trend was still evidenced in an international survey by the Basic Skills Agency on the numeracy skills of adults in seven countries, namely France, Netherlands, Sweden, Japan, Australia, Denmark and United Kingdom (UK). The UK sample ranks the highest in percentage of outright refusal to answer (13%), while in other countries; the percentage of outright refusal was at most 6%. Indirectly, these results suggest there is a lack of interest in mathematics or a relatively higher tendency of mathematics avoidance.

McLeod (1992) said that many adults accept the lack of accomplishment in mathematics as a permanent state over which they have little control. McLeod also found that some students, in particular students with mathematics learning difficulties and some pre-service teachers hold some common mathematical myths. Some of these myths are 'mathematics is computation'; 'mathematics is difficult'; and 'men are better in mathematics than women'. Even though mathematical myths are not necessarily false beliefs, they are mostly negative and could be harmful in distorting the image of mathematics of the students. Three widely claimed mathematical myths that McLeod established included: mathematics is a difficult subject, mathematics is only for the clever ones, and mathematics is a male domain subject.

Isakson (1989) indicates that mathematics has been seen to be a 'hard' subject, not necessarily in the sense of intellectually difficult, but hard as opposed to soft or feminine. This leads us to a widespread mathematics myth that 'mathematics is a male dominant subject'. Mathematics and science have always been stereotyped as strongly 'male' or 'masculine'. Perhaps traditionally, most mathematics teachers in secondary school and a large majority of mathematicians were found to be men. Moreover, mathematics as a field of study is often linked to masculine jobs such as military and engineering. Thus many people including primary and secondary students, adults, parents and even teachers regard mathematics as a male domain.

4. Factors Affecting Mathematics Performance

4.1 School factors

Bull (1996) stated that the learning of mathematics was dependent on the teacher such that those who cannot do mathematics can trace their inability almost certainly to the teacher. Cailloids and Postlethwaiate (1980) emphasize that those teachers who spend time preparing lessons, marking homework and class work tend to achieve better results with their pupils than those who do not. Griffin (1996) emphasize the importance of marking in induction of new teachers, which may well be applicable in any other school.

Wachiye (1990) stated that facilities and resources available in a school play an important role in performance. School facilities such as library, textbooks, laboratories, visual aids, water, playing fields, and dormitories are determinants to how the students perform. Postlethwaiate (1980) argues that school administration and management style influences performance. Studies shows that schools that consistently perform, have been found to have found an efficient leadership and policies

Lawrence (1983) asserts that the general factors affecting the academic performance in mathematics in primary schools are many. They include unfair distribution of teachers in the country, indiscipline in schools, lack of enough physical facilities in schools, poor school administration, individuals family background, peer influence, negative attitude, invalid teaching methods teachers unpreparedness, among many others. The school characteristics generally and teachers quality in particular make a significant positive contribution to the academic performance of the students.

4.2 Social Cultural factors

Eshiwani (1993) in his studies on the value of education found that the society's view on education has always favored boys more than girls in that it is supposed to prepare them to become good wives, mothers and homemakers. The central theme is that education is not important for their careers but for home making. Hence the society does not expect girls to waste time on education that is irrelevant to their future expected roles. The study further reinforces the view that the reasons for girls' inability to attain highly in school are found within the school, the home and the society. Also the way the school curriculum is structured, its content and methods influence the number of girls who fail to achieve well.

Hyde and Mertz (2009) have reviewed the strong evidence that at least in mathematics, the gender gap is down to social and cultural factors that can help or hinder women from pursuing the skills needed to master mathematics. They considered the presence of outstanding female mathematicians. Looking beyond individuals, they found that gender differences in mathematics performance don't really exist in the general population, with girls now performing as well as boys in standardized tests. Among the mathematically talented, a gender gap is more apparent but it is closing fast in many countries and non-existent in others. And tellingly, the size of the gap strongly depends on how equally the two sexes are treated

Huha (2003) citing educational international policy resolution 2001 on the role of education in global economy in the 21st century says that the economy is influenced by technical revolution in communication, transfer of information, major changes in production, transport and distribution. This notion has propelled children from low income backgrounds to be good performers in examinations. Sharker (1993) says rich people know they can pass on money to their children, but there is one great gift that parents can give their children and that is good education. This he says contributes to poor performance in children from economically stable backgrounds.

5. Parental Involvement in Mathematics Learning

5.1 Home Study Environment

A review by Henderson and Berla (2004) of sixty-six studies on the subject of parental involvement concluded that the most accurate predictor of students' achievement in school is not income or social status, but the extent to which families are able to create a home environment that supports learning; communicate high and reasonable expectations for their children's achievement; and become involved in their children's schools.

Schickedanz (2003) also reported that children of passive parents were found to perform poorly academically. Ryan (2005) reported that academic performance is positively related to having parents who enforce rules at home. The obviousness of the research findings reported in this study is that family involvement improves facets of children's education such as daily attendance, pupil achievement, behaviour, and motivation (Cotton & Wikelund, 2005). It is on this note that the study set to find out whether parent involvement would play a role on pupils' academic performance.

A policy brief prepared by the African Population and Health Research Center based upon a classroom observation study in 72 schools in Kenya, comprising of high-performing and low-performing schools in six districts in Kenya, established that student background variables and school characteristics and environment matter for academic success. Student absenteeism and delinquency (students often hurting each other) negatively affect grades, while positive habits such as reading often, having a supportive and caring teacher (teachers who never hurt students and always correct homework), belonging to a school where parents are supportive, and where the principal interacts with parents often, tend to be positively related to academic performance; controlling for other school characteristics. Jagero (1999),

According to Dermie (2007), lack of parental support among the Somali students in the United Kingdom contributed to their poor performance. Many of the Somali parents were unable to offer help to their children because of lack of prior education or ability to use English. The above research was supported by studies in Kenya by Oloo (2003), which showed that a major problem affecting academic achievement was a home environment of the day students that was not conducive to reading.

The family is the primary social system for children. Rollins and Thomas (2008) found that high parental control were associated with high achievement. Cassidy and Lynn (1991) included a specific factor of the family's socioeconomic status, crowding, as an indicator of how being disadvantaged affects educational attainment. They found that a less physically crowded environment, along with motivation and parental support, were associated with higher educational levels of children. Religiosity as an aspect of the family environment is another independent variable possibly influencing

academic achievement.

According to Hammer (2003) the home environment is as important as what goes on in the school. Important factors include parental involvement in their children's education, how much parents read to young children, how much TV children are allowed to watch and how often pupils change schools. Achievement gap is not only about what goes on once pupils get into the classroom. It's also about what happens to them before and after school. Parents and teachers have a crucial role to play to make sure that every child becomes a high achiever. Parental influence has been identified as an important factor affecting pupil achievement. Results indicate that parent education and encouragement are strongly related to improved pupil achievement (Odhiambo, 2005).

Phillips (1998) also found that parental education and social economic status have an impact on pupil achievement. Pupils with parents who were both college-educated tended to achieve at the highest levels. Income and family size were modestly related to achievement. Peng and Wright's (1994) analysis of academic achievement, home environment (including family income) and educational activities, concluded that home environment and educational activities explained the greatest amount of variance. In conclusion denying the role of the impact of a pupil's home circumstances will not help to endow teachers and schools with the capacity to reduce achievement gaps (Hammer, 2003).

5.2 Provision of Learning Materials

Ndiritu (1999) states that limited income among lower class families have been found to restrict provision of school fees and other necessary materials to ensure good performance and attendance. Such factors cause psychological disturbances and lower the learners self – esteem leading to feelings of inadequacy and finally poor performance

According to (Bos, 2002), a wide range of reading material at home can be thought to foster academic interests and serve to encourage learning. Psacharopoulos and Loxley as cited by Lauglo and Maclean (2005), opined that education should develop moral aesthetic, physical and practical capacities not just cognitive knowledge organized in academic disciplines. They added that practical subjects can have the additional justification because they allow students to learn from more active doing than what is typical in academic subjects. Mathematics as a subject can be made practical and enjoyable with the help of the government and parents/guardians who can financially support the schools in realizing this.

Learners from low socio-economic status families tend to value domestic activities more than schooling. Such children are subjected to child labour and they have little time for studies. Financial difficulties and hence poverty in developing countries have been a major barrier to effective undertaking of the major government financed programmes. He indicated that in most developing countries, there are many families whose members despite full days hard labour do not find it possible to make two ends meet. Children of tender age in such families have to work for their living. These coupled with little government financing of education sector makes many families unable to meet the requirements for their children's education thus contributing greatly to their poor performance.

5.3 Parental Follow-up on Schoolwork

Many parents advised that they do not receive enough information about school and what's going on at school (Clevenson, 1999). This lack of information can be summarized into concerns surrounding initiation, appropriateness reliability, follow through, lack of clarity and usefulness of communication, and a lack of teacher knowledge of students' needs (Munk, Bursuck, Epstein, Jayanthi, Polloway and Nelson 2001). According to Munk *et al* (2001), inconvenient opportunities to communicate, differing attitudes of parents and teachers toward homework, and teachers' limited knowledge about the student strengths and needs are factors that cause communication problems. Kathuri (1977) in his studies on Nairobi Secondary School revealed that parents who paid visits to schools to find out the progress of the children and attended to school functions do better academically than those whose parents never paid such visits.

A study that examined the effect of homework time specifically on mathematics achievement, (Pezdek, Tiffany, and Renno, 2002) found that increasing the accuracy of parents' awareness of their children's mathematical skills may be a sensible first step toward enhancing the poor mathematics performance of children. Participation of both parents and teachers to help with homework was found to increase the depth and quality of learning (Hatch, 1998). Providing greater motivation, responsibility, sense of purpose, and confidence, and all these factors could contribute to increase student achievement with homework completion (Hatch, 1998). Parental involvement appears to be part of the solution in improving students' homework completion. The schools' mission is to promote the importance of parental involvement

and should work on the classroom and school environments to improve children's adjustment and engagement. Parents should be very much involved in the lives of their early adolescent children, assisting them and preparing them for the modern life. The proactive parents in supporting their children with school work, enhances improvement of the student's behavior and social adjustment. In general, parent involvement is essential in homework completion to provide an encouraging environment and periodic rewards for assignment completion (Cooper, Lindsay & Nye, 2000).

One factor that influences parental involvement is that most of the parents lack the training to offer continuous involvement with their child's homework. Another factor is parents' personal beliefs about the causes of school achievement and their ability to help their child. In most cases, parents spend more time watching television than talking about school issues with their children (Clevenson, 1999). To improve the involvement, parents should establish a routine for their child and observe their progress to help in homework completion.

5.4 Parental Encouragement and Motivation

Avolos (1986) in his study of psychological factors (school grades and parental and teachers encouragement, school policies, plans and aspirations) were found to account for additional variance in attainments. Avolos notes the importance of parental encouragement on academic performance. Her study shows that, parents of high achieving children seem to make more interests in the child's schooling than parents of low achieving children.

According to Goldberg, Gallimore, Reese Garnier (2001), pupils with intrinsic motivation in academic would have higher self-perceptions of competence in academics and that pupils who are extrinsically motivated would have lower perceived academic competence. Harter's Effectance motivation theory is important because it includes the effects of both success and failure on subsequent motivation. Pupil's motivation for learning is generally regarded as one of the most critical determinants, if not the premier determinant, of the success and quality of any learning outcome. Examining the construct of intrinsic motivation in elementary school pupils is significant and important, because academic intrinsic motivation in the elementary years may have profound implications for initial and future school success. Pupils who are more intrinsically than extrinsically motivated fare better and pupils who are not motivated to engage in learning are unlikely to succeed (Gottfried and Gelman 2004).

Gottfried and Gelman (2004) found positive correlations between motivation and achievement. Specifically, young pupils with higher academic intrinsic motivation had significantly higher achievement and intellectual performance. She also found that early intrinsic motivation correlates with later motivation and achievement and that later motivation is predictable from early achievement (Gottfried and Gelman 2004). It was also found that perceived academic competence was positively related to intrinsic motivation. It seems that pupils who feel competent and self-determined in the school context develop an autonomous motivational profile toward education, which in turn leads them to obtain higher school grades. Perceived academic competence and perceived academic self-determination positively influenced autonomous academic motivation, which in turn had a positive impact on school performance.

6. Strategies towards Improving Mathematics Performance

Teachers who are exposed to systematic in-service training tend to become better teachers than those who lack the benefit of in-service training. There is need, therefore, to provide teachers of Mathematics with ongoing training to increase their subject matter knowledge, which is critical to improving pupils' performance. Teachers, like other professionals, should not have to stay for long periods – definitely not as long as 20 years without some form of refresher course to keep abreast of the latest in their subjects and profession.

The practice of lesson observation was more common in high- than in low-performing schools. As part of monitoring curriculum implementation and giving feedback, Headteachers should intensify lesson observations, mentoring, coaching and professional guidance with a view to improving the teaching practice of Mathematics teachers. Since principals are also charged with many other school management responsibilities, they need the support of deputy head teachers and senior teachers in carrying out lesson observation. Peer evaluation from subject team members is also a strategy that can be used to improve the effectiveness of Mathematics teaching practice. Therefore, there needs to be a policy that encourages the institutionalization of lesson observation by school administrations and peers at school level.

There is need to periodically assess teachers' level of competency in the subjects they teach. A teacher, who cannot score more than 90% in an objective curriculum-based test in Mathematics, should not be asked to teach the subject. This would be involving and probably expensive but Headteachers and fellow teachers can be used to address

this challenge.

Teachers who register positive performance in Mathematics should be rewarded by the parents in a manner that keeps them teaching. Sometimes good teachers are promoted to positions that reduce their ability to deliver subject-specific results in the classroom. By becoming administrators, for instance, such teachers' subject knowledge is missed in class. Rewards such as promotion to higher pay grades without an alteration of the job description, for instance, would go a long way to both motivate such teachers and to also encourage their colleagues to work harder.

7. Conclusions

Based on the literature reviewed, this paper observes that home environment variables affect the performance in mathematics. These included; presence of a study room and comfortable table and chair, time the pupils spent reading, studying with friends, lighting, and presence of learning materials at home. It is therefore concluded that pupils' performance in mathematics is affected by parental factors that included; providing them with mathematics learning materials, providing them with the necessary stationery, helping them to do their homework, doing follow-up of their schoolwork and participating in school meetings and functions. This way parents play a vital role in the pupil's mathematics learning and that the efforts of the parents are important in improving the grades of the pupils in mathematics.

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