



## SUPPORTING YOUNG CHILDREN'S MATHEMATICAL DEVELOPMENT: THE ROLE OF PARENTS

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### Abstract

Undeniably, parents remain one of the most important resources needed in children's mathematical development since children begin education from home. The part parents play in their children's math education are a largely untapped resource for improving the quality of mathematics education among Ghanaian children. In order to maximise this resource, there is the need for basic research on the nature of involvement of parents in their children's mathematical growth. In view of this, we employed case study design to explore ways by which parents involve themselves in their children's mathematical development and how these can be harnessed to improve students' mathematics achievement in Tano North Municipality. This study was guided by the Epstein's overlapping spheres of influence theory. A sample of 10 comprising 5 students and 5 parents was considered for the study. We employed a semi-structured interview to gather the required data which were analysed using inductive content analysis. Among the findings, it was revealed that some of the ways by which parents can help in the development of children's mathematical development is provision of learning resources and activity at home, helping with mathematics homework, encourage good study habits, monitor their school attendance, organize remedial classes, parents' participation in school activities, and teaching appropriate behaviour for academic success. Based on the findings of the study, we recommend the Tano North Municipal Directorate of Ghana Education Service to collaborate with headteachers at the basic schools to create family engagement programmes that highlight parents' role in the children's mathematics development and future success.

**Keywords:** Parental involvement, children's mathematical development, home and school support, post COVID-19.

### INTRODUCTION

Since the COVID-19 pandemic's spread, students all across the world have lost a significant amount of instructional time as a result of unexpected school cancellations. In 2020, school buildings were entirely shuttered for an average of 15 weeks (4 months) over the world, according to UNESCO monitoring (UNESCO, 2021a). Worldwide, schools were closed for an average of 26 weeks (6.5 months), or over two-thirds of a normal school year, when partial closures are taken into account. To assure learning continuity in response, educational systems have implemented remote and hybrid learning modalities. Depending on the modalities, traits, and implementation strategies of the various education programs, these initiatives have produced a range of improvements and reductions in learning inequities for students.

Due to this, almost all students require some catch-up learning, making it imperative for educational systems to promptly deploy and scale up targeted interventions to close students' achievement gaps. It addresses the growing concerns of policy and decision-makers about students' loss of learning or disengagement from learning as a result of the pandemic, as evidenced by low achievement levels at checkpoints compared to expected learning levels, decreased completion rates, and/or widening achievement gaps (UNESCO, UNICEF, & The World Bank, 2020). Particularly for minority students,



the pandemic has widened access gaps to the settings and resources that foster learning and growth (Amoah et al., 2021; Azzi-Huch & Shmis, 2020; Darling-Hammond & Kini, 2020). This prompts questions regarding the necessity of challenging the status quo and reformulating the educational system to prioritize parental involvement in children's academic performance.

It is critical to stress that this is not unexpected. Prior to the pandemic, the baseline operational state of the educational system in Ghana and throughout Africa had significant issues with inclusion and equity. This offers exceptional chances to challenge the status quo (Darling-Hammond & Kini, 2020), i.e., address structural issues in the educational system and invest in cutting-edge strategies that clarify parents' roles and give them the power to actively participate in children's mathematical competence development.

Due to parents' important contributions to the environmental, social, and economic elements that have a significant impact on students' academic success, schools must work closely with families. In the midst of the COVID-19 pandemic, Sharp et al. (2020) did a study and found that the number of students who were supposed to learn remotely at home throughout the summer term was low, with teachers reporting that only 38% of pupils turned in their final assignment. The level of parental involvement, which is essential for student engagement, particularly among children in primary school, was also quite low. Sharp et al. stated that teachers assigning activities requiring group collaboration among children and schools having stronger parental engagement were characteristics linked with reduced estimations of curriculum learning loss. Additionally, schools where a significant portion of parents were actively involved in their children's at-home education were connected with pupils not falling behind. According to the study's findings, parents do not control their children's playtime after school because of the nature of their jobs. The study's findings showed how important parental involvement in their children's education is for their learning, behaviour, and academic success. Therefore, cooperation between parents and schools is necessary in order to advocate for children's welfare and academic performance.

A global outcry has emerged in response to inadequate parental involvement in children's learning processes, which has transcended national boundaries (Epstein, 2001; Nyamosi, 2013). This is very important since a child's education starts at home long before they enter a classroom and is only furthered there. Parents, who are seen as stakeholders in the school community, are extremely important in their children's education. The notion that parental participation is a crucial component of children's academic progress and social adjustment is one of the many pillars of educational reform attempts (Jeynes, 2012). It has been demonstrated that there are direct relationships between parental involvement – a multifaceted and bidirectional construct – and children's social and intellectual outcomes.

Parental participation has traditionally been characterized as involving parents in educationally related activities and events held at the child's school. According to Magwa and Mugari (2017), parental engagement is a broad spectrum of attitudes, behaviours, and activities that take place primarily at home but also in the school context. In American schools where a school representative claimed that more than half of parents engaged in parent-teacher conferences, it was seen that 90% of fourth graders attended those conferences (Christenson & Sheridan, 2001). The U.S. Department of Education's report lists a number of causes for the drop in interest as preschoolers get older (Mwirichia, 2013). Parents of high school students frequently express the opinion that their children should complete their homework independently and that they shouldn't attempt to assist if they are not subject matter experts (Kraft et al., 2011). Many schools' organizational systems can discourage parents from assisting students. A parent room should also be maintained, and parent-to-parent communication and events should be supported. Therefore, it is essential for academic achievement that parental involvement be genuinely incorporated into a school's programs and culture.

Parents can participate at home or in the school. The discussion of school activities, parental objectives and expectations, checking of assignments, home duties, and monitoring are prominent parts of parental participation at home. Contacting school employees, participating in parent-teacher



associations (PTA), going to school plays and sporting activities, and volunteering are all examples of notable parental participation in schools (Chowa et al., 2012; Nyarko, 2011; Won-Tack, 2021). For instance, Chowa et al. (2012) compared parents who had never participated in their children's education to those who had both at home and in the classroom to study the nature and extent of parental involvement, including engagement and monitoring. The majority of parents report attending PTA meetings, indicating that parental involvement in the school environment is significant. The results also showed a high level of parental involvement with children at home, as most parents reported talking to their children about expectations. However, the majority of parents claimed they never gave their children's direct homework help.

According to Kraft et al. (2011), the first step towards parental involvement in a child's education may be for parents to be willing to speak with teachers about their child's progress. The OECD (2019) study on parents' involvement in school activities found, among other things, that, on average across the OECD nations, roughly 41% of parents of students addressed their child's achievement with a teacher on their own initiative and 57% did so on the initiative of instructors. However, just 17% of parents took part in local school government and 12% gave their time to extracurricular or athletic activities. Additionally, in the nine OECD nations that circulated the parent questionnaire, the necessity to work (34%) and the lack of time were the two factors that parents most frequently cited as preventing them from participating in school activities.

According to some, the relationship between a child's family and school fosters a unique environment that is ideal for optimal learning (Maphanga, 2006). Parents are considered to have a particular edge over everyone else in that they may provide a more steady and consistently beneficial effect that could enhance and complement what the school develops in their children, notwithstanding the contributions made by students and schools. Parental participation is unquestionably crucial in this aspect (Amponsah et al., 2018). A body of research that gives proof that parents play a key role in their children's education has resulted from the emphasis on the role of parents in policy efforts and throughout the literature. Although it has been acknowledged that parents play a vital role, the specific elements of parental participation that affect academic achievement and the various outcomes of parental involvement for different populations are both subject to a paucity of research (Sheldon & Epstein, 2005).

Numerous studies have been carried out to investigate the elements that influence students' academic performance in various educational institutions. Most of these studies have concentrated on students' personal causative factors, teachers' academic causal factors, and parents' family causal factors (Fan & Williams, 2010). Even while a combination of these elements affects students' academic performance, they differ between academic environments, between groups of students, and between cultural contexts. Parental participation is thought to have a major impact on children's characteristics and behaviours, which in turn affect their aptitude for math. For instance, Chowa et al. (2013) found that parental participation (involvement at home, involvement at school, and communication between parents and teachers) was a predictor of children's school engagement and socioemotional adjustment. In a similar study, parental influences on Greek primary school students' mathematical identities were examined in a qualitative way by Kafoussi et al. (2020). Their study revealed that parental influences on how students built their mathematical identities at home were entwined with their interactions with their parents. In other words, when kids work with their parents at home in a secure atmosphere, their mathematics skills have a potential to increase exponentially. In their investigation of the mediating effects of Chinese students' mathematical self-efficacy, Huang et al. (2021) conceptualised the multifaceted construct of parental participation, comprising cognitive involvement, behavioural involvement, and personal involvement. The results demonstrate that various aspects of parental participation have various impacts on students' mathematical proficiency. There is therefore the need to differentiate between the many involvements that parents take part in.

The value of family involvement in students' education does not appear to be in question, however it is unclear what kind of parental activities are most productive. In the southwest of England, the study by



Jay et al. (2018) identified several particular drawbacks of school-centered methods and showed that these methods may actually limit parents' knowledge of how to encourage mathematics learning at home. This shows that it's important to differentiate between the various forms of parental involvement (Huang et al., 2021). From literature, it has been established that parental involvement in education is essential for children's academic success. Despite these important roles that parents play in their students' lives, parents' contributions to their children's arithmetic learning are still largely unexplored as a resource for raising their children's math grades (Syahadhata et al., 2021). But before that resource can be fully utilized, it is necessary to conduct study on how parents view and participate in their children's mathematical practices. Schools are creating initiatives to connect with parents in response to this in an effort to strengthen the bond that already exists between the school and the families of students (Garcia & Weiss, 2020).

The COVID-19 pandemic, which disrupted the regular operation of schools in Ghana and throughout the world with its associated effects, has contributed to bringing attention to the significance of this underutilized resource (the parent factor), which is frequently disregarded in the context of education. Policy makers and math educators in every educational economy have a duty to create chances for families to participate in their children's mathematical education at home and at school. Davis and Kelly (2017) contend that despite the fact that there are some obstacles, policymakers and educators should not disregard the advantages, including improved achievement and favourable views toward arithmetic. Significant crises like COVID-19 offer exceptional chances for stakeholders in mathematics education to reconsider the present quo (Garcia & Weiss, 2020). Considering how parents view and participate in their children's mathematics development and how these might be improved to the benefit of children is necessary now that the pandemic has abated. Policymakers and implementers now have the chance to address structural issues in the educational system and make investments as a result of the study's conclusions.

There is research to support the idea that parental participation affects academic attainment (see, for example, Chowa et al., 2013; Gyamfi & Pobbi, 2018; Won-Tack, 2021). Gyamfi and Pobbi (2018), for instance, looked into the activities that parents engage in that comprise parental dialogue about children's education at home as well as the effects of that conversation on students' academic performance. Parents' discussions were proven to have a good and significant impact on their children's academic success. Studies on parental participation in student academic achievement in the Ghanaian setting (e.g., Chowa et al., 2012, 2013; Nyarko, 2011; Gyamfi, 2016, 2018) looked at the impact of parental involvement on student academic performance. It appears that there is little to no research, if any, that has been done to examine how parents view and participate in their children's mathematical practices. As a result, there is a void in the literature that this study aimed to fill. This study explores ways by which parents involve themselves in their children's mathematical development and how these can be harnessed to improve students' mathematics achievement in Tano North Municipality of Ghana. The study was guided by the following questions:

1. How do parents perceive their involvement in the children's mathematical development in Tano North Municipality?
2. How do parents involve themselves in their children's mathematical development in Tano North Municipality?

The findings of this study will assist the Ghana Education Service, headteachers, and teachers in evaluating the necessity of involving parents in the educational process. Together, schools and families can create a partnership that supports children. Education becomes a collaborative effort in which the value and influence of each participant are acknowledged and characterized by mutual respect and trust. Although teachers, schools, families, and students all gain from their collaboration, the educational process as a whole is improved. The study's findings might make basic school mathematics curriculum designers and implementers aware of the need of taking parental engagement in achieving educational goals into account when making curriculum selections. The findings may also assist parents in dispelling the myth that instructors are the only ones in charge of their children's



education. As a result, it makes parents aware of the various roles that they are expected to play in their children's academic success.

### **Theoretical framework**

Epstein's overlapping spheres of Influence Model served as the basis for this investigation. The ecological model of Bronfenbrenner (1979) served as the basis for the paradigm that is currently used to view parental participation. Part of the ecological systems model proposed by Bronfenbrenner is covered by the theory of overlapping spheres (Harris & Goodall, 2008). Epstein developed a paradigm that puts the kid at the centre and emphasises the overlapping domains of impact that include family, school, and community on the developing child. The effect of the family, school, and community is shown by the circles. The youngster, who serves as the main conduit between each arena, is the factor that unites all circles.

Children's development is influenced by many "spheres of influence," including school, home, and community. When these three environments cooperate to achieve common objectives, children's educational development is improved. To increase the "overlap" between the school, home, and community, it is advised to implement activities that span the six categories of involvement: parenting, communication, volunteering, learning at home, decision-making, and collaboration with the community. By doing so, educators can enhance students' academic performance and school experiences (Epstein, 2001).

The overlapping spheres of influence approach acknowledges that families, schools, and the community engage in some activities alone and in other instances together to affect a child's development and learning (Epstein, 2001). The three spheres' cooperative efforts provide the biggest and most advantageous influence on a child's growth. Greater overlap results from parents becoming more involved in their children's schoolwork as well as from teachers include parents in their normal teaching practices. Accordingly, the theory offers a broad framework from which to understand parental engagement, as stated by Smith (2011). In order to have the maximum impact on the children for whom they share responsibility, schools, families, and the community must work together.

### **The Concept of Parental Involvement**

By providing materials for their children to use in their academic careers, parents are said to be involved in their children's education (Dumont et al., 2012; Nyamosi, 2013). As a multifaceted topic, parental engagement cannot be fully examined by focusing on just one type of involvement. Consideration must be given to a number of elements that could point to parental involvement, including the parents' educational objectives for their kids, their help with homework, their encouragement of good study habits, their participation in school activities, their teaching of appropriate behaviour for academic success, and communication between the home and school.

Parental involvement is defined as parents getting involved in their children's education by giving them resources in a certain area, most notably in their academic careers (Dumont et al., 2012). Parents' educational goals for their children, helping with homework, encouraging good study habits, parents' participation in school activities, teaching appropriate behaviour for academic success, and communication between home and school are just a few examples of the many different types of measures that can be used to define "parental involvement" (Dumont et al, 2012). Due to all of these different factors, parental engagement should be viewed as a multidimensional concept since it is impossible to fully comprehend the relationship between parental involvement and children's education and development by focusing on just one type of contribution (Galindo & Sheldon, 2012). This supports the current study, which explores how parents perceive and involve themselves in the mathematical practices of their children at the junior high school level.

### **Epstein's Six Types of Parental Involvement**

While there are several definitions of parental involvement, most educators concur that it is essential for students' academic growth. Typically, parental involvement is characterised as involvement in both school and home activities. Examples include volunteering at the child's school, communicating with



teachers, assisting with homework, and attending open houses, back-to-school activities, and parent-teacher conferences (Epstein et al., 2009). There are six different types of parental participation in the strategy created by Epstein et al. (2009). The primary responsibility of parents (Type 1) includes the responsibility of a family to ensure the health and safety of the child through parenting, child rearing, ongoing supervision, discipline, and guidance at each age level as well as the provision of conducive living conditions that promote learning and behaviour. To put it another way, this is assisting all families in creating nurturing settings for their children. The primary duty of schools (Type 2) is to inform students and parents about their academic development (e.g., memos, notices, report cards, conferences). It is a way to create two-way conversations about educational initiatives and children's development.

Schools' primary duty is to encourage parental involvement in the learning environment (Type 3). (For instance, occasions, workshops, or courses for their own educational advancement). Parent assistance needs to be gathered and arranged at the school, at home, or in other locations. The fundamental duty of schools (Type 4) is to communicate with parents who organise, monitor, and encourage their kids' academic or homework-related activities. It involves instructing parents on how to help kids with their homework and other resources linked to the course. The fundamental responsibility of schools (Type 5) is defined as parent participation in decision-making committees that monitor educational reform (e.g., advisory councils, Parent-Teacher Association [PTA] etc.).

Parental involvement is the primary duty of schools (Type 3). As a result, parents from various socioeconomic levels serve as representatives and leaders on school committees. Working in collaboration with the community and finding and incorporating a variety of community groups and resources that support school programmes (e.g., Title 1, after-school activities, parent institute committee) are all part of the essential duty of schools (Type 6) (Epstein & Salinas, 2004).

According to Epstein (2001), when schools regularly involve parents, the results are better because the pupils gain from the constant message about the value of education sent by both their home and school. This framework provides numerous examples of best practises, challenges to success, definitions that can be updated for future advancements, and results that can be achieved when families and schools implement the framework (Epstein, 2001; Epstein et al., 2002). As a result, this provides a starting point for the current study from the perspective of parents and students.

### **Parental Involvement in Students' Academic Achievement**

Research has shown that collaborations between schools and families can improve educational initiatives and environments, provide families with the support they require, aid in the development of parents' parenting skills, and connect families with community resources (Epstein, 2001). The ability of these partnerships to create a network of support for kids that will enable them to succeed in school and in the future is perhaps most significant (Epstein et al., 2009). A growing amount of evidence shows that parental involvement at home and collaboration with school personnel enhances children's behaviour and academic success (Haenga, 2015). The two categories of "school-based involvement" and "home-based involvement," which focus on the site of parenting strategies, are the normative divisions of parental participation.

Parental behaviours that involve involvement and contact with schools are referred to as "school-based involvement" (Pomerantz et al., 2007). These behaviours include things like participating in school activities, chatting with teachers, attending meetings at the school, and volunteering there (Pomerantz et al., 2007). Two of the most common ways for parents to get involved in their children's education are parent-teacher conferences, which, according to national polls, are attended by two-thirds of parents in the United States (Pomerantz et al., 2007). By serving on the school board and attending board meetings, parents can engage in more school-related activities with their kids. Because parents have governance positions that offer them greater influence over decisions made at the school, this



level of participation is thought to be higher. However, because so few parents exhibit this higher level of dedication, most studies rarely draw attention to this engagement.

The goal of Haenga's (2015) study, which is anchored in a socio-cultural framework, is to better understand how home-school collaborations in the subject of mathematics may be created in a way that respects the needs and contributions of all participants – students, parents, and instructors. The regular family activities and how better parent knowledge of the mathematical opportunities given in these activities might promote parent confidence to participate in mathematical conversations with their children at home and in their community setting are of particular relevance. The study found that parent understanding of current approaches to teaching and learning in mathematics, better understanding of the language associated with the numeracy development project, and the facilitation of positive relationships between teachers and parents can all be supported by shared learning opportunities that involve parents, students, and teachers. Additionally, adopting activities that incorporate mathematics into regular activities, such as those in which families participate, can serve as a useful scaffold for parents to engage in mathematical conversations with their children more effectively in their own homes and in everyday situations. Opportunities for parents to see instructors' interactions with pupils have also been found to be an effective tool for helping them create more effective communication methods that will help them better support their children's education.

Adam (2018) in a study investigated the role of parents in the education of children with disabilities (CWD) in the Brong-Ahafo Region, Ghana. The study specifically looked at parents' expectations for CWD in schools, parents' participation in CWD decision-making in schools, parents' contributions, and partnerships between parents and teachers to improve CWD learning outcomes in schools. Despite the fact that parents, particularly mothers, frequently attended PTA meetings, the study concluded that parents are not involved in making decisions about matters pertaining to their children's education. The survey also found that parents are under-empowered and do not assist their children with their schoolwork, which has a negative impact on their children's learning outcomes. These findings corroborate what Kwarteng et al. (2022) found in their study that assessed the socioeconomic status and levels of parental participation on the academic performance of junior high school students in Ghana. The descriptive survey design was utilized expressly as part of the study's quantitative methodology. The study came to the conclusion that a significant element influencing students' academic performance is their socioeconomic status, specifically their education, employment, and income levels.

Little study has been done on informal home mathematics education. Parents' contributions to their children's mathematics education are a mostly underutilized resource for helping children perform better in math (Hyde et al., 2006). Due to the erratic relationship between this form of involvement and academic accomplishment, it is unclear exactly how parental homework involvement can be useful. According to studies, helping children with their schoolwork has no discernible effect on their academic performance (e.g., Hyde et al., 2006; Sharp et al., 2020).

Contrarily, Tam and Chan (2009) discovered a favourable correlation between parental involvement in children's schoolwork and their academic growth. Additionally, homework assistance is highly correlated with favourable attitudes about mathematics homework and academic accomplishment when parents are instructed to assist their children with their homework. For instance, Hyde et al. (2006) examined interactions between moms and their fifth-grade children as they worked on difficult arithmetic problems to assess homework habits in the home (pre-algebra equivalence problems). The findings showed that children worked on their math homework for an average of 23 minutes every day, with an additional 8 minutes on average from their parents. The quality of the mathematics content that mothers taught when instructing and the quality of the scaffolding they provided for the child were found to vary greatly among moms, according to videotapes of mother-child interactions. As anticipated, mothers who themselves had more training in mathematics did better when it came to structuring and delivering mathematical material. Mothers who were more confident in their mathematical abilities also did better.



The findings imply that children have unequal access to parental resources for learning math; these imbalances may be addressed through school-family cooperation programs. Gonida and Cortina (2014) investigated the potential predictive power of various types of homework involvement (including autonomous support, control, interference, and cognitive engagement). They discovered that the single factor predicting achievement is autonomy support. Additionally, parental intervention with homework was a poor predictor of success. According to research by Moroni et al. (2015), parental involvement in children's homework was positively correlated with their achievement when it was viewed as encouraging, but negatively correlated when it was viewed as invasive and controlling. Furthermore, compared to students with better reading achievement, students with lower achievement reported increased parental control.

Gyamfi and Pobbi (2018) used the context of Ghana to conduct their study with the goals of identifying significant parental actions that constitute parental discussion at home regarding a child's education and looking into how such discussion affects a child's school performance. For the study, a hybrid design technique was modified. Parents' conversations were proven to have a good and significant impact on their children's academic success. In their prior study, Gyamfi and Pobbi (2016) examined the practice of parental monitoring activities in Ghanaian homes, which are necessary to raise students' academic performance. The goal of the study was to identify the pertinent elements of parental monitoring that are required to enhance a child's academic performance. It specifically looked at the junior high school practise of parental supervision. Seven monitoring activities, including scheduling TV time for the child, limiting playtime, checking homework, selecting a TV show for the child, scheduling the child's return from school, scheduling the child's study time, and selecting subjects for the child, were used to assess parental supervision. The study indicated that parental involvement in all of the activities related to watching over their children's academic progress was minimal.

## METHOD

### Research design

In order to fulfil the study's objective, we employed case study design. This design helps in gathering data that describe parental involvement in so far as to catch the close-up reality of participants' experiences (Yin, 2014). The study was conducted in one junior high school in Duayaw-Nkwanta in the Tano North Municipality.

### Sample size and sampling techniques

In the selected junior high school (JHS), a sample size of 10 comprising 5 students and 5 parents was used for the study. Parents who were included in the study were those who had their wards in the selected JHS. Yin (2014) recommends at least 6 sources of evidence in case study. In other words, six or more interviewees are recommended per case study. Therefore, employing sample size of 10 is considered appropriate.

In the study, we employed purposive and snowball sampling techniques in selecting the school and participants. The decision for the selection of the school was motivated by their high performance in Basic Education Certificate Examination (BECE). We needed to understand how parents contributed to the academic success of their children. The study included only JHS students who were in their final year who gave their consents through consultation with their teachers and confirmed by parents, and these students led us to recruit their respective parents to partake in the study.

### Research instrument

We employed semi-structured interview in garnering qualitative data from the participants of the study. The use of semi-structured interview helped us to follow-up questions that came-up in the course of the interview and created room for easy responses to those questions. In ensuring the validity of the instrument, copies of the instrument were given to two colleagues one from Kwame Nkrumah University of Science & Technology and the other from St. Joseph's College of Education for their expert views on improving the quality of the instrument. There were two set of interview guides that were designed to solicit information from both parents and students about how parents perceive and





involve themselves in the mathematical practices of their children. Interview guide for parents consisted of three sections A, B, and C. Section A comprised demographic items such as level of education and work they do for a living. Sections B and C consisted of six questions that solicit information about how parents perceive and involve themselves in the mathematical practices of their children. In the case of students, the interview guide consisted of two sections: A and B. These sections consisted of seven questions that solicit information about how parents perceive and involve themselves in the mathematical practices of their children.

### **Data collection and analysis**

We sought a permission to conduct the study from the Directorate of Ghana Education Service at the Tano North Municipality. Following that, a visit was made to the selected school to seek permission from headteacher to conduct the study in the school. The headteacher then led us to the class and then helped in explaining the purpose of this study to the students, and among those who showed interest, five were selected. We took their parents' phone contact and addresses, and urge the students to share rationale for the study with their parents before we even get to them through contacts. Calls were made to parents on phone where we shared with them the rationale for this study and what they stand to benefit from the findings. We also made arrangements with each of the parents where and when to meet for interview. Based on the agreement, subsequent visits were made to them at their respective homes.

An individual face-to-face interviews were done at the respective homes of participants at the agreed time and day. Twi and English languages were used for the interviews, because the participants were fluent in at least one of the languages. The interviews were recorded with the permission of the participants using mobile phone device. During the interviews, participants were requested to give a detailed description of their experiences. This included the participants' experiences at home, and in school. The interview for the study lasted for about an hour with each participant. In this study, we had a prolonged and concentrated engagement with the participants about the study which spanned for almost a month. In order to ensure the study's credibility, we made reflections on the interview by cross-checking with the participants' audios regarding what had been experienced during the interview. The data was then analyzed using content analysis. In order to code the information obtained from the interview, common patterns and themes were identified.

## **RESULTS**

### **Demographic characteristics of parent participants**

From the interviews, the parent participants were found to have had different educational backgrounds. One of the parents had tertiary education with one junior high school leaver. Three parents also had no formal education. Also, three of the parents interviewed were farmers with two engaged in private trade businesses to support their homes.

### **How Parents Perceive their Involvement in Students' Mathematical Practices**

Parental involvement in children's academic success includes initiatives that guarantee students' academic success. In light of this, we questioned participants in an interview how they understood the concept of parental involvement in their children's education. Parental participation involves how parents support their children's learning activities, according to an interview with participating parents. This is evident in the following excerpts:

“If you ask, I will say it [parental involvement] is about how we [parents] support our children in their learning process by way of encouraging them to study hard.” (P3)

Another parent added that:

“Talking about parental involvement, we mean how parents monitor their children learning progress.” (P1)



Similarly, another parent respondent stated:

“As for me, I will say parental involvement involves parents assisting their children in school so that they can learn and pass their exams.” (P4)

Giving the aforementioned quotations from parent respondents, parental participation is defined as parental support for their children’s learning, monitoring learning progress, and concerning assistance provided to improve children’s academic work.

Parental involvement, according to the student responses, refers to how parents support their children's learning through motivating mechanisms like encouragement, meeting the children's educational needs, and providing all other necessary support. This is depicted in the comments made by some of the student respondents below:

“Parental involvement is where our parents give us the support we need to learn.” (S5)

“I think parental involvement is when parents get involve in what we [children] learn in school at home” (S2).

It was also commented by one of the student participants that:

“Parent’s involvement is when parents attend to our [children] needs with regards to schooling.” (S4)

Parental involvement, as evidenced by the aforementioned comments, is defined as parents actively supporting and providing for their children’s educational requirements. This is a consensus among parent and student participants.

The study also investigated how parents felt about being required to participate in school events. The analysis of the interview data showed that parents need to get involved in their children’s education by giving them financial and other educational supports. This is captured in the excerpts below:

“Oh! I can be there to help with any financial or other concerns. We cannot put the education of our children only in the hands of the instructors.” (P3)

Another parent respondent remarked:

“Yes, parents must participate in school events. For instance, parents can provide helpful comments during PTA meetings on how we can best support students' academic performance and the success of the entire school.” (P5)

According to the two aforementioned quotations from parent respondents, education of the child should be a shared duty rather than solely the domain of the instructor or school. However, one of the parent participants stated that parents ought not to involve themselves in school matters. She commented that:

“As for me, I’m not in support. This is due to the fact that the child is for the instructor while at school. Therefore, parents do not need to get involved in school-related issues.” (P1)

According to this quotation, parents’ involvement in their child's education is seen as an interference because the youngster is mostly in the care of the teacher or school.

The students who participated in the interview all agreed that parents ought to get involved in their children’s education since doing so can help them achieve better academically. Comments by some of the student participants is captured in the following excerpts:

“Sure, even if I don't feel like going to school, my parents can still insist that I do so.” (S5)

“Some of the parents’ initiatives might help us [children] in school to succeed academically.” (S1)



The study further investigated parents' perspectives on how to engage with their offspring. It was found that parents can influence their children's learning behaviour by keeping an eye on their at-home homework and attendance at school. This is captured in the following excerpts:

"I think we [parents] can keep an eye on our kids' schoolwork at home and make sure we meet their needs." (P1)

"Parents can become involved by keeping an eye on their children's attendance at school and meeting their needs while they are there." (P3)

From these two quotations, parents can infer that they should support and monitor their children's academic progress at home, encourage good attendance, and meet their needs while they're at school.

Parents can support their children in setting up remedial lessons and helping them with their homework, according to a parent participant. One commented that:

"In addition to helping their children with their schoolwork and tasks at home, parents can arrange for their children's extracurricular activities." (P2)

This remark expands on the ways that parents can support their children's education by setting up extra tuition and helping them with their homework. According to the student participants' accounts, parents can assist children with their academics by helping them in doing homework and solving some mathematical problems if possible and by reducing the amount of work they have to do at home. One of them stated that:

"Some parents who are educated can give their children some support when it comes to doing homework or provide mathematics resource materials." (S4)

Another student also commented:

"My parents can get involved by buying study materials on mathematics and reducing the amount of work their children have to do at home." (S1)

From the quotes above, students believe that parents can help their students learn by helping them enunciate certain words and by supporting them with textbooks or other reading resources.

Similar to this, one of the student participants said that parents can help their children in doing homework and solving some mathematical problems, and also giving them educational resource like textbooks, food. It was recounted that:

"Parents who teach math can assist their children in solving some mathematics problems and even buy textbooks and others." (S2)

From the quotation above, parents' contributions to their children's academic success include meeting their educational needs such as helping in homework and solving some mathematical problems so they can succeed in school. Participants in this study agree that parents should be involved in their children's education by offering financial and other educational supports for students to help them perform better academically.

### **How Parents Involve Themselves in Students' Mathematical Practices**

Parental involvement is not limited to a single set of activities and can take many various forms. Parental school involvement encompasses a wide range of activities that are all connected to academic achievement, including helping out in the classroom, interacting with the teacher, engaging in academic activities at home, promoting the importance of education, and participating in parent-teacher relationships. Families who are dedicated to actively promoting their children's mathematics learning and development unquestionably contribute to students' academic performance.

In light of this, we questioned the study's participants about the monitoring of children's mathematical activities to improve their performance in school. It was observed that some parents keep an eye on when their children get home from school and mathematics homework they bring home. This is illustrated in the excerpt below:



“I can keep an eye on my child’s return from school because I am aware of when he leaves for school. And he returns I usually ask whether he was given homework.” (P3)

According to the aforementioned remark, parents should keep an eye on when their children get home from school and whether they came home with mathematics homework as that can impact positively on their academic performance. Contrarily, one of the parent participants mentioned that:

“Hmm! since I finish work late due to the nature of my job, I am unable to truly keep track of when they get home from school. Also, I didn’t go to school and so I can help when it comes to students’ homework.” (P2)

In contrast, this remark finds parents’ claims that their ability to supervise their children’s return from school and assist in homework is hampered by the nature of their jobs and illiteracy.

In the case of monitoring children’s choice of programmes on television when at home, a parent stated:

“Monitoring the child’s television viewing preferences is not at all a concern to me. I don’t have television at home, so children won’t even have the chance to watch shows, let alone be left alone to choose.” (P4)

The aforementioned quotation highlights how crucial it is for parents to be able to afford a television and how their choice of television programmes can have a significant impact on their children’s education.

A student who commented on the monitoring of children’s choice of programmes on television said:

“My parents do not choose the shows I should watch on my behalf. But mom frequently drives me away to go learn if she catches me watching TV outside of my free time.” (S2)

It was discovered through the accounts of the student participants that some parents keep track of the time their children get home from school. This is captured in the comments below:

“The time I leave for school is known to my parents. So, if I arrive home late, she asks questions.” (S3)

“My mother can question why I arrive home late because she is aware of the time I am meant to leave for school.” (S4)

The two quotations mentioned above back up students’ claims that their time away from school is monitored and emphasize the necessity for them to be attentive and make sure the proper thing is done.

The study also looked at how frequently parents and their school-aged children interact about issues involving their academic work and also involve themselves in school activities. From the interview, parents and school-aged children frequently talk about things related to their academic work, though they seldom visit their schools to discuss their math progress. The following excerpts depict some of the parents’ narrations:

“Although I don’t get time to attend PTA meetings at school, I usually talk to her at home about the progress she is making in studies especially in difficult subjects like math.” (P1)

“As for meeting my son’s teachers at school, it is one thing that I don’t do. But my child constantly lets me know what he needs for school and how I can help.” (P3)

On the other hand, one parent claimed that he occasionally spoke with the children about issues related to their schoolwork. This is captured in the excerpt below:

“Sometimes it is carried out. I can make arrangements for my child if he or she informs me of any needs at school.” (P5)

The comments above reflect the idea that parents should talk to their children about their mathematics progress at home on a regular basis, and also visit the teachers of wards in school to discuss their



students' academic progress. It could be inferred from this quotation that parents did not frequently discuss their children's academic progress.

The student responses revealed that their parents frequently speak with them about issues pertaining to their academic work. One of them shared his/her experience in the following excerpt:

“My mum usually requests my exam results, and pay particular attention to what I got in math and English.” (S1)

Another student commented that:

“They frequently check to see if I can understand the material I was taught in school.” (S4)

The allegation made by children that their parents talk to them about their studies is also implied in this quotation. The quotations mentioned above back up students' claims that having parents who communicate with them has a good effect on their academic performance.

## DISCUSSION and CONCLUSION

### Discussions

The value of parental involvement in students' education has long been recognised, as evidenced by the literature. That is to say that, those interested in ensuring that school children have the best possible developmental and educational results have long been interested in the topic of parental participation in education. The two most crucial environments for a child's learning and growth are their home with their parents and their school with their teachers (Galindo & Sheldon, 2012). According to sociologist Epstein, a child's ability to learn can be significantly impacted by the way their family and school are connected. The growth of children and their academic success are impacted by these two fields of influence in "overlapping domains of influence" (Epstein, 2001; Epstein et al., 2009). According to Epstein's theory that cooperation between schools and families broadens the spheres of influence between these two groups, parental involvement can help both families and schools more effectively advance any common goals they may have regarding children's development and academic success.

From the study, it was found that majority of parents have had no form of formal education and majority of them were also farmers. These findings have implication for the extent to which they can involve themselves in the mathematical practices of their children. This is because, academic achievement of the students and the parents' educational background are closely correlated since raising children's mathematical abilities heavily relies on the parents' self-assurance in encouraging the growth of their children's arithmetic knowledge and skills. This is confirmed by Kwarteng et al. (2022) study's and Kafoussi et al. (2020) study's findings. Kwarteng et al. in their study came to the conclusion that a significant element influencing students' academic performance is their socioeconomic status, specifically their education, employment, and income levels. This calls for the Government initiate or if already started increase adult literacy to raise educational standards because doing so will greatly increase parental involvement in their children's education and thus boost students' performance in school subjects. In Papadopoulos' (2017) assertion, the interaction between parents and instructors is centred on empowering parents to assist their children with their homework and connecting kids' success with the amount of time parents spend on it. This is due to the fact that parents who attended school themselves understood the value of education. They have a better likelihood of helping their children succeed academically. This highlights the need to build research around the connections between parental involvement and their mathematical identity in order to improve mathematics education through carefully planned school-family interactions.

While there are several definitions of parental involvement, most educators concur that it is essential for students' academic growth. The interviewees defined parental participation as a method by which parents support their children's learning through encouraging mechanisms including providing for their educational needs. Parental participation, for instance, is described as “talking about how parents



support their children in the learning process” by one responder. This corroborates the definition of parental involvement given by Dumont et al. (2012), who described it as parents' participation in their children's education by giving them resources for their academic careers. Traditional definitions of parental involvement include involvement in both school and home activities, such as assisting with homework, volunteering at the school, engaging with teachers, and parent-teacher conferences. These were consistent with study findings which revealed among other findings that some of the ways by which parents can help in the development of children's mathematical development is provision of learning resources and activity at home, helping with mathematics homework, encourage good study habits, monitor their school attendance, organize remedial classes, parents' participation in school activities, and teaching appropriate behaviour for academic success.

From the study, it was revealed that some of the ways by which parents can help in the development of children's mathematical development is the monitoring of school attendance. Monitoring which is a primary responsibility of parenting according to Jeynes (2012), encompass the measures parents take to meet their children's fundamental physical and safety needs. For instance, arriving late to pick up a child from school might have serious safety repercussions, especially if the school closes and no adults are present. Depending on the child's chronological age, the distance between the child's house and the school, and other factors, different levels of safety protection are provided for school-age children. To ensure that the child does not struggle, parents must at the very least make sure that someone is present to handle the child's meal and transportation needs before and after the school day. Although some older kids can handle these duties on their own, someone should nevertheless keep an eye on their whereabouts before and after school, how they spend their weekends, and who they are spending them with. They should also be checked on about their dietary needs (Jeynes, 2007). In order to further improve their children's education, Pomerantz et al. (2007) suggested that parents watch how their children's teachers train them. By doing so, they may get more information and confidence about how to teach their children at home.

Another way that families can participate in their children's mathematics education is through homework. By creating math homework kits, teachers can come up with creative ways to get parents involved in homework (Davis & Kelly, 2017). All the materials needed to complete the activities were provided in the kits, along with clear, straightforward instructions. In this way, it broadens the range of engaging activities that kids can partake in while educating parents on the math concepts their children were studying in school. The study by Syhadhata et al. (2021) reveals a number of learning assistance strategies that parents can implement to support their children's mathematical development. These strategies include providing learning facilities, supervising children's learning activities at home, supervising how children use their study time at home, monitoring the learning challenges that children face, and assisting children in overcoming learning challenges.

Parents take advantage of the benefits inherent in communication to encourage good study habits as revealed by the study findings. This concurs with the findings from Kraft et al. (2011) study that, children's academic performance was greatly influenced by parent-child communication, which should be enhanced to support easy learning for the kids. They made the point that strong parent-child bonds result in children performing better academically. Cultivating the parents and children relationship is vital to the development of children in education. But for many parents, a key barrier to involvement is a lack of time. This is due to the fact that parents who are employed frequently cannot attend school events during the day. This confirms the study findings that parents do not regulate children's playing time after school due to the nature of their work. The ability to choose, carry out, and make decisions for oneself is a crucial skill for elementary school students to develop because at this age, kids frequently impose their will (Syhadhata et al., 2021). It is important that parents exercise some level of control over their children's daily engagement. In the view of parents granting their children both freedom and limits, parents must help their children develop positive personalities. In order for their children to learn, parents must also apply a lot of control and discipline. In this direction, parents' contributions to their children's success in their homeschooling become crucial. According to studies, parents' diligent attempts to instil discipline and strong study habits in their children are linked to their



performance in school across all family types through effective communication on matters related to academic work (Smith, 2011). This finding is consistent with what was found in the study that parents often communicate with school children on matters relating to their academic work.

Involving parents in their children's formal education makes sense because they serve as their children's first teachers from the moment of their birth (Liu & Liu, 2000). They serve as the children's first teachers and have a lasting impact on their aspirations and values in mathematics. Evidence suggests that parental involvement is important for children's academic performance in Ghana (Chowa et al., 2013; Gyamfi & Pobbi, 2018; Nyarko, 2011) But sadly, on our part of the world, parents still largely remain untapped resource for improving the mathematics performance of children (Hyde et al., 2006). It is therefore imperative that governments address the disparity in early mathematical proficiency and the ensuing achievement gap in high school mathematics (DeFlorio, 2011). From the findings, it was revealed that providing public education for parents could help improve parental involvement in the academic achievement of their children. Parents often do not have the education to engage their children in schoolwork or the resources to hire teachers. Therefore, giving parents the chance to work together through public education will give them the opportunity to exchange knowledge about school policies, practises, community resources, as well as approaches to parenting practises (LeBrun-Martin, 2013; Kafoussi et al., 2020). Schools must develop more effective methods of communication and outreach to parents who are unable, unwilling, or even reluctant to participate because of cultural and social capital hurdles if they are to boost student accomplishment through parental involvement. Engaging parents in conversation about the shift in teaching and learning in mathematics in particular might help to develop a feeling of urgency about the need for a focus on primary mathematics education. By illustrating the backdrop of proposals for reform, discussion of more universal reforms advocated in education today may help parents better comprehend developments in mathematics education

### **Conclusions**

In general, the COVID-19 crisis has served to draw attention to other variables that are sometimes neglected in the context of education but that should be fostered as a necessary component of attending school and that will warrant more attention in the wake of the epidemic. Together, the lessons discovered highlight the necessity of implementing a plan to support children's and lessen educational disparities once the coronavirus-related school closures are gone. In order to raise children and lessen educational disparities, the agenda must also repair the system. To provide wraparound resources, such as parenting classes customized to the individual needs of students across the nation, school systems and the parents of their students must build a flexible set of strategies.

From the findings, it was revealed that some of the ways by which parents can help in the development of children's mathematical development is provision of learning resources and activity at home, helping with mathematics homework, encourage good study habits, monitor their school attendance, organize remedial classes, parents' participation in school activities, and teaching appropriate behaviour for academic success. The results of the study demonstrated that parental involvement in children's education is essential for student's learning, behaviour, and academic achievement. Therefore, there is the need for parents and schools to collaborate in order to promote children's well-being and educational success through advocacy. From the study, providing public education for parents could help improve parental involvement in the academic achievement of their children.

### **Suggestions for practitioners and academics**

According to the study's findings, the following suggestions could be made: From the study, parents can influence their children's learning behaviour in mathematics by keeping an eye on their attendance at school, setting up remedial sessions, and helping them with their homework. Therefore, the study suggests that Tano North Municipal Directorate of Ghana Education Service should collaborate with headteachers at basic schools to develop family engagement programmes that place an emphasis on parent-school partnerships and the parents' role in the children's mathematics development and future success. Future studies could assess homework practices in the Ghanaian homes, and examine



interactions between parents and children as they work out mathematics problems.

### **Delimitation and limitations of the study**

As we interpret the results, we must keep the study's limitations in mind. One of the study's limitations is choice of the research design: case study. The case study's sample size is too small to allow for generalizing the results to the entire population. As a result, the results are biased in favour of the study's contributing elements. Also, for the researcher to function as a translator and transcribe some of the responses in the local language (Asante Twi) may threaten the credibility of the data despite the fact that the researcher is a native speaker of that language. The exploration of parents' views about their parental involvement and how they get involved in the mathematical practices of their children, also placed constraints on this study.

### **Ethics and conflict of interest**

Authors acted in accordance with the ethical rules in all matters such as data collection in the research, and that there is no conflict of interest on the part of the authors.

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