IOSR Journal of Research & Method in Education (IOSR-JRME)
e-ISSN: 2320–7388, p- ISSN: 2320-737x Volume 12, Issue 6 Ser. I (Nov. – Dec. 2022), 41-46
www.iosrjournals.org

Relationship Between Selected Factors And Academic Achievement Of Students In Mathematics In Public Day Secondary Schools In Meru-South Sub-County, Tharaka Nithi County

Sarah Mwende Musyoka
Chuka University
P.O Box 109-60400, Chuka.

Abstract
The academic achievement of students in Mathematics in Public Day Secondary Schools in Meru South Sub-County has been low in the National and County mean scores. This persistence poor performance results of students in mathematics in public day secondary schools raises concern as it is experienced in the backdrop of concerted efforts by stakeholders to better achievement in mathematics. This study sought to examine the relationship between selected factors, teacher related factors being one of them and academic achievement of students in mathematics in public day secondary school in Meru South Sub-County. This study was guided by the Walberg's productivity theory. The descriptive correlational research survey design was adopted. The study population was 1955 respondents comprising of 455 teachers and 1500 form 3 students in all Public Day Secondary Schools in Meru South Sub-County. Simple Random sampling was used to select sample number of teachers and students from the population and this sample formed the group from whom data was collected. Instruments for data collection were questionnaires for teachers and students. Piloting was carried out in a purposive sample of two public day secondary schools in Maara Sub-County selected for researcher's convenience, involving 5 teachers and 15 form three students totaling to 20 respondents representing 10% of the sample. To ensure the correct inference about the population, the instruments were subjected to reliability analysis using Cronbach's Coefficient Alpha at= 0.78 which is greater than 0.70 and thus the instruments were considered acceptable for data collection. Statistical Package for Social Sciences Version 25.0 was used to run data analysis where data was summarized using descriptive statistics. Inferential statistics involving use of Pearson's correlation co-efficient analysis was employed to determine the relationship between the teacher's related factors and academic achievement where a probability, p-value less than 0.05 was considered statistically significant. The findings from this study revealed that teacher-related factors (academic qualification, teaching experience and morale were found to influence academic achievement in mathematics positively. This study recommends that more emphasis be paid to training teachers, special workshops and training sessions that boost mathematics teaching skills in a highly dynamic world.

Keywords*: academic achievement, academic qualification, teaching experience, teacher morale.*

Date of Submission: 01-11-2022 Date of Acceptance: 12-11-2022

I. Background To The Study

Education has a key role worldwide in educating persons in the society as well as preparing and equipping them with skills for employment in the economy. Additionally, educations facilitate integration of people in the society and teaches valuable values and morals key in the society (UNESCO, 2011). Education is viewed as a critical investment, not only to the individual but also to the society (UNESCO, 2011). Asikhia (2010) observes that education deepens people's comprehension of themselves and society at large (Cathy, 2005). Gathiga (2010) states that education has great social benefits and boosts people's living standards. Smith (2011) adds that education equips people with contemporary knowledge boosting their productivity and creativity. Further, education encourages technological and entrepreneurship improvements. In addition, Osagi (2010) asserts that education has a crucial part in ensuring there is a sustainable economic and social progress leading to income distribution. Hence, it is clear that education has a key role in both the society and in individuals.

Bearing in mind the importance of education in promoting, advancing individual's productivity, promotion of entrepreneurship and technological advances among others; education achievement of students is to be attained since they carry vision and future of their country. There exists an affirmative correlation between

students' academic achievement and their growth and development of knowledge gained in learning processes (Uwaifo, 2008). Njue (2014) defines academic achievement as student's achievements in the subject studied in school. For instance, mathematics is a key subject that serves as the foundation of scientific –technological knowledge essential in the society to achieve social-economic development (Bekdemir, 2010). Mathematics is ranked on top of school subjects due to its merits and its direct link to different subjects such as technical and sciences subjects. Further, Mathematics is a compulsory subject in both primary and secondary schools. According to Tshabalala and Ncube (2013) Mathematics serves as the bedrock and an indispensable tool that nations use to achieve scientific, technical, and economic encroachment. In addition to that, Davies and Hersh (2012) state that mathematics, apart from preparing students for their future achievements regardless of their career choice, it also helps in achieving the desired academic qualifications at school or college.

According to Mefor (2014) mathematics is universally related to everything ranging from the smallest to the largest. Umameh (2011) mentioned that mathematics is closely integrated to everyday life and individual's lifelong planning. Hence, mathematics is an essential subject since no human and subject can effectively function without referencing it. Unfortunately, students' achievement in this important subject over the years has not been encouraging at the primary, secondary and tertiary levels of education in many countries in the world over and particularly in developing countries (UNESCO, 2020). The importance of mathematics in day-to-day activities is no longer news. Students' achievement in mathematics has not improved significantly despite its importance, not even with the introduction of strategies such as Strengthening Mathematics and Science Subjects in Secondary School Education (SMASE) and use of technology in mathematics, as confirmed by Chang (2006).

Researches around the world have directed resources on researching on what can be done to improve the quality of mathematics education in schools (Ramanujam, 2012). Success in mathematics in high school years directly affects the student's success in tertiary mathematics and other related subjects as well as effecting their career options and quality of life (Barry & Chapman, 2007; Wilson &MacGillivray, 2007). There has been an increased concern of mathematics achievements globally and the quality of mathematics education available in schools (Mishra, 2011). It factual that mathematics achievement has great impact in human lives hence it is a recurrent concern to academics, researchers and media on the how to improve mathematics achievements. For instance, in America due to their speedy dynamic technological advancements, mathematics will be of paramount relevancy. Williams & Williams (2010) carried a research on American student's international mathematics tests performance and results concluded that they were performing poorly which raised a global concern bearing in mind the paramount importance of mathematics. This shows that students' low achievement in mathematics is a global concern.

In the African continent especially, sub-Saharan African countries students' academic achievement in Mathematics is influenced by both student and teacher-related factors and others (Muola, 2010). Such factors are more aligned to school focused instead of home based focused. Previous studies focusing on students' achievement in mathematics in Africa such as Ogoye (2007, Kadenyi and Kamunyu (2006), Onsomu (2006) have mainly looked into school-based factors with little regard to home-based factors despite the knowledge that learners even though they are subjected to the same learning and conducive environment in school, it should not be ignored that students come from homes with different social and economic characteristics. Bryan (2005) argues when students are subjected to favorable selected factors they have an increased chance of achieving higher academic achievement levels in addition to improved behavior. This assertion together with anecdotal information on how the home environment influences students' achievement in mathematics gives impetus to this study.

In Kenya, students have shown poor mathematics performance in both internal (school-based examinations) and external examinations (interschool as well as national examinations) when compared to other subjects (Ojimba, 2012). Research carried out in the past years have revealed that there are factors that affect mathematics performance such as student's school environmental conduciveness, their home backgrounds, the student's attitudes and type of instruction on achievement (Karue&Amukowa, 2013). The low achievement in mathematics subject in Nairobi and Rift Valley provinces has been credited to several aspects such as social background features, competitively structured classrooms leading to high levels of anxiety and stress when learning mathematics and expertise mathematical language (Asikhia, 2010). The value of mathematics course books, undesirable attitude towards mathematics, and inappropriate teaching approaches have been observed as a probable factors accountable for dismal achievement in Nairobi Province and Rift Valley Provinces (Attwood, 2014).

The academic achievement of students in mathematics in Kenya Certificate of Secondary Education (KCSE) in public day secondary schools in Meru South Sub- County has been low when compared to that of students in public boarding secondary schools, yet the former was established to provide a more cost-effective education to the poor and expand secondary education(Ministry of Education, 2020). Students who do not perform well in Mathematics in KCSE is in more ways disadvantaged because it is not always about achieving

education which matters most when looking for employment but instead it is the attained quality grades in mathematics that matters (Republic of Kenya, 2007). This is explained by the fact that mathematics performance is a core in determining the mean performance of a candidate in the final national examinations. The persistent decline in the academic achievement of students in mathematics in public day secondary schools have in Meru South Sub-County raised concern because of the large degree of education wastage where students even drop out of school. (Ministry of Education, 2020). Furthermore, students who fail to get quality grades in mathematics in KCSE fail to compete effectively for admissions into colleges and higher institutions of learning as well as in the job market alongside their counterparts. A solution, therefore, needs to be found.

Academic achievement of students in mathematics is a result of several factors. It is for these reasons that this research pursued to institute the relationship existing between teacher-related factors(teacher's academic qualification, teaching experience and morale) and achievement in mathematics.

II. Literature Review

Teacher-related factors are important in student achievement in mathematics. This study has reviewed empirical studies on teacher qualification, teaching experience, and teacher morale.

Scholars like Harris and Sass (2011) have written a lot about mathematics education, and a lot of what they have written seems to show that everyone believes that a professionally trained teacher is better for learning than an untrained teacher. This is probably why teacher training is such an important part of every country's education system. Darling-Hammond (2010) says that a teacher's credentials are a very important sign of how good the education they give is. Smuthers (1990) says that the way teachers are trained should change. Instead of focusing on entry requirements, the new approach would look at how well teachers-to-be can meet certain requirements that make a good classroom teacher. Smuthers (1990) said that research shows that teachers who are trained have an impact in math achievement in developing countries, especially when it comes to teacher qualifications and the amount of knowledge a teacher has. There were two kinds of teachers in Kenyan schools. The untrained, who have various levels of educational achievement or achievement but no professional qualification, and the trained, who have both academic qualifications and professional training in a certain area of specialization. Kenya has graduate, diploma, and approved teacher status (ATS) teachers at the secondary level (Ndirangu, 2013). Students' math skills are affected by how well their teachers are trained or not trained. The teachers who are not trained rely on their academic credentials to teach. In this study, the researcher thought it was important to find out if there was a link between the different academic, pedagogical, and professional qualifications of math teachers and how well their students did in maths. Findings about teachers' degrees (bachelor's, master's, doctorate, etc.) aren't clear-cut. Some studies (Betts, Zau, & Rice, 2003; Goldhaber& Brewer, 2000) show that advanced degrees are good for people, while others show that they are bad (Ehrenberg & Brewer, 2004; Kiesling, 2004). Some researchers say that requiring teachers to have a second degree makes teacher education more expensive, both financially and in terms of time. This could keep good people from going into teaching (Murnane, 2006). Since these earlier studies did not come to a clear conclusion, it was important to do another one.

Teachers' personalities, experiences, and actions in the classroom shape the learning environment for their students, which in turn affects how well those students do in school (Clotfelter, Ladd, &Vigdor, 2007). People often think that when it comes to the relationship between teacher experience and student achievement, students who had teachers with more experience did better. This is because their teachers knew what they were teaching and had learned how to handle different kinds of classroom problems. Studies that looked at the link between a teacher's experience and how well their students did give mixed results.

Irumbi (1990) says that teaching experience is often used as a variable in research on education, but nothing else about its effects comes out. Aronson, Barrow, and Sander (2007) say that a teacher's effectiveness may go up over time, but that may not be directly linked to how well their students do in school. According to Harris and Sass (2007), there may be a problem in drawing firm conclusions on the impact of teachers' years of experience due to sample bias. The misconception that more experienced teachers are better could be perpetuated if ineffective educators are so much more inclined to leave the field. In contrast, selection bias may have unintended negative consequences if the most effective and financially secure educators are also the most inclined to leave their positions. There is a serious void in our understanding here.

Vescio, Ross, and Adams (2008) did a study that looked at teachers' development over time. They were especially interested in how teachers' experience affects their students' academic performance. Vescio et al. (2008) found that teachers with more experience, at least after their first few years in the classroom, were less likely to accept new ideas and changes in educational policies. Hill, Rowan, and Ball (2005) did a study that seems to contradict this when they said that having taught well is also a variable asset. It will help a person develop qualities that are good to have, like being on time, being flexible, being efficient, knowing how to get and keep people's attention, making good comments on teaching materials, and being able to face the class with confidence.

The connection between how long a teacher has been teaching and how well their students do in math in high school is very important, so it was studied. Hill, Rowan, and Ball (2005) found a link between the numbers of years a teacher has been teaching and how well their students do, while Makau (2014) found a weak link. Sirin (2005) also said that there are no big differences between how well students do and how long their teachers have been teaching. But ongoing talks about whether and how much teachers make a difference in how much students learn compared to a number of other factors are thought to also affect how much students learn, and if there are parts of the teaching that can be linked systematically and causally to how much students learn.

Previous research on the effect of teachers' years of experience on their pupils' learning has found a positive correlation between the two; however, this correlation is not always statistically significant or entirely linear. While there is evidence that new teachers perform worse than their more seasoned counterparts, that gap appears to close after only a few years in the profession (Rivkin, Hanushek, &Kain, 2000). Since market conditions and/or female instructors' propensity to work during the child-rearing phase strongly influence this variable, quantifying the link between teacher experiences with student achievement is challenging.

Morale is a person's drive to reach personal and group goals at work (Akintayo, 2012). Morale is based on organizational theory, which looks at each person's progress toward completing organizational tasks and how happy they are with their jobs in the context of the whole organization (Perumal, 2011). Webster's Dictionary (2010) says that a person's morale is his or her mental state, which is shown by how much control, commitment, and drive there is to do a certain task.

According to Govindarajan (2012), a teacher's morale is determined by how well their demands are met and how well they understand how their working conditions contribute to their degree of happiness. According to Khan, Farroq, and Ullah (2010), high morale can be defined as an emotionally charged and increasingly goal-oriented state of mind.

Every part of the education process is affected by how teachers feel (Reid, 2010). Reid says that a teacher's morale can be seen to have a good effect on how well they do their job. Still, we do not know enough about how morale affects how well math students do in school. This study tries to make up for this lack. Teachers are an important part of the education system (Bettinger, 2010). They can help make sure that the students get the help they need to do well in school. The teachers' morale needs to be boosted so that they can do their jobs well (Bettinger, 2010). Teachers' morale can go down if they have to work hard to keep trying to meet the goals of education, or if there are changes in governance or policy (Hindt, 2012). Boosting a teacher's morale has many benefits, such as making it easier for them to keep a helpful attitude and do a good job (Magendri, 2011).

According to Smith (2010), a teacher's morale can be gauged by how enthusiastic they are about their job, while low morale manifests itself in discontentment and irritation. High morale among educators, according to Hoy and Miskel (2011), correlates positively with job satisfaction.

Perumal (2011) also says that the best way to boost a teacher's morale is to make the school a positive place where teachers and workers can feel at ease. Canaya (2008) also said that if teachers' morale is kept high, they might be happier even if their pay is low and they help their students do well in school.

When teachers are paid well, their morale goes up, which makes it easier to find and keep good teachers (Independent Schools Queensland, 2012). Covington (2011) also says that when a teacher is stressed, their morale is usually low. Ravhudzulo (2012) also says that teachers' low morale is caused by their lack of management skills and abilities as well as their lack of commitment to their jobs. Adelabu (2005) also shows that teachers' low motivation can cause them to have low morale. Bambi (2001) said that teachers' low morale hurts how well they do their jobs. This study tried to find out if teachers' morale does affect how much work they are done at secondary schools in Meru South Sub County and if this has anything to do with how well their students do in math.

A research performed by Morgen (2005) in Mitchell County Schools in the United States uncovered marginally increased teacher morale. In this study, the researcher attempted to comprehend the characteristics of teacher morale and to distinguish between markers of high and bad morale. The Purdue Teacher Opinionnaire was used to quantitatively assess educator satisfaction in this study (questionnaire on teacher opinions). Since instructors' opinions are subjective, the survey's methodology may have introduced error.To address this methodological flaw, it is necessary to conduct this study in order to estimate the morale of teachers in public secondary schools in Meru South Sub County more objectively. This type of research may disclose critical information that can aid school administrators in boosting the morale of their teachers, strengthening the school's climate, and boosting the mathematics achievement of students.

In a study conducted by Huysman (2007) in Europe, it was discovered that teacher morale was low because the culture of the school was ingrained with unfairness resulting from the power distribution. In addition, the teachers who participated in the study identified corporate policies, lack of recognition, coworker interactions, development opportunities, and remunerations as the primary factors that lead to an unproductive

school culture. According to a research by Acheampong and Bennell (2003), teacher morale was low in Ghana. According to Mengistu (2012), teacher morale significantly affects student-learning results.

Kirau (2013) conducted a research study in Kenya on the perspectives of school teachers in Machakos area on chosen morale-related concerns. According to the data, teachers saw compensation as the most important problem affecting their working morale, followed by job security, instructional resources, student interest, promotions, and management assistance. The studies analyzed show that the majority of them engrossed on individual topic teachers in secondary schools. Nonetheless, little consideration has been given to teachers who teach mathematics. This study attempted to fill that void. According to Kirau (2013), the most important aspects influencing teacher morale at work are teaching facilities, job security, promotions, learner engagement, and management support.

The majority of research in the literature clearly demonstrated a link between morale of the teacher and success of the student. However, the perspectives of pupil accomplishment were not stated in the literature, resulting in an incomprehensible grasp of the essential variables. Information on teachers' morale and students' achievement in mathematics is scarcely documented in Meru South Sub County, despite the fact that teacher morale is an important area such like classroom management, conducting fieldwork and guidance and counseling, among other activities. This study wanted to address this void by concentrating on the relationship between teacher morale and student mathematics performance. Mathematics education necessitates highly motivated teachers since it necessitates reasoning, interpreting, and problem solving, mathematical concerns, and concepts.

III. Methodology

The descriptive correlational research survey design was adopted to establish the association between teacher- related factors and sudent's academic achievement in mathematics in public day secondary schools in Meru South Sub-County over which the researcher cannot modify.

The study population was 1955 respondents comprising of 455 teachers and 1500 form 3 students in all Public Day Secondary Schools in Meru South Sub-County. In a descriptive research survey, (Mugenda and Mugenda 2003) advocate sampling 10%-30% of the target population. Therefore, the study was conducted on a sample size of 46 teachers and 150 form three students.

The sample of teachers and students was obtained by simple random sampling (Orodho, 2001). The 46 teachers were chosen at random from the 13 public day secondary schools representing 10% of the target population. To select 150 form three students a list of students in the 13 schools was obtained from the form three class teachers where the lottery method was used to obtain 12 students per school.

IV. Results

The correlation analysis illustrates that the Pearson product-moment correlation index obtained on grade score in mathematics and academic qualification (pedagogical training) is r = 0.392 with significance or p-value = 0.007. This p-value is less than alpha = 0.05 implying a statistically significant relationship. This shows that pedagogical training by teachers is statistically significant and positively related to academic achievement by their respective students.

From the correlation analysis illustrates that, the Pearson product-moment correlation index obtained on math class mean score and teaching period in years at school is r = 0.318 with significance or p-value = 0.031. This p-value is less than alpha = 0.05 implying these two variables are statistically significant. The results show that the teaching period in years at a school by the teacher is statistically significant and positively related to academic achievement.

The correlation analysis illustrates that the Pearson product-moment correlation index obtained on maths class mean score and teachers' morale is r = 0.075 with significance or p-value = 0.620. This p-value is greater than alpha = 0.05 implying no statistical significance exists. However, the correlation index obtained is positive implying a positive relationship between maths class mean score and teachers' morale.

The discoveries align with the hypothesis formulated regarding teacher- related factors.

The study has also examined academic qualification under pedagogical training and found that teachers involved in more pedagogical training post better mathematics mean scores among their respective students.

Teachers with more years of service at a school produced better mean performance among their students which is consistence with findings by Rowan and Ball in 2005 that more years of teaching at a given school led to confident, creditable features such as promptness, efficacy, adaptableness, the technique of poignant and preserving concern, adequate remark of teaching provisions and aptitude of facing the class with confidence all of which led to better performance among students.

The findings are consistent with those of Reid in 2010 who concluded that positive results in academic achievement are influenced by teachers' morale.

V. Discussion Of Findings And Conclusion

The results were found to imply that the teaching period in years at a school by the teacher is statistically significant and positively related to student's academic achievement in mathematics.

This study discovered that the teachers' morale impacted positively academic achievement. Teachers with high morale were found to record better mathematics class mean.

The results were found to imply that pedagogical training or academic qualification has a statistically substantial positive consequence on academic achievement. Teachers with rigorous pedagogical training master the teaching skills required to deliver the content to students leading to better performance of students.

References

[1]. Achieng, B. (2012). Influence of Institutional Capacity on Academic Performance of Students in Public Secondary Schools in Usigu Division – Bondo District Kenya. A Master's Thesis, University of Nairobi'

[2]. Adebule, S. (2004). Gender Differences on a Locally Standardized Anxiety Rating Scale in Mathematics for Nigerian Secondary Schools. Nigerian Journal of Counselling and Applied Psychology, 1, 22 -29.

[3]. Asikihia, O. (2010). Students and teachers' perception of the causes of poor academic performance in Ogun state Secondary School (Nigeria): Implications for counseling for National Development. European Journal of Social Sciences. 13 (2), 229-242.

[4]. Bryan, J. (2005). Fostering Educational Resilience and Achievement in Urban Schools Through School-Family-Community Partnerships. Professional School of Counseling, 8, 219 227.

[5]. Clotfelter, C., Ladd, H., &Vigdor, J. (2007). Teacher credentials and student achievement: Longitudinal analysis with student fixed effects. Economics of Education Review, 26(6), 673-682.

[6]. Hill, H., Rowan, B., & Ball, D. (2005). Effects of teachers' mathematical knowledge for teaching on student achievement. American educational research journal, 42(2), 371-406.

[7]. Kadenyi, M., &Kamunyu, M. (2006). Challenges Facing Women in Tertiary Institutions: A Case of Eldoret Municipality. The Educator, 1(1): 121-1218.

[8]. Mishra, B. (2011). Important to Improve Quality of Mathematics Education: Academicians. The Times of India. (Retrieved from http://www.timesofindia. indiatimes.com/articleshow/11146612.cms).

[9]. Mugenda, A., &Mugenda, O. (2003). Research Methods, Quantitative and Qualitative Approach. Nairobi: Act Press.

[10]. Muola, J., &Gesinde, M. (2010). Relationship Between Academic Achievement and Home Environment Among Students and Pupils. Educational Research and Review, 5 (5), 213-217.

[11]. Ndirangu, C. (2013). Factors Influencing Teachers' Level of Implementation of Strengthening of Mathematics and Science Secondary Education (SMASSE) Innovation in Nyeri County, Kenya. Unpublished Masters' thesis). University of Nairobi, Kenya.

[12]. Njue, E. (2014). Effectiveness of Examination Handling and Distribution Procedures in Curbing Malpractices in Secondary Schools in Eastern Province, Kenya. Creative Education, 5, 573-579.

[13]. Ogoye, H. (2007). Parental Participation in Pupils' Homework in Kenya: In search of an inclusive policy. Nairobi: Act Press.

[14]. Onsomu, G. (2006). Impact of Gender and Socio-Economic Factors on Learning Achievements in Primary Education in Kenya: Empirical Evidence, Kenya Institute for Public Policy Research and Analysis KIPPRA Discussion Paper No. 56.

[15]. Orodho, J. (2001). Techniques of Writing Research Proposals and Report. Nairobi. KISE.

[16]. Ryan, R., Adam, F., & Smith, R. (2002). Children's Achievement Moderates the Effects of Mothers' Use of Control Autonomy Support. Chi

[17]. Smith, E. (2011). Staying in the Science Stream: Patterns of Participation in A-Level Science Subjects in the UK. Educational Studies, 37, 59-71.

[18]. The Republic of Kenya, (2007). Sessional Paper No1 of 2005 on a Policy Framework for Education, Training, and Research. Nairobi: Government Printer.

[19]. UNESCO, (2011). Challenges of Implementing Free Primary Education in Kenya: Assessment Report. Kenya. Nairobi: Ministry of Education, Science & Technology.

[20]. Uwaifo, V. (2008). The Effects of Family Structure and Parenthood on the Academic Performance of Nigerian University Students. Study Home Community Science, 2(2), 121-124.

[21]. Vescio, V., Ross, D., & Adams, A. (2008). A review of research on the impact of professional learning communities on teaching practice and student learning. Teaching and teacher education, 24(1), 80-91.

[22]. Williams, T., & Williams, K. (2010). Self-efficacy and performance in mathematics: Reciprocal determinism in 33 nations. Journal of educational Psychology, 102(2), 453.

Sarah Mwende Musyoka. "Relationship Between Selected Factors And Academic Achievement Of Students In Mathematics In Public Day Secondary Schools In Meru-South Sub-County, Tharaka Nithi County." *IOSR Journal of Research & Method in Education (IOSR-JRME)*, 12(06), (2022): pp. 41-46.