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Influence of Parent–Teacher Communication on Early Mathematics Achievement among Pre-Primary Learners in Moiben Sub-County, Kenya

Anjala Alata Electine, Kabesa Stella and Koross Rachel

Department of Curriculum and Instruction, School of Education, University of Eldoret, P.O. Box 1125-30100, Eldoret, Kenya

Abstract

Parent–teacher communication is a critical mechanism for aligning home and school learning environments under Kenya's Competency-Based Curriculum (CBC), yet its specific relationship with early mathematics achievement remains under-examined in rural pre-primary contexts. Grounded in Epstein's Theory of Parental Involvement, this study investigated the influence of parent–teacher communication on early mathematics achievement among pre-primary learners in Moiben Sub-County, Uasin Gishu County, Kenya. A descriptive survey design was adopted. The target population comprised 2,652 individuals including 72 head teachers, 144 ECDE teachers, and 2,436 parents or guardians drawn from 72 public ECDE centres. Yamane's formula yielded a sample of 196 participants selected through purposive and simple random sampling, and a 93.9% response rate was realized. Data were collected using structured questionnaires and analyzed in SPSS version 23.0 using descriptive statistics (frequencies and percentages) and Pearson's product–moment correlation coefficient. Findings showed that although 70.8% of parents communicated regularly with teachers, communication was dominated by attendance at school meetings (71.9%), while the most instructionally substantive practices such as receiving feedback on numeracy skills (65.6%) and consulting teachers on home mathematics support (63.5%) were least common. Teachers (78.0%) and head teachers (78.0%) nonetheless overwhelmingly affirmed that communication enhances early mathematics achievement. Inferential analysis established a moderate, positive, and statistically significant correlation between parent–teacher communication and early mathematics achievement ($r = 0.41$, $p = 0.003$), with communication accounting for approximately 17% of the variance in achievement. The study concludes that parent–teacher communication is significantly associated with early mathematics achievement, and that shifting communication from administrative contact toward instructionally focused, two-way exchange could strengthen foundational numeracy outcomes. It recommends that schools institutionalize structured numeracy feedback

and home-support consultation channels, and that teacher professional development embed parent-engagement competencies.

Keywords: Competency-Based Curriculum, early mathematics achievement, home–school communication, parent–teacher communication, pre-primary learners, Moiben Sub County, Kenya

***Correspondence:** electineanjala8@gmail.com

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Introduction

Early childhood education lays the foundation for children's cognitive, emotional, and social development, and early mathematics achievement is among the strongest predictors of school readiness and later academic success (UNICEF, 2024; Watts et al., 2014). Foundational numeracy skills such as number recognition, counting, quantity comparison, ordering, and pattern recognition begin to develop in the early years through structured instruction and everyday experiences (UNICEF, 2024; Zhao & Gibson, 2023), and longitudinal evidence shows that kindergarten number competence forecasts mathematics outcomes well into the primary grades (Jordan et al., 2009). This developmental significance is reflected in global policy: Target 4.2 of the Sustainable Development Goals commits nations to ensuring that all children have access to quality early childhood development, care, and pre-primary education (United Nations, 2015). Yet children's mathematical growth is not shaped by classroom instruction alone; responsive parent–child engagement and home mathematics activities are consistently associated with children's mathematical skills (Zhao & Gibson, 2023), making the connection between home and school a critical site of influence.

Parent–teacher communication is the primary mechanism through which that connection is built. It enables parents and teachers to exchange information about children's progress, discuss learning difficulties, provide feedback, and coordinate support across the two environments (Wolf, 2020; Caldwell et al., 2026). Through such communication, parents can come to understand the mathematical concepts taught at school and reinforce them through everyday activities such as counting objects, sorting items, comparing quantities, and recognizing numbers, while teachers gain insight into children's home learning experiences and the areas where additional instructional support is needed (Zhao & Gibson, 2023; James-Brabham et al., 2025; Mujtaba et al., 2024). Decades

of partnership research similarly indicate that well-structured home–school connections produce measurable gains in student achievement (Henderson & Mapp, 2002). The contribution of communication to early mathematics achievement, however, is unlikely to be uniform: it plausibly depends on the frequency, quality, accessibility, and relevance of the information exchanged, and on the extent to which parents and teachers act on it to address children's learning needs (Caldwell et al., 2026; Wolf, 2020).

Caldwell et al. (2026), studying 182 Hong Kong kindergarten children and their parents, found that parent–teacher collaboration was indirectly associated with children's numeracy skills through reduced parental stress, greater parental confidence in supporting mathematics, and increased home numeracy activity — suggesting that collaboration matters most when it equips parents to reinforce learning, not merely when it increases contact. In a complementary synthesis of 72 samples from 20 countries, James-Brabham et al. (2025) identified a small but statistically significant relationship between home mathematical activities and young children's mathematical skills ($r = .13$). Longitudinal work adds texture to these findings: Zhao and Gibson (2023) showed that responsive engagement and the home mathematics environment predicted skills between ages four and six, while Silinskas et al. (2025) demonstrated reciprocal influences between children's performance and parental involvement during the transition to Grade 1.

In Africa, however, the relationship between family engagement and learning must be read against socioeconomic conditions, parental educational backgrounds, and the resources available to schools and households. Research from Ghana shows that communication between parents and teachers can be constrained by divergent expectations and understandings of educational responsibility (Wolf, 2020), while Tanzanian evidence indicates that teacher training can improve some dimensions of teachers' engagement with parents, though without directly demonstrating effects on pre-primary mathematics achievement (Mujtaba et al., 2024). These findings imply that effective communication requires deliberate school-level strategies and should be evaluated against learning outcomes rather than assumed beneficial simply because parents and teachers interact.

In Kenya, pre-primary education is recognized as the foundation for school readiness and the development of age-appropriate competencies under the Competency-Based Curriculum (Kenya Institute of Curriculum Development [KICD], 2017). The National Pre-Primary Education Policy emphasizes quality, equitable, and relevant early learning alongside stakeholder participation in service provision (Ministry of Education, 2017). These policy commitments are especially consequential given persistent concerns about foundational numeracy: national learning assessments have repeatedly shown that substantial proportions of Kenyan children complete early primary grades without mastering expected numeracy skills (Uwezo, 2021). Within this context, parent–teacher communication offers a practical lever for aligning classroom instruction with home experience for instance, teachers can guide parents to practise counting during household chores, identify shapes in the environment, compare quantities, and reinforce number recognition using locally available materials.

Anyango (2020), studying pre-primary children, parents, and teachers in Lugari Sub-County, Kakamega County,

reported a positive correlation between parent–school communication and numeracy development (r = .42), although communication was more weakly related to numeracy than the provision of instructional materials and homework supervision. More recently, Obunga (2026) examined parental involvement and the acquisition of core competencies among pre-primary learners in Kisii County, offering further national evidence of the relevance of home–school engagement. Neither study, however, isolates the specific relationship between communication and mathematics achievement, since both employed broad competency outcomes.

A gap therefore remains concerning the specific influence of parent–teacher communication on early mathematics achievement among pre-primary learners in Moiben Sub-County, Uasin Gishu County. Findings from other counties cannot be assumed to generalize to Moiben, where communication practices, parental availability, access to communication channels, and home-learning conditions may differ; moreover, studies of general involvement rarely disaggregate communication frequency, feedback quality, information-sharing about mathematical difficulties, and teachers' guidance on home numeracy support. Without examining these dimensions alongside learners' mathematics achievement, it is difficult to determine which communication practices matter most for foundational mathematical skills. The present study addresses this gap by examining the influence of parent–teacher communication on early mathematics achievement among pre-primary learners in Moiben Sub-County, Kenya.

Theoretical Framework

This study was anchored on Epstein's Theory of Parental Involvement, developed by Joyce L. Epstein and colleagues at Johns Hopkins University and refined from the original overlapping spheres of influence model (Epstein, 1987, 1995) to its comprehensive handbook formulation (Epstein et al., 2018). The theory holds that children's learning is optimized when home, school, and community overlap and interact collaboratively rather than operating in isolation (Epstein, 2011; Epstein & Sheldon, 2016), creating an integrated network of shared responsibility (Epstein, 1995; Sanders & Sheldon, 2009). Epstein operationalized this partnership through six typologies of involvement such as parenting, communicating, volunteering, learning at home, decision making, and collaborating with the community among which communicating is foundational because it establishes the two-way channels through which all other forms of involvement become possible (Epstein, 2001; Epstein et al., 2018).

The link between communication and achievement is empirically well supported. Meta-analyses show that parental involvement, particularly its communication dimensions, predicts achievement more strongly than socioeconomic status or school-based involvement alone (Fan & Chen, 2001; Jeynes, 2007; Hill & Tyson, 2009). Henderson and Mapp (2002) concluded that programmes engaging families in two-way communication produce measurable achievement gains, while Galindo and Sheldon (2012) showed that family–school connection predicted kindergarten mathematics gains specifically, and Van Voorhis et al. (2014) found that interactive, teacher-guided home learning raised mathematics performance. The framework is also congruent with complementary theories: Bronfenbrenner (1979) locates the child within home–school mesosystem connections, Vygotsky (1978) implies that

parents can scaffold numeracy only when teachers communicate what and how to support, and Hoover-Dempsey and Sandler (1997) explain that parents' role construction and efficacy both strengthened through teacher contact determine whether involvement becomes learning support at home.

The framework nonetheless faces relevant critiques. It has been faulted for socioeconomic bias, assuming families have the time, stability, and literacy resources to engage across all six typologies (Lareau, 2003; Crozier & Davies, 2007); for being school-initiated and undervaluing organic, culturally rooted family practices (Goodall & Montgomery, 2014; Lightfoot, 2004); and for American origins whose assumptions about formal communication may require adaptation in Sub-Saharan African contexts (Wolf, 2020; Bartoli et al., 2022; Kambona, 2025) a caution directly pertinent to Moiben Sub-County, where rural livelihoods and variable parental education may condition communication (Gitonga et al., 2025).

In this study, the communicating typology served as the primary analytical lens. Kenya's Competency-Based Curriculum formally designates parents as co-educators (Republic of Kenya, 2017; KICD, 2017), and Epstein's theory highlights the necessity of structured, two-way communication through which parents understand curricular expectations, receive feedback on their children's numeracy progress, and acquire guidance on supporting early mathematics at home aligning the home and school environments that jointly shape early mathematics achievement.

Empirical Review

Studies increasingly shows that what passes between home and school shapes young children's mathematical development. In Hong Kong, Caldwell et al. (2026) found that stronger parent–teacher collaboration was associated with better early numeracy skills among 182 kindergarten children, operating through reduced parental stress, greater parental confidence, and more frequent home numeracy activities positioning communication not merely as a correlate of achievement but as a condition that activates effective home-based support. Meta-analytic evidence reinforces this picture, albeit modestly: James-Brabham et al. (2025), synthesizing 72 samples from 20 countries, found a small but significant relationship between home mathematical activities and children's skills ($r = .13$), while Nelson et al. (2024) reported that caregiver-delivered mathematics interventions improved achievement ($g = 0.26$), with larger effects where training included follow-up support, implying that sustained teacher guidance strengthens parental involvement.

Silinskas et al. (2025) found reciprocal links between children's mathematics performance and parental involvement, suggesting engagement responds to learning needs as much as it shapes them. Zhao and Gibson (2023) showed that responsive, mathematically stimulating parent–child engagement at age two predicted German children's skills at ages four and six, and Silver et al. (2023) demonstrated that both mothers' and fathers' mathematics engagement related to toddlers' skills in the United States. Cross-nationally, Alreshidi et al. (2022) found that parental education, expectations, and pre-primary attendance predicted achievement across ten countries, whereas frequent homework assistance was sometimes linked to lower scores underscoring that the quality of involvement matters more than its frequency.

In Africa, using TIMSS 2023 data, Mokgwathi (2026) found that home

numeracy activities and early childhood education participation predicted Grade 5 mathematics achievement in South Africa. Kambona's (2025) systematic review of sub-Saharan early childhood education identified collaboration with teachers as a key form of involvement, while citing barriers low socioeconomic status, limited parental education, inadequate materials, and time constraints directly pertinent to rural Kenyan settings such as Moiben Sub-County. Ghanaian and Tanzanian studies speak most directly to communication itself: Bartoli et al. (2022) found that school-based engagement was largely parent-initiated and constrained by convenience, while Wolf (2020) reported divergent parent–teacher perceptions and teacher frustration in communicating with parents. Mujtaba et al. (2024) showed that teacher training in Tanzania improved teachers' beliefs about and invitations to parental involvement, suggesting communication practices are malleable. Ndijuye and Benguye (2023) found that family socioeconomic status predicted Tanzanian children's early reading and mathematics skills. Notably, Wolf and Peele's (2020) cluster-randomised trial of 3,345 Ghanaian pre-primary children found that adding parental-awareness meetings to teacher training yielded no additional benefit and negatively affected numeracy growth in some analyses cautioning that engagement initiatives must be empirically tested rather than presumed effective.

In Kenya, Obunga (2026) found home–school communication positively correlated with PP2 learners' acquisition of core competencies in Kisii County ($r = .639$, $p < .01$), and Akoth (2026) found parent–school communication a significant predictor of pre-primary pupils' learning competencies in Kilifi County, $F(4, 123) = 25.853$, $p < .001$ though both measured general rather than mathematics-specific outcomes. Other studies illuminate the surrounding conditions: Gitonga et al. (2025) found that parental education and income shaped engagement in Embu County; Kang'ara and Mwangi (2025) documented barriers to parental involvement in CBC implementation in Kiambu County; and Komen and Onginjo (2024) identified limited digital skills and unequal technology access as obstacles where schools rely on digital communication. Joyce and Ong'ang'a (2023) linked parental involvement to pre-primary learners' collaborative competencies in Kilifi and recommended regular parent–teacher communication, while Nyakundi et al. (2020) tied parental involvement to learning outcomes in Nairobi's early childhood centres. Most proximate to this study, Anyango (2020) connected parent–school communication and home support to numeracy development among pre-primary children in Lugari Sub-County, Kakamega County, and Mueni (2026) framed parent–teacher synergy as central to learner success under Kenya's Competency-Based Curriculum.

Hence, Kenyan studies demonstrate significant associations between home–school communication and pre-primary learners' competencies (Akoth, 2026; Obunga, 2026), yet they have focused largely on general or collaborative competencies rather than mathematics achievement specifically. Few studies have isolated parent–teacher communication as an independent variable, and none have examined its influence on early mathematics achievement among pre-primary learners in Uasin Gishu County. The present study addresses this gap by investigating the influence of parent–teacher communication on early mathematics achievement among pre-primary learners in Moiben Sub-County, Kenya.

Methodology

Research Design

The study adopted a descriptive survey research design as it permits the systematic collection of quantitative data describing the characteristics, attitudes, and perceptions of a population and the relationships among variables as they naturally occur, without experimental manipulation (Creswell & Creswell, 2023).

Study Area

The research was conducted in Moiben Sub-County, Uasin Gishu County, Kenya. The sub-county is predominantly rural, with most households engaged in small-scale farming and agrarian livelihoods conditions that shape parental availability, household time allocation, and access to educational resources. The implementation of the Competency-Based Curriculum across public pre-primary centres in the sub-county, which formally designates parents as co-educators and emphasizes out-of-school learning support, made Moiben a fitting setting for examining home–school communication dynamics in early mathematics learning.

Target Population

The target population comprised 2,652 individuals drawn from 72 public ECDE centres in Moiben Sub-County: 2,436 parents or guardians, 144 ECDE teachers, and 72 head teachers (Sub-County Education Office, 2024). Parents and guardians were targeted because of their central role in supporting learning at home and engaging in home–school dialogue about children's progress. ECDE teachers were included because they deliver foundational mathematics instruction and communicate directly with parents regarding learning needs, while head teachers were included for their administrative oversight of early years programmes and school-level engagement structures.

Sample Size and Sampling Procedures

A representative sample was determined using Yamane's (1973) formula:

$n = N / (1 + N(e)^2)$

where n is the sample size, N is the target population, and e is the margin of error. Applying a 10% margin of error yielded a final sample of 196 participants distributed across the 72 public ECDE centres, comprising 41 head teachers, 59 ECDE teachers, and 96 parents or guardians, as summarized in Table 1.

Table 1 Sample Size Distribution

Participant Category	Target Population (N)	Sample Size (n)
ECDE Teachers	144	59
Head Teachers	72	41
Parents / Guardians	2,436	96
Total	2,652	196

Source: Field Data (2025)

Sampling techniques were tailored to each respondent category. Purposive sampling was used to select head teachers and ECDE teachers handling Pre-Primary 1 and Pre-Primary 2 classes, ensuring the inclusion of respondents with direct administrative oversight, curriculum knowledge, and ongoing interaction with parents regarding numeracy learning (Creswell & Creswell, 2023). Simple random sampling was used to select parents and guardians from class registers, giving each parent an equal probability of selection and

enhancing the representativeness of the sample (Kothari, 2021).

Data Collection Instruments and Procedures

Data were collected using structured questionnaires administered to head teachers, ECDE teachers, and parents or guardians. The questionnaires comprised closed-ended items, including Likert-type scales, which captured the level and forms of parent–teacher communication, respondents' views on the role of communication in early mathematics achievement, and data on learners' mathematics achievement.

Validity and Reliability of Instruments

Content and face validity were established by submitting the draft instruments to university supervisors and experts in early childhood education, whose feedback informed revisions that ensured the items adequately measured the study variables. Reliability was assessed through a pilot study in five ECDE centres in Kimumu ward, which share characteristics with the study area but were excluded from the final sample. Using a test–retest procedure over a two-week interval, internal consistency was measured with Cronbach's alpha coefficient, and coefficients exceeding the recommended threshold of 0.70 confirmed that the instruments were reliable and stable.

Data Analysis and Presentation

Completed questionnaires were coded, edited for completeness, and entered into the Statistical Package for the Social Sciences (SPSS) version 23.0 for analysis. Descriptive statistics, specifically frequencies and percentages, were used to summarize respondent characteristics, the level and forms of parent–teacher communication, and teachers' and head teachers' views. Inferential analysis employed Pearson's product–moment correlation coefficient (r) to test the relationship between parent–teacher communication and early mathematics achievement at the 0.05 level of significance. Results were presented in tables accompanied by narrative interpretation.

Results and Discussion

Response Rate and Respondent Characteristics

Data were collected from head teachers, ECDE teachers, and parents or guardians and the questionnaire return rate and demographic characteristics are summarized in Table 2.

Of the 196 questionnaires distributed, 184 were returned, giving an overall response rate of 93.9%. Return rates were 100% for head teachers, 91.8% for ECDE teachers, and 79.9% for parents/guardians. This exceeded the 70% benchmark discussed by Hendra and Hill (2019) and the average response rates reported in organisational surveys by Baruch and Holtom (2008). The lower parental response rate may reflect time and literacy constraints in rural early childhood settings (Kambona, 2025).

The gender distribution showed that head teachers were predominantly male (75.6%), whereas ECDE teachers (66.1%) and parents/guardians (81.4%) were mainly female. This reflects the feminisation of early childhood education alongside male-dominated school leadership (OECD, 2019). The predominance of women among parent respondents also suggests that mothers may be the primary school contacts, consistent with findings on parental engagement (Silver et al., 2023).

Most head teachers were aged 35 years or older (95.1%), and 85.4% had over five years of experience. In contrast, 64.4% of ECDE teachers were aged 26–35

years, while 57.6% had 1–5 years of experience. Regarding qualifications, 92.6% of head teachers held diplomas or bachelor's degrees, compared with 57.6% of ECDE teachers who held certificates. Parents had varied educational backgrounds, with 32.3% holding bachelor's degrees and 17.7% having primary or secondary education. These differences are relevant because parental education influences engagement in early childhood education (Gitonga et al., 2025) and may shape parents' ability to interpret Competency-Based Curriculum guidance and participate in learning-focused communication (Alreshidi et al., 2022).

Table 2: Summary of Questionnaire Return Rate and Demographic Characteristics of Respondents

Demographic / Variable Category	Sub-Category / Response	Head Teachers	ECDE Teachers	Parents / Guardians	Total / Overall
Questionnaire Return Rate	Sample Size (n)	41	59	96	196
	Returned Questionnaires	41	57	86	184
	Return Rate (%)	100.0%	91.8%	79.9%	93.9% (91.0% avg)
Gender Distribution	Male	31 (75.6%)	20 (33.9%)	16 (18.6%)	67
	Female	10 (24.4%)	39 (66.1%)	70 (81.4%)	119
	Total	41 (100%)	59 (100%)	86 (100%)	186
Age Distribution	18–25 years	0 (0.0%)	7 (11.9%)	10 (11.6%)	17
	26–35 years	2 (4.9%)	38 (64.4%)	40 (46.5%)	80
	35–45 years	18 (43.9%)	10 (16.9%)	21 (24.4%)	49
	Above 45 years	21 (51.2%)	4 (6.8%)	15 (17.5%)	40
	Total	41 (100%)	59 (100%)	86 (100%)	186
Level of Education	Primary School	0 (0.0%)	0 (0.0%)	2 (2.1%)	2
	Secondary School	0 (0.0%)	0 (0.0%)	15 (15.6%)	15
	Certificate	3 (7.3%)	34 (57.6%)	20 (20.8%)	57
	Diploma (Education)	25 (60.9%)	20 (33.8%)	28 (29.0%)	73
	Bachelor's Degree	13 (31.7%)	5 (8.5%)	31 (32.3%)	49
	Total	41 (100.0%)	59 (100.0%)	96 (100.0%)	196
Work Experience	Less than 1 year	1 (2.4%)	3 (5.1%)		4
	1–5 years	5 (12.2%)	34 (57.6%)		39

6–10 years	16 (39.0%)	12 (20.4%)	28
Above 10 years	19 (46.4%)	10 (16.9%)	29
Total	41 (100.0%)	59 (100.0%)	100

Source: Field Data (2025)

Level of Parent–Teacher Communication

When asked whether they regularly communicated with ECDE teachers about their children's mathematics learning, most parents responded affirmatively, as shown in Table 3.

Table 3: Level of Parent–Teacher Communication (Parents' Responses) (n = 96)

Response Category	Frequency (n)	Percentage (%)
Parents who regularly communicate with teachers	68	70.8
Parents who do not regularly communicate	28	29.2
Total	96	100.0

Source: Field Data (2025)

Although 70.8% of parents reported regular communication, the remaining 29.2% did not, indicating that a substantial minority of learners enter pre-primary mathematics learning without a functioning home–school information channel. This proportion is consistent with regional evidence that engagement in African pre-primary settings is often parent-initiated and unevenly distributed (Bartoli et al., 2022).

Forms of Parent–Teacher Communication

The specific forms of communication parents reported are presented in Table 4.

Table 4. Forms of Parent–Teacher Communication (Parents' Responses) (n = 96)

Communication Practice	Agree n (%)	Neutral n (%)	Disagree n (%)
Attending school meetings to discuss child's progress	69 (71.9)	14 (14.6)	13 (13.5)
Communicating with teachers about the child's mathematics achievement	66 (68.8)	15 (15.6)	15 (15.6)
Receiving feedback from teachers on the child's numeracy skills	63 (65.6)	17 (17.7)	16 (16.7)
Consulting teachers on how to support mathematics learning at home	61 (63.5)	18 (18.8)	17 (17.7)

Source: Field Data (2025)

Attending school meetings was the most common practice (71.9%), followed by discussing children's mathematics achievement (68.8%). Fewer parents reported receiving feedback on numeracy skills (65.6%) or consulting teachers on supporting mathematics learning at home (63.5%). This pattern suggests that communication focuses more on school meetings than on practical guidance for home learning. Caldwell et al. (2026) found that parent–teacher collaboration supports numeracy

through parental confidence and home mathematics activities. Similarly, meta-analytic evidence indicates that caregiver-led mathematics activities produce modest but reliable learning gains (James-Brabham et al., 2025; Nelson et al., 2024). Comparable patterns have been reported in Ghanaian pre-primary schools, where communication often centres on meetings rather than learning-focused exchanges (Bartoli et al., 2022; Wolf, 2020).

Teachers' Perceptions

ECDE teachers' views on the role of communication are presented in Table 5.

Table 5: ECDE Teachers' Views on Parent–Teacher Communication (n = 59)

Statement	Agree n (%)	Neutral n (%)	Disagree n (%)
Regular communication improves mathematics achievement	46 (78.0)	8 (13.6)	5 (8.4)
Parents who communicate offer better home support	43 (72.9)	9 (15.3)	7 (11.8)
Lack of communication affects numeracy progress	41 (69.5)	10 (16.9)	8 (13.6)
Communication aligns home and school learning	44 (74.6)	8 (13.6)	7 (11.8)

Source: Field Data (2025)

Most teachers (78.0%) agreed that regular communication improves mathematics achievement, while 74.6% indicated that it aligns home and school learning. Additionally, 72.9% agreed that communicating parents provide better home support, and 69.5% reported that inadequate communication affects learners' numeracy progress. Neutral responses ranged from 13.6% to 16.9%, suggesting some uncertainty about communication's role.

These findings align with Epstein's (2018) overlapping-spheres framework, which emphasizes coordination between home and school learning environments. The neutral responses may partly reflect differences in teachers' professional preparation, as over half held Certificate-level qualifications. This is relevant given evidence that teacher training can influence beliefs and practices concerning parental engagement (Mujtaba et al., 2024).

Head Teachers' Perceptions

Head teachers' views, summarized in Table 6, were almost similar. Head teachers affirmed that communication enhances early mathematics achievement (78.0%), that performance improves when parents receive feedback (75.6%), that learners benefit when parents consult teachers (73.2%), and that weak communication erodes the home–school linkage (70.7%). The close alignment between leaders' and teachers' endorsement (78.0% in both groups on the core achievement proposition) suggests a school-level consensus on the value of communication that, encouragingly, is not matched by the parental practice data in Table 4 pointing to an implementation gap between institutional belief and enacted practice, of the kind documented in other Sub-Saharan African settings where schools endorse partnership rhetorically but lack structured, two-way channels (Wolf, 2020; Kambona, 2025).

Table 6: Head Teachers' Views on Parent–Teacher Communication (n = 41)

Statement	Agree n (%)	Neutral n (%)	Disagree n (%)
Communication enhances early mathematics achievement	32 (78.0)	6 (14.6)	3 (7.4)
Learners benefit when parents consult teachers	30 (73.2)	7 (17.1)	4 (9.7)
Lack of communication weakens home–school linkage	29 (70.7)	8 (19.5)	4 (9.8)
Performance improves when parents receive feedback	31 (75.6)	6 (14.6)	4 (9.8)

Source: Field Data (2025)

Relationship between Communication and Early Mathematics Achievement

According to the results presented in Table 7, Pearson's correlation analysis revealed a moderate, positive, and statistically significant relationship between parent–teacher communication and early mathematics achievement ($r = .41$, $p = .003$, $N = 184$). Communication accounted for approximately 16.8% of the variance in achievement ($r^2 = .168$), suggesting that effective home–school communication is associated with better mathematics outcomes. This finding is consistent with Anyango (2020), who reported a similar association ($r = .42$) in Kakamega County, and with broader evidence linking home–school collaboration to children's learning outcomes (Obunga, 2026; Akoth, 2026).

Table 7: Correlation between Parent–Teacher Communication and Early Mathematics Achievement

Variable	1	2
1. Parent–teacher communication	—	
2. Early mathematics achievement	.41**	—

Note. N = 184. **p < .01 (two-tailed).
Source: Field Data (2025)

However, the correlation does not establish causation. Communication may support mathematics learning, but parents may also communicate more frequently when children perform well. Family socioeconomic circumstances may further influence both communication and achievement (Ndijuye & Benguye, 2023; Gitonga et al., 2025). Moreover, parental engagement does not necessarily translate into improved numeracy outcomes (Wolf & Peele, 2020). Given that communication in the study area tended to focus on meetings rather than learning-specific exchanges (Table 4), greater emphasis on feedback and practical guidance for supporting mathematics at home may help strengthen this relationship (Caldwell et al., 2026).

Conclusion

The study concludes that parent–teacher communication is positively associated with early mathematics achievement among pre-primary learners in Moiben Sub-County, Kenya. Regular communication supports continuity between school and home learning and enables early identification of learning difficulties. However, communication quality matters more than frequency

alone. Despite regular contact, communication focused mainly on school meetings and general progress, with limited feedback on numeracy skills and guidance for supporting mathematics at home. The study also found that communication remained uneven, with nearly three in ten parents engaging irregularly and fathers underrepresented.

Recommendations

Based on these conclusions, the study makes the following recommendations.

ECDE teachers and head teachers should move communication beyond general meetings toward structured, two-way, instructionally focused channels. This includes providing regular feedback on each child's numeracy progress, demonstrating simple home mathematics activities that use locally available materials, and scheduling consultations around individual learners' difficulties. Head teachers should institutionalize these practices within school improvement plans and mentor the younger, less experienced teachers who constitute the majority of the ECDE workforce, so that engagement with parents becomes a deliberate professional practice rather than a matter of personal initiative.

Parents should take an active role in their children's early mathematics learning through simple, low-cost activities woven into daily routines, such as counting during household chores, comparing quantities, sorting items, and recognizing numbers in the environment. Fathers in particular should be deliberately encouraged to participate in communication with schools, since home–school engagement in the study area rested disproportionately on mothers.

The Ministry of Education, the Kenya Institute of Curriculum Development, and county governments should give practical effect to the Competency-Based Curriculum's recognition of parents as partners in learning. This can be achieved through standardized numeracy feedback formats, parent-orientation modules on early mathematics, and communication guidelines that accommodate parents' varied educational backgrounds and unequal access to digital platforms. Any parent-engagement initiatives rolled out under this framework should be piloted and evaluated to confirm that they produce the intended benefits for children's learning.

Teacher education institutions and providers of in-service training should embed parent-engagement competencies in ECDE curricula, including initiating two-way communication, interpreting and sharing learner progress data, and coaching parents on supporting numeracy at home, with follow-up support after training to consolidate these skills.

Suggestions for Further Research

Future studies should employ experimental or longitudinal designs to establish whether structured, numeracy-focused communication interventions cause improvements in early mathematics achievement, thereby moving beyond the correlational evidence presented here. Researchers should also disaggregate communication into its component dimensions such as frequency, quality of feedback, and guidance on home support to determine which aspects contribute most strongly to achievement.

Finally, mixed-methods studies that include fathers, observe actual communication exchanges, and compare learners from different socioeconomic backgrounds would deepen understanding of the mechanisms through which home–school partnerships

operate and the conditions under which they benefit all learners equitably.

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