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**PRE-SCHOOL TEACHERS USE OF SCAFFOLDING
METHOD IN TEACHING MATHEMATICS: A CASE
STUDY OF EMBAKASI DIVISION, NAIROBI PROVINCE,
KENYA.**

BY

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REQUIREMENTS FOR THE AWARD OF THE DEGREE OF MASTER
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UNIVERSITY**

MAY 2007

DECLARATION

This thesis is my original work and has not been presented for a degree in any other university or any other award.

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DEDICATION

This thesis is dedicated to my mother, Mary Waruguru Mwaniki and to my mother-in law, Susan Wanjiku Kwai.

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This thesis would be incomplete if I did not express my heartfelt gratitude to all the people who made its completion possible.

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ABSTRACT

The study was based on poor performance of mathematics worldwide and more so in Kenya, despite numerous researches on the possible causes and proposed solutions. The researcher postulates that performance could be improved by using the known more effective methods such as scaffolding teaching method. The purpose of the study was to find out the extent to which pre-school teachers use scaffolding teaching method to teach mathematics. The study involved 24 pre-school teachers teaching in Embakasi Division of Nairobi Province, Kenya, selected using stratified random sampling. The study used three theories:- Bandura's Social Learning Theory, Lev Vygotsky's Social Development Theory and Bruner's Constructivist Theory. The research design used is Ex-post-facto research. Data was analyzed using both descriptive and inferential techniques. The study found that only one of the elements of scaffolding, namely directing, was being used at an appropriate mean frequency level score of 64.2 while the other five had low mean usage ranging between 4.5 and 23.7. These others are soliciting (4.5), child's idea (10.8), encouraging (12.0) questioning (18.8), and freedom (23.7). This indicated inadequate overall use of the method. However none of the independent variables under study that is class size, teaching experience, training program, pre-school teachers attitude towards frequency of use of scaffolding teaching method, mathematics attainment and school management, proved to have a significant effect on use of scaffolding teaching method. To improve on the performance of mathematics, the study recommends emphasis to be placed on continuous training on the use of the method during in-service training and

TABLE OF CONTENTS

TITLE PAGE	i
DECLARATION	ii
DEDICATION	iii
ACKNOWLEDGEMENT	iv
ABSTRACT	v
TABLE OF CONTENTS	vii
LIST OF TABLES	xiii
LIST OF FIGURES.....	xv
ABBREVIATIONS AND ACRONYMS	xvi
CHAPTER ONE: INTRODUCTION	1
1.1 Background	1
1.2 Statement of the Problem	9
1.3 Purpose of the Study	10
1.4 Objectives of the Study	10
1.5 Research Hypotheses.....	11
1.6 Significance of the Study	12
1.7 Delimitation and Limitation	12
1.8 Assumptions of the Study	13
1.9 Conceptual Framework	13
1.10 Definition of Operational Terms	15
CHAPTER TWO: LITERATURE REVIEW	18
2.0 Introduction	18
2.1 Theoretical Framework	18

2.1.1	Bandura's Social Learning Theory	18
2.1.1.1	Attentional Processes	19
2.1.1.2	Retention Processes	19
2.1.1.3	Motor Reproduction Processes.....	19
2.1.1.4	Motivational Processes.....	20
2.1.2	Lev Vygotsky's Social Development Theory	21
2.1.3	Bruner's Constructivist Theory.....	23
2.2	Teaching Methods	24
2.3	Scaffolding Teaching Method.....	25
2.4	Factors influencing frequency of use of Scaffolding Teaching Method in a Classroom Setting	30
2.4.1	Teachers Academic Level and Mathematics Attainment.....	31
2.4.2	Class Size	34
2.4.2	Teaching Experience	35
2.4.3	Professional Training Program.....	36
2.4.5	Teachers Attitude towards use of Scaffolding Teaching Method in teaching Mathematics.....	37
2.4.6	School Management	39
CHAPTER THREE: METHODOLOGY.....		40
3.0	Introduction	40
3.1	Research Design	40
3.2	Variables.....	40
3.2.1	Independent Variables.....	40
3.2.2	Dependent Variable	41
3.3	Target Population and Site	41

3.4	Sample Size	42
3.5	Sampling Techniques	42
3.6	Research Instruments	43
3.6.1	Questionnaires	45
3.6.2	Observation Checklist	45
3.7	Pilot Study	47
3.7.1	Validity	47
3.7.2	Reliability	48
3.8	Data Collection Techniques	48
3.9	Logistical and Ethical Consideration	49
3.10	Statistical Hypotheses	50
3.11	Analysis	51
CHAPTER FOUR: DATA ANALYSIS, RESULTS AND DISCUSSIONS ...		52
4.0	DESCRIPTIVE ANALYSIS.....	52
4.1	Distribution of Pre-School Teachers by the various Independent variables	52
4.1.1	Distribution of Pre-School Teachers by Mathematics Attainment	52
4.1.2	Distribution of the Pre-School Teachers by Training Program.....	53
4.1.3	Distribution of Pre-School Teachers by Teaching Experience in Years	54
4.1.4	Distribution of Class Sizes handled by Pre-School Teachers	55
4.1.5	Distribution of Pre-School Teachers by School Management.	57
4.1.6	Distribution of Pre-School Teachers by Training Program attended and Mathematics Attainment.....	57
4.2	Pre-school Teachers Attitude on Scaffolding Teaching	

Method	59
Introduction	59
4.2.1 Distribution of Attitude of Pre-School Teachers on Scaffolding Teaching Method in the teaching of Mathematics	59
4.2.2 Distribution of Pre- School Teachers Attitude Scores towards Scaffolding Teaching Method when Ranked	60
4.2.3 Distribution of Pre-School Teachers Attitude on Scaffolding Teaching Method by their Training Program when Ranked.....	61
4.2.4 Attitude Scores for Pre-School Teachers with Different Mathematics Attainment	62
4.2.5 Attitude Scores towards scaffolding teaching method of Pre-School Teachers by their Training Program.....	63
4.2.6 Attitude scores for Pre-School Teachers with different Teaching Experience, below 11 years and 11 years and above, where 11 years is the average (mean) number of years in teaching.	64
4.2.7 Attitude Scores towards scaffolding teaching method for Pre-School Teachers by Class Size.....	65
4.2.8 Attitude Scores towards scaffolding teaching method for Pre-School Teachers by School Management	66
4.3 Pre-school Teachers Frequency of use of all the Elements of Scaffolding Teaching Method amongst the Different Variables.....	67
4.3.1 Comparison of Frequency of Mean use of scaffolding Teaching Method by Mathematics Attainment.....	67
4.3.2 Comparison of the mean frequency of use of scaffolding teaching method among pre-school teachers trained under different training programs	69
4.3.3 Comparison of Mean Frequency of use of Scaffolding Teaching Method by Pre-School Teachers of different Teaching Experience.....	70
4.3.4 Comparison of Frequency of Mean use of Scaffolding Teaching Method by Pre-School Teachers with Different Class Sizes	71

4.3.5	Comparison of Frequency of Mean use of Scaffolding Teaching Method by Pre-School Teachers from different School Managements.....	73
4.3.6	Comparison of Overall use of the Different Elements of Scaffolding Teaching Method by the Pre-School Teachers.....	74
4.3.7	Comparison of the Mean Frequency of using Different Elements of Scaffolding Teaching Method	76
4.4	Statistical Analysis	77
4.4.1	Relationship between Class Size and Pre-School Teachers use of Scaffolding Teaching Method.	78
4.4.2	Relationship between Pre-School Teachers Teaching Experience and use of Scaffolding Teaching Method.....	79
4.4.3	Relationship between Training Program and use of Scaffolding Teaching Method	80
4.4.4.	Analysis of Relationship between Attitude and use of Scaffolding Teaching Method	81
4.4.5	Test of Difference in Frequency of use of Scaffolding Teaching Method by Mathematics Attainment.....	82
4.4.6	Analysis of Difference in Frequency of use of Scaffolding Teaching Method by School Management.	84
4.5	Discussion of Results	85
4.5.1	Class Size	85
4.5.2	Pre-school teachers teaching experience.....	86
4.5.3	Pre-school teachers Training Program.....	87
4.5.4	Pre-school teachers attitude towards scaffolding teaching method	87
4.5.5	Pre-school teachers Mathematics Attainment in highest academic level.....	88
4.5.6	Different school Managements.....	89

CHAPTER FIVE: SUMMARY, CONCLUSION, IMPLICATIONS AND RECOMMENDATIONS	91
5.1 Summary	91
5.2 Implications of the Findings.....	92
5.2.1 Implications for Managers.....	92
5.2.2 Implications for Policy Makers	92
5.2.3 Implications for Further Research	93
5.3 Conclusion on Overall use of Scaffolding Teaching Method	94
5.4 Recommendations	95
5.4.1 Recommendations for Pre-School Managers	95
5.4.2 Recommendations for Policy Makers.....	96
5.4.3 Research Recommendations	96
REFERENCES.....	98
APPENDICES.....	104
APPENDIX A.....	104
PRE-SCHOOL TEACHERS QUESTIONNAIRE.....	104
PRE-SCHOOL TEACHERS ATTITUDE TOWARDS SCAFFOLDING TEACHING METHOD.....	105
APPENDIX B	106
OBSERVATION CHECKLIST OF FREQUENCY OF PRE-SCHOOL TEACHER'S USE OF SCAFFOLDING TEACHING METHOD.....	106

LIST OF TABLES

Table 1.1:	K.C.S.E. Statistics grades for mathematics for the years 2000- ...3	
Table 1.2:	Mathematics KCPE results in 1997-2001.....5	
Table 3.1:	Distribution of pre-schools and pre-school teachers in each Management category.....42	
Table 3.2:	Sampling Frame.43	
Table 3.3:	Observation pattern.46	
Table 4.1:	Distribution of pre-school teachers by academic qualification.....52	
Table 4.2:	Distribution of the pre-school teachers by mathematics attainment.53	
Table 4.3:	Distribution of pre-school teachers by training program.53	
Table 4.4:	Distribution of pre-school teachers by teaching experience in years.54	
Table 4.5:	Distribution of pre-school teachers by class size.55	
Table 4.6:	Ranked class size.....56	
Table 4.7:	Distribution of pre-school teachers by school management.57	
Table 4.8:	Distribution of pre-school teachers by training program and mathematics attainment.....58	
Table 4.9:	Attitude of pre-school teachers towards scaffolding teaching method in the teaching of mathematics.....59	
Table 4.10:	Attitude scores when ranked (less than 8: negative more than 8:positive).....60	
Table 4.11:	Attitude scores of pre-school teachers with different mathematics attainment.62	
Table 4.12:	Pre-school teachers attitude scores by teaching experience (above and below average 11 years teaching experience).64	

LIST OF FIGURES

Table 4.13:	Pre-school teachers attitude towards scaffolding teaching method by school management.	66
Table 4.14:	Mean frequency of use of scaffolding teaching method by pre-school teachers of different teaching experiences.	70
Table 4.15:	Correlation between class size and pre-school teachers use of scaffolding teaching method.	78
Table 4. 16:	Correlation between pre-school teachers teaching experience and use of scaffolding teaching method.	79
Table 4.17:	Correlation significance between training program and use of scaffolding teaching method.	80
Table 4.18:	Correlation significance between attitude and use of scaffolding teaching method.	81
Table 4.19:	Mean frequency of use of scaffolding teaching method and mathematics attainment.	82
Table 4.20:	t- test results.	82
Table 4.21:	Mean frequency of use of scaffolding teaching method and school management.	84
Table 4. 22:	t- test results.	84

LIST OF FIGURES

Figure 1.1:	Graph on KCSE analysis.	4
Figure 1.2:	Teaching factors that influence the frequency of use of scaffolding method in teaching mathematics.	14
Figure 4.1:	Pre- schoolteachers attitude towards scaffolding by training program.....	61
Figure 4.2:	Pre-school teachers' attitude versus training program.....	63
Figure 4.3:	Pre-school teachers' attitude towards scaffolding teaching method versus class size.....	65
Figure 4.4:	Scaffolding teaching method versus mathematics attainment....	68
Figure 4.5:	Pre-school teachers mean frequency of use of scaffolding teaching method versus program/period of training.	69
Figure 4.6:	Mean score in scaffolding by teaching experience.....	70
Figure 4.7:	Pre-school teachers scaffolding scores by class size.....	72
Figure 4.8:	Pre-school teachers mean frequency of using scaffolding teaching method by school management.	73
Figure 4.9:	Graphical comparison of the mean frequency of use of scaffolding teaching method by pre-school teachers in teaching mathematics.....	74
Figure 4.10:	Comparing the means of the frequencies of using different elements of scaffolding teaching method by the pre-school teachers.....	76

ABBREVIATIONS AND ACRONYMS

K.N.E.C -	Kenya National Examination Council
KHA -	Kindergarten Headmistress Association.
KIE -	Kenya Institute of Education.
MoEST -	Ministry of Education Science and Technology.
MoE -	Ministry of Education
CESA -	Comprehensive Education Sector Analysis.
NACECE -	National Center for Early Childhood Education.
CICECE -	City Center for Early Childhood Education.
DICECE -	District Center for Early Childhood Education.
UNICEF -	United Nations International Children's Education Fund.
PTQ -	pre- school teachers questionnaire
CPE -	Certificate of Primary Education
KJSE -	Kenya Junior Secondary Examination
KCSE -	Kenya Certificate of Secondary Education
KACE -	Kenya Advanced Certificate of Education
KCPE -	Kenya Certificate of Primary Education
ECCDE -	Early Childhood Care Development Educational centers
ECD -	Early Childhood Development
ECDE -	Early Childhood Development and Education

CHAPTER ONE: INTRODUCTION

1.1 Background

Mathematics is a subject of very wide application in everyday life. It is a subject which has been made compulsory in Kenyan schools and teacher colleges because of its utility. Cockcroft (1982) expresses the importance of mathematics when he observes:

"There is no doubt that there is general agreement that every child should study mathematics at school; indeed, the study of mathematics together with English is regarded by most people as being essential". (Page 1)

Liebeck, (1984) asserts that mathematics is useful in everyday life, for science, for commerce and for industry. It provides a powerful, concise and unambiguous means of communication because it provides means to explain and predict. Mathematics attains its power through symbols, which have their own grammar and syntax. The usefulness of mathematics to the child and society can be perceived from many different perspectives. For many, it is seen in terms of arithmetic skills which are needed for use at home, in the office or workshop and work place. Others perceive it as the basis of scientific and modern technology (Wando, 1992).

Every person, on leaving school, should have a clear idea of numbers, their operations and the way they are applied to measures of all varieties. He should also be able to conveniently apply the knowledge of mathematics to a wide range of problems that continually occur in his everyday life. Cockcroft (Ibid)

further says that mathematics should enable a student to lead a rich and successful life that would instill confidence in him/her.

A report by Kenya Times 12/10/1991, states that in the world we live in today, the major concern has been to develop a relevant education system that would enable a country achieve rapid social and economic development, factors which measure its level of development. We cannot have technology without science, and neither can we have science without mathematics. Thus, it follows that mathematics is a basic necessity for social and economic development.

There are complaints all over the world and even in our country about the poor performance in mathematics at all levels of education systems. A study reported by the Washington Post, known as Trends in International Mathematics and Science Studies (TIMSS) shows that “We need to do an even better job of exciting our young people in math and science” Hickok, (2004). Another study known as Program for International Students Assessment (PISA) expresses similar sentiments about the American situation.

A paper entitled “Gender Disparity in Science and Mathematics Education” by Verdiana Masanja, (2001) of the Mathematics Department University of Dar es Salaam, Tanzania indicates little progress despite measures taken in Tanzania.

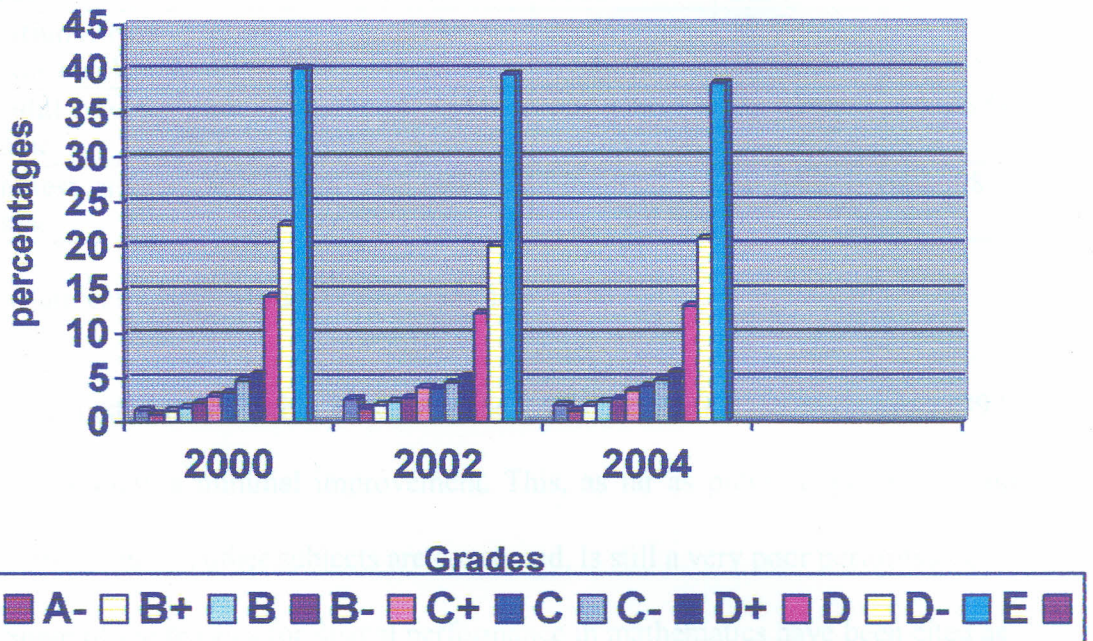
In Kenya this poor performance is especially displayed in the final examinations of Kenya Certificate of Primary Education (KCPE) and Kenya Certificate of Secondary Education (KCSE). This poor performance in mathematics is indicated in the following Table 1.1 and Graph Figure 1.1.

Table 1.1: K.C.S.E. Statistics grades for mathematics for the years 2000-2004.

		ENTRY	A	A-	B+	B	B-	C+	C	C-	D+	D	D-	E
2000	M	96115	1733	1123	1553	2057	2626	3474	3836	5344	5908	14538	20950	3297
	F	82493	526	372	594	760	1115	1674	2037	3121	3773	10878	19024	3861
	ALL	178608	2259	1495	2147	2817	3741	5148	5873	8465	9681	25416	39974	7159
	%		1.26	0.83	1.2	1.57	2.09	2.88	3.28	4.73	5.42	14.23	22.38	40.08
2002	M	104610	3705	2091	2557	3120	3510	4868	4695	5188	5819	13363	20186	3550
	F	91064	1291	884	1100	1395	1811	2755	2709	3500	4305	10787	19022	4150
	ALL	195674	4996	2975	3657	4515	5321	7623	7404	8688	10124	24150	39208	7701
	%		2.55	1.52	1.86	2.3	2.71	3.89	3.78	4.44	5.17	12.34	20.08	39.31
2004	M	117869	3212	2044	2884	3524	3924	5181	5547	6235	7248	15527	22900	3963
	F	101464	927	691	1021	1474	1647	2577	3275	4193	5222	13308	22695	4443
	ALL	219333	4139	2735	3905	5008	5571	7758	8822	10428	12470	28835	45595	8403
	%		1.88	1.24	1.78	2.28	2.53	3.53	4.02	4.75	5.68	13.14	20.78	38.31

(Source: KNEC statistics for years- 2000-2004).

Figure 1.1: Graph on KCSE analysis.



(Source: KNEC statistics for years- 2000-2004).

Table 1.1 (above) indicates a slightly higher percentage of grade A than either A-or B+. The percentages get higher from grade B downwards to around 40% at grade E. A small percentage of marks are very good, while the middle grades where one would expect the percentage to peak seem very low. This shows a positively skewed distribution whereby majority of the scores are low with very few high scores.

Table 1.2: Mathematics KCPE results in 1997-2001.

Year	1997	1998	1999	2000	2001
National raw mean mark	23.48 46.96 %	22.11 44.22 %	24.75 49.50 %	25.09 50.18 %	25.38 50.76 %
Modal raw mark	16.32 %	16.32 %	17.34 %	21.42 %	18.36 %
Highest raw mark	50 / 100	46 / 92	50 / 100	50 / 100	49 / 98

(Source: KNEC statistics for years 1997- 2001).

As depicted in the Table 1.2 above, the KCPE results for the five years (1997-2001) show a minimal improvement. This, as far as public expectations and performance in other subjects are concerned, is still a very poor performance.

Some of the reasons for dismal performance in mathematics have been cited as mathematics being a boring, dull and difficult subject for the learners

(Sidhu,1982). Teachers have been blamed by headteachers and managements as not making students put in adequate effort (Sidhu, 1982). This has resulted in members of the Kenyan public struggling to place their children in better performing schools, both at the pre-school and secondary school levels all over the Republic.

Parents, educators and the public at large have often expressed their concern about the poor performance of the pupils in mathematics with teachers shouldering much of the blame. This is because they are the chief implementers of the curriculum and are therefore seen as having failed to do their job properly. The Newspapers have also attempted to give reasons too. For example, it was reported that teachers go for traditional teaching methods such as lecturing, teacher centered, rote memory, and drilling. The same newspapers

newspapers continue to report that teachers go for these traditional methods because they are less time consuming and help cover the curriculum workload faster (Daily Nation 26/2/2001).

The Newspapers have also reported solutions aimed at improving mathematics performance. Such solutions include a diagnostic study of the approaches and methods being used in handling the subject (Daily Nation 26/2/2001), having the children begin by learning basics of mathematics and starting this learning in formative years (Kenya Times 4/9/2000). Mathematics, according to the 8-4-4 system is compulsory to all children and has been allocated 5 lessons out of 35 lessons per week for lower primary classes and 7 lessons per week out of 40 in upper primary classes (KIE, 2002 primary syllabus vol. 2). In secondary schools the allocations are six out of 45 lessons per week for forms 1 and 2 and 7 out of 45 lessons per week for forms 3 and 4 (KIE, 2002 secondary syllabus vol. 2). Although many hours have been allocated for the teaching of the subject on the timetable, dismal performance in mathematics has persisted. This led the researcher to postulate that the poor performance could be due to use of traditional teaching methods.

There are more effective teaching methods that are used in teaching young children such as thematic, play and scaffolding teaching method that enhance thinking, creativity, dependency and problem solving skills. Studies in other countries have proved scaffolding teaching method to be effective in promoting thinking and problem solving skills whereby collaboration of an adult is vital

(Smith and Cowie 1991). The study was selected to try and unearth the current status of use of scaffolding method in teaching young children.

The studies that have been conducted in mathematics teaching methods so far (Eshiwani, 1986; Rukangu, 2000; Wamani, 1980) although providing solutions, have concentrated on secondary schools, teacher training colleges and primary schools respectively.

According to Rukangu's observation, the cause of children lacking proper learning of spatial concepts was due to external factors such as teachers' lack of skills to control their harshness, to develop appropriate classroom communication and to organize their class activities properly for effective learning. Rukangu recommended the re-examination of formal teacher training programs in Kenya. This led the researcher to try to find out in a field study whether training program had an influence in the use of scaffolding teaching method.

Wamani (1980) dealt with standards 3, 4, and 5 boys' and girls' performance in mathematics and found that there was no significant difference between boys and girls as far as their performance in mathematics was concerned. His recommendation was that both parents and teachers should provide equal opportunities to both genders.

This study was an attempt to address the gap in research on use of scaffolding teaching method which is known to give long lasting effects to children.

Young children learn mathematics in diverse ways as they are taught by teachers of different academic qualifications, teaching experiences, and length of training programs. The same pre-school teachers use traditional teaching methods which do not encourage children's thinking, creativity and problem solving skills (Ngasike, 2004).

Although studies in methods of teaching in Early Childhood Development and Education (ECDE) have been done in Kenya by researchers, no known study in scaffolding teaching method has been done in the country. Scaffolding teaching method has been cited by Vygotsky (1978) as helping children in their ways of thinking and interpreting situations, rather than making children dependent on teachers who drill them to pass examinations with the aim of pleasing headteachers, managers and parents. These are the formative years that form the foundation for later adult life. Experiences achieved in Early Childhood have been proven to have an effect in later years. This is the period that children undergo fast growth changes in mental and physical development (KIE, 1997).

Theorists like Bruner (1960) and Vygotsky as cited by Driscoll (1994), Hausfather (1996), have found the need for the intervention of an adult in helping children move from what they know to what they are supposed to know through guidance. There is the need for pre-school teachers to use scaffolding teaching method in teaching pre-school children. In this case therefore, there is need to focus on how pre-school teachers use scaffolding

teaching method to help the children get to the level they are expected to be at any one time.

1.2 Statement of the Problem

As has already been noted, there has been a public outcry over the poor performance in mathematics at all levels of the education system world wide and in our country Kenya. Although Education studies on the methods of teaching of mathematics at higher levels in Kenya have been documented and results of the findings and recommendations cited, this has not improved results as far as performance of mathematics is concerned. This made the researcher to suggest that researches should be pushed way down to ECDE level, more so on teaching methods which have been cited as one of the contributory factors for the poor performance. This is especially critical when research in other countries of the world indicate that high quality, challenging and accessible mathematics education for 3-8 year old children is a vital foundation for future mathematics skills at higher levels of learning (K.I.E./NACECE, 1997). Research in childhood development has demonstrated that experiences gained in early childhood influence cognitive and social skills at higher levels of education (K.I.E./NACECE, 1997). This then means that improving mathematics performance at the E.C.D.E. level, should improve mathematics skills at higher levels.

Some of the ways of improving this foundation level is through use of better teaching methods such as thematic, play and scaffolding in place of the

traditional teaching methods for instance lecture method, drill and rote memory among others. Although a number of studies have been conducted on the importance of scaffolding teaching method in other parts of the world (Vygotsky as cited by Driscoll 1994, Hausfather 1996, Paul Light in meadows 1983, Forman and Cazden 1993), in Kenya no known studies have been done at ECDE level on the frequency of use of scaffolding teaching method. This study tried to shed some light on the issue by trying to find out how the pre-school teachers use the method during their teaching learning sessions of mathematics. The study was conducted in selected pre-school institutions of Embakasi Division of Nairobi province Kenya.

1.3 Purpose of the Study

The main purpose of this study was to find out the frequency to which pre-school teachers use scaffolding teaching method at ECDE level during their teaching learning sessions of mathematics.

1.4 Objectives of the Study

The study has the following objectives which would help it achieve its purpose:-

1. To find out if pre-school teachers academic level has an influence to the frequency of pre-school teachers use of scaffolding teaching method.
2. To find out whether class size has an influence to the frequency of pre-school teachers use of scaffolding teaching method.

3. To establish if pre-school teachers experience has an influence to the frequency of use of scaffolding teaching method.
4. To find out whether type of training program has an influence to the frequency of pre-school teachers use of scaffolding teaching method.
5. To establish if pre-school teachers vary in their use of scaffolding teaching method.

1.5 Research Hypotheses

The following are the research hypotheses conceptualized for the purpose of this study:-

- H1: There is a significant relationship between class size and the pre-school teachers frequency of use of scaffolding teaching method.
- H2: There is a significant relationship between the pre-school teachers teaching experience and the frequency of use of scaffolding teaching method.
- H3: There is a significant relationship between the type of ECDE Training program and the pre-school teachers frequency of use of scaffolding teaching method.
- H4: There is a significant relationship between pre-school teachers attitude and frequency of use of scaffolding teaching method.
- H5: There is a significant difference between the pre-school teachers who failed and those who passed mathematics at the highest academic levels they attained in their overall frequency of use of scaffolding teaching method.

H6: There is a significant difference between individual pre-school teachers under different managements in their overall frequency of use of scaffolding teaching method.

1.6 Significance of the Study

The findings of this research are useful to pre-school managers who might see the need for using more effective teaching methods. Also, they might see the need for improving their learning environment and making it more conducive for more effective methods. The policy makers, that is, MoE and NACECE, may see the need for implementing and enforcing existing rules and regulations that govern the setting up and running of pre-school institutions. The study could also serve as a pointer to the fields of Bandura's Social Learning Theory, Lev Vygotsky's Social Development and Bruner's Constructivist Theory. The report could also serve as a source of information and reference to the public and other bodies concerned with ECDE. It could also provide material useful in closing the gap existing in research on effective pre-school methods of teaching.

1.7 Delimitation and Limitation

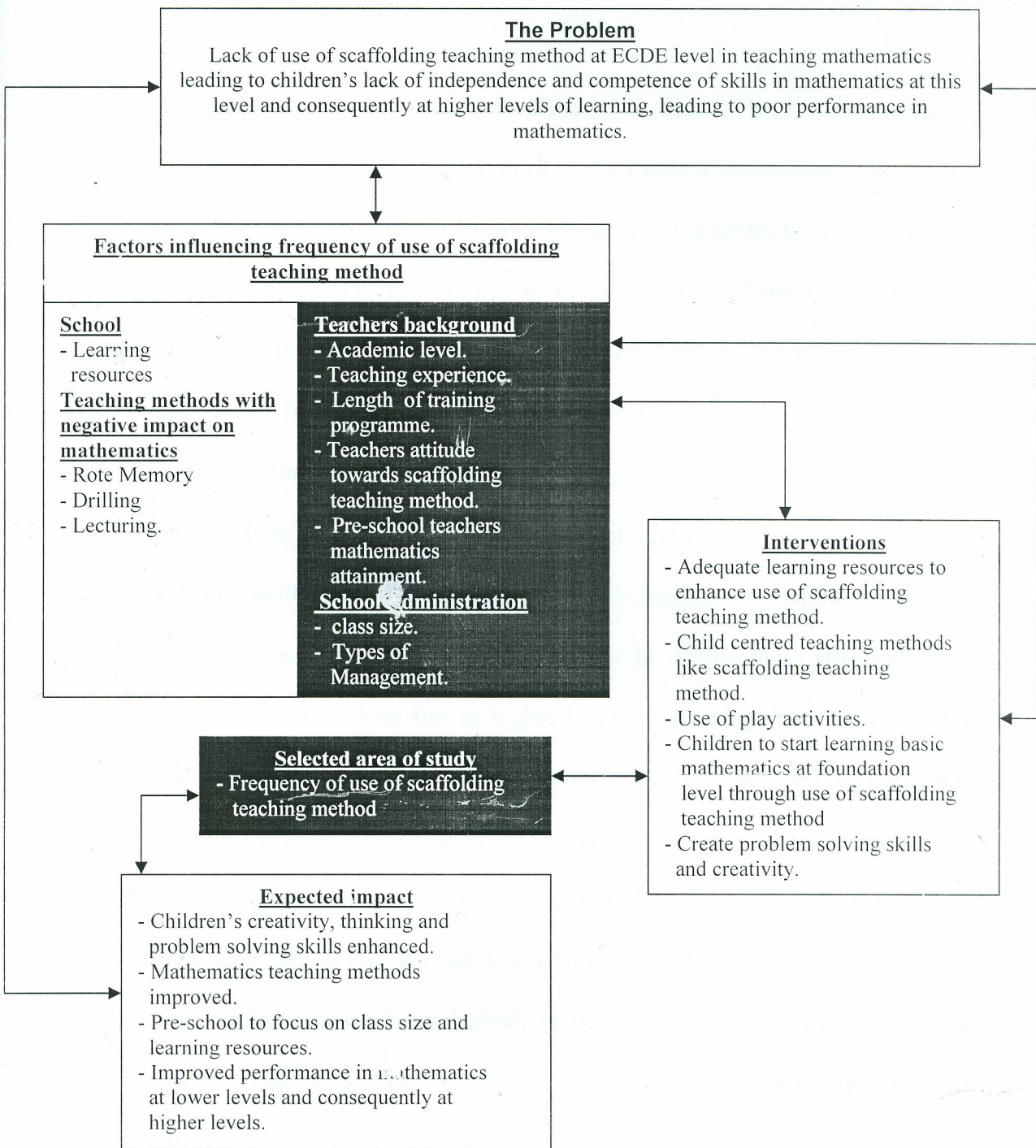
The scope of this study was Embakasi division of Nairobi province Kenya. Due to limited resources, the researcher could not cover the whole province. The results of this study may therefore not be generalized to all pre-schools in Kenya. However, the study could be useful in stimulating further studies in other geographical areas of Kenya in related study areas.

1.8 Assumptions of the Study

One assumption being made was that all private and public/others (Community and Church) pre-schools use the K.I.E./NACECE, K.H.A. and Montessori pre-school curriculum which should include skills, knowledge and attitudes that the children are supposed to acquire through the pre-school teachers use of scaffolding teaching method. It was further assumed that each pre-school teacher was teaching using scaffolding teaching method during the teaching learning process of mathematics. Further, it was assumed that teaching in pre-schools allowed opportunities for optimum interaction of teachers, children and peers through scaffolding teaching method to enhance better capturing of mathematics skills by the children who would then acquire a long lasting grasp of these skills for better performance of mathematics at higher levels of learning.

1.9 Conceptual Framework

The conceptual framework that is, Figure 1.2 shows the interrelationships between variables. This will be displayed in form of a diagram to help the reader quickly grasp the proposed relationship as directed by the arrows. The highlighted areas display the variables to be studied, while the other areas display variables that will not be used for the study but which influence use of scaffolding teaching method during the teaching learning sessions of mathematics. The factors influencing use of scaffolding teaching method, the possible intervention measures and the expected impact of the study are presented in Figure 1.2.



Variables used in the main study.



Variables not used in the main study but which impact on mathematics performance.

Figure 1.2: Teaching factors that influence the frequency of use of scaffolding method in teaching mathematics.

Figure 1.2 displays the interrelationships of the factors that have an influence on performance in mathematics. Poor performance in mathematics has been a headache to education scholars. As such, different scholars have embarked on methods of teaching to eliminate poor performance. However, despite the efforts, dismal performance has persisted. The diagram, Figure 1.2, shows the progression from problem recognition through the various stages of cause analysis, to the tentative solutions and the expected impact.

The problem is identified as lack of use of scaffolding teaching method in teaching mathematics at the ECDE level leading to children's lack of creativity, independence and competence in skills thus affecting their performance in mathematics at higher levels of learning. The causes of this lack of use of scaffolding teaching method are then indicated as traditional teaching methods with negative impact on mathematics, school environment and teacher factors all of which affect the child learning mathematics way down at ECDE level. Various interventions are then proposed with one of them, scaffolding teaching method, being shown as the area of study. The expected impact is then indicated. The various interrelationships are also shown.

1.10 Definition of Operational Terms

Private pre- schools: those pre-schools not staffed by the Ministry of Education and are run by managers.

Public/others (community and church) pre-schools:

Public: pre-schools attached to public primary

schools where staff is deployed by local authorities and Parents Teachers Association.

Others: Local community and church pre-schools developed and financed by groups of people, through communal efforts and could either be within or outside the primary school compound.

Pre-school: Any education institution offering pre-primary education to children between ages 3-8 years.

Pre-school children: between the age range 3-8 years.

Professional training program: the type of training including Kenya institute of Education (K.I.E.)/National Center for Early Childhood (N.A.C.E.C.E), District Center for Early Childhood Education (DICECE); Kindergarten Headmistress Association (K.H.A.) and Montessori.

Pre-school teacher: a teacher teaching in a pre-school.

School management: The type of administration running a school, either private or public/others (community and church).

Academic level: this refers to the highest academic certificate a teacher has acquired.

Scaffolding teaching method: method in which the teacher observes, asks, listens and engages the child in a discussion to help him/her with advanced or complex details on an activity before

listens and engages the child in a discussion to help him/her with advanced or complex details on an activity before he/she engages the activities to the children.

Teaching experience: the number of years a teacher has been teaching with or without training.

Frequency: The number of times a teacher uses scaffolding teaching method.

Teacher centered approach: where the teacher gives facts or criticizes the children.

Teaching method: ways and tactics the teacher uses to put learning content across to the children.

Learning resources: objects or materials that children will interact with during the teaching learning session.

Child centered approaches: where the child is at the center of learning environment.

Directing: teachers controlling childrens learning activities.

Class size: number of children in the classroom.

Soliciting: teachers getting answers/responses from children.

CHAPTER TWO: LITERATURE REVIEW

2.0 Introduction

This chapter is a review of the theories and literature that is related to the study. The first part contains the theoretical basis of the study and the final part reviews scaffolding teaching method and factors influencing its use.

2.1 Theoretical Framework

This research thesis is based on Bandura's Social Learning Theory (also referred to as Observational learning theory or modeling), Vygostky's Social Development Theory and Bruner's Constructivist Theory.

2.1.1 Bandura's Social Learning Theory

Bandura (1977) asserts that,

“Learning would be exceedingly laborious not to mention hazardous if people had to rely solely on the effects of their own action to inform what to do. Fortunately most human behavior is learned observationally through modeling: From observing others, one forms an idea of how new behaviors are performed and on later occasions this coded information serves as a guide for action. Because people can learn from example what to do, at least in approximate form, before performing any behavior, they are spared needless errors.” (p. 22).

According to Bandura, learning is a continuous reciprocal interaction between cognitive, behaviors and environmental influences. Before Bandura considered the following components involved in modeling, he did many studies in modeling (Boence, 1998).

The four components are explained below:-

2.1.1.1 Attentional Processes

Ability to learn through observation depends on attending to and perceiving accurately, significant features of the modeled behavior. Attention is regulated by the observer's characteristics, features of the modeled activities and the structural arrangement of human interactions. This is an important step in the use of scaffolding teaching method whereby the teacher needs to demonstrate activities to be learned in an interesting and succinct manner to cater for children's short attention span.

2.1.1.2 Retention Processes

Influence by retention is dependent on memory and retention of modeled activities. Observational learning is dependent on two representational systems which are imaginal and verbal. Visual imagery is vital in early ages while verbal skills are minimal or lacking. An important element of symbolic coding for retention is rehearsal which can be mental or physical. This rehearsal stage is vital during the use of scaffolding teaching method as it ensures the children have learnt what they need to know to take them to the next level of knowledge.

2.1.1.3 Motor Reproduction Processes

Modeled patterns result in reproduction of behavior as an achievement after organization of responses. The end product depends on availability of component

skills and ability to assimilate. Deficits in performance can be reduced by modeling and more practice. For purposes of accuracy it is important to correct and adjust as practice goes on. Trial and error fumbling can be refined to perfect performance after thorough practice. Teachers should ensure that they provide the children with enough time to practice the modeled activities and through continuous scaffolds the children are able to perfect the modeled activities.

2.1.1.4 Motivational Processes

Acquisition and performance will depend on observed consequences. Negative consequences will result in rejection as opposed to what is self satisfying (Hicks, 1971). Provision of models will not necessarily produce similar behavior due to the many factors controlling observational learning. Demonstration of desired responses instructs and prompts those who fail while rewarding those who succeed. In essence, what is correct should be followed by rewards and what the children have failed in should be modeled again and more practice in the activities to be provided to the children through the continuous use of scaffolds.

The observational learning theory is appropriate for this study because as pre-school teachers teach, children copy many behaviors modeled by the teacher who acts as their role model.

Children observe and learn from what their teachers do. The observer, who is the child, is expected to reproduce or display a modeled behavior that he/she liked when observing the teacher scaffold them during the teaching learning

session. If what is being taught is followed by positive reinforcement after scaffolding, those children will display the behavior they liked about the teacher.

2.1.2 Lev Vygotsky's Social Development Theory

Lev Vygotsky, (1978) asserts that all humans learn and develop within the context of their particular culture. This culture includes the family, school and social environment. According to Vygotsky's Social Development Theory as cited by (Driscoll 1994; Hausfather, 1996), development is a life long process that is dependent on social interaction, which leads to learning and this learning then leads to cognitive development.

Vygotsky says that children have a phenomena called the Zone of Proximal Development which he describes as the distance between the child's actual development level as determined by independent problem solving and the level of potential development as determined through problem solving under an adult's guidance, or in collaboration with more capable peers (Vygotsky, 1978). The Zone of Proximal Development bridges the gap between what children can do on their own and what they can only do with guidance. Childrens' social interaction with more knowledgeable or capable others or with their environment significantly impacts on their ways of thinking and interpreting situations.

A child develops his/her interests through internalizing concepts based on his/her own interpretation of an activity that occurs in a social setting. This communication involves parents, teachers, peers and others and helps the child

to construct an understanding of the concept (Bransford et al 2000). Vygotsky as cited by Hausfather, (1996) asserts that learning is a reciprocal experience where the teacher and the children are supposed to work in collaboration (Forman and Cazden (1993). The teacher should also not dictate what he or she wants her children to learn for future recitation but should collaborate with the children in order to create meaning in ways that can enable the children make their own meaning.

Vygotsky as cited by Hausfather, (1996) asserts that scaffolding as a teaching method is effective in accessing Zone of Proximal Development. Vygotsky continues to say that the teacher must engage children's interest, simplify tasks to make them manageable and motivate children to pursue the instructional goal. The teacher should also look for discrepancies between children's effort and the solution, control for frustration and risk and model an idealized version of the activities. Vygotsky's social development theory challenges traditional teaching methods where the teacher spreads the content to be memorized and then the children would recite the same to the teacher (Hausfather 1996).

In today's teaching, traditional methods such as rote memory are encouraged through teachers and parents of young children teaching their children counting as the first mathematical idea. This rote memory has no meaning at this developmental stage (Eshiwani 1974). Lev Vygotsky's Social Development Theory will be appropriate for this study in that as children learn, their interaction with peers and the teacher helps them learn better as proved by Vygotsky and his associates. As the teacher scaffolds children during the

teaching learning process, children are able to connect what they already know and what they are supposed to know through guidance.

The study wished to find out the current status of the use of scaffolding teaching method in pre-schools and the frequency to which it was being practiced.

2.1.3 Bruner's Constructivist Theory

Bruner's Constructivist Theory is based upon the study of cognition which stresses that "learning is an active process in which learners construct new ideas or concepts based upon their current/past knowledge" (Kearsley 1994b). Bruner continues to say that cognitive structures are used to provide meaning and organization to experiences and allow the individual to go beyond the information given. Smith and Cowie, 1991 asserts that the teacher should try and encourage students to discover principles by themselves. The teacher's role is to translate information to be learnt into a format appropriate to the learner's current state of understanding and organize it in a spiral manner so that the child continually builds upon what he/she has already learnt. Bruner (as cited by Smith and Cowie 1991) supports the assertion that a teacher's role is not as an instructor but rather a scaffolder supporting, encouraging and extending the child's own active search for understanding.

Teachers are supposed to make learning material simple and explain the same to the children in a language that they can understand through use of

scaffolding teaching method. It is also a teacher's responsibility to demonstrate activities and give children a chance to practice the activities as both parties interact through question and answer. This reciprocal stage is very important as it helps the teacher know whether any learning has taken place before engaging real activities to children. As the teacher now engages the activities to the children, he/she will at the same time work with them, scaffolding them through encouraging and supporting them through praises, either verbal or material.

As the teacher interacts with the children, he/she gets a chance to know what they already know and through building on the children's prior information, he/she is able to lead them to new knowledge through guidance during an activity. The researcher tried to find out the frequency of use of scaffolding teaching method in a field study.

2.2 Teaching Methods

According to Sidhu (1982), there are many different methods and approaches of teaching. Sidhu (1982) also notes that authorities appreciate good results emanating from traditional methods of learning, that is, lecturing, drilling and rote memory. Sidhu continues to say that the teacher goes for the same as it is easier but at the expense of practical work which enhances interest and understanding. However, Vygotsky (1978) asserts that scaffolding by an experienced adult (in this case a teacher/caregiver/peer) is helpful when teaching young children. According to K.I.E. / N.A.C.E.C.E. (1997), young

children learn best through play whereby the presence of an adult is of importance. They also learn best when teachers put into consideration the children's experiences. Thematic Teaching Approach according to Guidelines for Early Childhood Development in Kenya (1997) is a method of teaching young children using themes such as water, myself, kitchen utensils or domestic animals. The pre-school teachers and the children may develop themes according to their interests. All activity areas are totally integrated and revolve around the chosen theme whereby children acquire skills, knowledge and attitudes. Child Care Training Guide developed by Brown (2003) supports the use of a theme when teaching mathematics in individual or group activities and as an integrated segment of an entire pre-school curriculum.

Whitebread, (1997) emphasizes the use of a theme which he refers to as a topic or a project. He has used the theme "The Fashion Show" and has covered all the activity areas covered in pre-school such as language, science, music among others.

2.3 Scaffolding Teaching Method

According to North Central Region Educational Laboratory (2003), scaffolding is an instructional method of teaching whereby the teacher models the desired learning strategy or task then gradually shifts responsibility to the children. When a teacher suspects the child does not have an idea or words needed for a particular task, he/she may explain some part of the content with something else he/she knows the child understands from another situation. The teacher

uses what is correct in the child's response but probes the child so as to suggest good possibilities for active consideration.

Raymond (2000) defines scaffolding method as the role of the teacher and others in supporting the child's development and providing support structures to get the child to that next stage or level. Scaffolding instructions as a teaching method originates from Lev Vygotsky's concept of Zone Of Proximal Development. According to Vygotsky as cited by Whitebread (1997), a child has two levels of learning, namely level of actual development and level of potential development and without an adult, he/she can use only one level which is the level of actual development. This Zone Of Proximal Development is the distance between what children can do by themselves and the next learning episode that they can be helped to achieve with competent assistance (Raymond, 2000). During the teaching learning process of mathematics in pre-school, a teacher is considered important. Vygotsky's (Ibid) model of Zone Of Proximal Development further asserts that there must be two individuals of two different developmental levels, that is, one at a higher level and the other at a lower level, in order to enhance interaction (Driscoll 1994; Hausfather 1996). In this case therefore, the teacher through scaffolding will help the child to move from the actual development level to achieve the potential level. Further, peer collaboration will help the child to perform a task that would have been difficult if he did it alone (Smith and Cowie 1991). The teacher and the other peers should build children's ideas to help bridge what they know and what they are supposed to know. Marjasam (1974) supports the idea of a teacher being a scaffolder through talking to the child, questioning him, introducing

him/her to words and number names and also encouraging him to make comparisons and statements.

The more capable other provides the scaffold so that the learner can accomplish with assistance the tasks that he/she could otherwise not complete, thus helping the learner through Zone Of Proximal Development (Bransford et al 2000). Scaffolds are temporary as Chang et al, 2002 put it, in that, as the child's abilities increase, the scaffolding provided by the more knowledgeable other is progressively withdrawn. Finally the child is able to complete the task or master the concepts independently.

Parents and caregivers help young children learn how to link familiar situations with new knowledge through verbal and non-verbal communication and modeling behaviors through scaffolds. The scaffolds provided are activities and tasks that motivate, simplify the task, provide some direction, indicate differences between the child's work and the desired solution, reduce frustration and risk and clearly define the expectations of the activity to be performed (Bransford et al 2000).

“Teachers activate this zone when they teach children concepts that are just above their current skills and knowledge level which motivates them to excel beyond their current skills level” (Jaramillo,1996p.138). Children are guided and supported through learning activities that serve as interactive bridges to get them to the next level, thus developing new understanding by elaborating on their prior knowledge through the support provided by more capable others (Raymond, 2000). Studies have shown that in the absence of guided learning

experiences and social interaction, learning and development are hindered (Bransford, et al 2000).

Scaffolding instruction guides the learner to be independent and to gain self-regulated competence of skills. This occurs when the learner's inner speech occurs on an automatic unconscious level (Ellis et al n.d.). In addition to improving children's cognitive abilities, scaffolding instruction in the context of classroom learning delivers efficiency since the work is structured and focused and creates momentum through the structure provided by scaffolding, thus children spending less time searching and more time on learning, resulting in quicker learning (Mackenzie, 1999).

In scaffolding, questions help children to solve a problem or complete a task. Teachers may increase the level of questions or specificity until the child is able to provide a correct response. For example, in forming number seven, if a child makes the line that goes across to be longer than the one that goes downwards, the teacher can display a correctly written number seven on a pre-prepared number chart and then start his/her scaffolds from there leading the child to forming number seven correctly. This type of scaffold is reflected by Olson and Platt, (2000). As the child develops his/her ability in applying the rule, the intrusive nature of questions would be decreased until the child can do the task without prompting. Following the use of teacher provided scaffolds, he/she may then have the children engage in cooperative learning whereby the children help each other in small groups but still have some teacher assistance.

which serves as a step in the process of decreasing the scaffolds provided by the teacher and needed by the children (Hartman, 2002).

According to Vygotsky as quoted by Smith and Cowie (1991), an adult has a central role during the child's learning process. Young children are scaffolded by the teacher through explaining part of an activity that a child knows while the teacher can also still use what is correct in a child's response, to suggest good possibilities for active consideration (Clay and Cazden 1992). Harmin (1994), asserts that a teacher may model the appropriate thinking or working skill common to the children in the classroom and then children can take over the activity. The adult (in this case a teacher) acts as a scaffolder to support, encourage and extend the child's own active search for understanding.

Clermont (1980) as cited in Kamii, (1982) stresses the importance of social interaction between children. This is established through grouping children during an activity whereby through offering of opinions, children have an opportunity to make new relationships and reason at a higher level than children in a control group.

Though scaffolding has some drawbacks, such as individual preparation on the side of the teacher and need for teacher training in the use of the method to display its effect, it has a lot more far reaching impact on the side of the learner who is the child. The child is not passively listening but is fully engaged through the teacher prompting him/her to build on prior knowledge. Thus, children get motivated so that they want to learn more. Also this type of

instruction can minimize the level of frustration on the part of pre-school children whose attention span and boredom levels are very low.

Therefore the goal of the teacher when using scaffolding teaching method is for the child to become an independent and self-regulating learner and problem solver (Hartman, 2002).

It is in cognizance of these facts that the researcher tried to find out in a field study the frequency of use of scaffolding teaching method during the teaching learning process of mathematics. Further, the researcher tried to find out the extent to which various factors that influence its use affects its practice by pre-school teachers. This is the main focus of this study.

2.4 Factors influencing frequency of use of Scaffolding Teaching Method in a Classroom Setting

The researcher selected the following factors to study their effect on the use of scaffolding teaching method: - academic level, class size, teaching experience, type of training program, pre-school teachers attitude towards scaffolding teaching method, pre-school teachers mathematics attainment (in terms of grade scored at highest level attained) and school management.

Young children learn mathematics in diverse ways since they are taught by teachers of different academic qualifications, different teaching experiences, trained under different training programs, using different training methods and by teachers who have different attitudes towards use of scaffolding teaching method in teaching mathematics. The same teachers vary in their use of teaching methods.

Early interests and enjoyment in pre-number activities is fundamental for laying a firm foundation in mathematics and for future interests in the subject (ECD Guidelines 1997). Children acquire mathematical skills and concepts at an early age. By the age of four, for example, children can be heard making statements such as, "She has a big cup", "I am taller than you," and so on.

Deb Russel, (2002) says early development of number concepts is critical in developing positive attitudes about mathematics at an early age. Special methods of teaching and enough, motivating, concrete and stimulating learning resources for children to manipulate, along with activities will assist children to achieve a liking for mathematics. A teacher's knowledge and experience in mathematics will be of great help on the side of the teacher in choosing children's activities and teaching learning resources.

The above mentioned factors likely to influence frequency of use of scaffolding teaching method are discussed below.

2.4.1 Teachers Academic Level and Mathematics Attainment

Sidhu (1982) affirms that it is a common defect in our education set up that most of the teachers are not adequately qualified in the subjects concerned. Without proper qualifications they fail to do justice to the subject and hence do not assist their children adequately. Moyles and Adams (2000) in their studies indicated that teachers working in ECDE should be well equipped academically, intellectually and in their personal moral strength in issues related to their profession. An adequate and high qualification of a teacher

creates self confidence, self esteem and serves as a source of inspiration to the children he/she teaches.

Wando (1992) says that one of the most important resource for good mathematics teaching is an adequate supply of competent teachers. Normally the competency of teachers is classified in terms of their academic and professional qualifications.

Rising et al. (1972:5), argues that:

“Most people agree that a first requirement for success in teaching mathematics is knowing mathematics. If we are to teach mathematics so that it is understood and makes sense, so that it can be applied, we must have an adequate background in the mathematical content.” (pg.5).

Bell (1980) holds the same view:

“Although it is a fact that there are many people who have an excellent knowledge of mathematics but who are not good teachers of mathematics, there are few if any good mathematics teachers who do not know mathematics.” (pg. 3).

Among the many characteristics of a good mathematics teacher, the primary prerequisite is a sound knowledge and understanding of mathematics. Thus a teacher of mathematics has to have a sound knowledge and understanding of mathematics. If a teacher lacks this, he/she may well deliver the little he/she has which might be crowded with misinformation. This means that a teacher's

performance in mathematics at the highest academic level attained is of great importance in his/her teaching of mathematics.

In contrast, Ryan and Cooper, (1975) do not agree that knowledge in the subject is a necessity for teaching ability. They further stress that there is a profound difference between knowing and doing. Knowing in this case refers to academic qualification and doing refers to teaching ability. In effect, they are stating that one may be highly academically qualified but this is not an indicator of teaching ability. This is further shown by the fact that according to the MoEST Statistical Report (1995), teachers employed in Early Childhood Centers were secondary school leavers and Certificate of Primary Education holders. Advanced level of secondary education and University degree holders are also handling pre-school children. Some of the Early Childhood Centers are situated in primary schools. The community there rates the pre-school teachers as of low academic level because the profession is not expected to require highly qualified people.

According to (MoEST) circular of August 16/2001(Ref.PE/18/3/66), for recruitment of pre-school teachers, the minimum grade to enter a pre-school certificate training college was D+. This grade qualifies them to teach pre-school children during their in-service course in all the activity areas, regardless of whether or not they passed in the subject in their primary or secondary school academic work. The study wished to determine whether academic performance had an effect on use of scaffolding teaching method.

2.4.2 Class Size

A study by Sidhu (1982), shows that individual attention cannot be achieved if the classes are too large. In primary level, a maximum of forty five children is recommended per teacher. Moyles and Adam (2000), claim that in developed countries the recommended teacher-child ratio is 1:10, enabling teachers to give quality and individual attention. According to KIE/NACECE ECD Guidelines (1997), for children below one year teacher/child ratio should be 3-4 children; for the three year old children, it should be 10-15 children to one teacher; 3-5 year olds should be 25-30 children to one teacher and for 5-6 year olds the ratio should be 35 children per teacher. A study by Gakuru (1979), shows that teacher-child ratio is too high in Nairobi as one teacher can teach between forty to eighty children. The ratio of the number of children to one teacher increases in rural areas. In most communities, Early Childhood Care and Development Educational (ECCDE) centers lack the financial capacity to employ sufficient number of teachers, that is, they are unable to establish and maintain a reasonable Teacher per Pupil Ratio. According to the Comprehensive Education Sector Analysis (CESA) team as cited in (UNICEF,2001) Teacher per Pupil Ratios exhibit considerable regional disparity. Areas with satisfactory ratios include Nairobi 1:34, Eldoret Municipality 1:32, Baringo 1:34. But other areas are badly hit for example Turkana 1:504, Marsabit 1:330, Mt. Elgon 1:316, Bomet 1:294, Nyandarua 1:227.

At this point therefore, if scaffolding and individual attention are to be taken care of, Teacher per Pupil Ratio is an issue to be investigated. This is one of the

areas of focus of this study in order to establish whether class size had an influence on frequency of use of scaffolding teaching method.

2.4.2 Teaching Experience

Teaching experience as used in the study refers to the number of years a teacher has taught in a pre-school center.

Sidhu (1982), notes that:

“...successful teaching experience is a valuable asset. It will enable the person (teacher) to acquire certain commendable characteristics such as promptness, adaptability, efficiency, the knack of arousing and maintaining interest, adequate command of instructional material and the ability to face the class with confidence.” (pg.195).

Thus, teachers with successful teaching experience will be better able to choose appropriate teaching learning resources and use appropriate methods and to select problem solving skills to arouse children's curiosity and interest in learning mathematics.

Bernes (1985) observed that longitudinal studies conducted by Fuller and Fielder (which documented stages in the development of teachers education and focused particularly on their concerns), suggest that teachers' effectiveness while it may increase through the early years of a teaching career, probably does not continue to do so. He notes that as suggested in a substantial proportion of studies, increases in teaching experience, at least after the early years in classroom, are associated with a tendency for teachers to reject

innovations and alterations in educational policy. To gain more experience the teacher should also frequently observe classroom work of experienced teachers in the practicing school (Sidhu 1982). According to Richet (1994) a teacher's experience might turn out to be of importance or of no importance depending on the individual's application of what he learnt earlier to new learning. From these observations, it is safe to say that the relationships that exist between a teacher's experience and how he/she scaffolds children need to be established in a field study.

2.4.3 Professional Training Program

According to Sidhu (1982), many teaching failures in mathematics can be attributed primarily to lack of understanding of the subject. However, in early childhood, teachers should not only know one subject but also other subjects in the curriculum since the National Guidelines for E.C.E. (1997) emphasize the thematic way of teaching. The teacher should also acquire a good knowledge of educational psychology to be familiar with the laws of learning, for example the knowledge of the various factors governing attention, interest, fatigue, perception, understanding, among others that vitally affect his/her success in the classroom. A course in the principles and philosophy of teaching is also important for it will reveal to him/her the overall picture of the theory and practice of teaching (Farrant, 1964).

There are different types of pre-school teachers training colleges and they use different training methods. Examples are District Center for Early Childhood

Education (DICECE), Kindergarten Headmistress Association (K.H.A.) & Montessori. DICECE trains its teachers for two years which covers six in service sessions, each covering three weeks during the school holidays. K.H.A. gives a one year full time training course. K.H.A. offers training to post secondary school ECDE trainees. This is because the K.H.A. believes that for a pre-school teacher to be effective, he/she should have a sound educational background and training. Montessori, which has only one center situated in Nairobi, trains only a small number of teachers who later teach in the few schools using the Montessori method of teaching. The researcher wished to find out if use of different types of training programs, using different training methods is related to the extent to which pre-school teachers use scaffolding teaching method during the teaching of mathematics to pre-school children.

2.4.5 Teachers Attitude towards use of Scaffolding Teaching Method in teaching Mathematics

One of the general aims of mathematics teaching in Kenya, is that the children should acquire and preserve desirable attitudes about themselves and their relationship with the environment. At school, teachers should assist children to develop positive attitudes towards mathematics, since when a child's curiosity and concern are aroused, learning becomes automatic. This calls for the children to have positive attitudes towards the subject.

As Evans et al (1965) say:

“attitudes and interest can be and are learned. What form they will take is not determined at birth or

earlier but depends on the environment in which the child grows up in and the treatment he receives” (pg.10).

According to this statement, what a child inherits can be enhanced or inhibited by the environment he/she is brought up in. The method used to impart knowledge to this child is of great importance, thus the need for this study to find out the frequency of use of scaffolding teaching method which has been established by theorists to have far reaching effects in learning of young children.

Evans, (1965) et al also assert that the environment of the child is the school and the home. They also feel that it is important to know the attitude held by their teachers because they have a responsibility of helping children develop favorable attitudes towards mathematics. Seers (1973) noted about being forced to learn, “somebody must want to learn or he will not learn”. He is supported by Johnson (1972) who also noted that the attitude held by a child determines not only his willingness to study mathematics, but also his use of the same.

Fenema and Sherman (1981) did a research on sex related differences in mathematics and noted that starting in the early years of learning and continuing through high school, fathers were perceived as the family authority as far as learning of mathematics was concerned and females therefore started being socialized to the image that mathematics was for males. This is in line with what Maritim, (1979) has asserted about the positive attitude that the male

children have towards mathematics. They have an edge over their female counter parts.

According to Caidwell (1972) in Orton (1987) a neutral or negative attitude may influence the teachers in two ways; some teachers may simply avoid the teaching of mathematics while some of the female teachers may pass to the young children the negative attitude that they hold towards the subject. Stollerg (1974) argues that teachers with a negative attitude will avoid teaching of mathematics or if forced to teach the subject will either teach it as routine or neglect the subject completely. Teachers in their teaching career need encouragement and support from fellow teachers, parents, children and managers to boost their positive teaching morale and develop positive attitudes to teaching.

2.4.6 School Management

Gakuru's study (1979) indicated that early childhood centers in Nairobi are categorized as either public/others (community and church) or private pre-schools. Pre-primary education in Nairobi is owned by city administration, individual entrepreneurs, self-help committees, churches and welfare organizations. Learning in all these categories of pre-schools is varied since preparing a curriculum and coordinating it for the varied pre-schools seems difficult. At the same time class size will depend on the type of management.

The study wished to find out in a field study whether pre-school teachers teaching in the different categories of management differed in their frequency of use of scaffolding teaching.

CHAPTER THREE: METHODOLOGY

3.0 Introduction

This chapter explains the research design adopted in the study, teacher's personal variables, the population, sample and sampling procedure. It also gives a brief description of research instruments, pilot study, data collection techniques, data analysis and statistical hypotheses.

3.1 Research Design

The research design used in the study was ex-post-facto which was utilized to establish pre-school teachers use of scaffolding teaching method. Ex-post-facto research attempts to understand relationships among phenomena as they occur without the researcher's intervention (Polit and Hungler, 1995). It was used in collaboration with correlation techniques to relate various teachers factors with the different frequencies of the pre-school teachers use of scaffolding teaching method.

3.2 Variables

3.2.1 Independent Variables

- Number of children in the class.
- The experience in number of years a Pre-school teacher has been teaching with or without training.
- The type of training in ECDE program of the pre-school teachers.
- Pre-school teachers attitude towards frequency of use of

scaffolding teaching method.

- Pre-school teachers attainment in mathematics at highest level of education attained.
- Type of pre-school management.
- Pre-school teachers academic level.

3.2.2 Dependent Variable

- Pre-school teachers frequency of use of scaffolding teaching method.

3.3 Target Population and Site

The study targeted 85 pre-school institutions handled by 97 pre-school teachers in Embakasi Division of Nairobi Province (as shown in Table 3.1). Pre-school teachers who participated in the study were drawn from these institutions. These pre-schools are sponsored by public/others (community and church) & private managements. Embakasi is an average performing division academically at K.C.P.E. level in Nairobi province, Kenya as is shown by the fact that in the years 2003, 2004 and 2005 it was in positions 3, 4 and 5 out of the 8 divisions in Nairobi with mean scores of 50.60, 51.73 and 51.73 respectively (K.C.P.E analysis and order of merit, 2003, 2004, 2005). It is also a cosmopolitan division and the largest in Nairobi. It is divided into two educational zones, that is, Kayole and Dandora.

Table 3.1: Distribution of pre-schools and pre-school teachers in each management category.

Management.	No. of pre-schools	No. of pre-school teachers
Public/others (community and church)	33	43
Private	52	54
Total	85	97

3.4 Sample Size

The study involved 24 pre-school teachers. This number of pre-school teachers was selected from public/others (community and church) and private pre-school institutions. This small number of pre-school teachers was selected because the study used systematic observation where each teacher was observed three times. The previous researches from which this observation method was derived used a sample size of 20 -30 teachers (Flanders, 1970; Muthwii, 1981).

3.5 Sampling Techniques

Embakasi Division was randomly selected using lottery sampling method. The names of the eight divisions of Nairobi Province were indicated on eight lots (pieces of paper on which choices were indicated separately and subsequently folded) which were then thoroughly mixed in a container to eliminate bias. Random blindfolded picking yielded the lot for Embakasi. To select the teachers for the study from 97 pre-school teachers availed from the Divisional

Office (who were drawn from the two types of management to ensure that pre-school teachers handling children from both managements were included), the researcher categorized the pre-school teachers and entered their names in the computer spreadsheet and using the S-Plus package, numbers were generated of the twenty four pre-school teachers needed for the study. The schools selected depended on whether the pre-school teachers' characteristics named previously fell under them. Pre-school teachers were chosen from the two zones that is, Kayole and Dandora. This information is shown in Table 3.2.

Table 3.2: Sampling Frame.

Management	No. of pre-school teachers.	Selected sample.
Public/others (community and church)	43	11
Private	54	13
Total	97	24

3.6 Research Instruments

The study used 2 questionnaires and an observation checklist. The first questionnaire was used to solicit data on teachers' personal characteristics [Appendix A - Section I]. The second part of questionnaire was used to elicit information on pre-school teachers attitude towards scaffolding teaching-

method [Section II]). The observation checklist was used by the researcher in the classroom during the observation session to check off whenever a teacher used one of the six elements of scaffolding teaching method [Appendix B - Section I.

Data was coded for computer analysis. All the data was analyzed using the Statistical Package for Social Sciences (SPSS). From the questionnaires, the researcher collected the independent variables, namely academic level, class size, teaching experience, type of training program, attitude that the pre-school teachers held towards scaffolding teaching method, mathematics attainment grade in the highest academic level and type of management in relation to the dependent variable which was frequency of use of scaffolding teaching method. From Appendix A, Section II, the responses from the sample being researched, the researcher was able to gather information on the attitudes teachers had towards scaffolding teaching method.

Individual scores for the 13 different responses were added and then divided by the number of responses to get the mean. This made it possible to find out the quality of performance of the sample researched as far as frequency of use of scaffolding teaching method was concerned. A score of 8 out of 13 indicated a teacher's favorable (positive) attitude towards scaffolding teaching method.

The scoring for mean frequency of use of scaffolding teaching method and its six elements was done using the tally hash marks the researcher obtained during observation in the classrooms using the observation checklist [Appendix B Section I]. The mean scores for each teacher on the various elements of scaffolding, derived from the three different observations, were then used to

generate data on the various components of the study using the SPSS package.

This data was then utilized in the descriptive and inferential data analysis.

3.6.1 Questionnaires

The questionnaires contained a series of questions for the pre-school teachers to respond to and enable the researcher obtain the necessary information about their personal characteristics. The first part of the questionnaire was given to the pre-school teachers participating in the study to indicate their academic qualifications, class size, teaching experience, type of ECDE training program, attainment in Mathematics and type of school management. While the second part was for the teachers to indicate their attitude towards scaffolding teaching method,

3.6.2 Observation Checklist

This observation checklist was used to score on the teacher's use of the six elements of scaffolding teaching method. The researcher was checking off as the teacher used scaffolding teaching method on the six elements under the method during the teaching learning process of mathematics. This was formatted in five columns of five minutes each and a break of one minute. Thirty minutes were used for each lesson. Three different pages were used for the three different observations.

The following Table 3.3 shows the observation pattern that the researcher followed during her research period of 72 days. In the Table 3.3, D 1-72 represents 72 days of observation and T 1-24 represents 24 pre-school teachers.

Table 3.3: Observation pattern.

KEY: D represents day.

T represents teacher.

ROUND 1

ROUND 1	D	D	D	D	D	D	D	D	D	D	D	D
	1	2	3	4	5	6	7	8	9	10	11	12
TEACHER	T	T	T	T	T	T	T	T	T	T	T	T
	1	2	3	4	5	6	7	8	9	10	11	12
ROUND 1	D	D	D	D	D	D	D	D	D	D	D	D
	13	14	15	16	17	18	19	20	21	22	23	24
TEACHER	T	T	T	T	T	T	T	T	T	T	T	T
	13	14	15	16	17	18	19	20	21	22	23	24

ROUND 2

ROUND 2	D	D	D	D	D	D	D	D	D	D	D	D
	1	2	3	4	5	6	7	8	9	10	11	12
TEACHER	T	T	T	T	T	T	T	T	T	T	T	T
	1	2	3	4	5	6	7	8	9	10	11	12
ROUND 2	D	D	D	D	D	D	D	D	D	D	D	D
	13	14	15	16	17	18	19	20	21	22	23	24
TEACHER	T	T	T	T	T	T	T	T	T	T	T	T
	13	14	15	16	17	18	19	20	21	22	23	24

ROUND 3

ROUND 3	D	D	D	D	D	D	D	D	D	D	D	D
	1	2	3	4	5	6	7	8	9	10	11	12
TEACHER	T	T	T	T	T	T	T	T	T	T	T	T
	1	2	3	4	5	6	7	8	9	10	11	12
ROUND 3	D	D	D	D	D	D	D	D	D	D	D	D
	13	14	15	16	17	18	19	20	21	22	23	24
TEACHER	T	T	T	T	T	T	T	T	T	T	T	T
	13	14	15	16	17	18	19	20	21	22	23	24

3.7 Pilot Study

A pilot study was conducted in Embakasi Division Nairobi Province, Kenya prior to collection of data for the final study among pre-school teachers in Embakasi Division. The researcher purposefully sampled 4 pre-school teachers. The pre-schools included public/others (community and church) and private pre-schools. These pre-school teachers were observed teaching and they also filled the questionnaires. The data collected from this pilot study was analyzed and the results used to make appropriate adjustments on the instruments and the research process. For example, corrections were made on the language used on the questionnaire. Also, some corrections were made on the instrument Appendix A Section II where the teachers were supposed to respond on their personal characteristics, that is, numbers 1-5. The information was disregarded and number 6 was consolidated with information on page 104. Consequently the Appendix B Section I was disregarded and what was Appendix B section II became Appendix A Section II). Language on the current questionnaire Appendix A Section II was altered to enable pre-school teachers better understand the statements on scaffolding teaching method. The pre-schools from where pre-school teachers were selected for the pilot study were excluded from the main study.

3.7.1 Validity

Corrections were made to ambiguous phrases in the questionnaires and some questions which appeared repetitive were omitted to ensure validity of the

research contents. To ensure that tallying during classroom observations were accurate and reflected the pre-school teachers use of the elements of scaffolding teaching method, the researcher maintained a steady pace in line with Flanders (1970), procedures of classroom observation.

3.7.2 Reliability

Test-retest reliability measure was used to ascertain reliability. The teachers were each observed twice with an intervening period of one week between observations and the results compared using the spearman rank order test to generate a correlation coefficient, which at a value of $r= 0.7876$, was high enough to indicate an acceptable degree of reliability.

3.8 Data Collection Techniques

To enable the researcher to purposefully select the pre-school teachers, assistance from the Divisional Advisor was needed. Pre-school teachers with different ECDE training programs and from either Public/others (community and church) and Private pre-schools were selected. They were drawn from the two zones in Embakasi Division that is, Kayole and Dandora. After selecting the teachers as is indicated in section 3.5, the researcher visited the pre-schools and with the head teacher's/ manager's guidance, the selected teacher was identified. The researcher also checked time tables in the different pre-schools to be able to draw an appropriate observation pattern. The researcher first created good rapport and ensured confidentiality of the report with the teachers. This was to get rid of any anxiety that the teacher could have towards the

researcher as to why the researcher had come to that particular class. This was because some pre-school teachers may have a negative attitude towards anybody coming to their classrooms to observe events, assess them or just to know more about their teaching, that is, they lack trust in them (Rodd 1994). To collect data, the researcher observed from the back of the classroom as the teacher taught mathematics. The researcher checked off on the pre-prepared observation checklist to ascertain the frequency of the teacher's use of scaffolding teaching method on the six elements of the method. The mean of the total tallies from the three observations for each teacher were used to get the frequency of the use of the six elements of the teaching method. The overall use of the method was got from the mean totals of all its six elements. The researcher observed one teacher per day before break. The total number of days for observation was 72 since each teacher was observed three times. After the third observation, respondents filled the questionnaire about their attitude towards scaffolding teaching method and immediately handed over the papers to the researcher, followed immediately by the questionnaire that would solicit data on their personal characteristics and after completion, handed them over to the researcher. This immediate collection of papers ensured a hundred per cent reception of the questionnaires.

3.9 Logistical and Ethical Consideration

To ensure the study was fully authorized the researcher obtained a research permit from the Permanent Secretary in the Ministry of Education and permission from the Director of City Education to visit schools for purposes of

the research. The Division Officer enabled the researcher to make arrangements with headteachers/managers on how and when the researcher would visit their schools. Further, the researcher visited the teachers to familiarize herself with them and inform them of the purpose of the research. The researcher assured all the research participants of confidentiality during the research and after the research findings.

3.10 Statistical Hypotheses

The following are the statistical hypotheses which were tested.

- Ho1:** There is no significant relationship between class size and the frequency of use of scaffolding teaching method.
- Ho2:** There is no significant relationship between the teachers teaching experience and the frequency of use of scaffolding teaching method.
- Ho3:** There is no significant relationship between the type of ECDE training program and the frequency of use of scaffolding teaching method.
- Ho4:** There is no significant relationship between pre-school teachers attitude and frequency of use of scaffolding teaching method.
- Ho5:** There is no significant difference between the pre-school teachers who failed and those who passed mathematics at their highest academic level in their overall frequency of use of scaffolding teaching method.
- Ho6:** There is no significant difference between individual pre-school teachers under different managements in their overall frequency of use of scaffolding teaching method.

3.11 Analysis

To analyze hypotheses 1-4, non-parametric equivalence Spearman Rank Order Correlation Coefficient was used to test the relationship between the frequencies of use of scaffolding teaching method and class size, pre-school teachers teaching experience, type of training program and pre-school teachers attitude towards scaffolding teaching method. To analyze hypotheses 5-6, the t-test statistical test was used to get the significant difference between pre-school teachers' performance in mathematics and the frequency of use of scaffolding teaching method and between management type and the frequency of use of scaffolding teaching method. All these were tested at 0.05 alpha level of significance.

CHAPTER FOUR: DATA ANALYSIS, RESULTS AND DISCUSSIONS

4.0 Descriptive Analysis

4.1 Distribution of Pre-School Teachers by the various Independent variables

This section analyzes distribution of pre-school teachers.

Table 4.1: Distribution of pre-school teachers by academic qualification.

Academic Level attained	Number of pre-school teachers	Percentage of pre-school teachers
KJSE	1	4
KCSE	22	92
KACE	1	4

The study, as shown in Table 4.1 above, revealed that the majority of pre-school teachers at 92 percent (22 pre-school teachers) had attained KCSE level while a tiny minority at 4 per cent each (1 pre-school teacher) had gone up to KJSE and KACE, indicating a relatively high overall academic level. Due to this one sided distribution, it was not possible to perform any meaningful statistical analysis to compare the various levels.

4.1.1 Distribution of Pre-School Teachers by Mathematics Attainment

The study sought to establish the academic credentials in mathematics of the pre-school teachers. The results are shown in Table 4.2.

Table 4.2: Distribution of the pre-school teachers by mathematics attainment.

	Number (freq)	Percentage
Fail	14	58.3
Pass	10	41.7

The majority 58.3 percent had failed in their highest mathematics level attained with the remainder 41.7 percent having passed, indicating a possible lack of competency to teach mathematics (Wando 1992).

4.1.2 Distribution of the Pre-School Teachers by Training Program

Table 4.3 shows the distribution of pre-school teachers by their training Programs.

Table 4.3: Distribution of pre-school teachers by training program.

Training Program	Number of teachers	Percentage
KHA 1year	5	20.8
DICECE 2 years	11	45.9
MONTESSORI 3 years	8	33.3
Total	24	100

Table 4.3 reveals that DICECE had the highest percentage at 45.9 percent while KHA had the lowest at 20.8 percent while Montessori had 33.3 percent. The majority of the respondents were DICECE trained. This is probably

because DICECE used to charge the lowest fees as it used to be funded by MoEST, although this funding has since ceased.

KHA trains post secondary students while Montessori has only one training centre in Nairobi, Kenya, meaning they can only train a few teachers.

4.1.3 Distribution of Pre-School Teachers by Teaching Experience in Years

The study also sought to outline experience in number of years of teaching (number of years a teacher had taught with or without training when in in-service) of the pre-school teachers which is shown in Table 4.4.

Table 4.4: Distribution of pre-school teachers by teaching experience in years.

Experience in Number of years of teaching	Frequency (number of teachers)
3	2
4	2
6	4
7	4
9	2
10	2
11	1
13	1
16	1
17	2
19	1
20	1
26	1

The variations in teaching experience by years ranged from 26 years for the longest serving teacher to 3 years for the least experienced. Beyond the average years of 11 there were fewer pre-school teachers for each year of experience, indicating that pre-school teachers generally tend to leave service after about

ten years. Also 50 percent (12 teachers) of the pre-school teachers had between 3 and 7 years experience, suggesting that there was a high concentration of teachers with few years of teaching experience, while only 12.5 percent (3 teachers) of the pre-school teachers had between 19 and 26 years experience, further indicating that most pre-school teachers drop off the career after some period. This is probably because they tend to look for greener pastures elsewhere.

4.1.4 Distribution of Class Sizes handled by Pre-School Teachers

This study attempted to uncover information on the class sizes handled by pre-school teachers. The results were as in Table 4.5.

Table 4.5: Distribution of pre-school teachers by class size.

Class size (number of children)	Frequency (number of teachers)
7	1
15	1
19	1
20	1
21	3
23	2
24	1
31	2
32	2
36	1
37	1
38	1
40	2
41	1
42	1
43	1
44	1
45	1

Results show a minimum class size of 7 children and a maximum of 45. This is a huge variation, meaning some pre-school teachers have a much heavier workload than others, with a possible effect on their performance. The distribution of class size is fairly even as the frequency of each class size varies between 1 and 3 occurrences, with 1 occurrence being the most frequent. The average class size is 30 children which is more or less close to the recommended class size of 35 children (KIE/ NACECE, 1997). The most common occurrence is 21 children as shown by the mode of 21. Table 4.6 shows the percentage distribution of class size.

Table 4.6: Ranked class size

	Frequency (number of classes)	Percentage
Below 35 children	14	58.3
35 children and above	10	41.7

The table reveals that the majority of classes at 58.3 percent (14 classes) had the recommended class size of less or equal to 35 children. Those with above recommended class size were 41.7 percent (10 classes).This relatively high number of above recommended class size of 35 and below children per class (KIE/NACECE, 1997) means that quite a high number of pre-school teachers are overworked, a possible cause of poor performance in the use of scaffolding teaching method as the Teacher per Pupil Ratio is too high, hence individual attention to children becomes difficult.

4.1.5 Distribution of Pre-School Teachers by School Management.

Information on distribution of pre-school teachers by school management was also collected. The results are shown in Table 4.7.

Table 4.7: Distribution of pre-school teachers by school management.

School Management.	Number of Teachers	Percentage
Private	13	54.1
Public/others (community and church)	11	45.9

The private category had the highest share of pre-school teachers at 54.1 percent, meaning it had the highest number of pre-school teachers with public/others (community and church) category, having the remaining 45.9 percent.

4.1.6 Distribution of Pre-School Teachers by Training Program attended and Mathematics Attainment

The study also sought to establish mathematics attainment of pre-school teachers in the various training programs with the results displayed in Table 4.8.

Table 4.8: Distribution of pre-school teachers by training program and mathematics attainment.

Training Program	Failed Mathematics at highest academic level attained	Passed Mathematics at highest academic level attained
KHA	3 (21.4%)	2 (20%)
DICECE	5 (35.7%)	6 (60%)
MONTESSORI	6 (42.9%)	2 (20%)
Total	14 (100%)	10 (100%)

Figures in parenthesis represent column totals

DICECE had the majority of those who passed mathematics at 60 percent (six pre-school teachers) with comparatively few of the failures at 35.7 percent (five pre-school teachers). The higher admissions there, that is, 11 students or 46 percent of the admissions probably indicates a preference for this training program by students. Montessori had the majority of those who failed at 42.9 percent (six pre-school teachers) and a low percentage of those who passed at 20 percent (two pre-school teachers) adding up to 33 percent (8 pre-school teachers) of the total number of pre-school teachers. KHA interestingly had a fairly balanced score of 20 percent (2 pre-school teachers) of those who passed and 21.4 percent (3 pre-school teachers) of those who failed. However, it also had the fewest students at 5, probably because they tend to admit students with higher academic performance.

4.2 Pre-school Teachers Attitude on Scaffolding Teaching Method

Introduction

The objective of the study in this section was to analyze the distribution of pre-school teachers attitude towards scaffolding teaching method and how this attitude varied according to the independent variables. This was in an effort to establish the effect of attitude on frequency of use of scaffolding teaching method by pre-school teachers.

4.2.1 Distribution of Attitude of Pre-School Teachers on Scaffolding Teaching Method in the teaching of Mathematics

Information on attitude of pre-school teachers towards scaffolding teaching method on the teaching of mathematics was tabulated as in Table 4.9.

Table 4.9: Attitude of pre-school teachers towards scaffolding teaching method in the teaching of mathematics.

Score out of 13 questions	Number of teachers (freq)	Percentage
4	4	16.7
5	4	16.7
6	6	25.0
7	3	12.5
9	6	25.0
10	1	4.2

The mode of 6 and 9, with 6 being chosen as it is closer to the mean of 6.5 out of 13, indicates most pre-school teachers tended towards an attitude score of 6. The mean attitude score of 6.5 out of 13 possible scores shows an average score of 50.3 percent, that is, half of the possible scores.

4.2.2 Distribution of Pre-School Teachers Attitude Scores towards Scaffolding Teaching Method when Ranked

Information on the inclination of pre-school teachers attitude towards scaffolding teaching method, that is, either positive or negative attitude was also sought with the results as in Table 4.10.

Table 4.10: Attitude scores when ranked (less than 8: negative more than 8: positive).

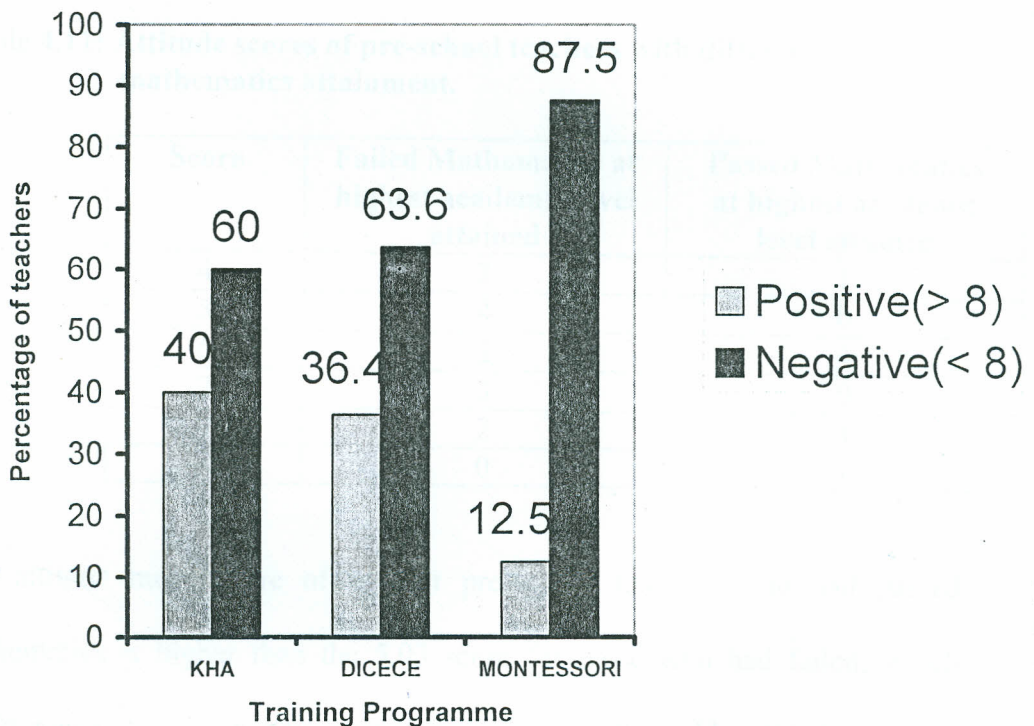
	Number of teachers (Frequency)	Percentage
Less than 8	17	70.8
Above 8	7	29.2

The above results indicate a prevalence of negative attitude as the score of less than eight (which is 60 percent of the 13 scores) and which was classified as a negative attitude towards scaffolding teaching method, had a percentage score of 70.8 percent against 29.2 percent for eight and above score, which was classified as a positive attitude towards the method. Thus, it can be said that the Pre-school teachers generally had a negative attitude towards scaffolding teaching method.

4.2.3 Distribution of Pre-School Teachers Attitude on Scaffolding Teaching Method by their Training Program when Ranked

The study tried to unearth the attitudes of pre-school teachers towards scaffolding teaching method by their training program as shown in figure 4.1 below.

Figure 4.1: Pre-school Teachers attitude towards scaffolding by training program.



In all cases the negative score is higher than the positive score but the disparity is greatest for Montessori. The proportion for positive vis-à-vis negative is more or less equal for KHA and DICECE. The results show Montessori teachers to have the most negative attitude towards scaffolding. Thus majority of teachers, irrespective of the program attended, have negative attitude about scaffolding method. And of the Montessori teachers, negative attitude has,

much bigger percentage than those with positive attitude, compared to distribution within other colleges.

4.2.4 Attitude Scores for Pre-School Teachers with Different Mathematics Attainment

The study sought to establish whether there was a difference of attitude amongst teachers of different mathematics attainment. The results are shown in Table 4.11.

Table 4.11: Attitude scores of pre-school teachers with different mathematics attainment.

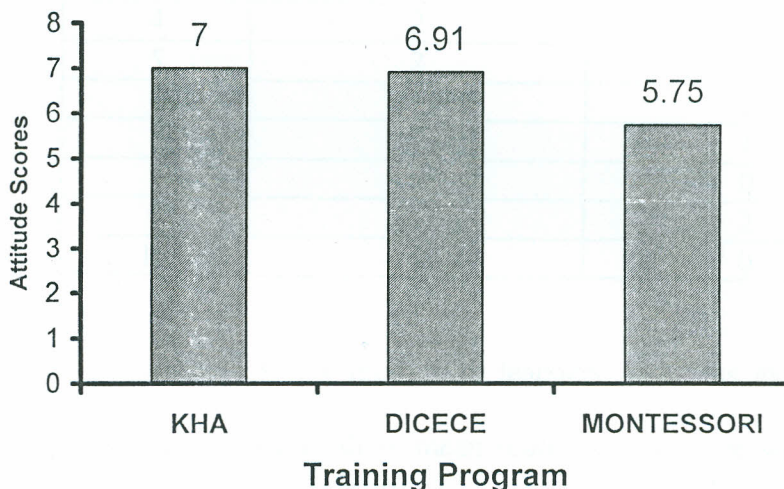
Score	Failed Mathematics at highest academic level attained	Passed Mathematics at highest academic level attained
4	3	1
5	4	0
6	2	4
7	3	0
9	2	4
10	0	1

The attitude mean score of 7.4 for pre-school teachers who had passed mathematics is higher than the 5.93 score for those who had failed, which might mean that those who passed have a more favorable attitude towards scaffolding teaching method. This might mean that their higher mathematics attainment indicates a better understanding of mathematics (Wando, 1992), which could possibly give them an advantage in understanding and applying more effective methods of teaching mathematics (Rising et al, 1972), hence their seemingly more favorable attitude. Thus a higher mathematics attainment might be beneficial towards use of scaffolding teaching method.

4.2.5 Attitude Scores towards scaffolding teaching method of Pre-School Teachers by their Training Program

Data was also sought to establish attitude of pre-school teachers towards scaffolding teaching method by their training programs. The results were as shown in Figure 4.2.

Figure 4.2: Pre-school teachers attitude versus training program.



KHA had the highest attitude mean score of 7.0 followed closely at 6.91 by DICECE. Montessori, at 5.75 had the lowest score, thus pre-school teachers from this training program had the least favorable attitude towards scaffolding teaching method. This is probably because their training emphasizes other methods/strategies such as use of learning resources, rather than use of scaffolding teaching method.

4.2.6 Attitude scores for Pre-School Teachers with different Teaching Experience, below 11 years and 11 years and above, where 11 years is the average (mean) number of years in teaching.

The study tried to unearth the relation between pre-school teachers attitude and their teaching experience in years with the results in Table 4.12.

Table 4.12: Pre-school teachers attitude scores by teaching experience (above and below average 11 years teaching experience).

Score	Frequency for Below average 11 years	Frequency for average 11 and above years
4	2	2
5	2	2
6	4	2
7	2	1
8	0	0
9	4	2
10	1	0

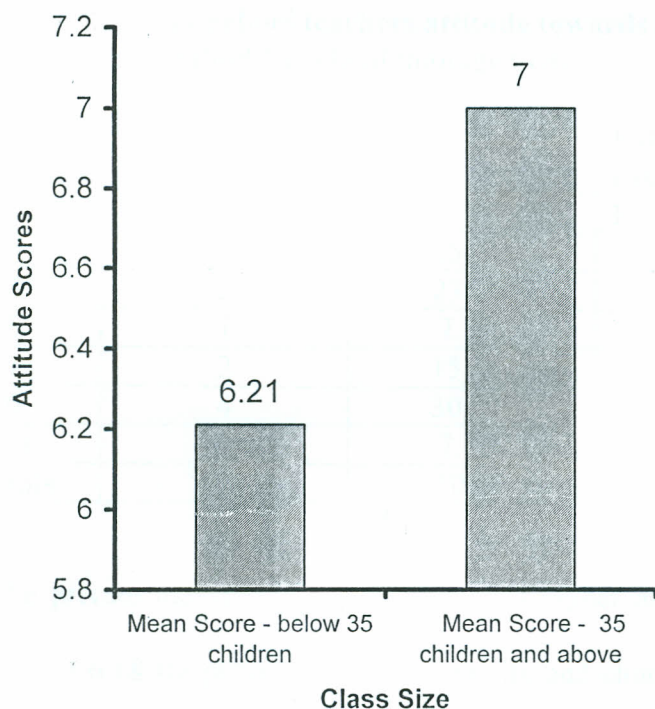
The mean attitude score (6.8) for pre-school teachers with less experience (below average 11 years) is higher than mean score (6.1) of those with more experience (beyond average 11 years) suggesting that the less experienced pre-school teachers have a more favorable and hence more agreeable attitude towards scaffolding teaching method, indicating a higher likelihood of using it. Also, the lower standard deviation (sd) for less experienced pre-school teachers suggests their scores are more similar, that is, distributed over a smaller score range, suggesting they are using similar tactics more. This could mean that they are still following the common training methods they were trained to use at college. This could be further confirmation that more experienced pre-school teachers might not favor scaffolding teaching method since their bigger standard deviation could be indicative of a wider score range. Hence they could

be having more different behaviors and beliefs amongst themselves.

4.2.7 Attitude Scores towards scaffolding teaching method for Pre-School Teachers by Class Size

Data was also collected to help survey pre-school teachers attitude on scaffolding teaching method by the size of class they taught with the results as in Figure 4.3.

Figure 4.3: Pre-school teachers attitude towards scaffolding teaching method versus class size.



Pre-school teachers with big class sizes (above 35 pupils) had a higher score at 7.0 than those with smaller classes at 6.21, indicating that pre-school teachers with bigger class size have a more favorable attitude towards scaffolding

teaching method than those with smaller classes. However, this contradicts another observation in this study (4.3.4), that pre-school teachers with bigger class size use scaffolding teaching method less, again suggesting that attitude is not a major influence on use of scaffolding teaching method. Thus a favorable attitude towards the method may not translate to more use of the method.

4.2.8 Attitude Scores towards scaffolding teaching method for Pre-School Teachers by School Management

The survey tried to unearth attitude of pre-school teachers by school management as is shown in Table 4.13.

Table 4.13: Pre-school teachers attitude towards scaffolding teaching method by school management.

Scores	Private Management		Public/Others (community and church) Management	
	Frequency	%	Frequency	%
4	2	15.4%	2	18.2%
5	3	23.1%	1	9.1%
6	1	7.7%	5	45.5%
7	2	15.4%	1	9.1%
9	4	30.8%	2	18.2%
10	1	7.7%	0	0.0%
Totals	13	100%	11	100%

The private management category had a higher attitude mean score of 6.85 against 6.18 for public/others (community and church) management. Thus the private management teachers seemingly had a more favorable attitude towards scaffolding teaching method although they appeared to use it less (4.3.5), suggesting attitude was not a deciding factor on use of scaffolding teaching method. However, the standard deviation for Public/others (community and church) management category at 1.6 against a mean of 6.18 was lower than the

standard deviation for private management category at 2.1 against the mean of 6.85, giving the possibility that there was less spread for Public/others (community and church) management category and hence more similarity in their use of scaffolding teaching method. Thus the Public/others (community and church) category seemed to have had a more uniform attitude score and were likely to be more uniform in their teaching methods.

4.3 Pre-school Teachers Frequency of use of all the Elements of Scaffolding Teaching Method amongst the Different Variables

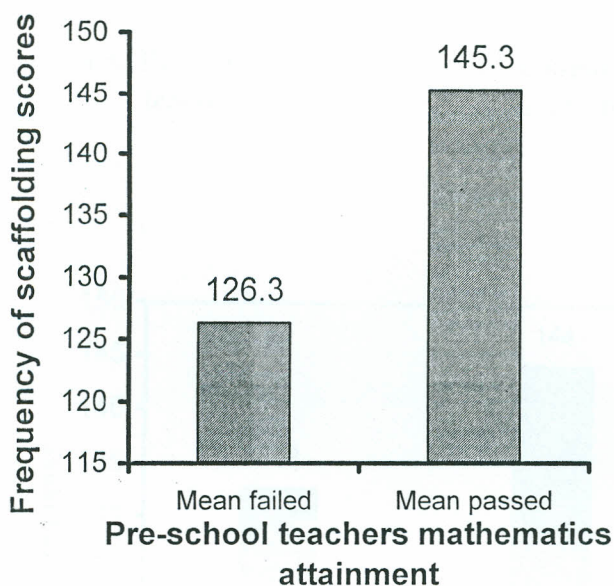
Introduction

This section seeks to uncover the frequency of use of the scaffolding teaching method as influenced by the various independent variables under study.

4.3.1 Comparison of Frequency of Mean use of scaffolding Teaching Method by Mathematics Attainment

The study went further to outline the score against scaffolding teaching method by different mathematics attainment, as shown in Figure 4.4.

Figure 4.4: Scaffolding teaching method versus mathematics attainment.

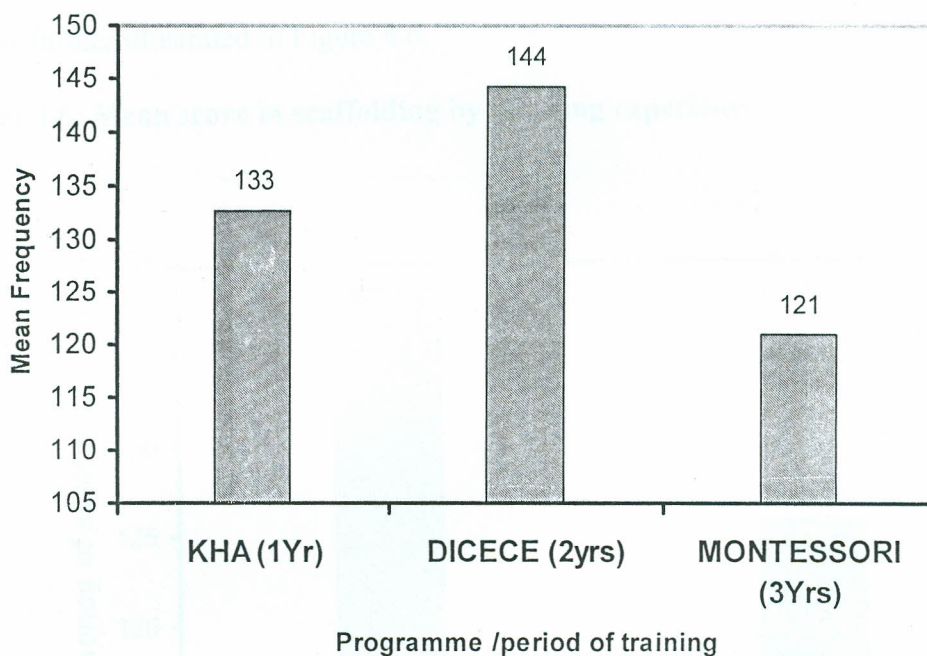


The mean score for the teachers who had passed mathematics was higher at 145.3 as against 126.3 for those who had failed in the subject. Thus, teachers with a better mathematics attainment appeared to use scaffolding teaching method more, probably showing they have a better understanding of mathematical concepts and consequently know better how to pass them on to the children. It seems that they are hence more likely to use the method frequently, supporting an earlier observation on its use (4.2.4).

4.3.2 Comparison of the mean frequency of use of scaffolding teaching method among pre-school teachers trained under different training programs

Figure 4.5 shows mean frequencies resulting from surveying teachers with different training programs.

Figure 4.5: Pre-school teachers mean frequency of use of scaffolding teaching method versus program/period of training.



The Montessori pre-school teachers at a mean frequency of use of 121 registered the lowest mean use of scaffolding teaching method compared to the others at 133 for KHA and 144 for DICECE, which has the highest usage of scaffolding teaching method. Thus, there appears to be a noticeable variation among pre-school teachers from different training programs.

4.3.3 Comparison of Mean Frequency of use of Scaffolding Teaching Method by Pre-School Teachers of different Teaching Experience

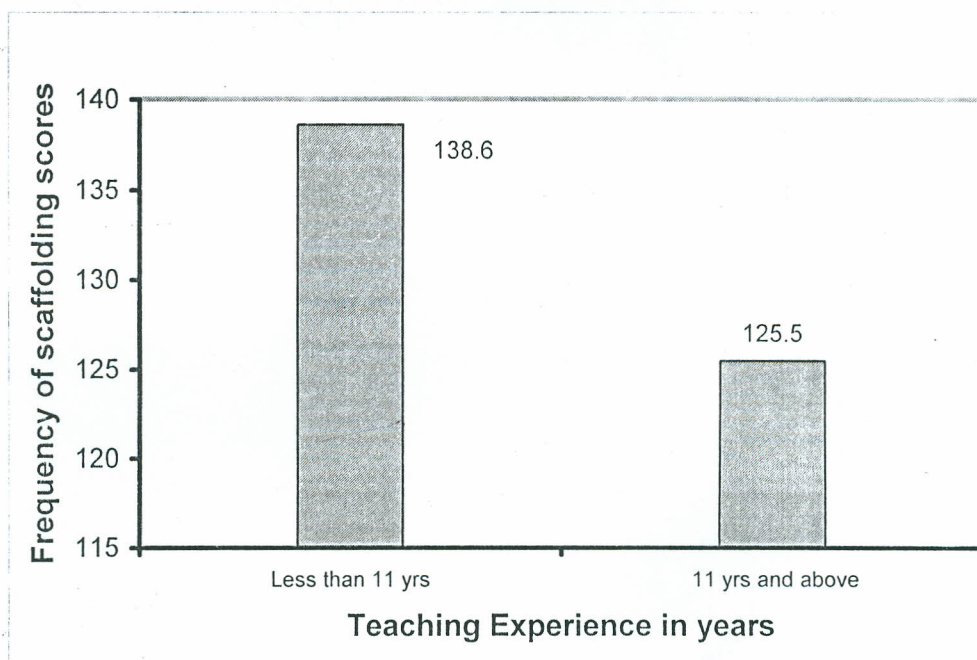
The results in Table 4.14 shows mean frequencies resulting from surveying teachers with different teaching experience.

Table 4.14: Mean frequency of use of scaffolding teaching method by pre-school teachers of different teaching experiences.

Teaching Experience	Number of teachers	Mean Score
Less than 11 years	16	138.6
11 years and above	8	125.5

This is further illustrated in Figure 4.6.

Figure 4.6: Mean score in scaffolding by teaching experience.



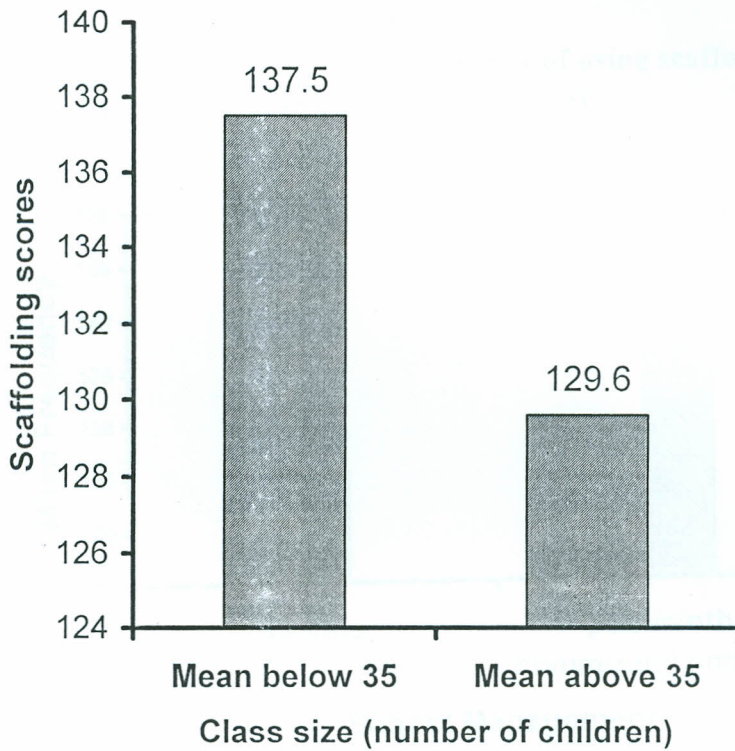
The teachers with less teaching experience (11 years and below) were revealed to have a higher usage of scaffolding teaching method at a mean score of 138.6 against 125.5 for teachers with more experience. This suggests that longer experience tends to make teachers develop their own teaching ways with which

they are more comfortable, while fresh pre-school teachers still attempt to use what they were trained to use. This supports Richet, (1994) who asserted that teachers' experience might turn out to be or not to be important depending on an individual's application. It further supports an earlier observation in this study (4.2.6) that pre-school teachers who have taught longer prefer using other methods they have evolved over time.

4.3.4 Comparison of Frequency of Mean use of Scaffolding Teaching Method by Pre-School Teachers with Different Class Sizes

The survey wished to establish the use of scaffolding teaching method by class size with the results in Figure 4.7.

Figure 4.7: Pre-school teachers scaffolding scores by class size.

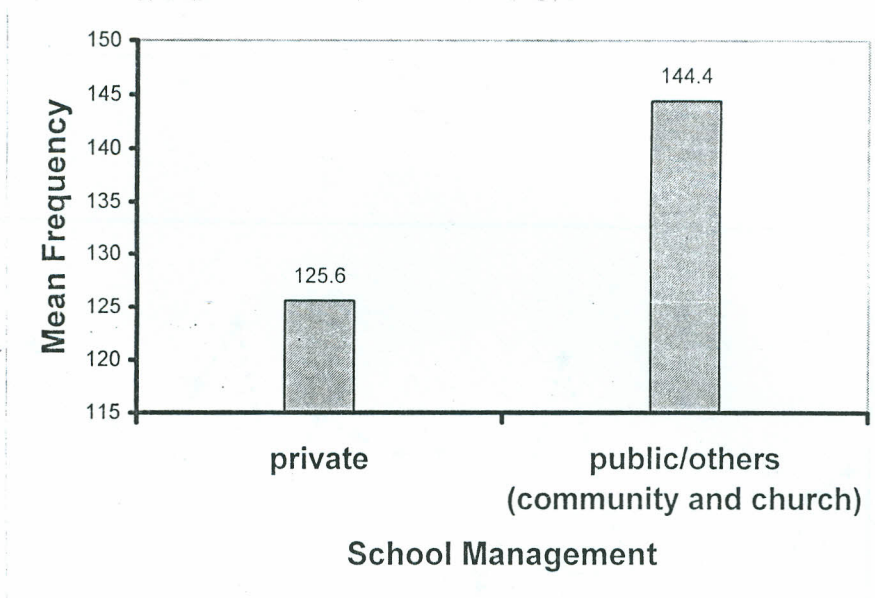


Teachers with class size below the recommended class size used scaffolding teaching method more with a mean score of 137.5 as against 129 for those with bigger class size, suggesting that as class size decreases, it increases the time the pre-school teachers can allocate for attention to individual children and hence the more they use scaffolding teaching method which is time intensive and needs case-by-case attention and child to child interaction. This concurs with Sidhu's (1982) observation that individual attention can only be achieved with small class sizes.

4.3.5 Comparison of Frequency of Mean use of Scaffolding Teaching Method by Pre-School Teachers from different School Managements

The survey of different school management categories use of scaffolding teaching method is reproduced in Figure 4.8.

Figure 4.8: Pre-school teachers mean frequency of using scaffolding teaching method by school management.

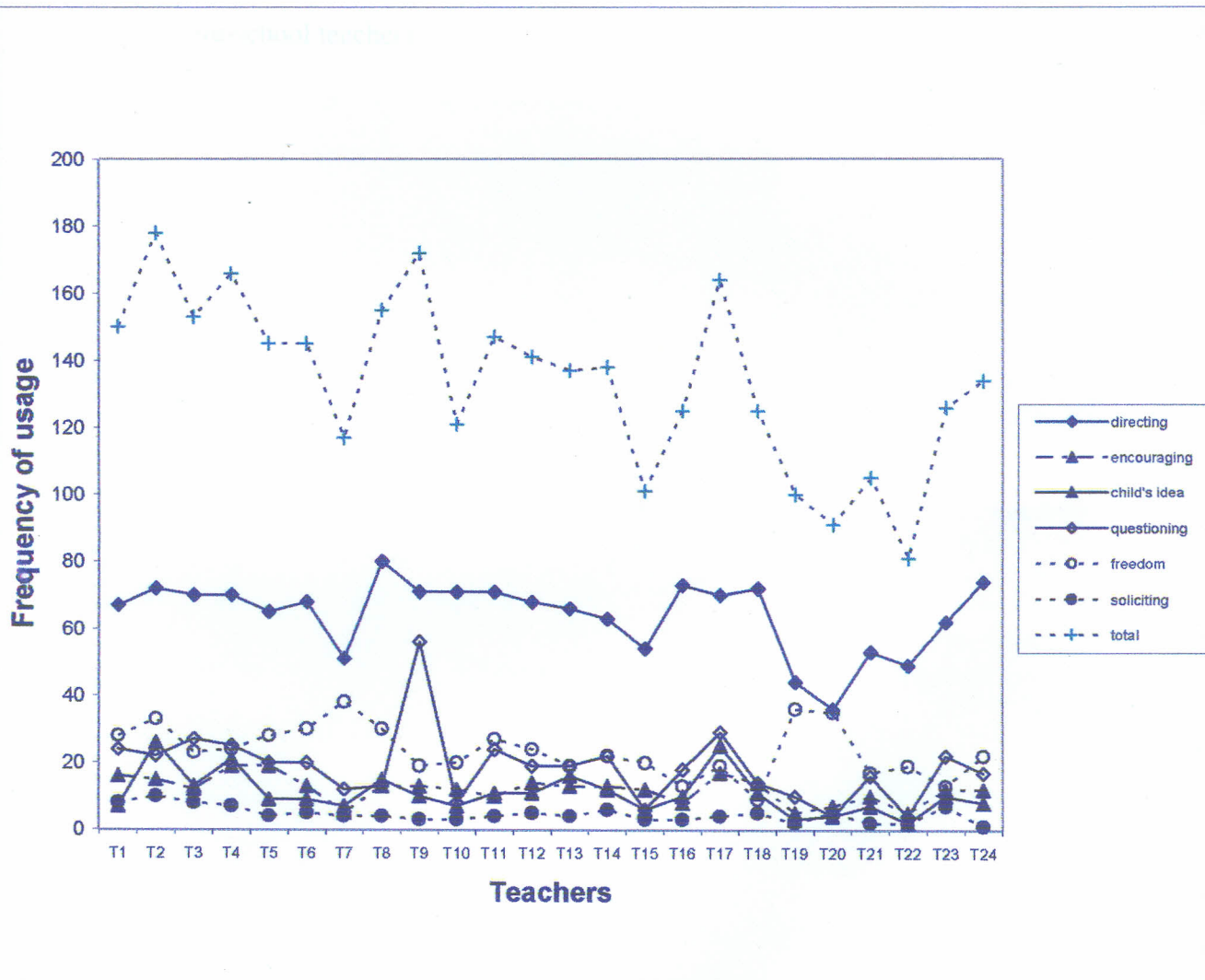


The Figure 4.8 reveals higher usage of scaffolding teaching method by pre-school teachers from public/others (community and church) category at a usage frequency score of 144.4 against a score of 125.6 for the private category. This may mean that the greater likelihood of using scaffolding teaching method by pre-school teachers in public/others (community and church) schools is probably due to the fact that there is no pressure to perform from the parents and management. This is unlike in private schools where parents demand value for their money, hence forcing teachers to use teacher-centred methods which are less time consuming and thus help cover the curriculum faster.

4.3.6 Comparison of Overall use of the Different Elements of Scaffolding Teaching Method by the Pre-School Teachers

The study wanted to establish the overall use of the elements of scaffolding amongst the different teachers. The results are as tabulated in Figure 4.9.

Figure 4.9: Graphical comparison of the mean frequency of use of scaffolding teaching method by pre-school teachers in teaching mathematics.



The graph indicates that apart from the directing method, the frequencies of using different elements of scaffolding teaching method by different pre-school

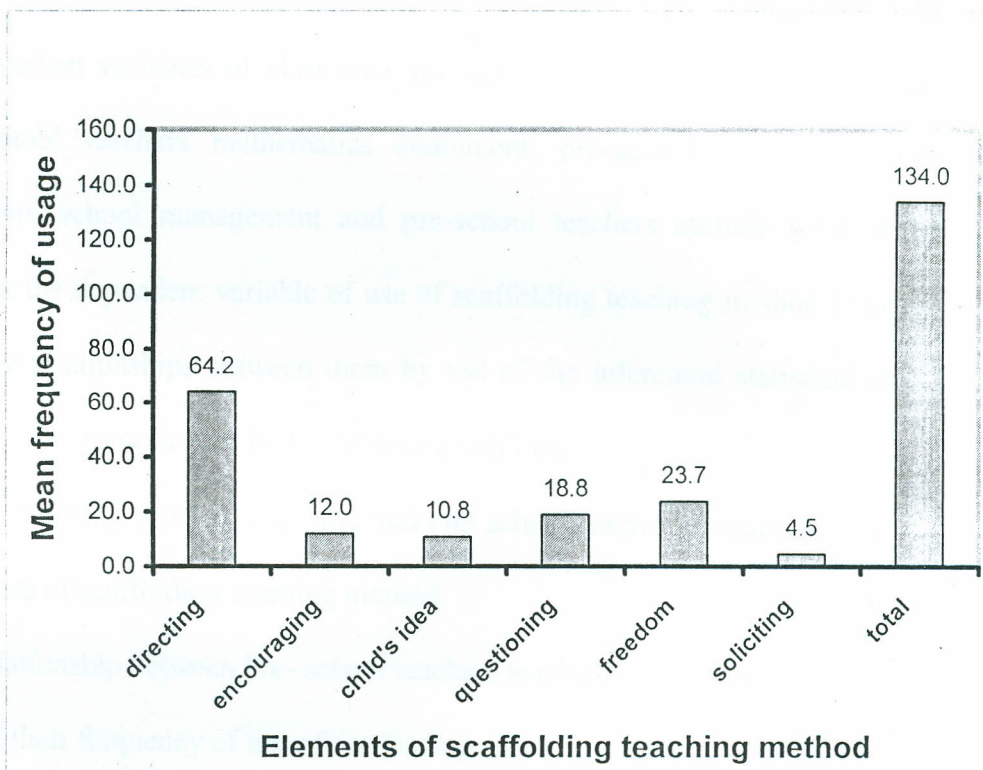
teachers seems to cluster around 20, suggesting that there is no significant difference between teachers frequency of use of the scaffolding teaching method elements. This also applies to the overall total use of scaffolding teaching method as can be seen from the graph. Further, even in the case of directing, although higher than for other elements, its use by different teachers is fairly uniform, suggesting a fairly even use of scaffolding teaching method by pre-school teachers.



4.3.7 Comparison of the Mean Frequency of using Different Elements of Scaffolding Teaching Method

The survey sought to establish the usage of different elements of scaffolding teaching method by pre-school teachers as shown in Figure 4.10

Figure 4.10: Comparing the means of the frequencies of using different elements of scaffolding teaching method by the pre-school teachers.



The scores for directing at 64.2 were much higher than the scores for other elements and actually more than doubled the highest score for the other elements, which ranged between 4.5 for soliciting, 10.8 for child's idea, 12.0 for encouraging, 18.8 for questioning and 23.7 for freedom. This sharp difference between directing and the other elements seems to suggest that either the other elements are used at a very low level or that there is a tendency to overuse a particular element, namely directing.

4.4 Statistical Analysis

This part presents the 6 main hypotheses of this study, which were statistically analyzed using the Statistical Package for Social Sciences (SPSS). Hypotheses 1-4 were analyzed using Spearman Rank Order Correlation Coefficient (ρ) and 5-6 were analyzed using the t- test, all at an alpha level of 0.05. The section attempted to examine and interpret the main variables of the probe. The independent variables of class size, pre-school teachers teaching experience, pre-school teachers mathematics attainment, pre-school teachers training program, school management and pre-school teachers attitude were tested against the dependent variable of use of scaffolding teaching method to check for any relationships between them by use of the inferential statistical tools. The results are presented in the following sections:-

- 1 - Relationship between class size and Pre- school teachers frequency of use of scaffolding teaching method.
- 2 - Relationship between Pre- school teachers teaching experience and their frequency of use of scaffolding teaching method.
- 3 - Relationship between Pre- school teachers training program and their frequency of use of scaffolding teaching method.
- 4 - Relationship between Pre- school teachers attitude and their frequency of use of scaffolding teaching method.
- 5 - Test of difference in Pre- school teachers frequency of use of scaffolding teaching method by their mathematics attainment.
- 6 - Test of difference in Pre- school teachers frequency of use of scaffolding teaching method by school management.

4.4.1 Relationship between Class Size and Pre-School Teachers use of Scaffolding Teaching Method.

The first hypothesis was:

H₀₁: There is no significant relationship between class size and use of scaffolding teaching method. Spearman Rank Order Correlation Coefficient was utilized to test the hypothesis with the results shown in Table 4.15.

Table 4.15: Correlation between class size and pre-school teachers use of scaffolding teaching method.

N (Group size)	rs value (calculated)	DF	rho Critical (Table) value
24	-0.3434	22	0.41

The calculated rs value of -0.3434 was less than the two tailed critical value of 0.41 at a value of N (group size) of 24, obtained from a table on critical values of Spearman Rank Order Correlation Coefficient (rho) at 0.05 probability level. The negative rs value denotes an inverse relationship. The H₀ (null hypothesis) was therefore accepted and the alternative hypothesis of a significant relationship between the two variables was rejected. Thus although it had been anticipated that the number of children in the classroom would affect the teachers use of scaffolding teaching method due to the huge disparity in class size of between 7 to 45 children, this turned out to not be the case, supporting Ngasike's, (2004) findings on play teaching strategy of no relationship between class size and use of the method. Therefore, although the negative calculated value of -0.3434 suggested the existence of an inverse relationship, the higher

critical value of 0.41 ruled this to be the result of random error.

4.4.2 Relationship between Pre-School Teachers Teaching Experience and use of Scaffolding Teaching Method

The second hypothesis was:

Ho2: There is no significant relationship between pre-school teachers experience in teaching and use of scaffolding teaching method. The results are shown in Table 4.16.

Table 4.16: Correlation between pre-school teachers teaching experience and use of scaffolding teaching method.

N (Group size)	rs value (calculated)	DF	Critical (Table) value
24	-0.2793	22	0.41

The results supported the null hypothesis that there is no relationship as the obtained rs value of -0.2793 (indicating an inverse relationship), was less than the critical two tailed table value of 0.41 at a value of N of 24, for the Spearman rho. Thus the alternative hypothesis of a significant relationship was rejected. It was therefore concluded that the pre-school teachers teaching experience does not have a significant influence on their use of scaffolding teaching method, although the negative rs value of -0.2793 seems to suggest an inverse relationship, that is, use of scaffolding teaching method decreases as the pre-school teachers experience increases, the higher rho (table) value of 0.41 at the 0.05 significance level rules this out as being due to random error, that is, any relationship noted is due to other factors and not to a relationship

between the two variables. These findings support Richet, (1994) who had asserted that teaching experience might turn out to be of importance or of no importance depending on an individual's application of what he learnt earlier to new learning.

4.4.3 Relationship between Training Program and use of Scaffolding Teaching Method

The third hypothesis was:

Ho3: There is no significant relationship between the pre-school teachers training program and the use of scaffolding teaching method. Again Spearman rho was used to test the hypothesis with the results shown in Table 4.17.

Table 4.17: Correlation significance between training program and use of scaffolding teaching method.

N (Group size)	rs value (calculated)	DF	Critical (Table) value
24	-0.1743	22	0.41

The analysis was done at the 0.05 significance level with the two tailed table value at a value of N of 24, that is, the critical value of 0.41 for Spearman rho. The yielded negative rs value of -0.1743 indicated a weak inverse relationship and as is to be expected from this, was far below the critical table value of 0.41 for the two tailed critical value. Hence the Ho (null hypothesis) of no relationship was accepted, thereby rejecting the research hypothesis, which had predicted a relationship. Thus it can be inferred that training program does not

influence how a pre-school teacher will use scaffolding teaching method. In other words, the type of training a pre-school teacher undergoes does not influence the use of scaffolding teaching method, even though that was what would have been expected, supporting Ngasike's (2004) findings of no significant relationship between teaching strategy and training program.

4.4.4. Analysis of Relationship between Attitude and use of Scaffolding Teaching Method

The study also proposed the hypothesis:

Ho4: There is no significant relationship between attitude of pre-school teachers and use of scaffolding teaching method. This probe again used the Spearman Rank Order correlation coefficient test with the results in Table 4.18.

Table 4.18: Correlation significance between attitude and use of scaffolding teaching method.

N (Group size)	rs value (calculated)	DF	Critical (Table) value
24	0.2321	22	0.41

The test was done at the 0.05 significance level, giving the calculated rs value of 0.2321 with Spearman rho. The positive rs value denotes a direct relationship. The analysis at N value of 24 for the two tailed non-directional test reveals that there is no significant relationship between attitude of pre-school teachers and use of scaffolding as the obtained rs value of 0.2321 is less

4.4.6 Analysis of Variance in Frequency of use of Scaffolding Teaching Method in Mathematics Management

The results from table 4.18 (above) indicated that teachers who had passed had a higher score in frequency of use of scaffolding teaching method (145.3) than those who had failed (126.3). However, the calculated t- value as shown in table 4.19 was less than the table value, hence the H_0 (null hypothesis) is valid. The test was done using the t- test at the 0.05 alpha level with 10 pre-school teachers who passed and 14 who failed, to give a calculated t- value of 1.87 from their mean frequencies of use of scaffolding teaching method. The obtained value, when compared with the two tailed table value of 2.07 at 22 degrees of freedom had a lower value, hence the H_0 (null hypothesis) is valid and the alternative hypothesis of a significant difference is rejected. Therefore it is seen that there is no significant difference in frequency of use of scaffolding teaching method between pre-school teachers with different mathematics attainment, implying that performance in mathematics does not influence use of scaffolding teaching method at ECDE level. This could be due to the fact that mathematics at pre -school level is very basic and teaching it does not require knowledge of higher mathematics principles, provided one has the methodologies. This concurs with Ryan and cooper, (1975) who do not agree that knowledge in the subject is a necessity for teaching ability. Hence pre-school teachers with a better academic performance do not have the expected advantage which would make them appreciate the advantages of scaffolding teaching method and use it better.

4.4.6 Analysis of Difference in Frequency of use of Scaffolding Teaching Method by School Management.

The final hypothesis of the study was:

Ho6: There is no significant difference in the use of scaffolding teaching method between teachers in different school managements (public/others (community and church) and private). The test was done using the t-test and the results are presented in Tables 4.21 and 4.22

Table 4.21: Mean frequency of use of scaffolding teaching method and school management.

School Management	No of Teachers	Mean score in scaffolding	S.D	S. Error
Private	13	125.6154	24.85	6.894
Public/others (community and church)	11	144.3636	24.266	7.317

Mean Difference 18.74

Table 4.22: t- test results.

t – value	Df	Table value (2 tailed)
1.86	22	2.07

Table 4.20 shows the teachers from the public category to be using scaffolding teaching method more with a mean score of 144.3636 against those from the private category with a mean score of 125.6154.

However the t- test results from table 4.21 revealed an obtained t-value of 1.86 which was compared with the critical table value of 2.07 obtained from a table

on critical values of t at 22 degrees of freedom for the two tailed non-directional test. The calculated value is less than the table value, hence the H_0 (null hypothesis) is valid and the alternative hypothesis of a significant difference is rejected. This implies that there is no real difference in frequency of use of scaffolding teaching method by pre-school teachers in the different school managements and so any noted difference is due to chance influence.

4.5 Discussion of Results

This section looks at the results of analysis of the various factors likely to affect frequency of use of scaffolding teaching method and then attempts to interpret these findings.

4.5.1 Class Size

The study's result showed there was no significant relationship between class size and use of scaffolding teaching method. This contradicts the results that would have been expected had pre-school teachers been guided by professional training rather than personal survival, as those with smaller class size (58.3 percent or 14 classes) had the opportunity to allocate more time per pupil and hence use scaffolding teaching method more, yet they were not doing so. Ngasike's (2004) study on play bridging teaching strategy found very little relationship between class size and teaching strategy. Likewise, in this study there was no significant relationship between class size and use of scaffolding teaching method, despite the huge disparities in class size, that is, 7 for the smallest and 45 for the biggest, with 58.3 percent (14 classes) being below

recommended class size and 41.7 percent (10 classes) having above recommended class size of 35 pupils.

4.5.2 Pre-school teachers teaching experience

The study revealed that there was no significant relationship between use of scaffolding teaching method and teaching experience despite the fact that there was quite a large variation in teaching experience ranging from 3 to 26 years. This supports Ngasike's (2004) assertion that teachers teach to sustain their own survival and not to enhance the quality of learning of children and also that teaching was not guided by pre-school teachers professional experience. Thus it would seem that experience is not a factor in improving the teaching strategies of teachers. Therefore, it appears that pre-school teachers do not utilize their experience suggesting that their interests are probably more in personal survival than in children's quality of learning. This was further supported by the observation that after about ten years of teaching most teachers drop out of the profession as was shown by the distribution of experience, probably to look for better paying jobs. Hence pre-school teaching is a stop-gap measure, supporting Richet's (1994) assertion that "a teacher's experience might turn out to be of importance or of no importance depending on the individual's application of what he learnt earlier to new learning". This indicates why experience does not lead to greater use of better teaching methods such as scaffolding teaching method since pre-school teachers probably feel that the extra effort needed is not of benefit to them.

4.5.3 Pre-school teachers Training Program

The results of the study revealed that there was no significant relationship between training programs and use of scaffolding teaching method, despite the obvious differences in length of training among various training programs. Also pre-school teachers from the various training programs have a more or less uniform negative attitude against scaffolding teaching method, with DICECE having 63.6 percent negative, KHA 60 percent negative and Montessori 87.5 percent negative, suggesting that in all training programs, advantages of scaffolding teaching method are not emphasized (KIE/NACECE/1995).

Further observations in the field during data collection confirmed that the Montessori methodology, which emphasizes use of learning resources and independence of children with the teacher playing an almost passive role, was being used by pre-school teachers from this training program and were hence not likely to use scaffolding teaching method.

4.5.4 Pre-school teachers attitude towards scaffolding teaching method

It was unearthed in the study that there was no significant relationship between attitude and use of scaffolding teaching method. Although generally there was a noticeable variation in pre-school teachers attitude by the various factors, for example in Figure 4.2.4 on attitude scores by different mathematics attainment, those who had passed had a higher mean score of 7.4 against those who had failed with a mean score of 5.93, it was found that this did not seem to influence use of the method as there was no significant relationship between

attitude and use of scaffolding teaching method. However, there is a real possibility of pre-school teachers with a negative attitude towards mathematics passing the same to their pupils as is pointed out by Bitengo (2005) and Caidwell (1972), in Orton(1987).

4.5.5 Pre-school teachers Mathematics Attainment in highest academic level

From the study, it emerged that there was no significant difference between pre-school teachers who had failed and those who had passed mathematics in their use of scaffolding teaching method although majority 58.3 percent who had failed had a mean score of 5.93 in use of scaffolding teaching method while a minority 41.7 percent who had passed had a higher mean score at 7.4. This contradicts previous studies by Moyles and Adams (2000), Wando (1992) and Bell (1980) which indicated that teachers with higher academic qualifications performed better in teaching.

Since there was no significant difference in the study between those who had failed and those who had passed mathematics in their use of scaffolding teaching method, it can only be inferred that there were other factors hindering pre-school teachers from using their knowledge on mathematics that would otherwise have resulted in them applying scaffolding teaching method more supporting Ryan and Cooper (1975), who did not agree that knowledge in the subject is a necessity for teaching ability.

4.5.6 Different school Managements

The study revealed that there was no significant difference between pre-school teachers from the various school managements in their use of scaffolding teaching method. This is contrary to what would have been expected considering that pre-school teachers in the private schools work under great pressure to perform from management and parents who demand value for their money, hence these teachers need to use traditional methods such as rote memory, drilling, etc, which produce results faster.

The private category also had a higher number of pre-school teachers at 54.1 percent and a seemingly lower mean use of scaffolding teaching method at 125.6 against 144.4 mean use for Public/others (community and church) pre-school teachers who were 45.9 percent of the total. However this lower score was proved to be the result of random error and not a true difference in the sample means. Thus, it can be seen that even public pre-school teachers with the chance and time to use scaffolding teaching method do not use it, indicating that pre-school teachers may be teaching more for survival than for enhancing pupil's quality of learning. This concurs with Ngasike's (2004) conclusion on teaching in different types of management whereby in his field study he established that pre-school teachers taught for survival to please their employers, parents and primary school teachers. These findings were further supported by Swadener, et al (2000) and Gakuru, (1979) as cited by Ngasike (2004). The study also discovered that private pre-school centres teach mathematics using Std. 1 textbooks, in an attempt to meet parents' demands.

In essence, none of the selected variables envisaged in the research, that is,

size, teaching experience, training program, pre-school teachers attitude towards scaffolding teaching method, mathematics attainment and school management, turned out to have an influence on frequency of use of the scaffolding teaching method.

6. major findings-

1. There was no significant relationship between pre-school teachers frequency of use of scaffolding teaching method.
2. There was no significant relationship between Pre-school teachers teaching experience and their frequency of use of scaffolding teaching method.
3. There was no significant relationship between Pre-school teachers training program and their frequency of use of scaffolding teaching method.
4. There was no significant relationship between Pre-school teachers attitude and their frequency of use of scaffolding teaching method.
5. There was no significant difference between pre-school teachers frequency of use of scaffolding teaching method by mathematics attainment.

There was no significant difference in frequency of use of scaffolding teaching method by school management.

CHAPTER FIVE: SUMMARY, CONCLUSION, IMPLICATIONS AND RECOMMENDATIONS

5.1 Summary

The study had set out mainly to investigate the frequency of use of scaffolding teaching method under the factors that influence its usage. The following are the major findings:-

1. There was no significant relationship between class size and Pre-school teachers frequency of use of scaffolding teaching method.
2. There was no significant relationship between Pre-school teachers teaching experience and their frequency of use of scaffolding teaching method.
3. There was no significant relationship between Pre-school teachers training program and their frequency of use of scaffolding teaching method.
4. There was no significant relationship between Pre-school teachers attitude and their frequency of use of scaffolding teaching method.
5. There was no significant difference in Pre- school teachers frequency of use of scaffolding teaching method by mathematics attainment.
6. There was no significant difference in Pre-school teachers frequency of use of scaffolding teaching method by school management.

5.2 Implications of the Findings

This section outlines the implications of this study for the various stakeholders, that is, policy makers (MoE and NACECE), management of pre-schools, parents and pre-school teachers. It also makes recommendations for further research.

5.2.1 Implications for Managers

Observations during data collection revealed sub-standard teaching conditions, for example small classrooms and inadequate teaching learning resources, supporting findings by Ngasike (2004), that congestion in classrooms hindered use of effective teaching methods and that teachers were using traditional teaching resources like chalk, text and exercise books among others, rather than using locally available materials like seeds and wooden block, implying difficulties in using scaffolding teaching method by pre-school teachers. This may imply that bettering these sub-standard teaching conditions might make it easier and more attractive for pre-school teachers to use scaffolding teaching method.

5.2.2 Implications for Policy Makers

The study results implied the need for continually updating teaching methods, as was shown by the fact that teachers were using only one element of scaffolding teaching method effectively, that is directing, at a mean frequency score of 64.2, against 4.5 - 23.7 for the rest. This updating is for pre-school teachers as well as for their trainers and managers. The results also implied a

need for protecting pre-school teachers from management and parent demands which force them to use traditional methods for fast results, rather than effective methods with a long lasting impact such as scaffolding teaching method. All this would make it easier to put pressure on pre-school teachers and management to use more effective teaching methods such as scaffolding teaching method.

The main conclusion of the study was that the selected independent variables did not have a significant effect on scaffolding teaching method. This automatically implies that other factors were at play, probable among them being limitations that hinder pre-school teachers use of scaffolding teaching method and which work in favor of traditional methods such as drilling. Another possible factor could be inadequate knowledge of advantages of scaffolding teaching method which should have however been acquired during training.

5.2.3 Implications for Further Research

To better generalize the results to the target population of pre-school teachers of Nairobi province, Kenya, and increase on knowledge of use of scaffolding teaching method left out by the study, the study results implied that further research be conducted in other geographical areas and on other variables. This research could also extend to cover other stakeholders in the field of pre-school teaching. All these would lead to acquisition of more wholesome knowledge on scaffolding teaching method that would contribute to its more effective use.

This research could further be extended to cover other activity areas in which scaffolding teaching method could be relevant.

(The study results implied the need for further research to be conducted in other geographical areas and on other variables in order to better generalize the results to the population and increase on knowledge of use of scaffolding teaching method that could have been left out by the study)

5.3 Conclusion on Overall use of Scaffolding Teaching Method

The main purpose of the study was to investigate the frequency to which scaffolding teaching method was being used by pre-school teachers in teaching mathematics to pre-school children. It was also anticipated that the six independent variables selected would have an influence on the use of scaffolding teaching method. However, the study generally showed that the six independent variables under investigation did not have a significant effect on use of scaffolding teaching method, indicating that other factors were at play. The main probable one discerned was possibly lack of emphasis on use of scaffolding teaching method during training (KIE/NACECE, 1995). Also the graph on overall frequency of use of scaffolding teaching method showed all the pre-school teachers to be using scaffolding teaching method more or less uniformly. It was also seen that apart from directing, which was used at a disproportionately high level, pre-school teachers were generally using most of the elements of scaffolding teaching method almost uniformly. This indicates either laxity to use the other elements or ignorance of their benefits.

5.4 Recommendations

After due consideration of the foregoing findings, the study makes recommendations in three areas.

These are:

1. Suggestions to managers of pre-school institutions that would aid their schools to perform better in mathematics.
2. Recommendations to the relevant authorities on ways of improving on use of more effective methods.
3. Recommendations on additional areas of research that could increase the use of better teaching methods including scaffolding teaching method.

5.4.1 Recommendations for Pre-School Managers

To improve their schools' mathematics performance, the following recommendations were made to managers:

1. Field observations had revealed high usage of traditional teaching methods. To improve mathematics performance in schools, it is recommended that schools use more effective teaching methods, among them scaffolding teaching method.
2. Following field observations of sub-standard teaching conditions that hinder the use of more effective teaching methods, it is recommended to managers to improve the learning environment to make it conducive for optimum use of more effective teaching methods such as scaffolding teaching method. In this regard, it is also recommended that they encourage or pressurize pre-school teachers to use scaffolding

teaching method.

5.4.2 Recommendations for Policy Makers

In the area of policy, it was found from field observations that there was a tendency to use traditional teaching methods by pre-school teachers and to overuse one element of the scaffolding teaching method that is directing. In this regard therefore, the following recommendations were made:

1. MoE and NACECE pressurize management to use the more effective and recommended methods including scaffolding teaching method.
2. Organize seminars/workshops on the mathematics teaching methods/strategies for pre-school teachers on use of scaffolding teaching method. It should also do the same for their trainers and managers in respect of child centred approaches/methods. This continuous training would also ensure pre-school teachers and their trainers keep abreast on new teaching approaches/methods that continue to promote problem solving skills in mathematics learning. Further to this, the use of scaffolding teaching method should be emphasized during in-service training for the pre-school teachers.

5.4.3 Research Recommendations

Since the non-significant results of the six independent variables pointed to other factors as being the ones influencing frequency of use of scaffolding teaching method, the study makes several recommendations on future research that would unearth such factors and thus enhance knowledge on use of

scaffolding teaching method. The recommendations are as follows:

1. Other factors likely to affect teaching methods but which were not part of this research should be investigated to establish whether they have an effect on pre-school teachers use of scaffolding teaching method. These variables include gender, age, marital status and emphasis on scaffolding teaching method during training among others.
2. Since scaffolding teaching method covers more than teaching of mathematics, the study recommends that further research on use of scaffolding teaching method should be conducted in other activity areas of pre-school learning.
3. To confirm the findings of the study, it is recommended that research be carried out on frequency of use of scaffolding teaching method in other geographical areas including other divisions of Nairobi and other parts of the country.
4. In order to verify the extent of influence of attitude of managers on scaffolding teaching method and its use, the study recommends future research in this direction.

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PRE-SCHOOL TEACHERS ATTITUDE TOWARDS SCAFFOLDING TEACHING METHOD.

SECTION II

Tick (✓) where you think is applicable according to your observation.

A- Agree.

D- Disagree.

	A	D
1. It is likely that scaffolding children during the teaching learning process of mathematics activities enables them to continue for some time with the activity.		
2. Scaffolding teaching method can be said to be stimulating to children as they learn mathematics.		
3. Scaffolding children by the teacher could help in moving them from what they know to what they are supposed to know through guidance.		
4. There is a possibility that children get more curious when the teacher scaffolds them.		
5. Scaffolding teaching method could generate more information from children which helps the teacher to know what children already know.		
6. Scaffolding teaching method probably arouses children's reasoning through guidance.		
7. It is likely that scaffolding teaching method engages the teacher and the children fully.		
8. As the teacher interacts with the children, it is possible that scaffolding teaching method encourages verbal interaction between them.		
9. It is possible that scaffolding teaching method enables the teacher to fully utilize available teaching learning resources.		
10. Scaffolding teaching method could enhance creativity during interaction of the teacher and the children.		
11. Use of scaffolding teaching method is likely to enable children to remember what they learnt very easily.		
12. Scaffolding teaching method enhances confidence, independency and competency in skills in children as they learn.		
13. It is possible that use of scaffolding teaching method causes the development of cordial relationships between the teacher and the children and also amongst the children themselves.		

APPENDIX B

OBSERVATION CHECKLIST OF FREQUENCY OF PRE-SCHOOL
TEACHERS USE OF SCAFFOLDING TEACHING METHOD.

SECTION I

SCHOOL'S NAME: _____

ROUND: _____

DATE: _____ TIME: _____

CATEGORIES OF TEACHING LEARNING ACTIVITIES TO BE OBSERVED	FREQUENCY OF USE OF SCAFFOLDING TEACHING METHOD.					TOTAL TALLIES
	5min.	5min.	5min.	5min.	5min.	
1. Teacher gives direction to children (directing)						
2. Teacher observes, praises and encourages children. (encouraging)						
3. Teacher accepts and uses children's experiences and ideas and builds on them. (child's idea)						
4. Teacher asks children questions concerning the content being learnt. (questioning)						
5. Children's response to teacher's or children's freedom of expression. (freedom)						
6. Teacher solicits children's statement to add to their peers or teachers contribution on an activity or a statement. (soliciting)						
TOTALS						

Tally hash marks by categories