DESIGN AND PRODUCTION OF INSTRUCTIONAL MATERIALS

MADE WITH LEATHER FOR PRE-SCHOOL EDUCATION

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KNUST

DECLARATION

I hereby declare that this submission is my work towards the MA degree and that to the best of my knowledge, it contains no material previously published by another person or material which has been accepted for the award of any other degree of the University, except where due acknowledgment has been made in the text.

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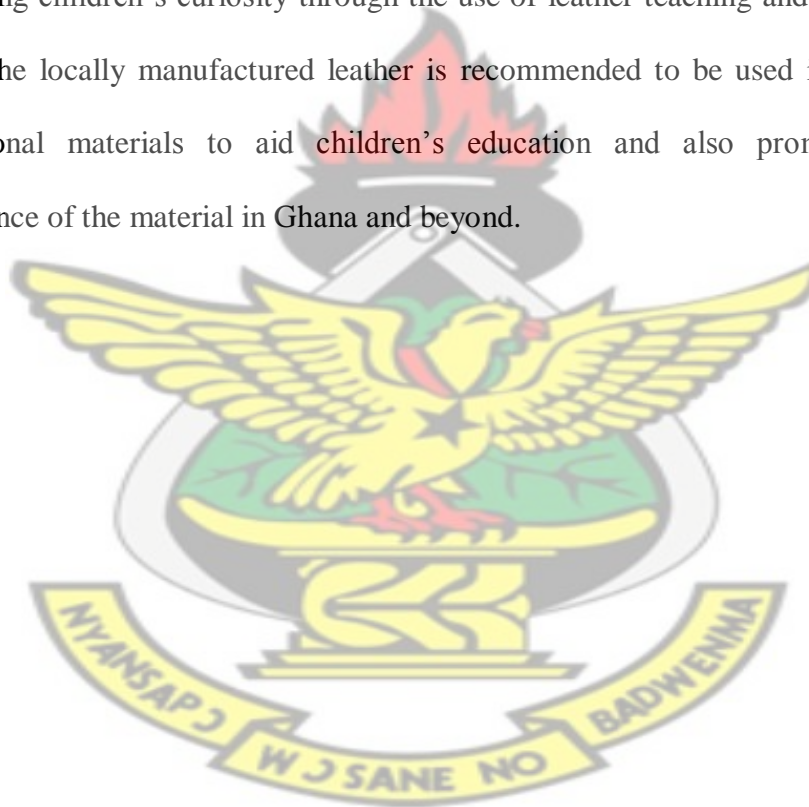Head of Department's Name   Signature   Date

ABSTRACT

The research explores the suitability and capability of leather as a material for making instructional materials to aid pre-school teaching and learning. Instructional materials play a vital role in teaching and learning at various levels of education, especially at the pre-school level where a strong foundation is needed. Materials usually employed in the production of instructional materials to serve as teaching and learning aid usually, include plastic, wood, paper, clay and plaster of Paris (PoP). These materials may be too heavy as found in wood, easily perishable as found with paper, or even too expensive to import from other countries. Conversely, leather, in terms of properties, is versatile, durable, pliable and can be dyed in various colours to attract children at the pre-school stage, since they are highly curious and easily become attracted to bright colours. Since leather is light in weight, its usage for making instructional materials will help reduce weight, promote durability of teaching and learning materials and also avoid/reduce the high cost of imported materials such as charts, plastic and electronically operated teaching and learning aid for pre-school education. The researcher employed qualitative research using the descriptive and experimental and methods. The descriptive study was used to describe the procedures and processes of producing appropriate instructional materials to arouse the interest of the children. The principal instruments designed to collect data were observation and interview. The convenience sampling approach was used to select the sample population with respect to data collection and accessibility of elements. In this regard, the headteacher, teachers and pupils of KNUST Nursery School were used as a sample for the study. Leather was identified to be a convenient material for making instructional media for pre-school

4

education since it has been found to be readily accessible, easily manipulated, remarkably light in weight, and attractive when painted or dyed in various colours to arouse the interest of the children. The researcher recommends that classrooms should have a plentiful supply of leather instructional materials and objects, which encourage children's inquiries and education. The research takes note of the intuitive desire in children for learning and urges schoolteachers to take advantage of this trait to facilitate the process of teaching and learning at the pre-school level. Schools are encouraged to make ample provision for stimulating children's curiosity through the use of leather teaching and learning aid. In this regard, the locally manufactured leather is recommended to be used in the production of instructional materials to aid children's education and also promote the economic significance of the material in Ghana and beyond.

ACKNOWLEDGMENTS

TABLE OF CONTENTS

Page

CHAPTER ONE

INTRODUCTION

CHAPTER TWO

REVIEW OF RELATED LITERATURE

CHAPTER THREE

METHODOLOGY

CHAPTER FOUR

PRESENTATION AND DISCUSSION OF FINDINGS

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

LIST OF PLATES

LIST OF TABLES

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ABBREVIATIONS

FCUBE – Free Compulsory Universal Basic Education

KNUST – Kwame Nkrumah University of Science and Technology

POP – Plaster of Paris

UNESCO – United Nations Education, Scientific and Cultural Organisation

UNICEF – United Nations International Children and Education Fund

USAID – United States Agency for International Development

CHAPTER ONE

INTRODUCTION

1.1   Overview

This chapter contains the background of the study, statement of the problem, research questions, objectives and delimitation, limitations, definition of terms, abbreviations, and importance of the study and organization of the rest of the text.

1.2   Background of the Study

Until recently, pre-school education was seen as an aspect of education of minor importance in Ghana, pre-school education has been made formal for children before proceeding to the primary school. In Ghana, pre-school education is meant to prepare the child for school education, which starts at the age of six years. They include crèches, day care centers, nurseries, and kindergartens.

It must be noted that pre-school education is a very important foundation in the lives of children, particularly in today's dynamic society and in a world where more and more parents in both urban and rural areas have less time for their children due to time constraints created by their occupations. In the pre-school preparation process of children, instructional materials play important roles in educating this age group. Since it is well understood that, children learn better by seeing and doing, the goal of this project is to explore the use of local leather as an alternative medium suitable for making instructional materials to serve as teaching and learning aid comparatively better in performance than existing ones made with

plastic, paper, wood, metals, clay and Plaster of Paris (POP). Leather has been chosen due to its well-known dependable, durability, versatility, pliability and bleaching properties. The material can also be dyed in various colours to enhance attraction.

1.3   Statement of the Problem

The research explores the use of local leather as an alternative medium for making instructional materials to aid pre-school teaching and learning. Instructional materials play a vital role in teaching and learning at various levels of education, especially at the pre-school level where children need to build a strong foundation to ground them firmly for mainstream education. Such instructional aids are usually made from materials that include plastic, wood, paper, clay and plaster of Paris. It has been observed that teaching and learning materials made in plastics are usually imported into the country at high cost to the detriment of the economy of the nation. Additionally, many types of plastic materials involved are not biodegradable when they are disposed of. Wood resources may be used, but its sources are being depleted, and consequently, scarce and expensive. Metals are not conducive for instructional materials meant for pre-school children because of their weight, toxicity and tendency to injure children. Paper is highly perishable and easily wears out, especially in the hands of pre-school pupils.

Conversely, leather is versatile, durable, pliable, bleachable and can be dyed in various colours for easy attraction. Children at the pre-school stage are highly curious and easily become attracted to bright colours. Moreover, there are various design and decorative techniques that can be employed to beautify leather, such as marbling, embossing, carving and scorching.

19

In spite of the suitability and applicability of leather in producing artifacts that have been empirically known, very few or none of the instructional materials found in the pre-school institutions visited in Kumasi are made of leather. It is therefore expedient to explore leather for use as a material for making instructional materials to aid pre-school teaching and learning.

1.4   Objectives of the Research

1. The research explores the feasibility of local leather as a medium for making instructional materials.

2. The research seeks to design and produce (50) instructional materials in leather for pre-school education.

3. To assess the suitability of leather instructional materials in teaching and learning at the pre-school level of education.

1.5   Research Questions

1. How can the feasibility of leather for making instructional materials be determined?

2. How can leather be used to make instructional materials to aid teaching and learning at the pre-school level?

3. How can the leather instructional materials produced be suitable for teaching and learning at the pre-school level?

1.6   Delimitation

The study was restricted to the use of locally processed leather in producing instructional media for teaching and learning at the KNUST Nursery School in the Kumasi Metropolis.

1.7   Limitation

The researcher produced (40) leather instructional materials instead of (50) as stated in objective two due to financial and logistic constraints.

1.8   Definition of Terms

Concept: a basic idea.

Crèche: a place or school where babies are looked after while their mothers are at work.

Development Centre: a center comprising nurseries and kindergartens where the social, physical, spiritual and moral needs of the children are attended to.

Early Childhood Center: a place of school where small children are nurtured morally.

Kindergarten: is a German word which means *children's garden*. It is an adopted name for a school which nurtures or prepares children between the ages of 2 to 5 years.

Nursery: a place or school where small children are nurtured and taken care of when their parents are at work. The level of a nursery (play group) should be above the crèche.

Nurture: the care and education of a child.

Pre-School Education: it is the type of education which covers the initial stages of early childhood education. It is the foundation upon which the child's life and education is developed.

Pre-School: it comprises all school before stage one of the primary division, Nurseries, kindergartens, early childhood development centers are examples of pre-school.

Stage One: a class or stage after pre-school.

1.9 Importance of the Study

The study will help improve the use of local leather in making instructional materials for teaching and learning in the nation's pre-schools.

It will also help Ministry of Education to reduce the cost of imported materials such as charts, plastics and electronically operated teaching materials.

The study will encourage teachers in Ghana to use available local leather as resource materials without relying on foreign ones.

1.10 Organization of the rest of the text

The research is presented in five chapters. The introductory chapter gives the Background of the study, Statement of the problem, Research questions, Delimitation, Limitations, Definition of terms, Importance of the study, and finally, the Organization of the rest of the text.

Chapter Two deals with the Review of related literature for the study. It made use of secondary sources of information such as magazines, books, unpublished theses, theories and dictionaries to deal with issues related to the topic. Chapter Three examines the methodology of the study and assesses the suitability and applicability of leather as an alternative medium for making instructional materials to aid teaching and learning in pre-school education.

Chapter Four presents and discusses the results of the study. Chapter Five is the concluding chapter where the Summary, Conclusion and Recommendations are also presented.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

2.1   Overview

This chapter presents the review of related literature relevant to the theoretical base of the research. It consists of the theories, concepts and ideologies regarding pre-school education in relation to teaching and learning materials essential to promote the fundamental education of the child.

Since leather as a material for making instructional materials to support pre-school teaching and learning is the focus of this study, the chapter concentrates on the concepts and theories of leather with regard to its sources, preparation, uses.

2.2   The Concept of Pre-School Education

The ideologies and concepts behind pre-school education have received in-depth attention in documentation such as books, journals, published and unpublished theses and on the internet. Writers including Milbank and Osborn (1987), Castle (1993), Reeves (2000), Sarpong (2006) have given various accounts on pre-school education, its approaches and facilities requisite for its successful implementation.

Milbank and Osborn (1987) observed that in a pre-school setting, as children interact with their peers and engage in a wide variety of activities, their cognitive development is stimulated.

In another development, Castle (1993) underscored Pre-school Education as to give children the opportunity to learn to play together, to share toys, to use their hands, feet and eyes to gain self-confidence, to learn how to keep clean, how to dress and how to use their bodies. The children will also sing and recite poems, which will improve their speech. According to Reeves (2000) pre-school education is the provision of education for children, usually between the age of three and five, depending on the jurisdiction before the commencement of statutory education. Sarpong (2006) explains that pre-school in Ghana are those that prepares children before the actual formal school education starts at the age of six years and also covers the initial stages of early childhood education. Also, it comprises all schools before stage one of the primary division, crèches, day care centres, nurseries, kindergarten, and cites early childhood development centers are example of pre-school. It provides a major influence on the development of the child's intellectual capabilities, interpersonal skills, social/emotional, behaviour and personality of children.

Pre-school education programmes are generally offered a few years immediately preceding entry to a compulsory system at six years of age (plus or minus depending on the country) Malmberg, L.-E. et al. (2010) says there are different opinions pertaining to the concept of pre-school education but they center on the development of children between the ages of one and six.

2.2.1 Pre-School Age

According to Chutima (2005), most child psychologists pay greater attention to the pre-school age because this is the most important period when human beings establish the foundation for their subsequent physical, mental, emotional, social and intellectual

25

development as well as their personality. This is the time when the children undergo the greatest development and, it is a golden period for establishing the foundation for subsequent development in all areas of life. In Piaget`s framework, the period between two and half and six years is a transition time during which children gradually overcome various mental barriers to systematic, logical thinking (Piaget & Inhelder, 1969).

Reeves (2000), states that Pre-school is generally considered appropriate for children between three and five years of age. According to Shabnan (2003), Pre-school child refers to children who range from conception age to 5 years 11 months and 29 days. Also, Pichisainit (2003) (as cited in Chutima (2005) defines Pre-school children as those who were between one and six years of age. Regarding the age at which a child begins pre-school education, he notes that a child should not be below age of three and above five. Pre-school is the term used to indicate the educational level for children below the age of six.

During an interview, the Headteacher of the University Nursery School said that, at the KNUST Nursery School, children are admitted every 30th September and by that date, the child should have attained the ages between three years 9 months and four years 8 months to qualify for admission.

2.2.2 Learning Strategies for Pre-School Education

Learning in young children is a result of the active interaction that occurs between the child and the environment, materials, ideas and people he/she meets. Experiences should match the child's development and emerging abilities, while at the same time they provide some challenges for continued growth and expansion of interests. This assertion raises concerns

26

on the teaching and learning materials employed in pre-school education whether they are capable of helping the child to develop his emerging abilities and interests. (http://www.circleofinclusion.org/english/approaches/dap.html).

Vygotsky, L. S. (1978) state that the teaching approach goes under the acronym MAMACHOLASU MA: material; MA: manipulation; CHO: choice LA: language and SU: support). They should provide opportunities for children to manipulate a variety of objects. The choice of materials to explore and manipulate elaborate language and provision of support of early years of education, which are crucial parts of the promotion of pre-school children's cognitive development (La Paro, K. M & Pianta, R. C; 2000).

Children are seen as active learners, and learning and teaching are seen to be reciprocal processes where often the teacher learns and the child teaches. The intended outcomes of such social-cultural learning environments are for children to grow up as competent and confident learners and communicators; healthy in mind, body and spirit, secure in their sense of belonging and in the knowledge that they make valued contributions to society. According to *Unesco Expert in Audio-Visual aids and production of teacher training materials,* Shankar (1980) stated that adult guidance through play activities can result in language, cognitive and psychomotor development of a child. When children play or make anything, their brains are involved. Play has been regarded as the heart-beat of early childhood education. It is an important vehicle for the child's social, emotional and cognitive development, as well as a reflection of development. Children learn naturally through the following: Doing, Discovering and Exploring, Asking Questions, Talking and Listening, Imitation, Trial and Error and Practice, Learning from other and Children and Play (Avelino, A. S., et al. 2003).

According to Castle (1993) imitation, curiosity, self-assertion, and especially the constructive tendency, can all be seen in children's play. This, quite naturally, brings together many of the essential growing points of a child development. For this reason, it is of immense importance in education. It is the medium through which children gain much of their language.

2.2.3   The Ideas of Pre-School Education

Castle (1993) underscored the main ideas of pre-school is to give children the opportunity to play together, share toys, to use their hands, feet and eyes, to again self-confidence, to learn how to keep clean, how to dress and how to use their bodies. The children will also sing and recite poems, which will improve their speech. However, no teacher should neglect this [idea] in children, for it is the foundation of several aspects of learning, early ideas of numbers, the use of materials, the feeling of thickness, weight, length and breadth, judgment of space and shape and many other concepts.

Shabnam (2003) state that pre-school education plays a significant role as it helps children in successful completion of primary education.

According to Shankar (1980), the purpose of education at the pre-school levels is not so much a question of giving information to children to memorize as of deeply stimulating their senses arousing their curiosity, interests, stimulating, inquiry and helping them to achieve significant perceptual growth. Additionally, *The World Survey of Pre-school Education* (1976) stated that one of the main goals of Pre-school Education is to give every child the same chance of succeeding at primary school and pre-school education and thus become an important factor in democratization. Pre-school education must serve the cause

28

of genuine democratization, which means that all must have the same opportunity to develop and to succeed.

2.2.4   Curriculum for Pre-School Education

According to Johnson (1968) "The curriculum is the sum experiences of learners while they are under the auspices of the school" (p.124). This means curriculum refers to all the activities planned for learners in the school. The curriculum focuses first on the child as a total person. It deals with the emotional, mental, social and physical development of the child. The curriculum includes the following:

Language skills: this promotes language development for effective communication (listening, understanding, speaking, pre-reading and pre-writing activities).

Pre-mathematical skills: these include ordering, matching, sorting, classification, measurement, pairing, adding, subtraction and others.

Creativity: children seem naturally creative. This aspect is geared towards giving opportunity to children to explore things around them by the use of their sense of smell, hearing, taste and touch. Using a variety of materials such as crayons, paint, clay, markers, etc. to create original work, is one example.

Music and movement: music enables children to have fun, explore and identify sounds, sing, play simple instruments and develop melody.

Nature and environment: this course enables children identify and appreciate objects in the environment, and talk about them, and use them purposefully. Moreover, for the pre-school children curriculum (37-60 months old) and kindergarteners (61-72 months old), goals and objectives were defined according to their developmental abilities. It can be

inferred that goals and objectives have a crucial place within the curriculum while proving flexibility to teachers. According to MONE (1994) (as cited in Chutima (2005) the goal areas defined in this curriculum were:

1. Goals related to Self-Awareness

2. Goals related to Psychomotor Skills

3. Goals related to Self-Help Skills

4. Goals related to Emotional Skills

5. Goals related to Social Skills

6. Goals related to Cognitive Skills

7. Goals related to Language Skills

8. Goals related to Aesthetic and Creativity Skills

Accordingly, curriculum philosophy of pre-school education is connected to the physical environment. For example, a curriculum philosophy, which is based on play, might imply to us; (a) supply materials and toys, and (b) give the child free time to interact with them and play (Garvey, 1990).

Another pre-school curriculum based on the Whole Child principle might imply different strategies in designing the physical environment. Bowe (2000) indicates that to enhance the development of the child, the teacher should attend to, assess and intervene in five domains, namely, the adaptive, cognitive, communication, physical and social/emotional domains.

Avelino, A. S., et al. (2003) states that pre-school education are better prepared for primary school education in that they would acquire some pre-reading skills, counting skills and fine motor and social skills during their pre-school education.

Pre-school curriculum often involves activities leading to use of visual spatial intelligence. The use of bodily-kinesthetic intelligence as a dominant intelligence among 4 to 6 years old children could be explained by developmental features of this age group in which children's efforts of discovering the world are mostly based on experiences related with movement (Malmberg, L.-E. et al. 2010).

2.3   History of Pre-School in Ghana

Historically, Ampadu and Ofosu (2007) have written that pre-school education dates back to 1843 when the Basel missionaries attached the kindergarten to some of the primary schools in Ghana. In 1954 the Convention People's Party established day care centers to commemorate the ascension of Queen Elizabeth II in her honour. The 1961 Education Act of Ghana placed all early childhood centers under the care of the Ministry of Education. In 1975 the Evans Anfom Report encouraged private participation in nursery and kindergarten education. In 1977, the Secretary for Education directed that kindergarten classes should be attached to all primary schools in Ghana. The 31st December Women's Movement provided service by establishing many centers with government support.

The School Management Committee Law 144 1978 now empowers the Department of Social Welfare to register crèche and day care centers. *The White Paper Report on Education Reform*, (2004) states that "the Government of Ghana appreciates the value and crucial role that pre-school education plays in the formative years of the child, especially its potential to overcome the educational disabilities of children from less favored family backgrounds" (p.17). It also emphasizes that, two years of pre-school have been added to occupy all of Ghana's children from the age of 4 till 15 of basic education.

Government has decided that [pre-school] education should progressively become part of the Free Compulsory Universal Basic Education (FCUBE) structure. Modalities for the realization of this objective by the year 2015 are to be worked out, including co-operation with the private sector providers of pre-school education.

In Ghana, organizations such as UNICEF, USAID, UNESCO and other non-governmental organizations promote pre-school education through the supply of books and other teaching and learning materials, which are mostly foreign in concept or nature. According to Yahaya who writes for UNESCO on the topic: *Use of Play Activities for Educational Purposes,* a child, whatever his age, belongs to a given culture, which must be respected and understood. Grasping the various aspects of that culture may therefore help the teacher to understand the workings of his young charges' minds, their beliefs, experiences, aspirations and on that basis work out a teaching strategy. He added that, it is less expensive to use endogenous games and playthings than imported ones, which besides, are not necessarily suitable. Concerning the use of leather, *American Educator* (1970) (as cited in Atiase (2004) states that leather is one of most beautiful and durable of materials. A piece of leather finished in an attractive and useful way will give many years of satisfying service.

2.4 Instructional Materials for Pre-school Children

Conveying ideas skillfully to children is another important task for the teacher of pre-school children. Words have different meanings to different individuals, but pictures, drawings, models and charts can go further to convey what we have in mind. Therefore, instructional materials are needed to convey ideas to the children to enhance their understanding.

Instructional materials are the basic components in teaching at all levels of education, especially pre-schools and primary schools. They help the child to understand what is being taught when they see and handle the object itself Shankar (1980). The instructional materials provide opportunities for children to broaden and deepen their knowledge by providing a variety of firsthand, developmentally appropriate experiences and by helping children acquire symbolic knowledge through representing their experiences *(Electronic Journal of Science Education (2008) vol. 12 no.2).*

According to Croft (2000) a visual presentation of an idea or a concept using pictures, charts and models helps the child to develop mental images of the object that we are talking about.

As an old oriental saying goes,

"If I hear, I forget;

If I see, I remember;

If I do, I understand."

If the child could "see" what we are talking about, it helps him understand what we exactly mean in words. Seeing, hearing, touching, smelling and manipulating things in the environment tells the child what the world is like. Materials such as toys, charts, pictures, maps, diagrams are basically materials of sight offer a variety of experiences, which stimulate the senses and promote self-activity in children.

Craig (n.d) stated that, "A good aid is like a window; it should not call attention to itself, it should just let in the light". He emphasizes that, instructional materials for children should:

- attract attention

- develop interest

- adjust the learning climate

33

- promote acceptance of an idea.

Instructional materials should possess the qualities above in order to help children understand what is being taught. Measures should be put in place to ensure effective teaching and learning at this level and the kind of instructional materials to be used. Caples (1996), states that materials, which are durable and easy to maintain, should be selected for pre-school children. It is against this background that the research explores the durability of leather as a material in making instructional materials for such age group. Green (1988) added that "if young children were designers, textural quality of the space would be one of the first orders of business" p. 66). Textures are very important in the lives of children, because young children use their hands frequently to learn and to explore the physical environment. Allison (1999) also has this to say, that different ranges of colours can be used according to what psychological impact is expected. Bright reds create excitement, deep purples and greens are nearly stabilizing and smoothing and yellows are restful and easily perceived by young children.

Also, Green (1988) indicates that colour can be used to create boundaries between different areas.

2.5   Theoretical Review on the Properties of Leather as a Viable Material for Utility

Asubonteng (2011) explains that man encounters the mechanical properties of leather many times each day in the course of using leather products, although they are usually accepted without thought. These are the properties, which justify and determine the viability of the material's applications and utility, when well conditioned. Due to the natural orientation of skins and leather, it is well established that the interwoven structure of the skin is what

renders the varied abilities of leather for various uses. Although the skin has the epidermal layer, corium and the flesh layer, it is the corium layer, which gives the leather its strength and resistance to tear. This makes leather viable for products, which require resistance to tear. Since the grain layer does not have such large interweaving character, the fibre bundles are relatively weak compared to the corium.

Asubonteng (2011) has again stressed that the properties of leather vary considerably depending upon the type and quality of both the raw material and the tanning process employed. Also, due to the variation of animal characteristics from which skins are obtained for leather processing, every piece of leather has individual markings which relate to its origins and add character.

Arnold (1981) as cited in Asubonteng (2011), says that the most distinct quality for which a tanner looks to the grain of his raw stock is a smooth, firm and attractive surface for dressing – whether for display with its natural pattern or as a foundation for some artificial finish. Since the natural finish on the grain surface of leather can be altered artificially, there is the possibility of enhancing the appeal to make leather attractive to children.

Asubonteng (2011) emphasizes that there are different characteristics exhibited by the various sections of leather, and these variations usually dictate to the user the application of artefacts befitting the various parts. The neck and shoulder region tend to be thicker than the rest of the skin, while the bellies and particularly the axillae (the armpits) have a very thin, loose structure. The area termed as the butt (the back and rump area) is the most densely fibred area and is generally thicker than the remainder of the skin. It yields the best leather,

having a taut grain structure and a very durable corium layer. The butt area has the most uniform structure and is the prime cutting area for leather goods.

The shoulder area is less densely fibred and the surface has grown wrinkly, produced by movement of the animal's head while alive Kit and Thomson (2007).

The way in which the collagen fibres and hair follicles are angled varies from one species to another and it is this variation which gives leather made from the skin of different animals their own special characteristics and uses.

2.6   Application of Leather in Making Teaching and Learning Materials

According to Boahin (2008) and Asubonteng (2011), historically, leatherwork is a very old vocation, and its development dates as far back as the prehistoric era when man made serious efforts to find something to cover himself against the harsh weather conditions. It is well established that leather is obtained through the chemical convertion of the animal skin to meet man's needs of time. The World Book Encyclopaedia Vol. 12 (1972) (as cited in Boahin (2008) and Asubonteng (2011), leather as a material is strong and durable. It possesses properties which give it the ability to stretch, to be as flexible as cloth or as stiff as wood and some kinds are thick and heavy. Leather can be dyed and polished until it has a glossy finish. Decorative techniques such as embossment, marbling and coating can be employed to beautify its aesthetic appeal. In terms of utility, leather as material is employed in the production of diverse products including shoes, apparel, bags and hats to mention a few (Boahin, 2005).

Well (1994) (as cited in Asubonteng (2011), is of the view that unlike synthetic material, leather has durability, workability and beauty that enhances with age. This gives assurance

of its endurance to dirt and the longevity of the material when in use. This is one of the bases upon which the researcher believes that leather can be employed in the production of instructional materials suitable for preschool education.

Christopher (1952) is of the same view expressed by Well Larry, and believes that leather is one of the strongest, most flexible, pliable and adaptable materials which are resistant to wear and tear.

The American Encyclopaedia (1965) confirms this, as it states that "because of its light weight and pliancy, leather was for clothing, shoes and so on in the early culture of the early empires such as the Egyptians, Greeks and Romans. Wear and tear is minimal in leather. Leather can lined and cut into shapes for construction in leather works.

The property of leather to be flexible, pliable, durable, light weight and tough is considered properties appropriate for the production of the instructional media for preschool education.

2.7   Preparation of Leather

Comprehensively, Boahin (2008) has noted that the choice of pelt by the early man brought about serious efforts to improve upon its quality and comfort in diverse utility and applications. This aspiration to render the skin obtained from the animals hunted more durable, pliable, water resistant and suitable brought about the pre-tanning, tanning and post-tanning processes which enhance leather for specific use. Boahin (2008) has it that the results of the early man's efforts still remain as some of the oldest methods and techniques employed in leather processing.

Various researchers, in their quest to improve the significance of leather in man's life, have led to varied approaches to improve the preservation of the material and enhance its ergonomic significance through the past years (Maddox (1940).

Today, their unrelenting efforts yielded fruitful results, which have enhanced the economic viability of leatherwork in a more applicable manner in national development. Chrome tanning has allowed more attractive and flexible leathers to be produced at a much faster rate to meet the high demands faced by tanners for both domestic and industrial utility. The vegetable tanning method on the other hand is used to prepare leather for artefacts which require embossing, moulding, carving and other forms of tooling (Sharphouse, 1995; Boahin, 2005; 2008; Asubonteng, 2011).

Currently, the use of leather is expanding, particularly, as the appropriate treatment approach is being employed. Boahin (2005) has realized that leather is used in production of unconventional products such as door panels, ceiling panels, office accessories, decorative picture frames, mirror frames and many more. With the availability of complementary materials such as wood, cardboard, strawboard, rattan, glue, paints and other colourants to render the necessary support, leather remains unlimited in its innovative applications, for which the production of instructional media for educational purposes in preschools is not exempted.

2.8   Empirical Review on Leather Applications in Functional Objects

According to Bettie (1995) creative activities enhance children to explore their own world. She researched on a manual on some creative activities for pre-schools. By implication, during the formative years, colour can be instrumental in bringing out the behavioral

38

characteristics of children to serve as a basis upon which suitable instructional guidelines can be given by art teachers.

Antwi-Safee (1997) wrote about instructional materials for nursery schools in Ghana and stated that the right teaching and learning materials will appeal to the child's natural curiosities, desire to explore, experiment and communicate ideas in a beautiful way. She said most of the teaching and learning materials exhibit foreign elements. These include the nursery text, illustration and teaching methodology. Alphabets were cut out of paper and foam. According to her, reading materials for the nursery child must be bold and clear for easy identification. In conclusion, she said nursery is the age of concept formation, and therefore a crucial foundation for education. She also regretted the problems emanating from the fact that nursery education in Ghana lacks meaningful research that would lead to the effective development of teaching and learning materials as methodologies in their selection and utilization. It is necessary for the researcher to review the topic since the linkage is useful and could help him bring out teaching and learning materials, which will arouse the interest of such age group.

Using local leather to design and produce instructional materials for pre school education denounce any foreign elements in our education system. Instructional materials in leather can be bold, clear and painted into different colours to enhance concept formation for such age.

More importantly, Atiase (2004) discusses about leather as a medium for sculpture. He said the use of leather in the production of articles is in weight reduction, durability and the exhilarating variety of techniques. Treatment of leather was given much attention to make it workable and free from unpleasant smell. He went through with the following processes:

sanding, deodorizing, soaking, stretching, drying etc. Leather as it is, can be used for modeling, carving and casting. Hence, he concluded that leather is versatile and could be used for the production of artifacts.

Additionally, Boahin (1994) wrote on leatherwork techniques for senior secondary schools. He emphasized on the preparation of leather and decoration techniques. He said leatherwork in its indigenous form had not received sufficient attention to make it popular in the educational field in Ghana. Decorative techniques that are useful for decorating instructional materials in leather for pre school education were highlighted in this research. Some of the decorative techniques employed in this research include painting, marbling, embroidery and appliqué.
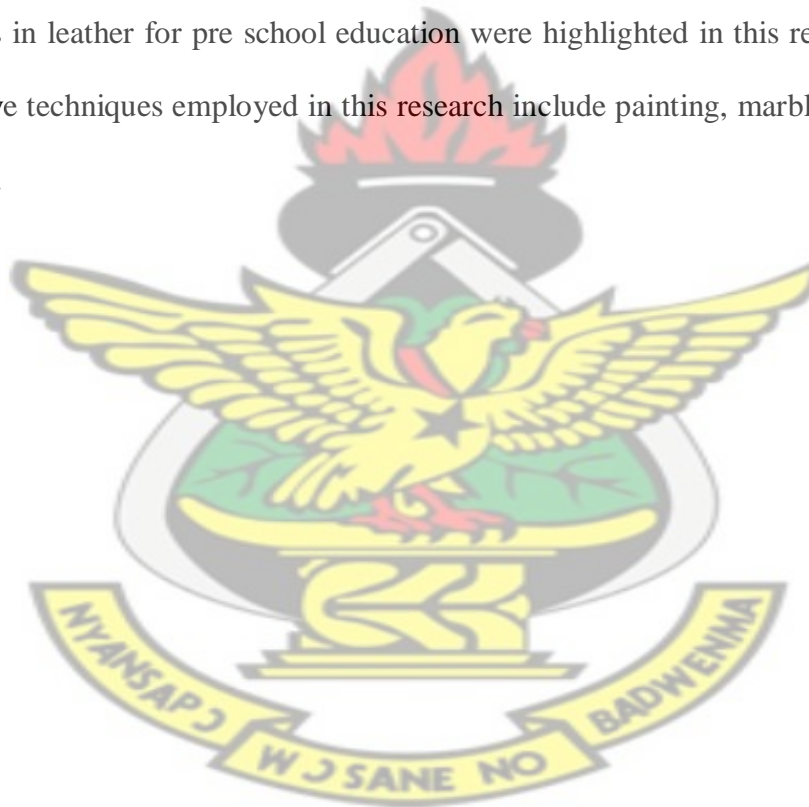
CHAPTER THREE

METHODOLOGY

3.1   Overview

This chapter examines the methodology of the study. It expounds the research design, experiments conducted, description of processes followed and uses of various tools and materials for the execution of instructional media produced. It also assesses the suitability and applicability of leather as a medium in making instructional materials to aid teaching and learning in pre-school education.

3.2   Research Design

The researcher employed the Qualitative research, using the Descriptive and Experimental methods in this study. The KNUST Nursery School was used to test the effectiveness of the instructional media designed and produced.

The methodology made use of classroom observation and unstructured interviews to solicit data. The descriptive method was employed to describe the processes followed to execute the experiments conducted towards the production of the instructional materials to enhance the teaching and learning process. It is relevant to state that although the experimental method was chosen to explore the feasibility of leather for making instructional materials for pre-school children and also practically design and produce the teaching and learning media, the test conducted at the KNUST Nursery School was a determinant of the usefulness of the outcome of the entire project. Tools, materials, practical tests and the results are described in detail.

3.3   Library Research

Documented literature was gathered from the following libraries:

- KNUST Main, Library

- Faculty of Art Library KNUST

- Department of General Art Studies Library KNUST

- University of Education, Winneba – Kumasi Campus Library

- Wesley College of Education, (WESCO) –Library, Kumasi

3.4   Population for the Study

The population for the study is heterogeneous and it was made up of teachers, pupils, local tanners and leather sellers. The population had different characteristics and dealing with them required different approaches to collect data for the study.

3.4.1 Accessible/Target Population

The accessible population included KNUST nursery school teachers and pupils, leather tanners at Aboabo in Kumasi, Hausa Zongo in Tamale and leather sellers in both Kumasi and Tamale.

3.5   Sampling Technique

The Convenience approach was used in selecting the sites for the study. The sites were KNUST Nursery School, Kumasi and Tamale. In addition, random sampling was employed to select local tanners at Aboabo in Kumasi and Hausa Zongo at Tamale, leather sellers from both Kumasi and Tamale. On the other hand, convenience approach was again, employed to select teachers and pupils at KNUST Nursery School as part of the sample for the study because of the proximity to the place where the researcher was based.

3.5.1   Sample Size

The sample size involved 4 local tanners, 6 leather sellers, 6 teachers and 180 pupils.

Table 3.1: The results of sample size

POPULATION	PLACES	SAMPLE SIZE
Local tanners	Kumasi, Tamale	4
Leather sellers	Kumasi, Tamale	6
Teachers	KNUST Nursery	6
Pupils	KNUST Nursery	180
Total		**196**

3.6   Data Collection Instruments

The main data collection instruments for the research were observation and interview. The use of observation helped the researcher to ascertain the situation pertaining to teaching and learning at KNUST Nursery School with the use of instructional materials such as paper, wood, metal and plastic. This helped the researcher to design and produce instructional

43

materials in leather and to determine the suitability and applicability of leather for the purpose. The researcher also conducted face-to-face interviews with the stakeholders under the study. These interviews involved unstructured and generally open-ended questions that were intended to elicit views and opinions from the KNUST Nursery School teachers. These teachers had had between 6 to 10 years of teaching experience in pre-school institutions and their ages ranged from 30 to 50 years. Some of the teachers at KNUST Nursery were interviewed regarding the use of leather instructional materials for teaching and learning at the pre-school level.

3.7   Types of Data

The types of data gathered to facilitate the answering of the research questions to meet the objectives of the study were mainly primary data and secondary data.

3.7.1   Primary Data

Primary data were obtained from KNUST Nursery School, Aboabo tannery in Kumasi and Hausa Zongo tannery in Tamale, leather sellers in both places and the studio of Department of Integrated Rural Art and Industry at KNUST for practical work to be done.

3.7.2   Secondary Data

In gathering the secondary data, the researcher consulted books, journals, the Internet, published and unpublished theses, and other documents that dealt directly with topics related to pre-school education, leather and its applicability for developing instructional materials for children between 3 to 6 years of age.

44

3.8   Execution of Activities for Research Question One

How can the feasibility of leather for making instructional materials be determined?

This question handled objective one, which deals with the determination of the feasibility of leather being used for making instructional materials for pre-school education. To answer the question, the following activities were performed.

Activity 1: **Feasibility studies at KNUST Nursery School:** The study commenced with a visit to the KNUST Nursery School where the researcher conducted the feasibility of teaching and learning activities in the school. First of all, the researcher visited all the eight classrooms and studied the nature of curriculum being implemented as well as teaching methods employed. Secondly, the researcher took a critical look at the type of teaching and learning materials, the materials in which they were made, how they were used to facilitate teaching and learning and the shapes and of various instructional media used in the school. The feasibility studies meant to help the researcher to understand the teaching learning situations at pre-school level of education as well as how leather could be used to substitute the instructional media existing in the school.

Activity 2: **Assessment of the availability and price range of local leather:** The availability of local leather for making instructional materials was ascertained by identifying different sources of local leather. Places visited were the leather markets in Kumasi and Tamale. Observations and interviews were conducted on the availability of leather at the various places visited. The prices of leathers were compared at the various places visited. This was to give the researcher an idea about how many sheets of leather were needed to execute the project. Leather sellers in both Kumasi and Tamale were observed and

45

interviewed to find out the rates at which they received sheets of leather and the prices at which they were sold.

Activity 3: **Determining the thickness of leather:** The thickness of the leather was determined by measuring with calipers. This was to determine how heavy or light the instructional materials would be when the local leather is used.

Activity 4: **Testing for softness of the leather:** The softness of the leather was tested to select leather that was smooth and easy to manipulate. This was done through the hand feel and folding by the researcher to get the required leather for the intended purpose.

3.9   Execution of Activities for Research Question Two

How can leather be used to make instructional materials to aid teaching and learning at the pre-school level?

After testing for the workability of leather, the next stage was to produce instructional materials in leather to aid the educational process of the targeted pre-school children. The following are the activities performed:

Activity 1: **Sketching of the teaching and learning materials:** Having made a selection of concepts for developing instructional materials that suit the interest of children, preliminary sketches were developed into operational or working drawings with details of shapes, sizes, colours and dimensions. Since the researcher had already visited the KNUST Nursery School find out the teaching and learning materials used and the identification of materials employed in their manufacturing, the selection of the concepts or ideas were based on the

46

activities that went on during the observations and interviews. The information obtained guided the researcher to design and produce a number of instructional materials. The behaviour, interest and age of the children were also taken into consideration at this stage.
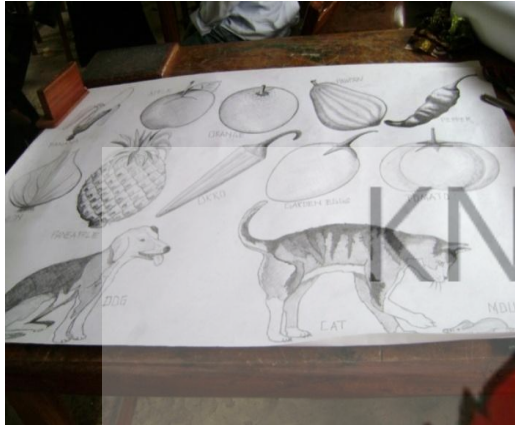
Plate 3.1(a): Fruits, vegetables and animals

Plate 3.1(b) : A car, bird, ball, aeroplane, butterfly, goat

Plate 3.1(c): A picture of a boy and a girl

Activity 2: Selection and Preparation of Materials for the Instructional Media

Based on the selected designs for the production of the instructional media, it was found necessary to select and prepare the materials requisite for the production. The following outlines the materials selected and how they were prepared for the execution of the project:

Selection and Secondary Preparation of Leather: Since the local leathers selected from Aboabo tannery in Kumasi and Hausa Zongo in Tamale were found to possess excess flesh and unpleasant smell, it was found necessary to take them through a series of activities to refine them to make them healthy for children to handle. The activities were as follows:

Sanding: Firstly, as shown in Plate 3.2, the leather was placed flesh side up for sanding to remove the excess flesh from the leather and to render it smooth and soft.

Plate 3.2: Sanding of leather

Washing: Citrus lime was added to clean water and the leathers were immersed in the solution and washed clean. The leathers were then rinsed in another basin of clean water to remove the bad odour.

Stretching: The leathers were spread on a wooden board and stretched with the help of thumb pins as shown in plate 3.3 (a & b).

Plate 3.3 (a & b): Stretching of leather

Drying: Drying was done under a shade. The slow drying allowed loose tannins, dyes and oil to spread uniformly through the leather. The leather was then ready for the intended use.

Plate 3.4: Khaki leather   Plate 3.5: Brown leather
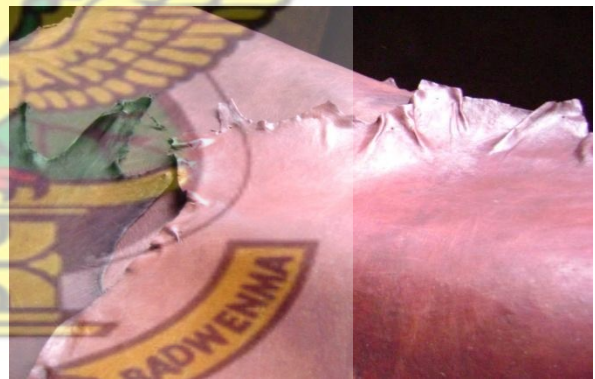
Strawboard : Strawboard was used as reinforcement material.

Plate 3.6: Strawboard

Glue: White glue was used as a fastening material to hold together the pieces of leather to the various shapes of the templates.

Plate 3.7: Tiger brand glue

Acrylic paint: was used to paint some of the works

Plate 3.8(a & b): Acrylic paint in various containers

Plate 3.9 (a & b): Acrylic paint being used on the leather to depict various colours of objects.

Nylon thread: was used to sew together the pieces of leather.

Plate 3.10: Nylon thread

Activity 3: Organization of Tools: The tools meant for the project work were organized as follows:

Utility knife was used to cut out the strawboard templates and the leather.

Plate 3.11: Utility knife

A pair of scissors: was used as a supplementary tool to cut out templates from the cardboards and pieces of leather.

Plate 3.12: A pair of scissors

Soldering iron: was used to create various designs on the pieces of leather and for scorching.

Plate 3.13 (a & b): Scorching method

A calibrated ruler: was used for measuring and marking on the leather and other materials used in the project.

Plate 3.14: A calibrated ruler   Plate 3.15: Taking measurements on the leather

Steel set square: were used for making accurate corners and marking out polygonal shapes on the boards and leather.

Pencils: were used for marking and tracing out outlines on the boards and leather for cutting.

Nails: were used to stretch the pelts and leather.

Hammer: A flat-and-pane hammer was used for hammering folds and edges of the leather.

Plate 3.16: Hammer

Activity 4: Construction of the selected items

The designs were traced through and around the templates and transferred on the leather.

Plate 3.17: Tracing

Plate 3.18: Image of object transferred onto

the leather

Cutting of templates: the sheets of leather were cut out into pieces and designs transferred into working drawings on paper and strawboard and cut to represent the items. The shapes of the items were cut out with scissors.
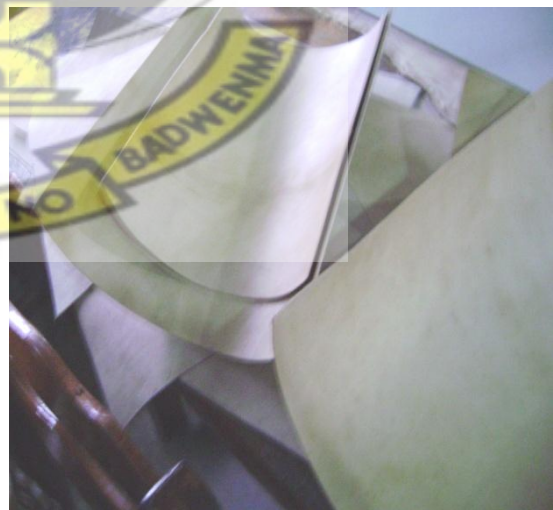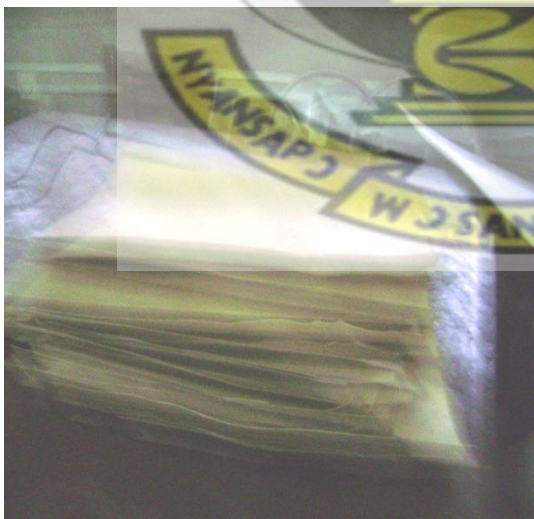
Plate 3.19 (a & b): Sheets of leather
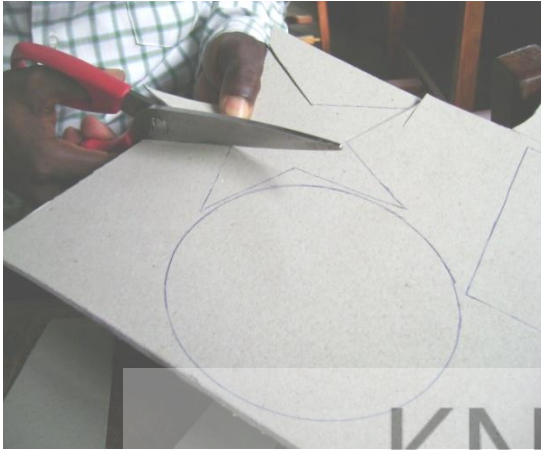
Plate 3.20: Cutting of template   Plate 3.21: Cut out letters

Decorating: A number of design techniques were employed to decorate the leather. The decorating techniques used were painting, marbling, dyeing and scorching, embossing and polishing.

Plate 3.22: Some images were painted   Plate 3.23: Some of the images were scorched
           onto the leather   onto the leather

.

The parts of the selected items were assembled

Various design techniques were applied on the leather. The final touches required for making the leather articles were put in at this stage. The items were classified accordingly and made ready for pre-testing.

Selection of Instructional materials

At this stage, the decorated leathers were used to make the following instructional materials:

Two sets of the letters of the English Alphabet

One set comprised both upper and lower cases. The set was displayed on a board to be viewed by the children. The other set, too, in upper and lower cases, were to be handled and manipulated by the children.

Two sets of Arabic numerals (0-10)

The first set constituted the Arabic numerals from 0 to 10. Their corresponding values in words were also provided. They were displayed on a board and hung on the walls of the classroom. Children handled the other set of numbers.

Parts of the body: this depicted the human figure in both genders, a boy and a girl.

Fruits: apple, banana, orange, pawpaw and pineapple.

Vegetables: garden egg, okro, onion, pepper and tomato.

Animals: lion, dog, cat and mouse, bird on a tree.

Objects: car, ball, aeroplane.

Basic Shapes: Star, Rectangle, Oval, Circle, Square, Triangle.

Mathematical Signs: Addition, Subtraction, Equal to, Division, Multiplication, Less than, Greater than

3.10   Execution of Activities for Research Question Three

 Are the instructional materials produced in leather suitable for teaching and learning at the pre-school level?

The instructional materials produced in leather were ready for testing to ascertain their suitability for teaching and learning at the pre-school level.

Activity 1: With the permission from the Headteacher, the instructional materials were organized according to the various subjects taught in the school, such as mathematics (number work), English language (literacy), environmental studies, creative activities and music and dance.

Activity 2: A class teacher assisted the researcher to test the leather instructional materials. The materials were sent to the classroom according to the subjects on the timetable. The testing of the instructional materials took one month, to execute.

Activity 3: On – the – spot observation was carried out in the classroom during teaching and learning at KNUST Nursery Class One 'C' and 'D' and Two 'A' and 'B'.

The researcher observed as the class teacher used leather instructional materials to teach the pupils.
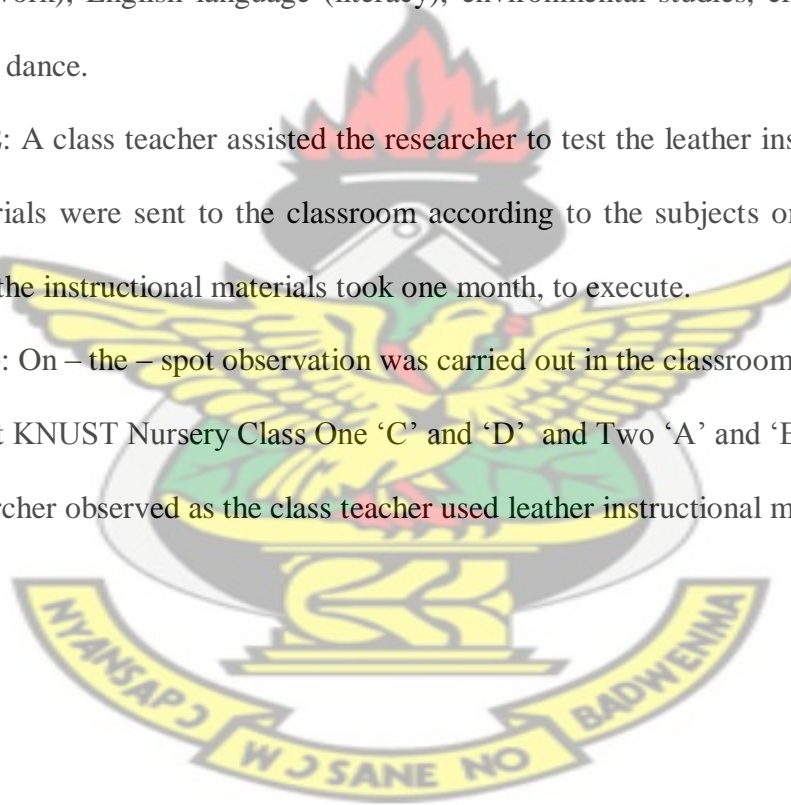
3.11 Samples of activities during the Testing of Leather Instructional Materials produced for pre-school children at KNUST Nursery School.

Plate 3.24: Samples of the instructional materials painted on leather

Plate 3.25: A preschooler showing a tomato painted on a leather sheet to the class

Plate 3.26: A Preschooler showing a garden egg painted on a leather sheet to the class

Plate 3.27: A teacher assisting a preschooler during the lesson to use one of the instructional materials

Plate 3.28: A child showing the picture of a pawpaw painted on leather to the class
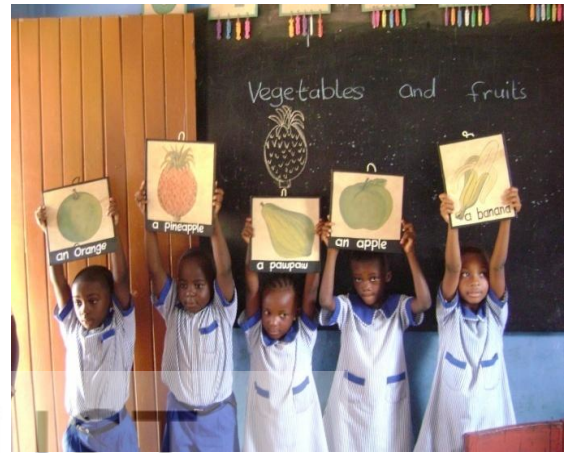
Plate 3.29: A section of children showing various fruits painted on leather during the lesson

Plate 3.30: A section of children showing various vegetables painted on leather to the class

Plate 3.31 : Drawing of vegetables and fruits on chalkboard to match paintings of the same on leather

Plate 3.32: A child pointing to a part of the body on a leather instructional material

Plate 3.33: A teacher drawing a human figure on the chalkboard to match a similar motif on leather

Plate 3.34: Children responding to questions during the lesson

Plate 3.35: Display of instructional material during the lesson

Plate 3.36 (a, b, c & d): The display of more instructional materials by the children during

the lesson

Plate 3.37: A teacher writing the key words
to match similar words on leather
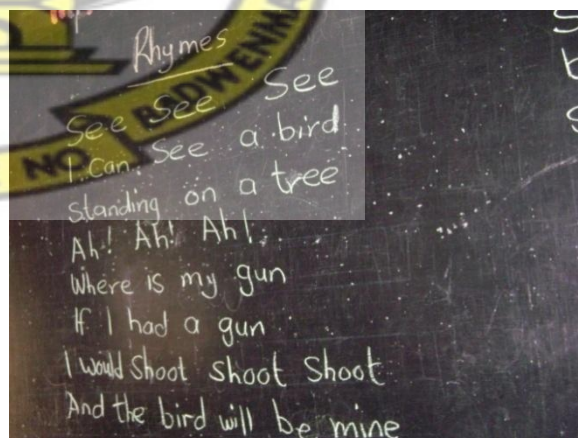
Plate 3.38: A rhyme on the chalkboard
to match a similar rhyme on leather

Plate 3.39: A teacher going through the rhyme
with the children
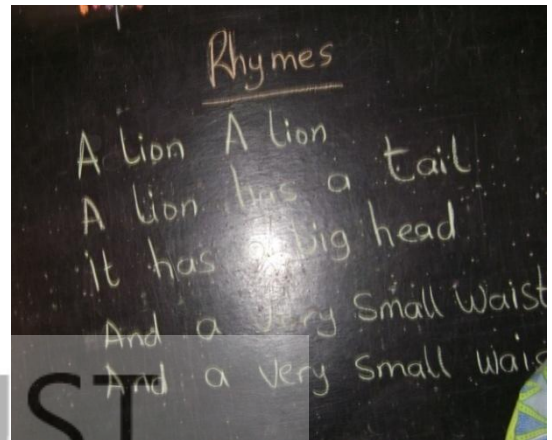
Plate 3.40: The words of the rhyme on
the chalkboard
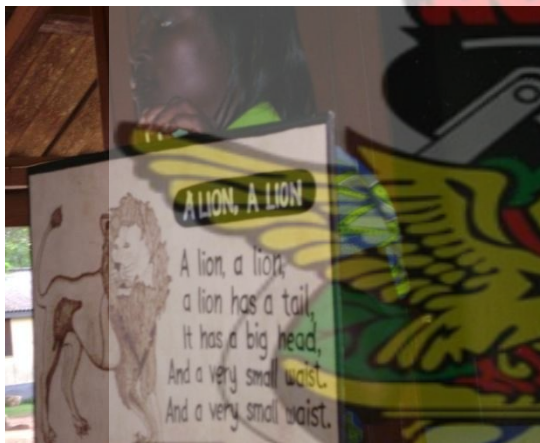
Plate 3.41: A picture on leather depicting
the rhyme

Plate 3.42: The teacher and the children
reciting the rhyme during the testing
stage of the research

Plate 3.43: The teacher explains the rhyme to the children

Plate 3.44: The teacher showing the picture for identification
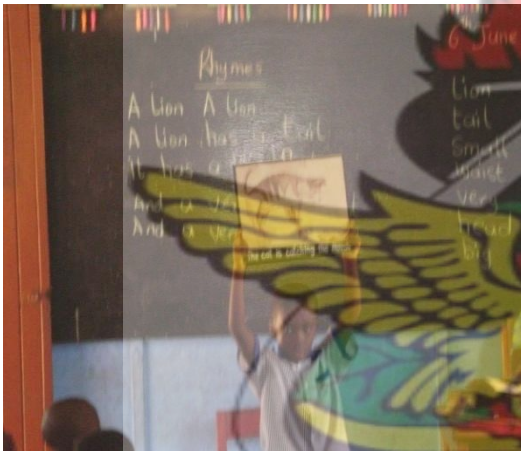
Plate 3.45: A child identifies a picture
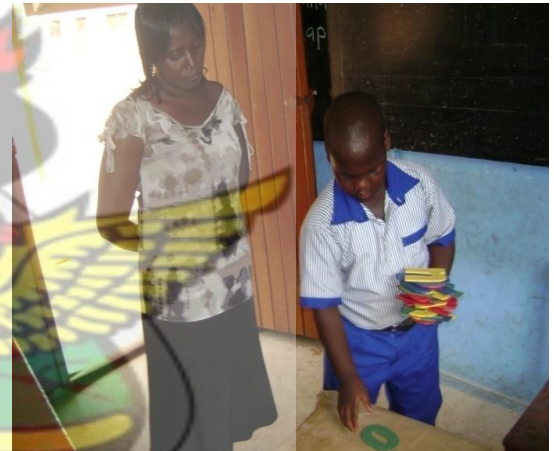
Plate 3.46: A child counting the letters of alphabet

The teacher and the children going through identification of letters, sounds of letters, spellings, pronunciations of words and formation of sentences
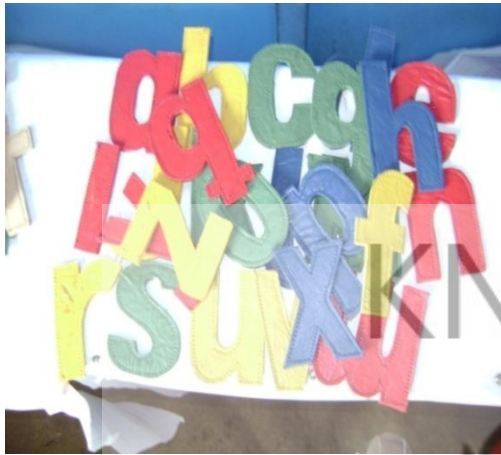
Plate 3.47: Letters made with leather

Plate 3.48: Formation of words and sentences with some of the leather materials

Plate 3.49: A child reading an arrangement of leather materials from the chalkboard

Plate 3.50: A display of letters, words and sentences made with leather materials

Plate 3.51: A teacher pointing to words formed   Plate 3.52: A child formed a word with
            with the leather materials   leather materials
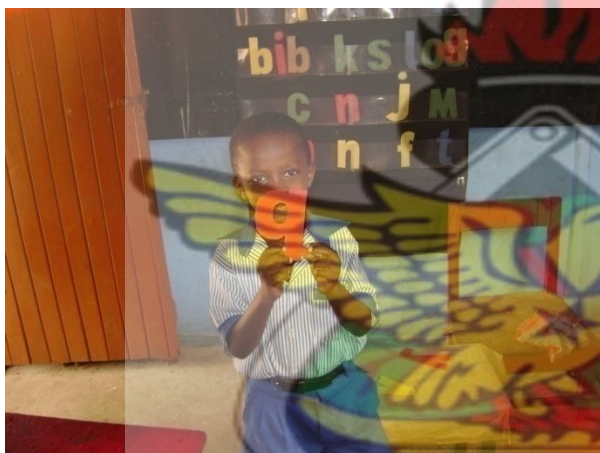
Plate 3.53 (a & b): Identification of letters and sounds of the letters formed by
                using the leather materials by the children during a lesson

Plate 3.54: A display of numbers made in
leather on the chalkboard during the lesson

Plate 3.55: A child pointing to a number on the
chalkboard

Plate 3.56 (a & b): Identification of numbers made with leather by the children during the

lesson

CHAPTER FOUR

PRESENTATION AND DISCUSSION OF FINDINGS

4.1 Overview

This chapter looks at the presentation and discussion of result as well as the findings made in this study. The discussion focuses on the results and findings of the various activities performed during the execution of work for research objectives one and two. The outcome of the testing process of the instructional materials produced in leather for pre-school children have also been deliberated upon.

4.2 Discussion of Results and findings for Objective One

To explore feasibility of local leather as an alternative medium for making instructional materials.

The data recorded indicates that leather was mostly available in the northern parts of the country. There was a local tannery at Aboabo in the Kumasi Metropolis and Tamale in the Northern regions where the researcher sourced the leather to make the instructional materials for the KNUST Nursery School children. Most of the local leather sellers and tanneries sell their leathers in bulk rather than in retail. However, it was realized that some leather sellers allow leathers to be bought in single sheets. In addition, smaller amounts of leathers were found in stock at two markets in Central Market in Kumasi where the researcher also visited when studying the rate at which leather is distributed in the country. The cost of a sheet of leather ranged from Gh¢5 up to Gh¢10. Averagely, four pieces of instructional materials consumed one sheet of leather.

In terms of thickness, it became evident that the local leather was lighter in thickness, since none of the pieces assessed with the caliper measured not up to 2mm. This brought to mind the need for reinforcement of the instructional media to be constructed in order to ensure firmness and rigidity. Table 4.1 shows the results obtained from the average thickness assessment conducted.

Table 4.1: Leather thickness assessment results

Leather type	Sources	Average thickness
Khaki	Kumasi, Tamale	1.5mm
Brown	Kumasi, Tamale	1.8mm

The leather was reinforced with strawboard to make it rigid and easier to manipulate to achieve the desired shapes, forms and sizes. Most of the instructional materials made were on flat surface.

4.3   Discussion of results and findings for Objective Two

To design and produce (50) instructional materials with leather for pre-school education.

The research has confirmed that:

- Leather can be dyed.

- Leather can be painted with acrylic paint.

- Leather can be marbled.

- Treated leather is odourless and does not allow mould to grow on it.

- Leather can easily be manipulated to achieve a desired shapes, forms and sizes.

69

4.3.1   Leather can be Dyed

The research found that, leather absorbs water, oil and dye. The surface of the leather was dyed to achieve the desired colours to suit the interest of the children. The children were attracted to the colours used in dyeing the leather. They were mostly primary colours.

4.3.2   Leather can be Painted with Acrylic Paint

In another development, the study found that colours are of much important to children, so most of the items made in leather were painted with acrylic paint to bring out various colours to arouse the interest of the children of such age group. Although acrylic paint is water-based, they are waterproof when dry and are flexible. The items that were painted with acrylic paint, therefore, acquired the protective properties of the acrylic paint and enhanced their durability.

4.3.3   Leather can be Marbled

The marbling technique was used because the surface of some of the leathers was rough. Marbling is more effective and more appealing when the surface of the leather is rough. Instructional materials produced with marbling leather looked like cloth to the children of such age.

4.3.4 Treated Leather is Odourless and Relatively does not Allow Mould to Grow on it

Leathers sourced from local tanneries were rarely fit to produce instructional materials for pre-school children. It was very important to give it second treatment to make it safe to prepare instructional materials for the children. In this regard, vegetable tanning was employed to avoid any health hazard to the children. The leather items produced for pre-school children to aid teaching and learning were child-friendly.

4.3.5 Leather can easily be Manipulated to Achieve a Desired Shapes, Forms and Sizes

Leather is believed to be one of the strongest, most flexible and adaptable material which can resist wear and tear. Due to the nature of the leather, the researcher was able to manipulate it to produce various shapes, forms and sizes to suit the children interest.

In the light of the above stated observations, leather is a suitable material for making instructional materials to aid pre-school teaching and learning

4.4   Discussion of results and findings for Objective Three.

To assess the suitability of leather instructional materials produced in teaching and learning at pre-school level of education.

The leather instructional materials produced were tested for the following qualities.

- Legibility

- Attractiveness

- Manipulability

- Durability

- Safety in use

- Fitness for purpose of the leather instructional materials

 4.4.1 Legibility

The instructional materials in leather were legible enough for the last child in the classroom to see. The colours used in painting the surface of the leather were bright enough to be seen by all the children in the classroom. The teacher had no difficulty in using the materials to

teach the children of such age group. The images were clear enough for the teacher to use to communicate ideas to the children. The plates below illustrate the legibility of the instructional materials.

Plate 4.1: A Preschooler showing the painting of a tomato on leather to the class

Plate 4.2 A teacher showing the picture of a dog scorched on leather to the class
.

Plate 4.3: A picture depicting a lion scorched on leather and a rhyme about the lion

Plate 4.4: The display of instructional materials during the lesson

The materials were bold enough to be seen from afar. Shapes and colours were big and clear enough to be identified, recognized and appreciated by the teacher and the children. Children were in love with the bright colours. On the other hand, the colour of the picture of

a banana fruit did not contrast well with the background colour of the leather. As a result, the children could not identify the banana as readily as expected. The banana shape was re-painted with yellow and green colours and mounted on a new background leather with black inscription for the children to see it more clearly.

Teacher's comment: The images on the leather seem to be real and they easily register in the minds of the children.

4.4.2 Attractiveness

During the testing, children were attracted to the leather instructional materials based on the theme in which they represented. The themes were suited to children, so they got attracted to them. More so, they were things related to their daily activities and interest.
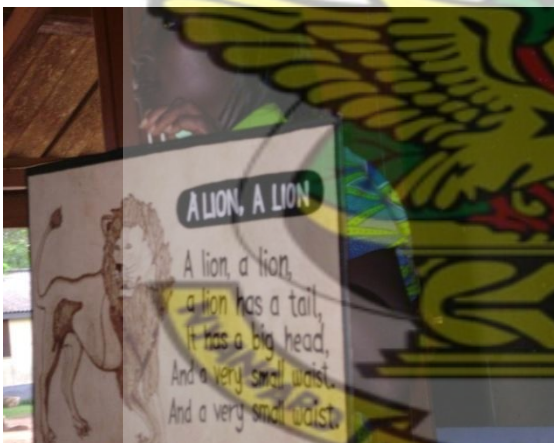

Plate 4.5: A picture on leather depicting the rhyme

Plate 4.6: A teacher and the children reciting the rhyme during the testing of the research

For instance, the pictures depicting the rhymes written on the sheets of leather attracted the attention of the children during the lessons. They saw the pictures of the animals in the

rhymes and they grasped the concepts easily. The attraction of the pictures always prompted them to recite the rhymes with or without the teacher's help. At the point in time, the pupils referred to the drawings on the sheets of leather as pictures of themselves as shown below.

Plate 4.7 (a & b): Pre-school children displaying leather instructional materials during the lessons.

Every child wanted to get hold of those that depicted a boy and a girl and claimed to be his or her photograph. The topic was "Parts of the Body", and the teacher skillfully used the materials to communicate effectively to the children.

The designing process of the items were carefully executed in a manner which portrays children's activities and environment. The drawings were realistic, not abstract as seen in plates 3.41 and 4.7(a & b). Colours mean a lot to children therefore a variety of colours were employed in painting the items. Leather is absorbent especially with acrylic paint and the children were fascinated with the bright colours. The colours facilitated the identification of letters, shapes and sizes. The dominant colours were red, yellow, blue, orange and green. Cool and warm/ hot colours were used to control the temperament of the children and also to stimulate those who were dull in the class. The finished items were attracted to the

children due to the effect of the colours, the folded or curvy nature, the sewing, painting, scorching and marbling of them. The final presentations of the items made were paramount to ensure the children's understanding of the concepts.

The pictures, symbols, colours, shapes of the instructional materials were vivid enough to attract attention and arouse the children's interest as shown below.

Plate 4.8: A child pointing to a part of the body

Plate 4.9: A Preschool child showing a garden egg painted on a sheet of leather

Plate 4.10: A teacher pointing to the letters of the English alphabet made in leather.
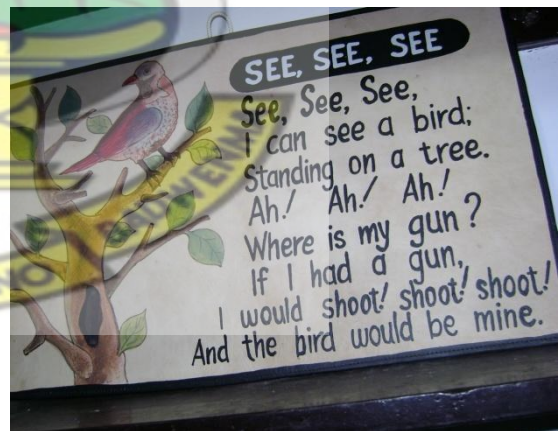
Plate 4.11: A picture depicting a rhyme on a sheet of leather.

Teacher's comment: "The children were in love with the materials".

4.4.3 Manipulability

The pupils, looking fascinated, wanted to feel all the instructional materials.

Plate 4.12: The pre-school children displaying the leather instructional materials during the lessons.

The children played with the leather instructional materials during and after the lessons.
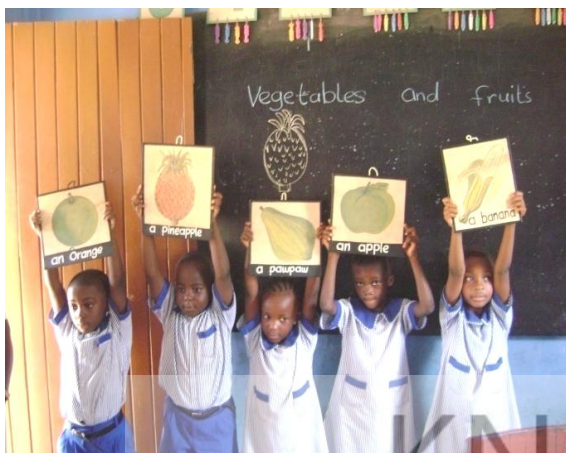
Plate 4.13: A section of the children showing fruits on sheets of leather during the lessons

Plate 4.14: A Section of the children showing vegetables on sheets of leather during the lessons

The materials withstood the rough handling of the children, proving the durability of the leather. The children had the opportunity to play with the instructional materials throughout the period of the study. They were found to be handy and could be handled by all, and they did not occupy too much space in the classroom.

The children used the leather materials to make images, with which they communicated ideas around.

Teacher's comments:

(a) "The instructional materials made in leather can be manipulated and it was easy for the children to use them during the lesson as compared to paper and cardboard."

(b) "The instructional materials were handy and the children could move them around".

4.4.4 Durability

The durability of leather instructional materials was tested in the course of the research to find out their resistance to children's pressure when using them during teaching and learning.

The ability of the instructional materials to survive in the hands of the children was tested for wear and tear, scratch, discolouration and dirt. The items withstood the pressure to which the children subjected them. This proved that leather is reasonably resistant to wear and tear. The surface of leather resists scratching, so the activities of the children during the lessons could not disfigure the surface impressions of the items.

Leather absorbs both water and oil. The acrylic paint protected the surface of the items from water marks and perforations. The pupils were required to wash their hands immediately they returned from every break. They often handled the leather items with their wet hands, but due to the waterproof property of the acrylic paints, the paintings did not suffer any watermarks. The paint also protected the surface of the items from light perforations to which the children subjected the items.

Most of the works were reinforced with strawboard and glued together to secure the edges permanently for children's use. Although these items were available to the pupils all day, they lasted in their hands. More importantly, throughout the study period, no report was made of any damage to the leather instructional materials. The teacher confirmed the durability of the materials produced.

By contrast, the pupils did not have access to some of imported materials, such as paper and cardboard, for fear that they would destroy them. She said, some teachers could not use the

existing materials such as paper and cardboard to teach the children over a sustained period, since the children tore the materials as they used them.

Teacher's comment: "Due to the durable nature of the instructional materials, they can last for a long time".

4.4.5 Safety in use

Pre-school children are curious, playful, exploitative, manipulative to mention but a few. Safety measures should be ensured when designing instructional materials for children of such age. The age of the children were of prime consideration. Children like putting things into their mouth. However, the vegetable tannins that were used in preparing the leather could cause no threat to human health. The use tannins, dyes, glue and polish were health-friendly. The skin of the animals, which becomes leather after tanning, is used as food in most Ghanaians homes and public food vending sports. It is called "wele" or "kawuro" and cannot be harmful to children even when they put them into their mouth. The edges of the items were rounded, curvy and had no sharp edges that could cut or injure the children. Due to these properties, the teacher and the children enjoyed using them.

Teacher's comment: "The materials posed no health hazards to the children".

4.4.6 Fitness for purpose

The features of the designs were created to suit the interest of the children. The selection of the items were carefully made to bring the children's world into the research. The items were selected based on the pre-school curriculum. These included; Mathematics (Number work), English (Language and Literacy), Environmental Studies, Creative activity and Music and dance (i.e. rhymes, etc.).

79

The instructional materials were found to be:

- Durable
- Attractive
- Easy to manipulate

Colours were blended with their environment and when the items were hung on the walls of the classroom, the pupils could easily learn on their own, or with the assistance and direction of the teacher.
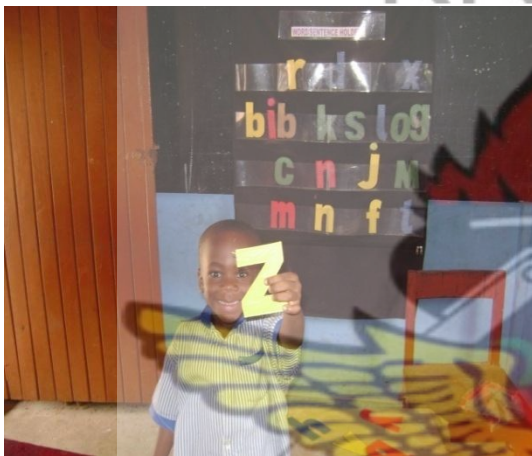

Plate 4.15: A child identifies a letter of leather alphabet
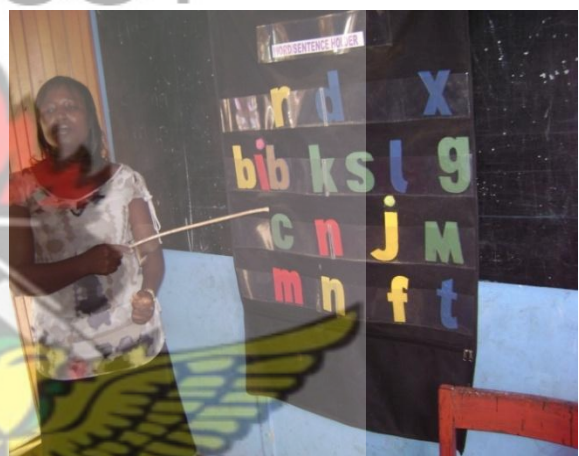
Plate 4.16: A teacher pointing to words formed with the leather materials

Plate 4.17: A child identifies a picture on leather during the study

Plate 4.18: Children responding to questions during the study

The pre-school children were able to recognize, identify, form, spell and pronounce any word, number, objects, within their domain that was presented with the leather materials. They could serve many purposes hence they were fit for use in pre-school education.

The responses from the children attest to the fact that, children of such age enjoyed every bit of the lesson during the testing of leather instructional materials to aid teaching and learning process as shown in Plate 4.18.

Teacher's comment: "This is a very new and nice experience to KNUST Nursery School and we welcomed the idea."

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1   Summary

The research explored the use of local leather for designing and producing instructional materials for pre-school education. Leather instructional materials were used in place of existing materials such as plastics, paper, metal and imported articles. Some of these traditional materials are not biodegradable, highly perishable, are heavy, toxic and have tendency to injure children, and their cost in foreign exchange was detrimental to the economy of the nation. The data recorded indicates that, local leather was mostly available in the northern sector of the country. More importantly, leather is versatile, durable, flexible, resists to wear and tear, tough, lightweight, can be dyed into various colours for children's attraction. It was observed during the research that, the use of leather instructional materials to aid teaching and learning at pre-school level was successfully carried out through the parameters such as legibility, attractiveness, durability, manipulability, safety in use and fitness for purpose.

5.2   Conclusions

Based on the objectives set for the study and above findings, the following conclusions can be drawn.

5.2.1   Conclusion One on Objective One

Objective One: To explore the feasibility of local leather as a medium for making instructional materials.

The research found out that, local leather were mostly available in the north and other areas of the country including Aboabo in the Kumasi metropolis, where researcher sourced the leather to produce instructional materials for the KNUST Nursery School children. The local tanners and leather markets sold leather in bulk quantity, which ranged from Gh¢5 up to Gh¢10 per sheet. Four pieces of instructional materials consumed one sheet of leather. Most of the leather used were soft and easy to manipulate to achieve the desired shapes, forms and sizes to suit pre-school children. The average thickness of the leather used for the instructional materials ranges from 1.5m to 1.8m.

5.2.2   Conclusion Two on Objective Two

Objective Two: To design and produce 50 instructional materials with leather for pre-school education.

The researcher employed the use of various techniques such as painting with acrylic paint, marbling and scorching to produce instructional materials with leather to aid teaching and learning at pre-school level of education. The research successfully produced the instructional materials with leather for pre-school children. Samples are shown below and the rest to the appendices for further verification and references.

Acrylic painting of a red (ripe) tomato on khaki leather with white inscription

Acrylic painting of a yellowish garden egg on khaki leather with white inscription

Acrylic painting of green pawpaw on khaki leather with white inscription

Acrylic painting of an orange and green pineapple on khaki leather with white inscription

Acrylic Painting of a Bird on a tree, on Khaki leather accompanying the Rhyme "See, See, See" with black and white inscription

A scorched lion on khaki leather accompanying the Rhyme "A Lion" with black and white inscription

A scorched aeroplane on khaki leather with white inscription

A scorched car on khaki leather with white inscription

A scorched human being on khaki leather indicating the parts of the body with black and white inscription

A scorched ball on a khaki leather with white inscription

A scorched pre-school girl on khaki leather with white inscription

A scorched pre-school boy on Khaki leather with white inscription

A scorched cat and mouse on khaki leather with white inscription. The cat is trying to catch the mouse and it also tells a story of a cat and mouse
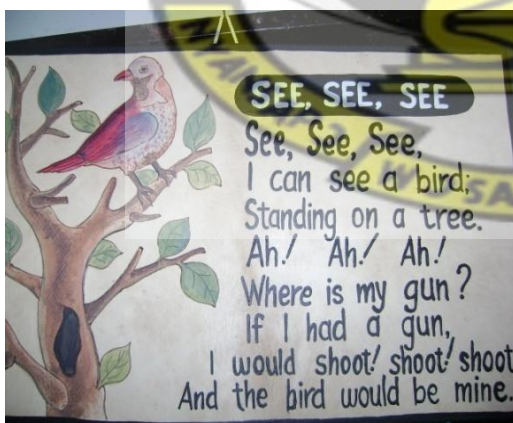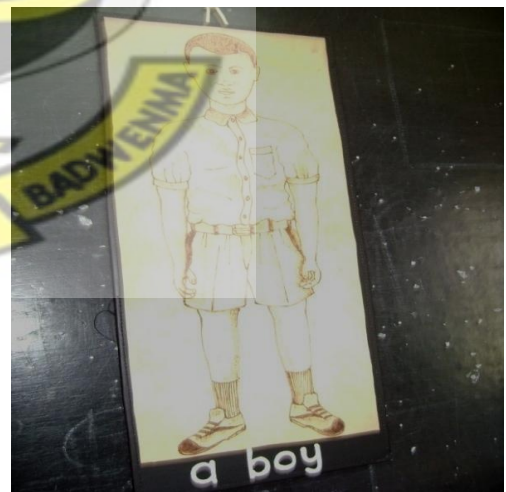

A scorched dog on a khaki leather with black inscription

Acrylic painting of a green orange on khaki leather with white inscription
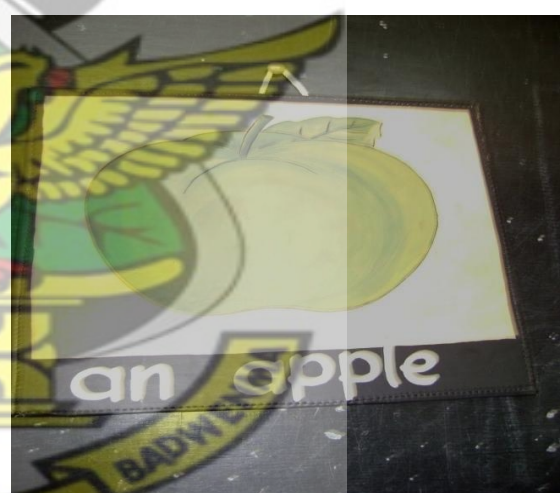
Acrylic painting of green apple on a khaki leather with white inscription

Acrylic painting of brownish onion on a khaki leather with white inscription

Acrylic painting of yellowish banana on a khaki leather with black inscritption

Acrylic painting of red pepper on a Khaki leather with white inscription

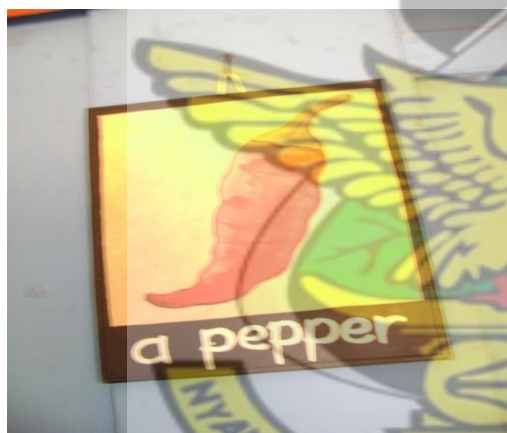Acrylic painting of green okro on a khaki leather with white inscription

5.2.3   Conclusion Three on Objective Three

Objective Three: To assess the suitability of leather instructional materials produced in teaching and learning at the pre-school level of education.

The research successfully assessed the suitability of leather for instructional materials on teaching and learning at the pre-school level of education. The research found out that leather is suitable for use as instructional materials to aid teaching and learning at pre-school level because leather is:

- Attractive

- Durable

- Fit for the purpose

- Legible

- Manipulable

- Safe to use

The children were much involved in all the activities carried out during the research and their responses were satisfactory due to the nature of leather instructional materials.

5.3   Recommendations

In this research, leather has been found to be versatile, pliable, durable, and bleachable and that it can be dyed in various colours to attract children. For the promotion and improvement of leather instructional materials for teaching and learning at pre-schools level in this country, the following recommendations are hereby made:

1. Pre-schools should have plentiful supply of leather instructional materials for demonstrative purpose and decoration.

2. Pre-schools should have permanent and spacious classrooms where leather instructional materials can be displayed on their walls to support teaching and learning.

3. Instructional materials should be simple, child-friendly, attractive and safe for children at pre-school level to use.

4. The teaching and learning methods at pre-schools should be child-centered and activity- oriented.

5. Local industries that deals with leather should take up the project to produce leather instructional materials to aid teaching and learning at pre-school level of education.
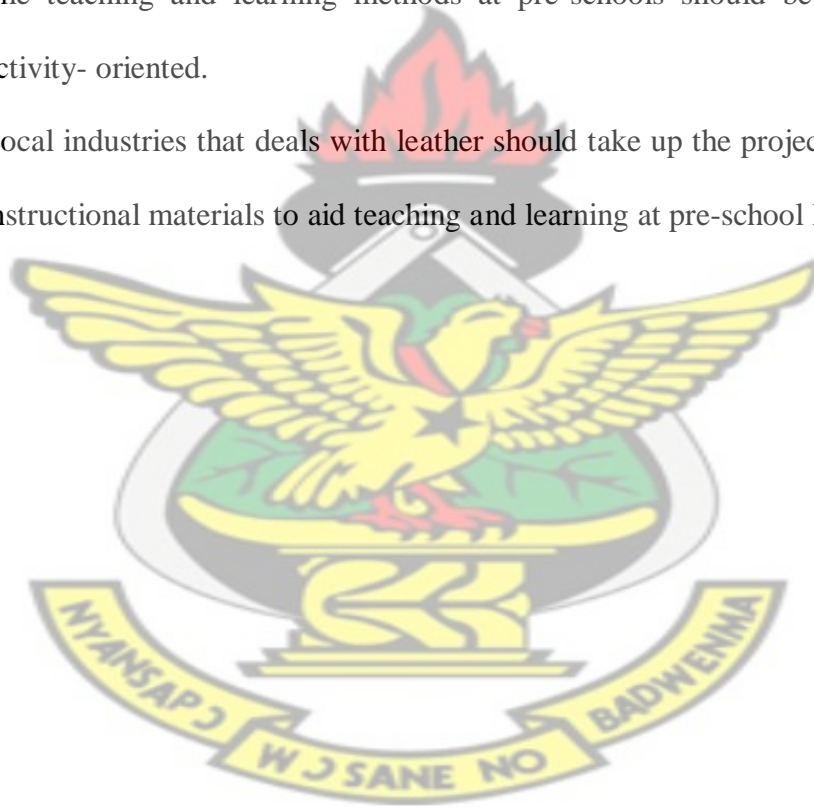
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91

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APPENDICES

APPENDIX A: THE REST OF INSTRUCTIONAL MATERIALS PRODUCED WITH LEATHER FOR TEACHING AND LEARNING AT PRE-SCHOOL LEVEL
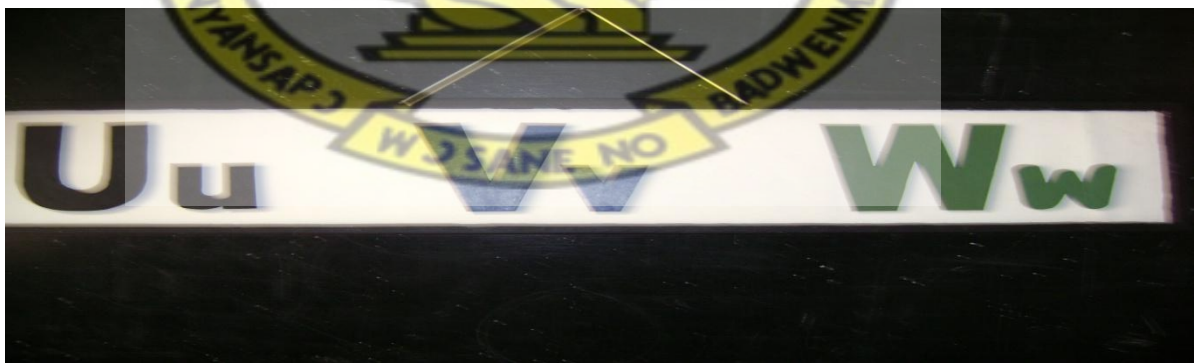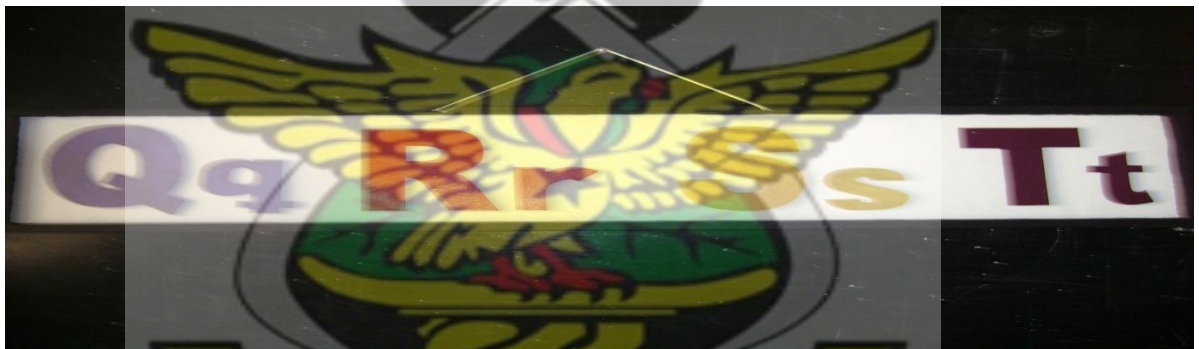

A marbled leather of a Ghana Map

Acrylic painting of Ghana Flag indicating Red, Gold, Green and Black Star on leather with white inscription

Acrylic painting of English Alphabet made in leather as instructional materials for children with white backgrounds

E e F f G g H h

M m N n O o P p
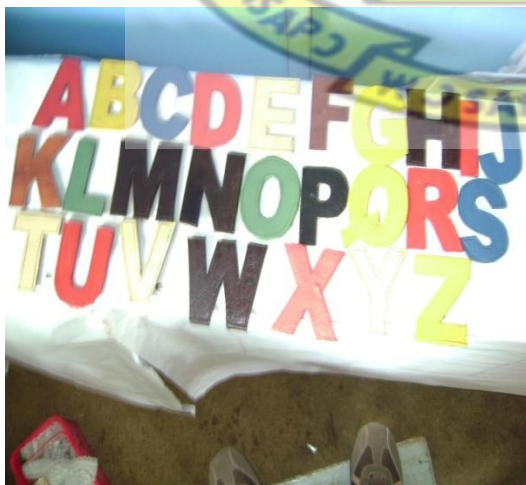
Q q R r S s T t

U u V v W w

Acrylic painting of upper and cower case letters made in leather for pre-school level indicating various coulours

Acrylic painting of numerals made in leather with their corresponding words on white backgrounds for hanging on the walls of the pre-school classroom
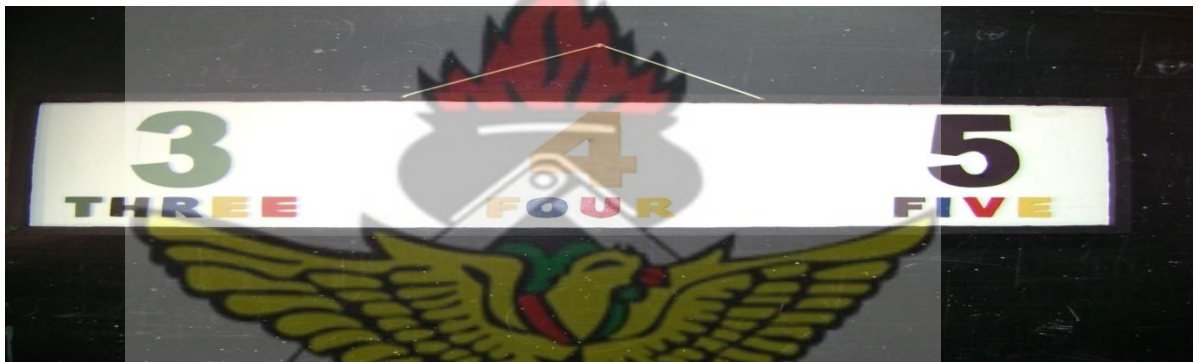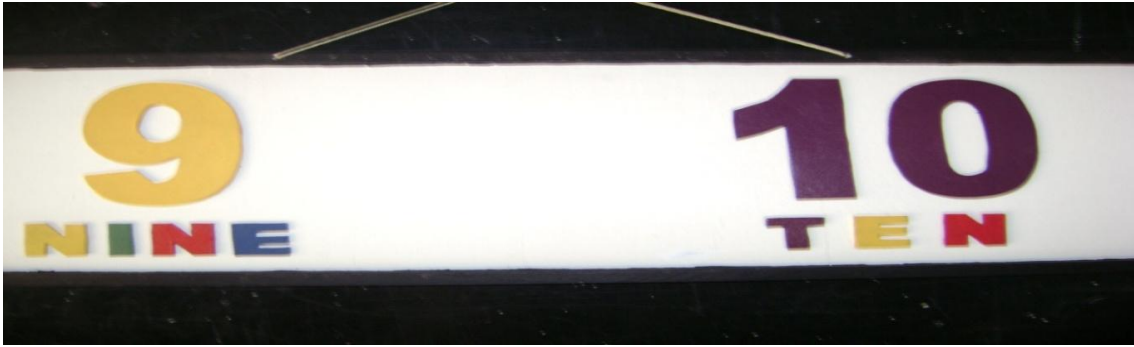
Acrylic painting of numerals made in leather for pre-school children to hold or manipulate

Acrylic painting of basic shapes made in leather indicating their names

Acrylic painting of mathematical signs made in leather for pre-school children

APPENDIX B – INTERVIEW GUIDE

1. Name………………………………………………….......................

2. Sex…………………..

3. Age………………….

4. Years taught in KNUST Nursery………………….

5. Rank………………………………………………….

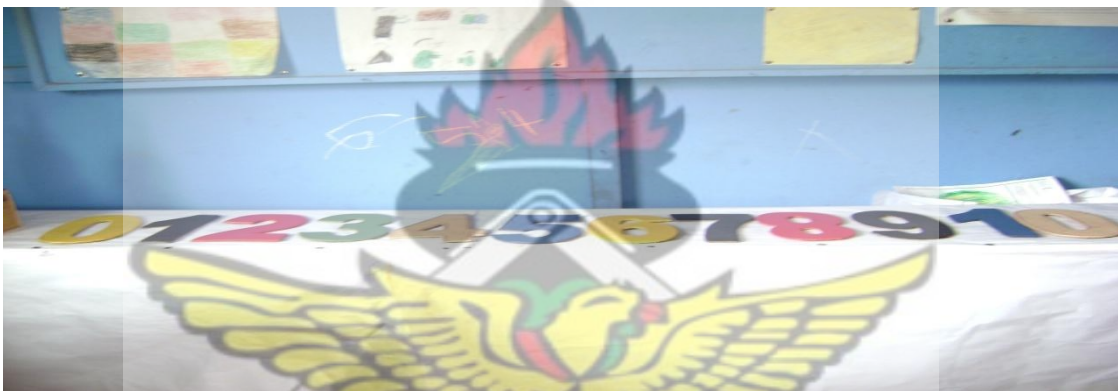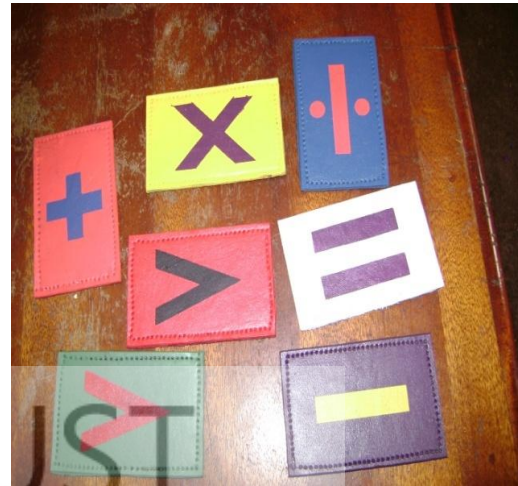6. Qualification…………………………………………………………………………..

7. Experience of teaching/working in pre-school institution
....
....
....
....

8.   Brief comment about the children in pre-school
…………………………………………………………………………………………
…………………………………………………………………………………………
…………………………………………………………………………………………
………………………

9. Do you have leather as instructional material in your classroom?
…………………………………………………………………………………………

10. Have you seen any instructional material in leather?
…………………………………………………………………………………………

11.   Do you welcome instructional material in leather for pre-school children?
…………………………………………………………………………………………

12. What do you think about an idea of making instructional materials in leather for pre-school children?...

…………………………………………………………………………………………
…………………………………………………………………………………………
…………………………………………………………………………………………

APPENDIX C – OBSERVATION GUIDE

1. The type of material used in making instructional material for the children; are they convenient for them?

2. Are children able to identify and recognize the instructional materials?

3. How legible it is, looking at the distance of the teacher and the last child in the classroom?

4. Are the images on the leather attractive to the children in terms of colours, shapes, front size, front type etc?

5. How the teacher uses the instructional materials.

6. Are the instructional materials appropriate for the subject matter?

7. How the children receive the message through the use of the instructional materials.

8. How the teacher receives the message as the children use the instructional materials.

9. How easy are the instructional materials applicable and accessible to the teacher and the children?

10. Are the children able to develop their manipulative skills by using instructional materials in leather as a means of making images and communicating ideas?