

**INFLUENCE OF CLASS GROUPING ON CHILDREN'S PERFORMANCE IN
MATHEMATICS IN PRE-SCHOOLS, IN CHANGAMWE DIVISION,
MOMBASA COUNTY, KENYA.**

BY

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**A RESEARCH PROJECT SUBMITTED IN PARTIAL FULFILLMENT OF
THE REQUIREMENTS FOR THE AWARD OF THE MASTERS DEGREE IN
EARLY CHILDHOOD EDUCATION.**

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DECLARATION

I declare that this is my original work and has not been submitted for a degree or in any other university.

Josephine Logedi Chahilu

Sign.....

This project has been submitted with my approval as university of Nairobi supervisor.



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DEDICATION

This work is dedicated to my husband Mr. Fredrick Chahilu and my two sons Sammy and Benson.

ACKNOWLEDGEMENTS

I would like to acknowledge the contributions that many people have made to assist me get this far. Firstly, I would like to appreciate the tireless efforts of my supervisor Dr. Boniface Ngaruiya who has been both encouraging and patient as he guided me through this study.

I would like to acknowledge the contributions of my family for their understanding and untiring love. Most especially, my husband Fredrick, my sons Sammy and Benson and my sister Grace who have cheered me on in this academic race.

There are many others who have made a contribution in one way or the other. I would like them to know that, despite being named, I wholeheartedly appreciate their contribution to my success in this study.

ABSTRACT

The purpose of this study was to determine how class groupings can contribute to improvement of children's performance in mathematics in public pre-schools in Changamwe division Mombasa county district. The study examined group work as both a teaching and learning activity that is used in preschools. The study considered issues pertaining to the use of group work in educational institutions and the impact group work has on learners. The study endeavored to identify the types of groups that were commonly constituted in preschool classrooms and how these groups influenced the learning of mathematics. In the literature review, the study examined related studies on the issue of types grouping, characteristics of grouping, influence of groups on performance and theories related to group learning. The study adopted the social interdependence theory. The study used questionnaires and observation as the principal data collection instruments. These were administered on a sample of four preschools that were purposively selected. The schools had a total population of 130 preschool children who constitute the observed population of the study. The study found that teachers in the study area typically group learners by ability. A survey of student performance revealed that the use of grouping had impacted positively on the learners and performance was admirable based on the assessment done after each observed lesson. Observations were done in class as per appendix III. Data collected were grouped according to the research questions. Data was analyzed using frequencies, percentages and presented in tables. Findings from the study established that the class grouping contributed to high increase in performance and achievement in mathematics. The following were the recommendations were made-1. Pre-schools to have adequate spacious facilities. 2. The government to use all its mechanism and especially in-service opportunities, workshops, inductions, and seminars to sensitize teachers and parents on the benefits of grouping. This will produce independent and self-actualized individuals who are capable of solving their life problems.

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LIST OF ABBREVIATIONS AND ACRONYMS

DEO - Divisional Educational Officer

ECE – Early Childhood Education

ECD – Early Childhood Development

FIAC- Flanders Interaction Analysis Category

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CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

Group work can be an effective method to motivate students, encourage active learning, and develop key critical-thinking, communication, and decision-making skills (Beckman, 1990). Group work in classrooms has become more and more common over the last several years. Many teachers use it to help students learn from each other, build community, and teach cooperation. Like anything in education, grouping works best when it is planned and used thoughtfully. Simply seating students in groups of four or five does not mean students are engaged with each other. It could simply mean they are going to play and talk to each other, rather than complete class work (Chickering and Gamson, 1991). That is why it is important to plan group work and the types of groups you will be using.

There has been a vigorous debate about class grouping and class size in schools. On one side of the debates are the enthusiasts who feel very strongly that smaller class groups and small class size reduction is in doubt and that they are likely to be the most cost effective strategies for improving educational standards (Holfields, 1987). Studies conducted through visits to schools in Nigeria and S. Africa were clear that the overwhelming professional judgments of teachers were that smaller grouping in classes allow more effective and flexible teaching and potential for more effective learning through cooperative groups (Okebukola, 1985). Grouping children homogeneously, by ability level, is a common practices in public middle classes. This practice persists, despite the research evidence that it actively hinders children's learning. The low-achievers are denied the opportunity to learn (Emily, 2003).

Collaborative group work, both large and small, is considered valuable and necessary to advance cognitive development. Children are encouraged to dialogue, critique, compare, negotiate, hypothesize, and problem solve through group work. Working as co-teachers, the role of the teacher is first and foremost to be that of a learner alongside the children. The teacher is a teacher-researcher, a resource and guide as she/he lends expertise to children (Emily, 2003). Within such a teacher-researcher role, educators carefully listen, observe, and document children's work and the growth of community in their classroom and are to provoke, co-construct, and stimulate thinking, and children's collaboration with peers.

Grouping students should allow, and even force, students to work together. It should build their communication skills and it should help them learn how to respectfully hold each other accountable. There is a wide gap between the potential of group work and its limited use in schools (Beckman, 1990). Groups in classrooms are often formed without a strategic view of their purpose, and teachers and pupils have concerns about group work. Students learn best when they are actively involved in the process. Regardless of the subject matter, students working in small groups tend to learn more of what is taught and retain it longer than when the same content is presented in other instructional formats. Students who work in collaborative groups also appear more satisfied with their classes.

To ensure a blend of personality types, abilities, genders and ethnicities, children are grouped randomly, this is because, the children are not grouped using pre-planned criteria. Rather, they are organized by birthdays, numbers, favorite animal's names or free to collaborate with out pre-conceived expectations of their performance (Davis, 1993). Student selected groupings place responsibility of creating cooperative teams entirely on children. This works best in smaller classes with members who know each other perfectly well. Student-select groupings form

effective study teams which function to support learning and review with classmates who have missed material due to absence (Daniel, 2007). Flexible grouping practices calls for diverse groups of learners when combined with high expectation and quality in mathematics instruction have great potential for ensuring equality and excellence for all learners. This enables teachers to meet a wide range of and concerns of diverse. The achievement of the children is in increased (Slavin, 1989).

To formulate both academic and social skills objectives is a requirement of formal cooperation groupings where role interdependence is established. There is creation of environment of independence, working together to achieve joint learning goal. The goal can only be achieved when given the tasks that lead children to sink or swim together (Johnson & Johnson, 2008). Teachers are committed to reflection about their own teaching and learning. Small group instruction lets me give guidance to those who are struggling. It allows me to identify where and how their mistakes are occurring. It provides me with opportunities to reassure students that they will get this and that they are growing in their skills. It enables me to correct misperceptions in a non-threatening and non-embarrassing way. It frees the kids up to ask more questions and ask for help as they need it. Any activity that gives people a chance to move around has many benefits: it provides an opportunity for laughter and socializing, which helps make the group safe for people to take risks in their learning; it reduces boredom; it gives a chance for students to help each other unobtrusively; it gives a chance to talk about math, and it is useful for many students, including some trauma survivors, to be able to show the "right" answer without having to speak or assert their opinion, where they can move in a group and so be more hidden. Particularly for students who are kinesthetic learners, movement promotes learning and retention (Johnson & Johnson, 2009).

Structuring inter grouping cooperation by having groups checks with and helps each other groups and giving rewards, praises and extend the benefits of cooperation to whole class (Kagan, 1989) Teacher has to explain the criteria for success by evaluating by using criterion-referenced rather than a norm-referenced. Specify expected behaviors when the children are working in their respective groups. Everyone to contribute, participate, have turns, share ask group members questions and use of quite voices (Johnson, 1994).

Monitoring and intervening the children working in the groups. The arrangement in their seating should be that one that allows face-face. The beneficial educational outcomes of cooperative learning groups are due the interaction patterns and verbal exchanges that take place among children. Teacher makes sure there are oral summarizing, giving and receiving explanations and elaborating what is going on. Evaluation and the process evaluating children's learning by assessing how well children complete task and give them feedback on how well they did it (Johnson & Johnson, 2009). Process group function in order to improve, children need time and procedures for analyzing how well their groups are functioning and how well they use collaborating skills. Processing can be done by individual small groups or whole class. They can mention things done better, then summaries as a whole class. To close the achievement gaps and achieve the equity, there is need to focus on the effective domain and help children become resilient by providing, caring and supportive relationships, positive and high expectations and opportunities meaningful participation. Like many recent studies (Frank&Kazemi,2001.Papic Mulligan and Mitchelmore,2011) have examined many aspects of early mathematics, ranging from the way young children learn and acquire math skills and knowledge to the methods in which early education teachers employ to teach math in the classroom. Likewise, therole of parents has been considered (sarama&Clements,2009), as well as the effectiveness of various

early mathematics programs and curricula (Mason, Stephens, & Watson, 2009). These recent research on early mathematics demonstrates that this topic has become a priority, and researchers are continuing to discover ways to promote positive early math outcomes for young children. In Kenya, the overall performance in mathematics at early primary level still remains wanting and the levels of literacy are also low (Uwezo, 2011). Academic performance of pupils in Mombasa county has been unable to match with other areas such as central, Nairobi, Nyanza among others. If we examine the K.C.P.E results (2010) in changamwe division, it can be noted that the pre-schools who insists on using class grouping at pre-schools post better results in math than those schools that do not. This may be motivated by the teaching approaches adopted by teachers in math, particularly in pre-schools and primary level. The strategy used in teaching mathematics has significant impact on enhancing or reducing the desire to perform. This study therefore seek to find out the influence of class grouping on children's the performance in mathematics in pre-schools in public primary schools in changamwe division, Mombasa county.

Table 1:1 Public schools Changamwe Division KCPE results mean scores (2010)

NO.	NAME OF SCHOOL	MATHS
1.	Amani	60.06
2.	Mikadini	53.00
3.	St. Mary's Bangladesh	51.84
4.	Gome	50.08
5.	Umoja	44.46
6.	Mikindani	42.06
7.	KwaHola	42.55
8.	KwaShee	47.39
9.	Magongo	41.71
10.	KwaJomvu	43.76
11.	Mainland	38.81
12.	Mwijabu	40.57
13.	Kipevu	36.83
14.	Changamwe	37.67
15.	Chaani	36.63
16.	St. Lwanga	36.76
17.	Bomu	36.87
18.	Miritini World Bank	35.75
19.	Miritini	32.57
20.	Port Reitz	29.00
	Subject Mean Scores	41.92

Source: D/TAC Changamwe (2010)

1.2 Statement of the Problem

Focusing on mathematics in early education can lead to more positive outcomes in higher education and beyond. There is a rising concern on the influence of various teaching and learning approaches of math on academic performance among children in pre-schools in Kenya. This arises from the fact that the overall performance in mathematics at early primary school still remains wanting and the levels of literacy are very low (Uwezo, 2011). The impact of this performance is usually felt in primary school when children have problems solving mathematical problems. Changamwe division has been registering a consistent deterioration in the performance of math in pre-schools. This is evident from the order of merit analysis of the Division as obtained in the Divisional Education office. This has caused worry and anxiety among parents who have been seeing children as windows of their future hope. There is a need to lay a strong foundation for future educational stability which leads to more school readiness, higher results probably on time of enrollment in primary grading, reduce low rate of grade repetition, dropout and increase performance throughout the children's life.

The teacher's choice of method is crucial in imparting mathematical concepts. Learner participation ensures that children in preschool are involved in their own learning. In order to improve the lowering standards of performance in mathematics, there is need to review not only the content, but the pedagogical approaches used at the foundation – preschool. Therefore, this study seeks to find out how the use of class grouping to teach mathematics can improve children's performance in mathematics in pre-schools in Changamwe division, Mombasa County, Kenya.

1.3 Purpose of the Study

The purpose of this study was to determine how class groupings can contribute to improvement of children's performance in mathematics in public pre-schools in Changamwe division of Mombasa County.

1.4 Study Objectives

The study sought to achieve the following objectives:

- i) To describe the types of grouping used in preschool math lessons in Changamwe division of Mombasa County.
- ii) To identify the mathematics topics in which grouping is used in preschool math lessons in Changamwe division of Mombasa County.
- iii) To examine the extent to which teacher's direction in class groupings influences children's performance in mathematics in preschool math lessons in Changamwe division of Mombasa County.
- iv) To find out how cooperation in class grouping influences the children's performance in mathematics in preschool math lessons in Changamwe division of Mombasa County.

1.5 Research Questions

The study sought to answer the following questions:-

- i) What types of class groupings are commonly used by teachers of preschool mathematics in preschool math lessons in Changamwe division of Mombasa County?
- ii) What topic areas of preschool mathematics do preschool teachers use with group work in preschool math lessons in Changamwe division of Mombasa County?

iii) What effect does teacher-direction have on children's performance mathematics in preschool math lessons in Changamwe division of Mombasa County?

iv) To what extent does the cooperation in groups enhance the performance of preschoolers in preschool math lessons in Changamwe division of Mombasa County?

1.6 Significance of the Study

This study strives to identify the strengths and weaknesses of grouping as is used in preschools in Changamwe division. It is hoped that the findings of this study will inform preschool teacher trainers on the areas that need reinforcement in so far as the teaching of preschool math using class groupings is concerned. Furthermore, this study will further provoke preschool teachers in pre-schools to adopt critical pedagogies in their approach in teaching mathematics and curriculum developers to come up with appropriate methods that can be used in teaching preschool mathematics.

1.7 Limitations of the Study

This study was limited in both scope and methodology. The study focused on preschool math lessons in public preschools in Changamwe division of Mombasa County. Hence the scope was limited to a specific educational zone and to a specific subject area. With regard to methodology, the study was limited to the use of observation as its principal data collection methodology. The study did not engage in other methods such as focus group discussions which could yield some amount of insights into the teachers own experiences with the learners. This is due to the difficulty in bringing together teachers of different schools because of their differences in teaching and living circumstances.

1.8 Delimitation of the Study

The scope of the study includes the pre-school teachers and pre-school children in public institutions in Changamwe division, Mombasa County, Kenya. Teachers and pupils in the sample were only in respective institution by the time of the study. Although class grouping is used in public primary, secondary, teachers training, this study only confined itself to public pre-schools in Changamwe division, Mombasa County. Private pre-schools were not included in the study. Finally, there are several learning strategies that may significantly contribute towards improvement of children's performance in mathematics, but this study confined itself to class grouping for improving children's performance in mathematics in Changamwe division, Mombasa County, Kenya.

1.9 Basic Assumptions

This study was carried out with the following basic assumptions:

1. That preschool learner assessment mechanisms are standardized procedures.
2. That class grouping is practiced in every school in the study sample.
3. The study makes the assumption that all preschools are not affected by factors such as social economic behaviors, health status and the nature of preschool administration.

1.10 Definition of Terms

Pre-school – this refers to a school set up serving age 2-6 years old before joining primary school.

Performance—This refers to how well or badly you do something

Class grouping– refers to a learning strategy involving children’s participation in small groups learning activities that promote positive interactions.

1.11 Organization of the Study

The study is organized in chapters, chapter one consists of the background of the problem which address the influence of class groupings on children’s performance in mathematics in pre-schools. it also contains statement of the problem, research objectives, research questions, limitation and delimitation, basic assumptions, significance of the study and finally the definition of the terms. The chapter two covers literature review. The researcher reviewed literature on class grouping, the type of groups used in class grouping, cooperation in class grouping and teachers direction in class grouping. Chapter three consists of methodology, research design which the researcher will use in the study, population, sample and sampling techniques, instruments used to collect data. Data analysis is covered in chapter four, where the findings from the study are presented. Chapter five addresses summary, conclusion and finally recommendation

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CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This literature review is an extended examination of views and opinions regarding aspects on the teaching of mathematics in preschool. Literature review surveys scholarly articles, books and other sources relevant to a particular issue, area of research, or theory, providing a description, summary, and critical evaluation of each work (Cooper, 2010). The purpose is to offer an overview of significant literature published on a topic. This review makes a critical examination of concept of class grouping, type of groups in class grouping, cooperation in class grouping and teachers directions in class grouping as well as theories related to learning. Both primary, secondary sources and Journals were used to review the literature.

2.1 Studies on Class Grouping

Current research on early mathematical development adopts the view that young children are capable of abstraction and generalization of mathematical ideas (Sarama & Clements, 2009). An intuitive awareness of patterning concepts and structural relationships has been found more critical to fundamental mathematics learning than previously considered. If current trends in maternal employment continue, increasing numbers of young children will spend larger proportions of their preschool years in care outside of their homes (Katz, 1988). Young children who are cared for at home are unlikely to spend large amounts of time in groups of children of the same age. Natural family units are typically heterogeneous in age. The family group

provides all members with the opportunity to observe emulate and initiate a wide range of competencies. Grouping helps all learners to have an advantage of learning at their own pace and even from the fast learners in the group. (Slavin1987).

2.2 Types of Class Groups

Given that spontaneously formed peer groups are typically heterogeneous in composition, the separation of children into same-age groups in early childhood education settings is common practice (Clements & Sarama, 2009; Perry & Dockett, 2008). This grouping practice is based on the assumption that chronological age is the single most reliable developmental index. This assumption has led to the extensive screening and testing related to kindergarten entrance. But developmental indexes other than chronological age-indexes such as social, emotional, and cognitive level of maturity are used.

Mixed-Age Groups in Early Childhood Education

According to Katz (1988) the practice of educating children in mixed-age groups in early childhood education, including the primary grades, has a long history. Mixed-age grouping has also been known as "heterogeneous, multi-age, vertical, upgraded" or "nongraded," and "family grouping." Cross-age tutoring is another method of altering traditional ways of grouping children in their early years (Carraher & Schliemann, 2007).

In mixed-age classes, it may be easier for kindergarten and preschool teachers to resist the "push-down" tendency--the trend to introduce the primary school curriculum into kindergarten and preschool classes (Gallagher & Coche, 1987). Because mixed-age grouping invites cooperation and other prosocial behaviors, the discipline problems of competitive environments can often be minimized. A mixture of ages within a class can be particularly desirable for

children functioning below age group norms in some areas of their development. These children may find it less stressful to interact with younger peers than with same-age peers. Such interactions can enhance younger children's motivation and self-confidence.

Mixed-age interaction among young children can offer a variety of developmental benefits to all participants (Kaput, 2008). However, this is not to suggest that merely mixing children of different ages in a group will guarantee that the benefits mentioned earlier will be realized. Swoboda & Tatsis, (2009) suggest that, before grouping, one must consider the optimum age range, the proportion of older to younger children, the allocation of time to the mixed-age group and the curriculum and teaching strategies that will maximize the educational benefits for the group. The empirical data on the educational principles that should guide instruction in mixed-age environments are not yet available. When the data become available, they should support the position that mixed-age group interaction can have unique adaptive, facilitating and enriching effects on children's development.

Ability Groups

This within class ability grouping when it is closely related to the purpose of instruction and is applied flexibly, Grouping and regrouping based on the needs and interests of children that will benefits the children's diversity ability (Slavin,1987). The gifted children in working in within class grouping increases their self-esteem and greater self-confidence when children work in these grouping (Emily, 2003).

Ability or between class grouping is the practice of dividing children in homogeneous groups for instruction on the basis of their perceived capacities for the learning. It is the practice of placing children of similar academic level within the same group for instructions (Slavin,

1990).Kulik and kulik meta-analyses and Slavin's best-evidence syntheses addressing a number of important issues on ability grouping for academic instruction. Issues of the role of gifted children as role models for others children to imitate, children's behavior, and teacher's expectation are crucial. This type of grouping unmotivated children, because of peer pressure, personality and teachers expectation of poor performance .The low achiever will be deprived of opportunities to learn(Emily,2003).These groups are easy to manage, the children's interest is boosted and sustained. The teacher better tailors the pace and content of instruction and children's needs. They provide more repetitive and reinforcement to the low- achievers and advanced or enhanced level of instruction to high achievers. Low-ability and average achievers benefit academic from the ability grouping in mathematics and science. The children work at the pace and depth that matches the ability of children in each class, but form of racial segregation. The children are denied opportunity to receiving attention from the teacher from the general assumption of the teachers that all is well with all members of the class. The children also feel comfortable and participate more when they are grouped with peers of similar ability. They help teacher to adjust material and method of instruction to suit the need and level of children. Luxuring of time, space, materials involved in individual instruction is reduced through this type of grouping (Emily, 2003).

Flexible grouping practices calls for groups of children, when combined with high expectation and high quality mathematic instruction, have great potential for ensuring equity and excellence for all children. This enables teachers to meet a wide range of individual needs. Consequently they also may enable educators to be more responsible to concerns of diverse parents and community. This brings educational community for excellent schools using flexible groups and instructional opportunity both inside and outside of the classroom that improve performance for

all children including most able (Slavin, 1988). Hence, there is need to evaluate class groupings in improving performance in mathematics in pre-schools in changamwe division, Mombasa county, Kenya.

Formal groups range in length from one class period to several weeks. Teachers can use any assignment or requirement for formal cooperative learning. Specific objective is to achieve shared learning goals, complete jointly tasks and assignments (Johnson and Holubec, 1993). The role of interdependence is established through material distribution and creation of resource interdependence. Informal groups, on the other hand, involve learners working together to achieve joint learning goals in temporary ad-hoc groups that last for a few minutes to one class period (Johnson&Holubec,2008). Informal groups are used to break demonstration or lecture to sub units for clarification. Informal grouping is used to focus attention on the material to be learnt and set a mood conducive to learning, help set expectation as to what will be covered in a class session, ensure that children cognitively process and rehearse the material being taught (Papic, Mulligan, and Mitchelmore, 2011).

Cooperative-Based Grouping

Johnson & Holubec, (2008) describe the cooperative-based grouping as long-term groups that last for at least a year .They are heterogeneous groups with stable membership whose primary purpose is for members to give each other the support, help, encouragement and assistance each needs to progress academically. Base groups provide children with long term, committed relationships (Johnson, Johnson and Holubec, 1998:18).Children hold each other accountable for striving to learn, (individual accountability). The children provide each other with support, encouragement, assistance, in completing assignment (interactions) for effective function.

Teachers teach the needed social skills and have groups process and how effectively they are functioning (membership in terms of achievement motivation and task orientation), children get to know each other and helping each other to solve non-academic problems routine tasks, checking each other's understanding of the answers to test questions when the test is first taken individually then taken on base group.

The longer a cooperative group exists, the more caring their relationships will tend to be the greater the social support (Papic, Mulligan, and Mitchelmore, 2011). The more committed they will be to each other's success, the more influence members will have over each other. Caring and committed relationships can be created that provide the social support needed to improve attendance, personalize the educational experiences, increase achievement and improve the quality of school life (Johnson&Johnson,2009) For positive interdependence, the teacher gives a clear task and a group goal that children can perform together. The children perceive that they linked with each other in the manner that no one cannot succeed unless everyone succeeds (one fail, all fails). Individual efforts of each of the member, individual accountability exists when the performance of each individual is assessed and results given back to group and the individual in order to ascertain who needs more assistance, support and encouragement in completing the assignment (Kagan, 1992).

Face to face interaction. Face to face interaction is another aspect of cooperative learning in class grouping in that it enhances cognitive activities and interpersonal dynamics that occur only when the children promotes each other's learning. This includes oral explanation of how to solve problems, discussing the nature of the concept being learnt, and connecting present learning with past knowledge. It is through face to face interaction that members become personally committed to each other as well as to their mutual goals (Kagan 1989). The learners

are able to share resources, help, and support, encourage and praise each other's effort to learn. This supports the academic system; personal teaching one's knowledge to classmate to the level of language they can understand better (Slavin, 1983). It is through these interactions that children develop their self-confidence, self-esteem and lastly their actualization.

Promotive interactions are practiced through sharing resources, helping, supporting, encouragement, praise, and each other's effort to learn. Group members must know how to provide effective leadership, decision making, trust building and conflict management skills and be motivated to use the pre-requisite skills (Johnson Johnson, 2009). Groups have to discuss how well they are achieving in their goals and maintain effective working relationships. The children have to say the behaviors they didn't like and the parts that they enjoyed most. This study will strive to identify the types of groupings used by teachers to teach mathematics in preschools in Changamwe Division of Mombasa County.

2.3 Topics in Preschool Mathematics

Current research on early mathematical development adopts the view that young children are capable of abstraction and generalization of mathematical ideas. An intuitive awareness of patterning concepts and structural relationships has been found more critical to fundamental mathematics learning than previously considered. Pre-algebraic thinking develops through a structural awareness of patterns (Carraher, Schliemann, Brizuela, & Earnest, 2006; Mason, Stephens, & Watson, 2009; Sarama & Clements, 2009). Increasingly, studies of conceptual growth have shifted attention from number and arithmetic processes to focus on early algebraic thinking and mathematical reasoning (Carraher & Schliemann, 2007; Clements & Sarama, 2007a; Davis, 1985; English, 2004; Kaput, 2008).

A recent surge of research interest in algebra in elementary school (Blanton & Kaput, 2002, 2003; Carraher & Schliemann, 2007; Kaput, 2008; Warren & Cooper, 2008), and preschool (Papic, Mulligan, & Mitchelmore, 2009; Perry & Dockett, 2008; Swoboda & Tatsis, 2009; Tzekaki & Ikononou, 2009; Waters, 2004) is beginning to provide the necessary research base.

New mathematics programs (for children aged 4 to 8 years) and aligned professional development initiatives now extend beyond basic numeracy to emphasize aspects of patterning and structural relationships, including equivalence, growing patterns, and functional thinking (Mulligan & Mitchelmore, 2009; Warren & Cooper, 2005, 2008). Spatial structuring is considered necessary for visualizing and organizing these mathematical structures (Battista, 1999). Recognizing the structure of a pattern—initially, a simple repetition—is central to the notion of unit of repeat and the development of composite units (Steffe, 1994). Thus, patterning, even at a primitive level of skip counting, can play an important role in the development of multiplicative reasoning (Mulligan & Mitchelmore, 1997; Nunes, Bryant, Burman, Bell, Evans, & Hallett, 2009).

The early patterning experiences of young children often involve simple repetition using one variable (e.g., blue, red, blue, red) (Papic, 2007). This may account for difficulties that older students face in recognizing and generalizing patterns and relationships. Often, the teaching of patterning skills focuses on additive thinking, rather than on multiplicative thinking, which is necessary for developing composite units in complex repetitions, and on constructing growing patterns and functional relationships (Mulligan & Mitchelmore, 1997). This article describes the first phase of a design study: the development of an assessment instrument to evaluate the influence of an early intervention program on preschoolers' mathematical patterning.

2.4 Teacher Direction in Class Grouping

Teachers who employ cooperative learning methods promote learning because these collaborative experiences engage students in an interactive approach to processing information, resulting in greater retention of subject matter, improved attitudes toward learning, and enhanced interpersonal relations among group members (Papic, 2007). Slavin (1984) indicates that teacher input is crucial in effecting order in the function of groups in class. Initially, the teacher carefully designs meaningful tasks that require active participation of each student in the group toward a common end. At the beginning of a cooperative lesson, the teacher's role, often in cooperation with the class, is that of "task setter." As groups work on tasks, the teacher acts as a facilitator/coach moving from group to group to monitor the learning process. The teacher also provides students with on-going feedback and assessment of the group's progress.

Johnson & Johnson, (2009), propose a variety of formal cooperative learning models which have been developed for use during cooperative learning. These include such as activities as *Jig-Saw*, *Co-Op*, *Learning Together*, and *Group Investigation*. In addition, a number of specific cooperative learning designs, such as think-pair-share, peer response groups for writing, paired problem solving for mathematics, reciprocal teaching in reading, group experiments in science, and discussion circles in social studies have been successfully applied in the classroom. The selection of a particular model or design is influenced by the desired outcomes for instruction, the subject area, and the social skills of the students.

2.5 Cooperative Learning and Learner Achievement

Cooperative learning produces greater student achievement than traditional learning methodologies (Slavin 1984). Slavin found that 63% of the cooperative learning groups

analyzed had an increase in achievement. Students who work individually must compete against their peers to gain praise or other forms of rewards and reinforcements. In this type of competition many individuals attempt to accomplish a goal with only a few winners. The success of these individuals can mean failures for others. There are more winners in a cooperative team because all members reap from the success of an achievement. Low achieving students tend to work harder when grouped with higher achieving students. There is competition among groups in cooperative learning. Some forms of group competition promote cohesiveness among group members and group spirit.

According to Johnson & Johnson, (2009), cooperative learning provides the learner an opportunity to work with their peers to accomplish a shared or common goal. The goal is reached through interdependence among all group members rather than working alone. Each member is responsible for the outcome of the shared goal. In order to have effective cooperative learning the following 5 essential elements are needed. Each group member depends on each other to accomplish a shared goal or task. Without the help of one member the group is not able to reach the desired goal.

Moreover, cooperative learning promotes success of group members by praising, encouraging, supporting, or assisting each other (Mulligan & Mitchelmore, 1997). Each group member is held accountable for his or her work. Individual accountability helps to avoid members from "riding" on other group members' accomplishments. Cooperative learning groups set the stage for students to learn social skills. These skills help to build stronger cooperation among group members. Leadership, decision-making, trust-building, and communication are different skills that are developed in cooperative learning. Furthermore, Group processing is an assessment of how groups are functioning to achieve their goals or tasks. By reviewing group behavior the

students and the teacher get a chance to discuss special needs or problems within the group (Mulligan & Mitchelmore, 1997). Groups get a chance to express their feelings about beneficial and unhelpful aspects of the group learning process in order to correct unwanted behavior and celebrate successful outcomes in the group work.

Moreover, Nunes, Bryant, Burman, Bell, Evans, & Hallett, (2009) assert that the role of the teacher is very important in cooperative learning. To have an effective cooperative learning group teacher must know their students well. Grouping of students can be a difficult process and must be decided with care. Teachers must consider the different learning skills, cultural background, personalities, and even gender when arranging cooperative groups. Much time is devoted to prepare the lesson for cooperative learning. However, teachers fade in the background and become a coach, facilitate, or and sometimes a spectator after the lesson is implemented. Teachers who set up a good cooperative lesson teach children to teach themselves and each other. Students learn from their peers and become less dependent on the teacher for help.

Thus the role of the teacher in active learning has been seen as being crucial. The teacher is the facilitator who creates a learning environment that is mathematically empowering. According to Baroody, (2000) learning is more likely to occur if adults or older children mediate young children's learning experiences. The role of the teacher, therefore, is to provide "scaffold assistance" (Berk & Winsler, 1995), which entails a continual modification of the tasks so as to provide the appropriate level of challenge that enables the child to learn. The adult changes the quality of the support over a teaching session, adjusting the assistance to fit the child's level of performance (Berk & Winsler, 1995). Children learn through meaningful, naturalistic, active learning experiences. The adult must build on this knowledge and take the children to higher

levels of understanding. Sequences of mathematical concepts to assess and guide all the students' learning of these mathematical concepts include: (1) matching and one-to-one correspondence, (2) sets and classification, and (3) order and seriation. Children's development of these concepts progresses through several stages.

2.6 Theoretical Framework

For the purposes of this study, we shall adopt the Social interdependence theory as propounded by Johnson and Johnson (1989). The social Interdependence theory is a generic human phenomenon that affects many different outcomes simultaneously. Variables of human endeavor that have been the focus of these theory include: individual achievement and retention, group and organizational productivity, higher-level reasoning, moral reasoning, achievement motivation, intrinsic motivation, transfer of training and learning, interpersonal attraction, social support, interpersonal affection and love, attitudes toward diversity, prejudice, self-esteem, personal causation and locus of control, attributions concerning success and failure, psychological health, social competencies, and many others. These numerous outcomes may be subsumed within three broad categories (Johnson & Johnson, 1989): effort to achieve, positive interpersonal relationships, and psychological health.

Social Interdependence Theory is built on the assumption that human survival is dependent on interaction with others. In an education setting such as the case for this study, social interdependence refers to learners' efforts to achieve, develop positive relationships, adjust psychologically, and show social competence. The social interdependence perspective of cooperative learning, in which category the concept of group work falls, presupposes that the way social interdependence is structured determines the way persons interact with each other.

Therefore, one of the cooperative elements that have to be structured in the classroom is positive interdependence or cooperation. When this is done, cooperation results in promotive interaction as group members encourage and ease each other's efforts to learn (Johnson, Johnson, & Holubec, 1998).

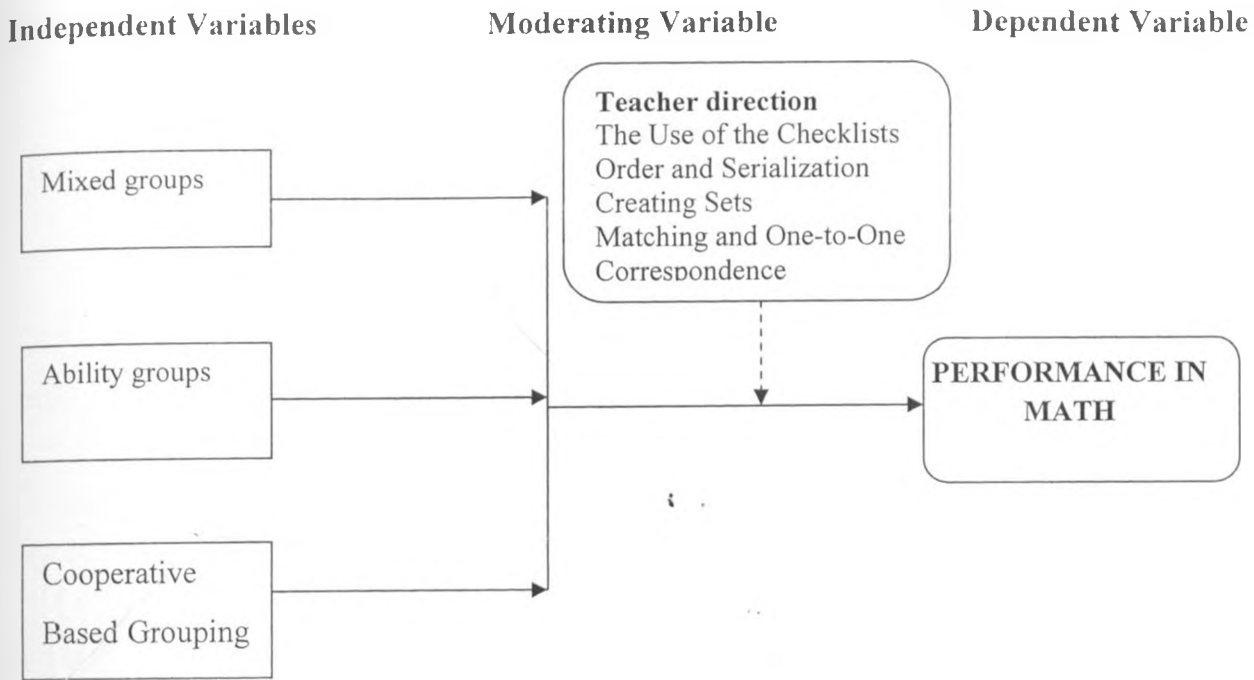
Social interdependence exists when individuals share common goals, and each person's success is affected by the actions of the others (Deutsch, 1962; Johnson & Johnson, 1989). Moreover, Johnson and Johnson suggest two types of social interdependence: cooperative and competitive. The absence of social interdependence and dependence results in individualistic efforts. Social interdependence is one of the most fundamental and a ubiquitous aspect of being a human being and it affects all aspects of our lives (Deutsch, 1949, 1962). For interdependence to exist there must be more than one person or entity involved, and the persons or entities must have impact on each other in that a change in the state of one causes a change in the state of the others. The preschool classroom presents a unique social setting with the children and the teacher playing their different social roles within the classroom and in the learning activities that take place during lessons.

Deutsch (1962) further conceptualized three types of social interdependence: positive, negative, and none. His basic premise was that the type of interdependence structured in a situation determines how individuals interact with each other, which, in turn, largely determines outcomes. Positive interdependence tends to result in promotive interaction; negative interdependence tends to result in oppositional or contrient interaction; and no interdependence results in an absence of interaction. Depending on whether individuals promote or obstruct each other's goal accomplishments, there is substitutability, cathexis, and inducibility- The

relationships between the type of social interdependence and the interaction pattern it elicits is assumed to be directional

2.7 Conceptual Framework

Figure 2.1 Illustrations of the relationships of the study variables



Source: (2011)

For overall success of Children's performance, all the factors indicated above have to interact with each other in order to achieve the best results. For better effects on performance, the activities are interrelated and should be directed toward the main goal (Okumbe 1988). Some are directly related class grouping and some are indirectly related. Children's performance can only be achieved through positive interdependence, individual and group and group accountability, face to face, interpersonal and small groups' skills and direction of the teacher. However,

learning in class groups will be considered in this study as to improve children's performance in pre-schools. If class grouping is going to be used broadly the outcomes could be improvement in children's achievement.

CHAPTER THREE

RESEARCH METHODOLOGY

3.0 Introduction

The purpose of this study was to investigate the impact of group work on the performance of mathematics in preschool. In this chapter, the methodology for dealing with the study is presented. A research methodology is defined as an operational framework within which the facts are placed so that their meaning may be seen more clearly (Leedy, 1989). Furthermore, it can be defined as the description of the procedures that have been followed in conducting a study (Mugenda and Mugenda, 2003). This chapter consists of research design, population, sampling procedures and sample size, instruments, validity and reliability, procedure for data collection and data analysis.

3.1 Research Design

According to Anderson (1997), a research design is an approach to addressing a research question or problem. The study adopted a descriptive survey design; Kothan (2004) explains that descriptive survey studies are those studies concerned with describing the characteristics of a particular individual or group. The choice of descriptive survey design was made based on the fact that in the study, the researcher was interested on the state of affairs already existing in the field with class grouping as an independent variable and children's performance as dependent variable and no variable was manipulated. Thus it was suitable for collecting descriptive data and acted as the plan and structure of investigation as to obtain accurate answers to research questions (Borg and Gall, 1989).

3.2 Study Population

According to (Orodho, 2004), population is defined as all items, things, objectives or people under consideration in any field or inquiry makes up a universe or targeted population. The population study was pre-schools in public primary schools in Changamwe division of Mombasa district. Changamwe division consists of two educational zones namely Mikindani (12 schools) and Chaani (8 schools). The number of pre-schools in these two zones is 20 (Zonal Education Office statistics, 2010).

3.3 Study Sample and Sampling Procedure

Wiersma, (1995) defines a sample as a small proportion of a target population selected using some systematic procedures for the study. To avoid or increase larger number of observations which will involve a lot of funds, time and human resources, only a few from the targeted population in the universe are selected from the study. The items selected constitute what is technically called a sample. Among the reasons accepted for sampling are limitations of the time for the study. The categories of respondents for this study comprise of pre-school teachers, and pre-school children. According to Mugenda and Mugenda (1999) descriptive research requires 20 percent of accessible population which is adequate for a sample. Two schools in each zone were randomly selected to a total of 4 in the division. The selected sample had 4 pre-schools and 4 preschool teachers who had been purposively sampled since they were the preschool teachers of the sample schools. One pre-schoolteacher from each school made a total of 4 pre-school teachers.

3.4 Data Collection Procedure

Research instruments are the tools the researcher uses to collect data. The researcher used questionnaires and observation schedule to collect data. Tuckman (1972) argues that questionnaires make it possible for the researcher to measure what a person knows (knowledge), likes and dislikes (value and preferences), and what a person thinks (attitude and beliefs). The researcher used questionnaires for pre-school teachers and observation schedule classroom observation.

The semi-structured Questionnaire consisted of items based on the objectives of the study. Both closed and open-ended questions were used to collect the data. Questionnaires according to (Wiersman, 1985) are generally much less expensive and they do not consume a lot of time in their administration. The questionnaires encourage the respondents to give their depth responses as they are free to express themselves. The pilot schools were visited in advance. A letter of introduction from university of Nairobi was given to head teachers during the first visit. Researcher was introduced to the pre-school teachers. There were three visits to establish rapport with ECD teachers and care for misinterpretation. On the 4th visit, the questionnaires were administered to the respective schools personally by the researcher in case of any clarification about the items in the questionnaires.

Observation Analysis category schedule was used to observe what was happening in a real life situation, in this case, the classroom. The researcher used direct or structured observation as emphasized by Mugenda (1999). Observation is a primary tool of scientific inquiry because it observes the interactions between teachers and pupils, pupils and pupils. The researcher used the observation schedule following Flanders (1970) design interaction to observe what is

happening in classroom setting. According to Flanders (1970) interaction Analysis categories (FIAC) is a process of encoding and decoding the study patterns or behaviors in the learning and teaching process. The researcher observed children once (one lesson) transcribed and recorded observable group activities after every 2 minutes using a stop watch. The researcher had an Assistant researcher to observe the same things so that the two can compare what they have observed before making conclusions. The researcher and assistant researcher acted as human instruments of data collection because they became part of the study according to (Patton, 1990).

3.5 Validity and Reliability

According to Kombo and Tromp (2006) a research instrument is said to be valid if it measures what it is supposed to measure. Validity therefore refers to the accuracy of the content in the research instrument in regard to collecting data that will remain accurate. The researcher developed questionnaires for pre-school teachers, observation interaction Analysis categories for classroom learning. The researcher gave the developed instruments to experts in the Department Of Educational And Communication Technology for validation. The instruments were then piloted in the selected schools in Mikindani and Chaani zone that are not included in the study.

Reliability refers to the consistence of the research instrument in order to get the specific data needed. According to Coolican (1994), reliability is a measure of consistency that should give similar results on different but comparable occasions. The reliability of the instrument was determined by collecting data three times and carrying out calculations on reliability as recommended by Ingule & Gatumu (1996). The unsuitable questions were discarded while

others moderated. After modifications, the instrument was administered to the sample population as according to (Mugenda, 1999)

3.6 Data Analysis

Data analysis involves examining what has been collected and making deductions and inferences (Kombo and Tromp: 2006, Mugenda and Mugenda: 1999). This study employed descriptive statistics and some inferential statistics to analyze the data obtained. The data was coded and presented in descriptive statistics, which involves the collection, organization and analysis of all data relating to some population or sample under study. This study perused pupil's performance data with a view to establishing student performance prior to the study. This allowed the researcher to establish entry behavior of the learners in the sample. The data also enabled the researcher to make conclusions on whether the grouping employed by preschool teachers is effective or not. Furthermore, this data was also useful in exploring way of enhancing the grouping used within preschools in Changamwe Division of Mombasa County.

CHAPTER FOUR

DATA PRESENTATIONS, ANALYSIS AND DISCUSSION OF FINDINGS

4.0 Introduction

The purpose of this study is to investigate the influence of class grouping on the performance of mathematics in preschool. To obtain the data for this study, a semi-structured oral interview questionnaire, and observation were administered to a sample of respondents from the sample schools. The researcher took notes on what was observed during interactions in the classrooms.

4.1 Questionnaire Return Rate

This study used the semi-structured questionnaire as its principal data collection tool. The questionnaires were self-administered by the researcher. Four preschool teachers were given the questionnaires and all the four returned the answered questionnaires. This gave a return rate of 100% on Questionnaires issued during data collection.

4.2 Demographic Data

The study sought to know the number of children they taught, the class level and their gender. The demographic data got from the teachers is presented in Table 4.1 on the next page.

Table 4.1 Demographic data on sample preschools

School	No. of Children	Class	Teacher Gender
School 1	30	KG 2	Female
School 2	51	KG 3	Female
School 3	40	KG 3	Female
School 4	35	KG 2	Female

Source: Questionnaire (2011)

Table 4.1 above shows the background data for the four schools in the study sample. The data shows that all the teachers in the sample were female. These teachers were in KG 2 and KG 3 levels in these schools. School 1 had 30 children in the preschool, school2 had 51 children, and school 3 had 40 children while school 4 had 35 children in its preschool.

4.3 The Types of Grouping Used By Preschool Teachers

The first objective for this study was to describe the types of grouping used in preschools math lessons. This was essential since it was upon this basis that the discussion of the use and effectiveness could follow. The study sought to find out how the teachers in the pre- schools grouped their pupils in class. All the teachers indicated that they grouped the children according to ability. One of the teacher indicated that she had children grouped in ten, while in school 2;the teacher indicated that the brightest children were the group leaders in each group. These teachers also indicated that their groups were comprised of mixed ability. This study set out to

identify the common classroom groupings used by preschool teachers during mathematics lessons in Changamwe division of Mombasa County.

The identification of the grouping types was based on common practice as given by the teacher in the questionnaire and also through researcher observation in the classrooms. The study found that teachers commonly used ability to group children. What was clear was the use of mixed ability groups so that the fast learners can help the slow learners. However, the majority of teachers in Changamwe division adopted an ability based method of grouping where teachers grouped children in groups of similar ability. The teachers also indicated that they used both Kiswahili and English as media of communication during group work with the children.

With regard to group size, the study sought to establish the number of children in each group as organized by the teacher. The study also established that the groups consisted of between 6 and 10 members. However, the data does not reveal the criteria used by the teachers to select the group size. What was evident for the researcher was the overcrowding in the classes. Small spaces are rather difficult to deal with when groups have to be set up. This may have caused the teachers to use large groups of ten so that time is not wasted in arranging the groups. The findings are presented in Table 4.2 on the next page.

Table: 4:2 Group size in Class grouping

Category	Frequency	Percentage
10 per group	2	50%
6 per group	1	25%
5 per group	1	25%
Total	4	100%

Source: Questionnaire (2011)

Table 4.2 shows that two teachers had 10 children per group which was 50%, while two other teachers had 6 children and 5 children per group which was covering each 25%. This showed those teachers grouped their children for easy interactions. This was established from observation made by the researcher and indications made by the teachers.

4.4 Learning Topics Covered By Group Work

Group work allows the learners to achieve a lot through the cooperative learning exercise that takes place in the groups. This study sought to identify these areas as achieved in the mathematics lessons. The study further sought to establish the activities children engage in during group work, how fast they are expected to complete these tasks and the learning outcomes of these tasks.

With regard to the activities performed in groups the teachers indicated they taught matching and pairing, tracing, drawing, writing, storytelling, ordering and grouping, tracing, coloring and

playing. Each of these activities had its own requirements of the children and tests the children's ability to learn in different ways. The analysis of these activities following the domains of learning is done below in Table 4.3.

Table 4.3 learning activities for group work

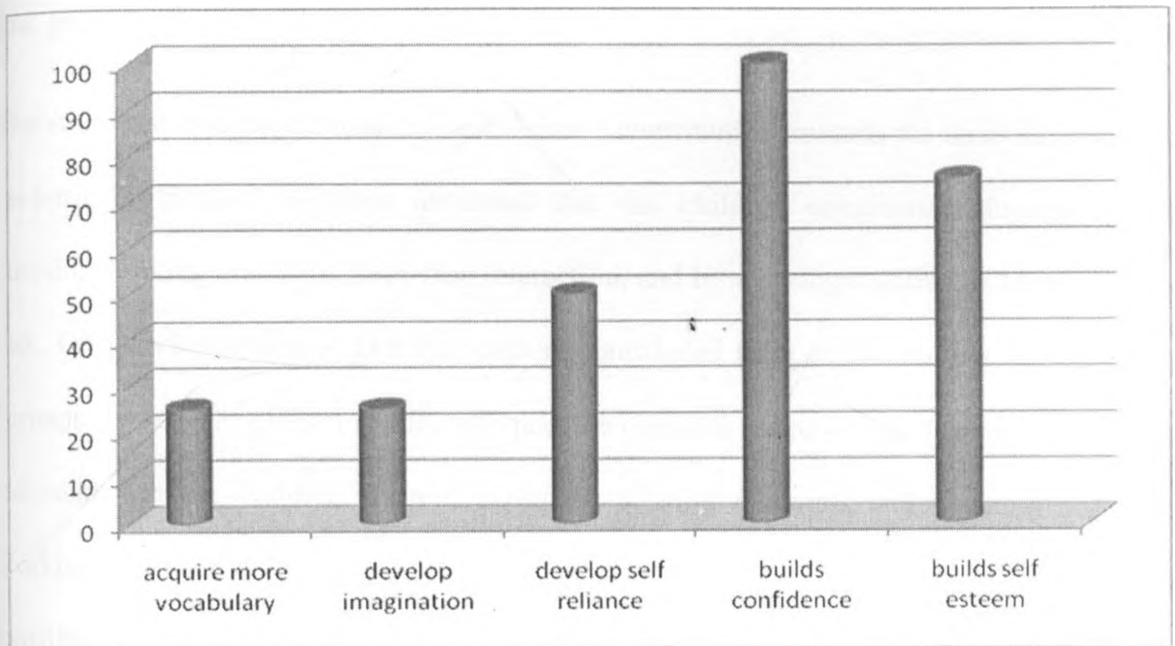
Domain of learning	Activity
Cognitive	Ordering, coloring, matching and pairing
Psychomotor	Tracing, drawing, writing
Affective	Storytelling, discussion, playing

Source: Questionnaire (2011)

The table 4.3 shows the activities children engage in during group work, how fast they are expected to complete these tasks and the learning outcomes of these tasks. These aspects are related since they have a collective influence on performance. The study found that the topic areas where learning is done in groups include: matching and pairing, tracing, drawing, writing storytelling, ordering and grouping, tracing, coloring and playing. Each of these activities has its own requirements of the children and tests the children's ability to learn in different ways.

With regard to the speed of working, the teachers indicated that the children depicted varied abilities to complete the tasks before them. This was primarily governed by individual children's aptitude in the various learning activities that they handled. Moreover, it also depended on the demands of the particular learning activity.

The study then sought to establish the benefits of group work to individual children. The teachers indicated that the children benefited through interaction, through answering questions, and that the slow learners got to understand the contents of the lesson thus becoming quick learners. Furthermore, the study found out from the teacher show the children's participation influenced their own learning and their benefits. The findings with regard to the levels of interest are presented in the figure 4.1 below.



Source: Questionnaire (2011)

Figure 4.1: benefits children get from group work

Figure 4.1 above shows the benefits that the children have as a result of participating in group work. The data shows that 25% of the teachers indicated that the children were able to acquire more vocabulary through interaction with peers in their groups. Furthermore, 25% indicated that children were able to develop their imagination courtesy of involvement in group activity. Fifty

percent of the teachers indicated that the children were able to develop self-reliance as a result of getting involved in group activity in class.

Since each child was supposed to contribute to the group activity, the children learnt to do things and hence developed self-reliance. Furthermore, the teachers indicated that involvement in group work made the children develop their self-esteem to a level where they were no longer shy to make contributions within the group and this was 75%. All the teachers, 100%, indicated that group work built the child's confidence and made them active and appreciative of learning.

The study also sought to establish the children's contribution towards the tasks they are given to perform in groups. Teachers indicated that the children contributed through answering questions, asking questions, face-face interaction, and by working together in turns on the same task. One teacher indicated that the learners contributed through the teacher asking questions. Perhaps the teacher did not clearly interpret the question asked of her. Moreover, the teachers indicated that the children showed caring by sharing materials and teaching one another. Working together on the same task, the teacher suggested, helped the children feel they contributed towards their own learning and the learning of others. The findings are presented on the table 4.5 on the next page.

Table: 4:4: Contribution towards the tasks given.

Category	Frequency	Percentage
Answering questions	4	100%
Asking question	4	100%
Working on the same tasks	4	100%
Face to face interaction	4	100%

Source: Questionnaire (2011)

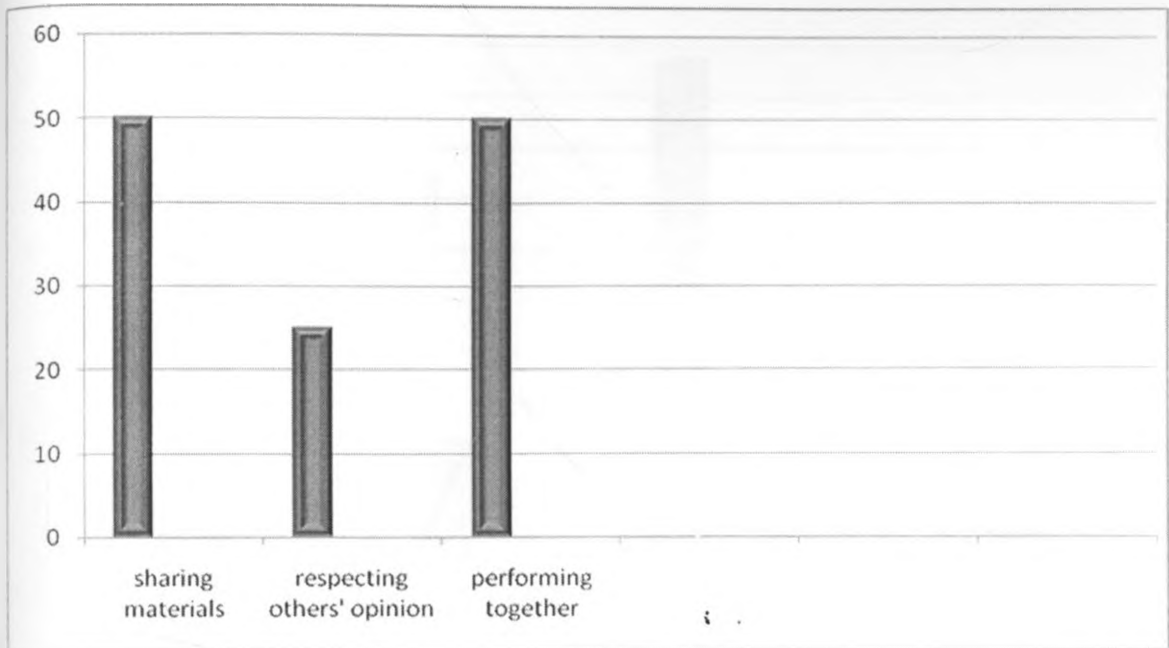
According to the data in the table 4.4 above, all of the respondents indicated that group works helps the children to contribute towards the tasks and this was 100%.

4.5 Influence of Teacher Direction on children’s performance

The study sought to establish the effectiveness of teacher’s direction on class grouping. To do this, the study identified aspects of teacher direction as it was evident in the classrooms. The study then sought to establish how the teachers ensured that the learners maintained togetherness during group work. The teachers indicated that they ensured togetherness through having the children carry out group activities in common. That is, having each group member perform the same task.

One of teacher indicated that in writing lesson, every member of the group was asked to write in the same book in turns. The group leader ensures every member of the group has done this.

Moreover, the teachers indicated that the children learnt to share and were responsible for each other's learning. The opinions of the teachers in this regard are shown in figure 4.2 below.



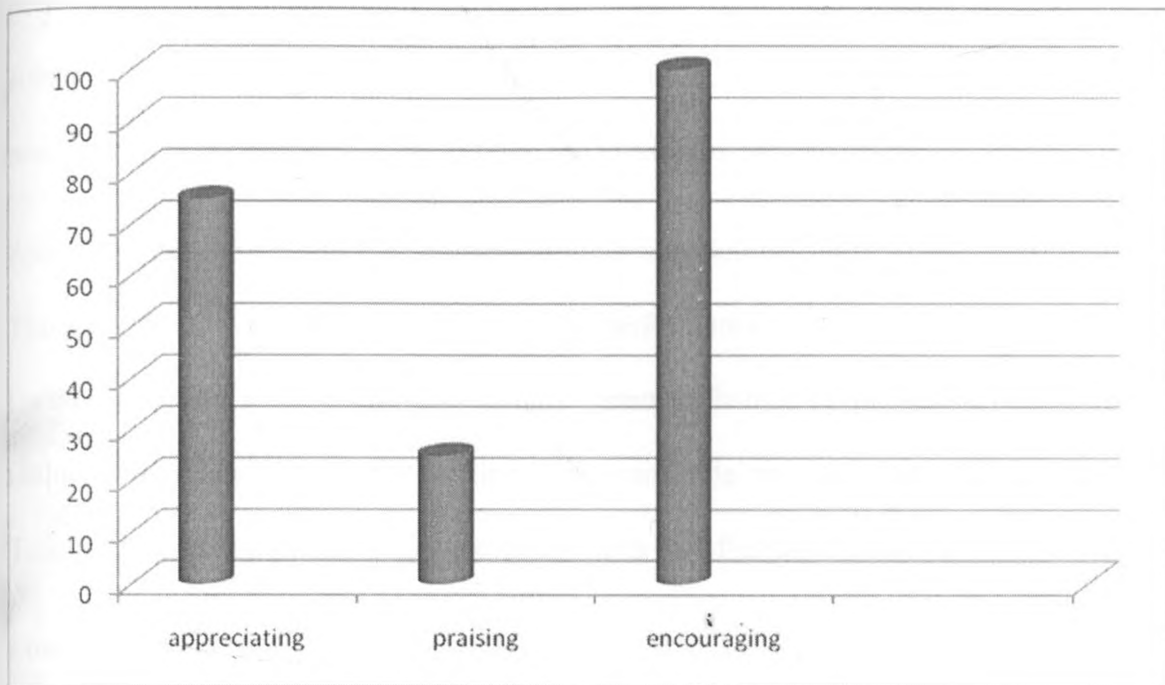
Source : Questionnaire (2011)

Figure 4.2: Methods of ensuring togetherness in groups

Figure 4.2 shows how the children knew that they were responsible for each other's learning. The two teachers indicated that the children knew this through sharing of the learning materials in their groups and this was covering 50%. Other two teachers indicated that the children knew they were responsible for each other's learning through either respecting each other's opinion or through performing learning tasks together and this was 25%.

The study then sought to find out from the respondents what the teachers did to ensure that each individual child in the group felt responsible for learning. Teachers indicated that they ensured each learner participated in the group activity. However, the study further sought to find out

how the teachers dealt with learners of low esteem within these groups to ensure that they participated effectively. The findings are presented in figure 4.3 below.



Source: Questionnaire (2011)

Figure 4.3 what teachers do to encourage learners with low self-esteem

Figure 4.3 above shows what teachers do to encourage children who have a low self-esteem. Low self-esteem is considered to inhibit children from fully getting involved in group activities since the concerned children rarely contribute in the presence of others. The teachers in the study, 75% indicated that they appreciated the contributions made by these children with low - esteem, while 25% indicated that they praised these children for any effort made to participate or to answer questions. All the teachers indicated that they encouraged children with low self-esteem which was 100%. The study found that the teachers accessed the children's efforts in the groups through moving around and monitoring what the children did in groups.

Teacher direction is an important aspect of effective use of group work in preschool classes. Hence, this study sought to establish the effect of teacher direction on the children's performance in the classroom. Firstly, the study found that teacher direction took up a substantial amount of time in the mathematics lesson. This was important because the teacher needed to provide guidance to the groups and to assist those that needed her help.

Secondly, the study found that teachers ensured each learner participated in the group activity. This they did by keenly following up on the performance of individual children in the groups. Furthermore, the study found that teacher direction helped in mitigating the needs of those children with low self-esteem so that they were able to cope with the tasks before them. Teachers did this by giving positive motivation to the affected learners.

Low self-esteem is considered to inhibit children from fully getting involved in group activities since the concerned children rarely contribute in the presence of others. Teachers appreciated the contributions made by these children with low esteem, praised these children for any effort made to participate or to answer questions; and encouraged children with low self-esteem. The study found that the teachers accessed the children's efforts in the groups through moving around and monitoring what the children did in groups.

4.6 Influence of Cooperation in class grouping on Children's Performance

Having examined the teacher's direction in the figure 4.3 above, the study sought to establish the influence of cooperation in class grouping had on the learners' performance in mathematics. Most of the data in this regard was collected through observation of the cooperative aspects of learning. The observation followed six aspects of cooperative learning namely: pairing, freedom

of expression, sharing materials, teacher guidance, working together, and children answering questions. The findings in this regard are presented in table 4.5 below.

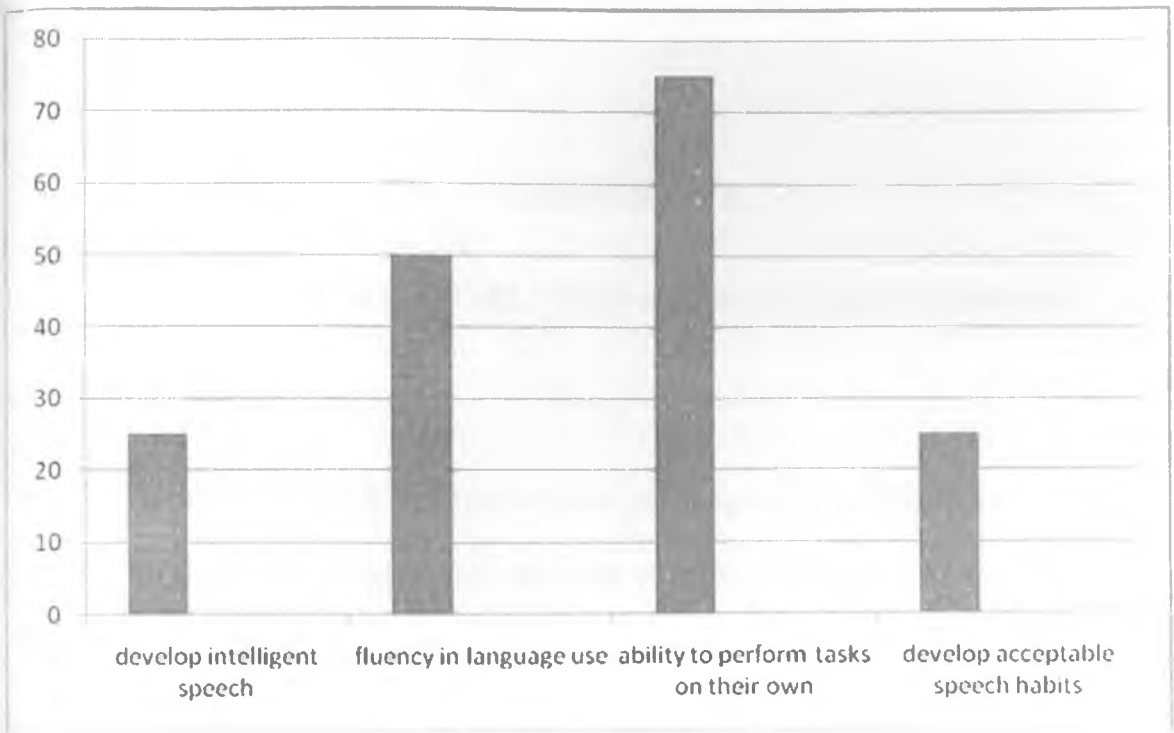
Table 4.5 observation of cooperative learning

Cooperative learning aspects	Schools							
	School 1 (51pupils)		School 2 (38pupils)		School 3 (40pupils)		School 4 (30pupils)	
	<i>Freq.</i>	<i>%</i>	<i>Freq.</i>	<i>%</i>	<i>Freq.</i>	<i>%</i>	<i>Freq.</i>	<i>%</i>
Pairing	1	6.25	1	6.25	1	6.25	1	6.25
Freedom of expression	3	18.7	2	12.5	2	12.5	2	12.5
Sharing materials	3	18.7	4	25	2	12.5	3	18.7
Working together	3	18.7	3	18.7	3	18.7	3	18.7
Answering questions	2	12.5	2	12.5	3	18.7	2	12.5
Teachers guidance	4	25	4	25	5	31	5	31

30 min-observation focus on cooperative learning aspects. (Source: Author 2011)

The table 4.4 on page 42 shows the frequency of occurrence of the aspects of cooperative learning activities in the classes under observation at every collapse of two minute. All the four preschool classes were observed and these findings deduced. According to the data, pairing occurred usually in the first minutes of the lesson and did not occur again throughout the class hence it consumed 6.25% of the lesson.

Sharing materials and working together constituted the most active events in these classrooms during group work. These activities took up the largest quantity of learning time with sharing materials consuming a maximum of 25% of the lesson in school 2 and working together consuming 18.7% of the learning time in all the schools in the sample. However, teacher guidance took up the bulk of teaching time with school1 and 2 indicating 25% of the time and 51% of lesson time in schools 3 and 4. The study also sought to establish the learning outcomes related to the activities carried out by the children in their groups. The findings in this regard are presented in figure 4.4 on the next page.



Source: Questionnaire (2011)

Figure 4.4 Learning outcomes from group work

Figure 4.4 presents the learning outcomes associated with the use of group work in the sample preschools. According to the data in the chart, 25% of the teachers indicated that the children were able to develop intelligent speech. This was realized through the influence of other children's speech during group activity. The same number of teachers also indicated that children developed acceptable speech habits due to the influence the group work had on their language. The teachers further indicated that fluency in language was an outcome of group activity and this was 50%, while 75% indicated that the learners were more able to perform tasks on their own after being exposed to group work.

CHAPTER FIVE

5:0 SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This study sought to establish the effect of class grouping on the performance of mathematics in preschool classrooms. In chapter four, the data collected was presented and analyzed. In this chapter, the summary, conclusions and recommendations are made based on these findings. The discussion of findings was based on the study questions of this study.

5.2 Summary

5.2.1 Types of class grouping used in preschool math lesson.

The study established that teachers group their children according to ability, mixed ability so that the fast learners can help the slow-learners. This also helps low esteemed to be encouraged. The study also established that the teachers group their children in groups of between 6-10 members this is because the space is small.

5.2.2 Topics used in mathematics in pre-schools

The study established that the topics that the children participated in group work were activities like, tracing, coloring, matching and pairing, ordering and grouping. With regards to benefits of group work to individual children, the teachers indicated that the children benefited through interaction, answering questions and face to face interaction. The children engaged themselves in performing activities in group work. The children were able to acquire more vocabulary

through interaction and develop their imaginations courtesy of involvement in group activity. The children were able to develop their self-esteem to a level where they were no longer shy to make contributions within the group. All teachers, which was 100%, indicated that group work built confidence, made the children active and appreciate learning. Contribution towards the tasks, the respondents indicated that the children were able to answer question, asking questions and sharing materials evenly.

5.2.3 Teacher's direction in class grouping.

The study established that effectiveness of class grouping is a result of teacher's direction and this was maintained by how the teachers ensured that the learners maintained togetherness during group work. One teacher indicated that the children wrote in the same book to show togetherness. Moreover, teachers encouraged children to share and be responsible for each other's learning. The teachers ensured that each child participates effectively and the low-esteemed were encouraged. Low self-esteem is considered to inhibit children from fully getting involved in participating in group activities since they rarely contribute in the presence of others.

5.2.4 Cooperation in class grouping

The study established that cooperation in class grouping influences the performance of the children. For the children to work cooperatively there must be aspects of cooperative learning. This includes sharing of materials, pairing, freedom of expression, teacher's guidance, working together and answering questions. Sharing of materials and working together constituted the most active events in the class during group work this covered 18.7% where as teachers guidance took the bulk time during the learning which was 51% of lesson time in school 3 and

4. On effectiveness of class grouping the study found that the use of class grouping in the sample schools, teachers indicated that children were able to develop intelligent speech. This helped the children to develop acceptable speech habits due to the influence the group work had on their language and this was 50%, while 75% indicated that children were more able to perform tasks on their own after exposure hence interdependence.

5:3 Conclusions

There is a vital component in enhancing capacity and understanding of mathematics lessons not only interested but increased in performance of solving math, this confirms the view propounded by (Davis, 1993). Flexible grouping practices calls for diverse groups of learners when combined with high expectation and quality in mathematics instruction have great potential for ensuring equality and excellence for all learners. The achievement of children is therefore enhanced and increased (Slavin, 1989).

Based on the discussion above, several conclusions can be drawn from the findings of the study. Firstly, it can be concluded that teachers in Changamwe division have class grouping in teaching mathematics in preschools. This fact is corroborated by Slavin (1987) who suggested that groups provide all members with the opportunity to observe emulate and initiate a wide range of competencies. Grouping helps all learners to have an advantage of learning at their own pace and even from the fast learners in the group.

Secondly, the study concluded that class grouping, as a teaching and learning strategy, provides a more holistic approach to learning by inculcating the cognitive, affective and psychomotor skills in the learners. Slavin, (1988) indicates that, for excellent schools, using flexible groups

and instructional opportunity both inside and outside of the classroom improves performance for all children including most able.

Thirdly, this study concludes that group work is very beneficial to learners. Groupings provide for maximum advantage of the resources in the classroom. The study found that children were able to help each other and hence increase the opportunity for learning and achievement.

Fourthly, the preschools have physical and material challenges to deal with and each challenge have repercussions on the effectiveness of group work in these schools. The classrooms are small due to increased enrolment and the materials to be used in groups are few. This therefore makes the effectiveness of group work not to work successfully.

5.4 Recommendations.

Following the conclusions above, the following recommendations were being made:

1. There is need to provide adequate and spacious facilities for preschools particularly those that are in public primary schools.
2. There is need to provide more in-service opportunities for the preschool teachers to be able to handle group work more effectively.
3. There is need to conduct workshops, inductions and seminars for pre-school teachers. Here pedagogy skills in teaching mathematics in preschools will be improved.
4. The government to come up with policies encouraging male teachers to join preschool education to remove the notion that Early Childhood Education as a female dominate occupation.

5.5 Suggestion for further Research.

Research to be done on the influence of class grouping on children's performance in other activity area like, language, science, creative arts and social studies in other area with challenged environment.

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APPENDICES

APPENDIX 1

QUESTIONNAIRE FOR PRE-SCHOOL TEACHERS

Dear sir| madam,

I am interested in getting information from you about the ECD Centre, your professional status, working terms and conditions, your ECD children, methods you use, please note that the information you give will be strictly for education purpose and will be kept in confidence.

For every question with offered choices, tick your preferred choice for open-ended question indicate your response in the space provided

SECTION A

Background.

No. of children.....

Class.....

Gender.....

SECTION B

1. How have you grouped your children?

2. Which language do children use while working in the groups?

Kiswahili []

English []

3. What is the size of each group.....

4. What do you do to ensure children maintain togetherness?

5. How will children know that they are responsible each other's learning?

.....

6. What do you do to ensure each individual in the group feels responsible for learning?.....

7. How do you encourage the lower self – esteem in the group work?

.....

8. How do you access individual's effort in groups when performing a task?

.....

9. How do children benefit from each other's contribution when working in groups?

.....

10. How are the children sitting in their groups?.....

11. How does children's talking, thinking and acts have influence on their learning?

.....

12. When children are given a task, how do they contribute towards the task?

.....

13. How do children show the caring behaviors towards one another when working in their groups?.....

14. How do children solve their problems when they are working in their groups?

.....

15. When children are working in their in their groups how do they feel for each other?

.....

16. Which activities do you use in the groups?.....

17. How do children work on these group activities?

.....

18. What is the outcome when children are exposed to these learning activities?

.....

19. How are the children motivated to engage in behaviors that increase achievement?

.....

20. What are some of challenges you teachers face when children are learning in class groups?

APPENDIX II

INTERVIEW SCHEDULE PRE-SCHOOL CHILDREN.

1. Who are your friends?
2. How do you feel when you are with your friends?
3. How do you feel when you work together in a group?
4. Who have you helped in the group?
5. Which activities are enjoyable to you?

APPENDIX III

CHILDREN'S PARTICIPATION OBSERVATION SCHEDULE FORM

SECTION (A)

BACKGROUND INFORMATION

Name of school _____

Subject _____ Date _____

Class _____ Duration. _____

Age _____ No. of children _____

30 MIN-OBSERVATION FOCUS ON COOPERATIVE LEARNING ASPECTS.

1. Pairing up of children
2. Teacher walk/guide groups
3. Freedom of expression.
4. Working together on task
5. Sharing of materials
6. Pupils answering questions.

0	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30

Author's design (2011) inform of Flanders's design.

APPENDIX IV
MATHEMATIC TEST

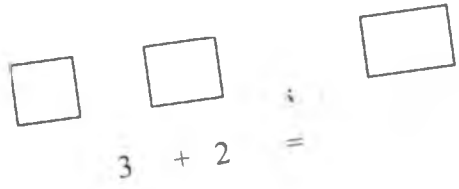
Name of School _____ Class _____

Name of Pupil _____

Answer all questions:

Put together

$OO+OO =$



$OOO \quad OO =$

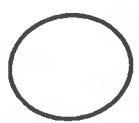
Arrange the Numbers In order

5, 1, 4, 2, 3

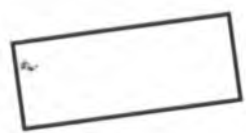
Match the shapes with names



Rectangle



Oval



Circle

UNIVERSITY
KIKUYU
J. B
M.A.I



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15 September 2011

T O W H O M I T M A Y C O N C E R N

RE: JOSEPHINE LOGEDI CHAHILU - 557/82465/10

This is to certify that Josephine Logedi Chahilu is a bonafide student of the University of Nairobi, Department of Educational Communication and Technology. She is doing M.Ed in Early Childhood Education. Her project Title is INFLUENCE OF CLASS GROUPINGS ON CHILDREN'S PERFORMANCE IN NUMBER WORK IN PRE-SCHOOLS, CHANGAMWE DIVISION, MOMBASA DISTRICT, KENYA. Any assistance accorded to her will be highly appreciated.

Yours faithfully,

17 SEP 2011

PROF. P.O.O. DIGOLO
CHAIRMAN, DEPARTMENT OF EDUCATIONAL COMMUNICATION AND TECHNOLOGY