# Parent-Teacher Collaboration on Preschool Children's Development of Numeracy Skills in Ibeju-Lekki Local Government Area of Lagos State

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**Abstract**

*Tie study investigated the effects of parent-teacher collaboration on preschool children's development of numeracy skills in Ibeju-Lekki Local Government Area of Lagos State. The study adopted the pretest-posttest control group quasi experimental design with 2x2x2 factorial matrix. Purposive sampling technique was used to select two pre-primary public schools in Ibeju-Lekki Local Government Area. The school selected have preschool sections and the number of children selected in each school is 30. Three instruments were instructional guides and Achievement Test on the Numeracy Development of Preschool Children (r = 0.84). Data were analyzed using Analysis of Covariance (ANCOVA). Findings revealed that there was a significant main effect of treatment on number and operational skills ($F_{(1,55)}$ =16.96; P<0.05). Thee pupils exposed to teacher-parents collaboration performed better in number and operations (mean = 19.20) than those exposed to conventional strategy (mean = 13.68). There was a significant main effect of treatment on geometry skills ($F_{(1,55)}$ =4.24; P<0.05). Participants exposed to teacher-parents collaboration activities performed better in geometry (mean = 3.49) than those exposed to conventional strategy. All other results were not significant. Parent-teacher collaboration activities were effective strategies for enhancing numeracy development skills of preschool children. Therefore, parent-teacher collaboration should be adopted by teachers as a teaching-learning strategy in preschools*

**Key Words**: Parent-teacher collaboration, Numeracy development skills, Preschool children, Gender.

## Introduction

Education is indeed a social system; even the most individualized form of education is identified with social factors. The interface network among learners, teachers, administrators, and parents is the social texture of education programmes with respect to structure and process. The participation of parents and the society is one of the features of an effective school. In such schools, the child's family and society participate in teaching and learning activities and in the school's decision-making process. Additionally, they serve as sources that help develop the school's activities.

It is not possible for the school's educational programmes to be effective without the participation of the child's family. The family provides the child with informal education, while schools impart formal education to the child. It is very important for informal and formal education to complement each other, so as to enable children to attain social goals. The family must participate in the formal education process in order to achieve these goals. Cooperation between parents and teachers builds a better relationship between both parties. The child's education, which was initiated at home, takes shape at school; it is shaped further in social circles (Oduolowu and Amosun, 2012). Good education is contingent on the coordinated effort of these three entities and particularly on strong ties between the school and the family. (Myende and Nhlumayo, 2022, Vural, 2004)

The earliest years of life are particularly important because vital development occurs in all domains during this period (Ewunonu, Amosun and Njoku, 2024; Shonkoff and Phillips, 2000). Many studies suggest that early learning contributes to the brain's developing architecture (Ewunonu and Amosun, 2025, Blakemore and Frith, 2005) and underpins the development of intellectual schemas (Sylva, 1994). Well before entering school, the young child acquires learning dispositions as well as key cognitive skills (Sylva and Pugh, 2005), especially in an environment where parents are full of expectation for their children.

The emphasis on meeting the expectations of parents in preschool education clearly implies a greater involvement by parents. This involvement has emerged as a widespread response to increased pressure for reform and democratization across the entire educational spectrum in many countries such as the UK, Australia, and Norway (Dimmock et al., 1996). In the US, parental involvement has stemmed from concerns about social justice, particularly in relation to federal initiatives aimed at promoting equity and equality among poor people, Blacks, disabled people, and other minority groups (Dimmock et al., 1996).

Olatonye and Ogunkola (2008) posit that traditionally, parental involvement in education included contributions to their children's home-based activities such as helping with homework, encouraging reading and school attendance

(Olalowo, Olarogba and Amosun, 2024) and school-based activities (like attending Parents Teachers' Association meeting, Parent/Teacher conferences, and participating in fund raising activities). Uzoechina and Obidike (2008) contend that parental involvement in children's education now is manifested in their interest in school activities and active participation in children's school work. Some of these activities are fund-raising, inter-house sports, involvement in school's decision-making, information dissemination, monitoring of children' school and enforcing pupils and staff discipline.

However, there has also been considerable debate about the precise nature of this involvement (Baker, 2014, Ball, 1994). School staff members may be ambivalent because of the perceived threat to their professional status (Edwards and Knight, 1994). Parents may be nervous about assuming increased responsibilities for which they feel untrained and unprepared. Because of legislation and budgetary controls, parents may not have much actual power and it may not be of the kind they want (Stacey, 1991). Parents may trust the staff implicitly to establish the curriculum and organize the classroom, but may face immediate concerns about issues related to individual children and staff-parent communication, especially if things appear to go awry.

Uzoechina and Obidike (2008) added that parental involvement is not a friendly acquaintance with teachers but obligations from parents. This participation must be seen in area of development of educational policies and curriculum issues that affect the destiny of children. A high level of parental involvement will no doubt goad primary education to more effective and more efficient performance. Research has indicated that there are positive academic outcomes stemming from parent involvement ranging from benefits in early childhood to adolescence and beyond (Henderson and Mapp, 2002; Patrikakou, Weissberg, Redding, and Walberg, 2005).

It has been shown that children whose parents are involved in early childhood or participate with their children in early childhood programmes, such as Head Start, have higher cognitive and language skills than do children whose families are not involved or part of such programmes. Also, children who participate in early childhood programmes that had strong family collaboration are more likely to be better prepared for school. Most importantly, benefits continue to be evident even later, as these children have fewer class retentions and are more likely to graduate from high school. Patrikakou, Weissberg, Redding, and Walberg, 2005; Olalowo, Olarogba and Amosun, 2024)

There is continuous argument about whether or not parental involvement in homework affects pupils' achievement at school. For example, a study from the United States has explored the effects of different types of parental involvement in homework and found that different forms of support (such as support for children's autonomy) are associated with higher test scores, whereas others (such as direct involvement) are associated with lower test scores (Sharp and Benefield, 2001). Beyond simply eliminating distractions, parents can help to create an effective learning environment for their children, as international studies have found that children can have distinct preferences for different learning environments (Sharp and Benefield, 2001).

The most consistent predictors of children's academic achievement and social adjustment are parent expectations of the child's academic attainment and satisfaction with their child's education at school. Parents of high-achieving students set higher standards for their children's educational activities than parents of low-achieving students. (Burns, et al, 1992) Therefore, it is important for the teachers to suitably evaluate the child's family environment and engage in communication with the responsible family members to provide better education. The preschool years are important for the development of many skills used later in life, but some of the most valuable lifelong skills children acquire during this time are skills like language, verbal, writing, numeracy, social, and science (Ikie, Amosun and Olalowo, 2022; Wilcox, et.al..,2001).

Numeracy skill is very important because of its known importance in the further learning of various topics. Numeracy in preschool children has to do with the understanding and ability to reason with number. Though there are clearly limits to preschool children's capacity to reason numerically at certain levels, but there are many fundamental numeracy concepts that are fully within their grasp (Lave, 1988; Rogoff, 1990). These concepts, when taken together, provide a sound foundation for further conceptual understanding. However, the situation is somewhat unique at the preschool level- for very young children, these prior conception have been primarily acquired in the absence of intentional or formal instruction. Therefore, it is necessary to identify and structure initial activities according to what children have acquired naturally through interaction with their environment, and provide well- planned opportunities for children to build upon their informally acquired knowledge and

abilities, or even to help them from their initial constructions at the earliest ages.

Since number work is designed to promote numeracy skills, it is therefore important that children at the preschool level are properly exposed to the concepts taught in the subject during the early years (Russell, 2012). Relevant number activities are also relevant to the science activities. As children learn to classify, and group and as they think about functions and relationships, they are learning both maths and science. In addition, aside from solving problems in application and in practicality, skills in expressing a number as an object of thought and disassembling a number form the basic knowledge of arithmetic (Hunting, 2003), children will become aware of addition when they mix a group of objects with another group of objects, and they will recognize subtraction when they remove one or several objects from a group of objects (Butterworth, 2005). Educator's can help children to grasp the meaning of operations such as addition and subtraction by presenting them various problems (Ktoridou, Eteokleous and Gregoriou, 2005).

Geometry, spatial thinking, and measurement make up the second area of mathematics that is emphasized for young children. Geometry is grasping space and it is grasping that space in which the child lives, breathes, and moves. The space that the child must learn to know, explore, and conquer in order to live, breath and move better in it (Freudenthal (1973), Gerjard and Melander, 2018). Children's foundational mathematics involves geometry or learning about space and shapes in two and three dimensions (such as learning to recognise shapes in many different orientations, sizes and shapes). A fundamental understanding of shapes begins with experiences in which children are shown varied examples and nonexamples and understand attributes of shapes that are numerically relevant as well as those that are not. As children progress along the teaching-learning path, they need opportunities to discuss and describe shapes into pictures and eventually learn to take apart and put together shapes to create new shapes.

Importantly, children's knowledge of measurement helps them connect number and geometry because measurement involves covering space and quantifying this coverage. Later, children can compare lengths by measuring object with manipulable units, such as centimetre cubes. Number is particularly important to later success in school mathematics, as number and related concept make up the majority of mathematics content covered in later grades. However, it is important to point out that concepts related to number (and operations and relations) can also be explored through geometry and measurement. In addition, geometry and measurement provide rich contexts in which children can deepen their numeracy reasoning ability. However, inspite of the importance of developing of the aforementioned numeracy skills; researchers have shown that many children still enter school without adequate development of these numeracy skills (Seo and Ginsburg, 2004)

The importance of good parent-teacher collaboration has been well documented. According to Henderson and Berla (1994), "the most accurate predictor of a learner's achievement in school is not income or social status but the extent to which that learner's family is able to: (1) Create a home environment that encourages learning; (2) Express high (but not unrealistic) expectations for their children's achievement and future careers; and (3) Become involved in their children's education at school and in the community. Families who receive frequent and positive messages from teachers tend to become more involved in their children's education than parents who do not receive this kind of communication (Christenson and Sheridan, 2001). Both parents and teachers have an important role to play; their roles do not replace but rather complement and reinforce the other's role, thus providing the children with a consistent message about numerical activities. Thinking of parents and teachers as “partners” refers to this mutual effort toward a shared goal.

**Statement of the Problem**

Over the past two decades, a quiet revolution in developmental psychology and related fields has demonstrated that children have skills and concepts relevant to mathematics learning that are present early in life, and that most children enter school with a wealth of knowledge and cognitive skills that can provide a foundation for mathematics learning. At the same time, these foundational skills are not enough; children need rich numeracy interactions, both at home and at school in order to be well prepared for the challenges they will meet in elementary school and beyond. The knowledge and interest that children show about number and shape and other mathematics topics provide an important opportunity for parents and preschool teachers to help them develop their understanding of mathematics. However, literature have shown that too many children not only start behind, but they also begin a negative and difficult to change path in early numeracy skills development with negative long term effects. This is shown in poor performance in elementary mathematics and negative attitude to it in post-primary schools. Parent-teacher

collaboration has been found to be a strategy which may enhance or discourage the development of the early numeracy skills.

The study therefore examined the effect of parent-teacher collaboration on preschool children's development of numeracy skills in selected schools in Ibeju- Lekki Local Government Area, Lagos state.

**Hypotheses**

$H_{01}$: There is no significant main effect of treatment on preschool children's development in (a) number and operational skills, (b) geometry skills and (c) measurement skills.

$H_{02}$: There is no significant main effect of gender in preschool children's development in (a) number and operational skills, (b) geometry skills and (c) measurement skills.

$H_{03}$: There is no significant interaction effect of treatment and gender on preschool children's development in (a) number and operational skills, (b) geometry skills and (c) measurement skills.

**Methodology**

The study adopted the pretest-posttest, control group quasi-experimental research design. The target population for this study consisted of preschool children in Ibeju-Lekki local government area of Lagos State. Purposive sampling technique was used to select two schools. The criteria for the selection were based on the following: The school must have a communication path between parents and teachers. The school must have a preschool section, whereby the preschool children's age fall between 3 and 5years among others. Three research instruments were developed and validated to gather the data namely: (1) Preschool Mathematics Achievement Test (PMAT) with α=0.84; (2) Teacher / Parents Collaboration Instructional Guide (TPCIG) and (3) Conventional Strategy Instructional Guide (CSIG). Data collected were analysed using

**Results**

**Testing the Null Hypotheses (Effect of Treatment on Pupils' Numeracy Skill)**

**$Ho_{1(a)}$:** There is no significant main effect of treatment on preschool children's development in number and operations skills.

**Table 1: Summary of Analysis of Covariance on Number and Operational skills**

Dependent Variable: Post Number and Operation

| Source | Type III Sum of Squares | Df | Mean Square | F | Sig. | Partial Eta Squared |
|---|---|---|---|---|---|---|
| Corrected Model | 1668.816[a] | 4 | 417.204 | 22.335 | .000 | .619 |
| Intercept | 1352.899 | 1 | 1352.899 | 72.427 | .000 | .568 |
| Prenumop | 584.287 | 1 | 584.287 | 31.280 | .000 | .363 |
| Treatment | 316.847 | 1 | 316.847 | 16.962 | .000 | .236 |
| Gender | 1.788 | 1 | 1.788 | .096 | .758 | .002 |
| treatment * gender | 10.202 | 1 | 10.202 | .546 | .463 | .010 |
| Error | 1027.367 | 55 | 18.679 | | | |
| Total | 18605.000 | 60 | | | | |
| Corrected Total | 2696.183 | 59 | | | | |

Table 1 reveals that there is a significant main effect of treatment on number and operational skills ($F_{(1,55)}$ =16.96; P<0.05). Therefore $Ho_{1(a)}$ is rejected. Table 4.4a reveals the magnitude of performance across the groups.

**Table 2: Estimated Marginal Means on Number and Operations**

| Variable | Mean | Std. Error |
|---|---|---|
| INTERCEPT | | |
| Prescore | 12.567 | --- |
| Postscore | 16.439 | .613 |
| TREATMENT | | |
| Control | 13.676 | .841 |
| Experimental | 19.201 | .972 |
| GENDER | | |
| Male | 16.248 | .694 |
| Female | 16.630 | 1.015 |

Table 2 shows that those pupils exposed to Teacher / Parents Collaboration Instructional Guide (TPCIG) performed better in number and operations (mean = 19.20) than those exposed to Conventional Strategy Instructional Guide (CSIG) (mean = 13.68).

**$Ho_{1(b)}$:** There is no significant main effect of treatment on preschool children's development in geometry skills.

**Table 3: Summary of Analysis of Covariance on Geometry skills**
**Dependent Variable: Post Geometry**

| Source | Type III Sum of Squares | Df | Mean Square | F | Sig. | Partial Eta Squared |
|---|---|---|---|---|---|---|
| Corrected Model | 21.543[a] | 4 | 5.386 | 2.767 | .036 | .168 |
| Intercept | 118.145 | 1 | 118.145 | 60.706 | .000 | .525 |
| Pregoe | 12.498 | 1 | 12.498 | 6.422 | .014 | .105 |
| Treatment | 8.259 | 1 | 8.259 | 4.244 | .044 | .072 |
| Gender | .309 | 1 | .309 | .159 | .692 | .003 |
| treatment * gender | .799 | 1 | .799 | .411 | .524 | .007 |
| Error | 107.040 | 55 | 1.946 | | | |
| Total | 699.000 | 60 | | | | |
| Corrected Total | 128.583 | 59 | | | | |

Table 3 reveals that there is a significant main effect of treatment on geometry skills ($F_{(1,55)}$ =4.24; P<0.05). Therefore $Ho_{1(b)}$ is rejected. Table 4.4b reveals the magnitude of performance across the groups.

**Table 4: Estimated Marginal Means on Geometry**

| Variable | Mean | Std. Error |
|---|---|---|
| INTERCEPT | | |
| Prescore | 2.250 | --- |
| Postscore | 3.082 | .198 |
| TREATMENT | | |
| Control | 2.673 | .257 |
| Experimental | 3.492 | .302 |
| GENDER | | |
| Male | 3.161 | .223 |
| Female | 3.003 | .328 |

Table 4 shows that those pupils exposed to Teacher/ Parents Collaboration Instructional Guide (TPCIG) performed better in geometry (mean = 3.49) than those exposed to Conventional Strategy Instructional Guide (CSIG) (mean = 2.67).

**$Ho_{1(c)}$:** There is no significant main effect of treatment on preschool children's development in measurement skills.

**Table 5: Summary of Analysis of Covariance on Measurement skills**
**Dependent Variable: post measurement**

| Source | Type III Sum of Squares | Df | Mean Square | F | Sig. | Partial Eta Squared |
|---|---|---|---|---|---|---|
| Corrected Model | 109.567[a] | 4 | 27.392 | 2.522 | .051 | .155 |
| Intercept | 246.963 | 1 | 246.963 | 22.741 | .000 | .293 |
| Premeas | 62.720 | 1 | 62.720 | 5.776 | .020 | .095 |
| Treatment | 24.944 | 1 | 24.944 | 2.297 | .135 | .040 |
| Gender | 15.495 | 1 | 15.495 | 1.427 | .237 | .025 |
| treatment * gender | .001 | 1 | .001 | .000 | .994 | .000 |
| Error | 597.283 | 55 | 10.860 | | | |
| Total | 2237.000 | 60 | | | | |
| Corrected Total | 706.850 | 59 | | | | |

Table 5 reveals that there is no significant main effect of treatment on measurement skills ($F_{(1,55)}$ =2.30; P>0.05). Hence, the hypothesis 1c is not rejected. Table 4.4c reveals the magnitude of performance across the groups.

**Table 6: Estimated Marginal Mean on Measurement**

| Variable | Mean | Std. Error |
|---|---|---|
| INTERCEPT | | |
| Prescore | 4.017 | --- |
| Postscore | 4.862 | .468 |
| TREATMENT | | |
| Control | 4.153 | .608 |
| Experimental | 5.571 | .711 |
| GENDER | | |
| Male | 5.424 | .528 |
| Female | 4.301 | .775 |

Table 6 shows that those pupils exposed to Teacher/ Parents Collaboration Instructional Guide (TPCIG) performed better in measurement (mean = 5.57) than those exposed to Conventional Strategy Instructional Guide (CSIG) (mean = 4.15).

**$Ho_{2(a)}$:** There is no significant main effect of gender on preschool children's development of number and operational skills.

Table 1 reveals that there is no significant main effect of gender on preschool children's development in number and operational skills ($F_{(1,55)}$ =.096; P>0.05).

**$Ho_{2(b)}$:** There is no significant main effect of gender on preschool children's development of geometry skills.

Table 2 reveals that there is no significant main effect of gender on preschool children's development in number and operational skills ($F_{(1,55)}$ =.159; P>0.05).

**$Ho_{2(c)}$:** There is no significant main effect of gender on preschool children's development of measurement skills.

Table 3 reveals that there is no significant main effect of gender on preschool children's development in measurement skills ($F_{(1,55)}$ =1.427; P>0.05).

**$Ho_{3(a)}$:** There is no significant interaction effect of treatment and gender on preschool children's development in number and operational skills.

Table 3 reveals that there is no significant interaction effect of treatment and gender on preschool children's development in number and operational skills ($F_{(1,55)}$ =.546; P>0.05).

**$Ho_{3(b}$:** There is no significant interaction effect of treatment and gender on preschool children's development in geometry skills.

Table 3 reveals that there is no significant interaction effect of treatment and gender on preschool children's development in geometry skills ($F_{(1,55)}$ =.411; P>0.05).

**$Ho_{3(c}$:** There is no significant interaction effect of treatment and gender on preschool children's development in measurement skills.

Table 3 reveals that there is no significant interaction effect of treatment and gender on preschool children's

**Discussion of Findings**

**Effects of Treatment on Preschool Children's Development of Numeracy Skills**

The main focus of this study was to investigate the effects of parent-teacher collaboration on preschool children development of numeracy skills. Based on the hypothesis one that says there is no significant main effect of treatment on preschool children development in (a) number and operational skills, (b) geometry skills and (c) measurement skills.

Findings revealed that there is significant main effect of treatment (that's parent-teacher collaboration) on preschool children's performance in number and operations and geometry skills. Those that were exposed to parent-teacher collaboration had higher scores in number and operations and geometry activities than those exposed to the conventional strategy.

This might be as a result of the fact that those children in the experimental group (with parent-teacher collaboration) were able to learn these skills from both the caregivers (teachers) in school and their parents at home. They were exposed to these skills in the school and home-works that actively involved the parents (Parental Activity Guide (PAG)) were given on how to actively involve in each of the teaching and learning

process of the pupils. This set of children performed better than the control group (without parent-teacher collaboration) whereby homework was not sent home. This corroborates a recent finding of Ginsburg Block, Manz and McWayne (2010) that identified specific parental involvement activities, like increasing positive communication between the home and school, providing home-based support for learning, and providing home-based celebrations for accomplishments, as essential to supporting positive mathematics outcomes in children.

Again, this finding supports the finding of Sanders and Sheldon, (2009); and Yan and Lin, (2005) that parental involvement directly affects their children's math achievement. Again, this finding supports the finding of Shirvani (2007) that parental involvement contributes significantly to achievement of both primary and secondary school students in math.

Findings also revealed that there is no significant main effect of treatment (parent-teacher collaboration) on preschool children's development in measurement skills. This finding negates the findings of Griffin, Case, and Siegler (1994) which reported that parent's active participation in small group numeracy activities led to improvement in their children's numeracy skills. This might be as a result of the fact that the skills in measurement in numeracy is better acquired through practical experiences. It seems the parents might have not exposed the children to this skill in practical way at home. For the collaboration strategy to work better on measurement, it seems more effort is required from the teachers.

**Effect of Gender on Preschool Children's Development in (a) Number and Operational skills, (b) Geometry skills and (c) Measurement skills**

Hypothesis two compared the relative performance of boys and girls in both experimental and control groups (with parent-teacher collaboration and without parent-teacher collaboration). The findings have revealed that there was no significant main effect of gender on the preschool children's development in number and operations; geometry; and measurement skills. This implies that Gender have nothing or little to do with Preschool Children's development of numeracy skills when collaboration strategy is used. This finding might be as a result of the fact that both boys and girls were able to acquire the numeracy skills from several activities at home and in the school at the same rate and in a less abstractive way. This buttress the findings of Inomesia, (1999) that there was no significant sex difference in the students' performance in science subjects when effective instructional strategy is used.

**Interaction Effect of Treatment and Gender on Preschool Children's Development in (a) Number and Operational skills, (b) Geometry skills and (c) Measurement skills**

The focus of hypothesis three was on whether or not the treatment and gender interacted in such a way that affected preschool children's development of numeracy skills. The findings have revealed that there is no significant interaction effect of treatment and gender on numeracy skills.

This means that gender of the children has little or no effect on numeracy skills. What really determines development of numeracy skills on children is parent-teacher collaboration. This research finding is in agreement with Friedel, Cortino, Turner, and Midgley (2010) which reports that parental involvement in its many and varied ways is a vital parameter for increasing children's mathematics achievement. This implies that irrespective of Gender difference in children, the Experimental treatment is more effective than the control.

**Conclusion**

The study reveals that parent-teacher collaboration activities positively affect children's development of numeracy skills. The use of this teaching strategy has been observed to enable the children interact effectively with their learning environment and therefore constructing their own knowledge.

It is paramount to mention that teachers also need to be very close to parents and clearly define their roles as early as their children join school. When parents are involved, children achieve more and everyone benefits in the sense that the school is recognized, parents have faith in the teachers and children are willing to stay. Parental involvement is a crucial force in children's development, learning, and success at school and in life. Parental involvement in their children's academic achievement yields positive academic outcomes ranging from early childhood throughout adolescence and beyond.

**Recommendations**

In teaching mathematics, the parent-teacher collaboration approach should be adopted. It also encourages acceptable classroom behaviour and ensures that the child completes schoolwork.

Parents should provide resources, monitor their wards, and volunteer in school events; develop good relationship with teachers and head teachers.

There should be programmed teacher parent conferences where such forums would have teachers reporting in areas that need to be addressed and parents giving feedback and areas that would require improvement both at individual and school level.

The government in conjunction with the Ministry of Education should encourage parental involvement programmes in which the school administration of the public primary schools could join forces in sourcing for motivational speakers.

School staff (head teacher, assistant head teachers and teachers) should organize open day as effective mechanisms for commitment, raise consciousness and build school-family skills, recognize contributions and make an attempt to learn about parents' strengths, skills, talents, and experiences.

Curriculum planners should change the organisational processes and culture, and help to increase parent knowledge and involvement of curriculum, provide regular feedback to parents on curriculum issues, pupils' progress and resource needs and foster school-community relationship.

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