DEVELOPMENT OF AN INDIGENOUS CERAMICS BEAD MODEL "CLAY FOR PLAY" TO ENHANCE LEARNING OF CHILDREN WITH LEARNING DISABILITIES

BY

ESTHER ELISHA DOKYOUNG

MA/ENV-DES/8394/2009-2010

DEPARTMENT OF INDUSTRIAL DESIGN,

AHMADU BELLO UNIVERSITY, ZARIA.

JUNE, 2012.

TITLE PAGE

DEVELOPMENT OF AN INDIGENOUS CERAMICS BEAD MODEL "CLAY FOR PLAY" TO ENHANCE LEARNING OF CHILDREN WITH LEARNING DISABILITIES

BY

ESTHER ELISHA DOKYOUNG

MA/ENV-DES/8394/2009-2010

A THESIS SUBMITTED TO THE POST GRADUATE SCHOOL

AHMADU BELLO UNIVERSITY, ZARIA

IN PARTIAL FULFILMENT OF THE AWARD OF MASTER OF ARTS DEGREE IN INDUSTRIAL DESIGN (CERAMICS)

DEPARTMENT OF INDUSTRIAL DESIGN,

FACULTY OF ENVIRONMENTAL DESIGN,

AHMADU BELLO UNIVERSITY, ZARIA, NIGERIA.

JUNE, 2012.

DECLARATION

I, Esther Elisha Dokyoung, solemnly declare that the content of this thesis is the report of the study on the "Development of an Indigenous Ceramics Bead Model "Clay for Play" to enhance Learning of Children with Learning Disabilities" has been written by me in the Department of Industrial Design under the supervision of Prof A.M Ahuwan and Dr. B Danborno. I processed, formulated, fired (sample) clay beads, developed and designed the Clay for Play Model, Clay for Play Manual, tested and appraised same as stated in this thesis. All sources of information have been duly acknowledged in the text and a list of references provided. No part of thesis has been presented for any previous higher degree.

…….

ESTHER ELISHA DOKYOUNG

…….……

Date

CERTIFICATION

This Thesis titled "Development of an Indigenous Ceramics Instructional Model "Clay for Play" Using Beads for Children with Learning Disabilities" by Esther Elisha Dokyoung meets the regulations governing the award of the Master of Arts, Industrial Design of Ahmadu Bello University, and is approved for its contributions to knowledge and literary presentation.

Prof A. M Ahuwan	…….	……...
Chairman Supervisory Committee	Signature	Date
Department of Industrial Design		
Ahmadu Bello University, Zaria		

Dr. S.B Danborno	…….	……..
Member, Supervisory Committee	Signature	Date
Department of Human Anatomy		
Ahmadu Bello University, Zaria		

Dr. S Maiwada	…..…….	…….
Head of Department	Signature	Date
Department of Industrial Design		
Ahmadu Bello University, Zaria		

Prof J Adebayo	…….	…….
Dean, School of Post Graduate Studies	Signature	Date

DEDICATION

Dedicated to all children with disabilities especially those who have been abused, misunderstood and suffered due to their learning disabilities. The hidden talents you have are an eye opener to generations yet unborn.

In the loving memory of Jonathan Garba, my elder brother who exposed me to the pain, and challenges of living with learning disabilities

ACKNOWLEDGEMENT

God Almighty deserves the praise for the wisdom, strength, financial support and protection he gave me to complete this study. My profound thanks go to Prof A.M Ahuwan and Dr. B Danborno my supervisors who painstakingly took time to direct, correct and guide me throughout the period of this study. I extremely appreciate the support of the head of Department, Dr S. Maiwada, the former and present Post Graduate coordinators Dr. A. Garkida and Dr. B. Gwari respectively, who ensured that I remained on track.

Words cannot express how the support, prayers and the tender loving care of my hero, and husband Pharmacist Elisha Dokyoung, many thanks to my biological children Maranatha, Kharis and Ephraim. I am indebted to all the nine lovely children who participated in this study; I cannot forget their parents, and the volunteer teachers Ejembili, James and Rose who availed themselves for this study.

My unreserved appreciation goes to the proprietors, and staff of the following Special Schools MTC, Othniel, and Open Doors and varying experts who participated in the appraisal of the manual, your idealistic inspirations helped to restructure the design, and broaden the contents of the Clay for Play Manual. I appreciate the Staff of the Ministry of Education Plateau State, and Mr Ezulu of the Federal Ministry of Women Affairs and Social Development Abuja for data provided to me. I remain grateful for the capacity building provided by CBM Nigeria, through the sponsorship they provided for me to attend the 4th International Conference on Community-Based Rehabilitation in Abuja November 2011.

Several lecturers, friends and colleagues gave me their shoulders to lean on; your sacrifices went a long way! Notable amongst them are Dr. Mrs Ejembi, Dr. Mrs Nyager, Dr. and Mrs S Amos (USA), Prof and Mrs W. B. Quirix, Dr Mrs I Mohammed, Mr Sunday Ogunwole, Rev.

Clement Gonah, Mr V. Alkali, Mr Eric Opoku, Mr Michael Aluwong, Prof A. U. Sullayman, Mr and Mrs Ewule. Many thanks to Abraham Morankinyo, Ibrahim Mamman, Rose Pam, Esther Zuru, Jonathan Okewu, and Daniel O for your sacrifices. I wish to specially thank Amos Natsa for the informal couching rendered me on word processing and computer usage. Finally, the concern shown to me by all teaching and non-academic staff from the Departments of Fine Art and Industrial Design assisted me in no small measure.

There are many colleagues, friends and many parents of special needs children who have shared their experiences with me and with whom I have had discussions that have shaped my professional views. There are too many people to name, please be assured that I value your knowledge, support, and the time we spent together.

ABSTRACT

The study developed and designed four components indigenous Ceramics Bead Model 'Clay for Play Model' in which the academic and physical components of the model were utilized to design an indigenous Ceramics instructional manual. The study sought to provide solutions to the problem of lack of appropriate indigenous ceramics instructional material for the education and rehabilitation of children with learning disabilities. Nine children with Learning Disabilities, mental retardation, cerebral palsy, and autism in three special schools in Plateau State were trained on how to play with clay through the soft and hard copies of the clay for play manual, in which the principles of playing with clay were applied to enhance reading, writing, sensory and visual-perceptual skills, fine motor exercises which can enhance the performance skills of LD through continuous use of the clay mathematical game, and clay beads production; the study enabled LD to interact socially through individual and collective play irrespective of their disabilities, culture, class, environment and educational level. Three instruments were used for data collection, questionnaire and interview and observation, the American Occupational Therapy Association (AOTA) Basic assessment for mental function was adopted and utilized to illicit information from 20 respondents for the appraisal of the manual, semi- structured questionnaire was utilized to interview nine parents who were involved in the study due to the auditory and dyslexic discrepancies of their children. The results of the study exposed the usefulness of clay as a veritable tool in providing tactile experience, organised or free play and social interaction which many of these children lack. The manual was appraised a very good resource, an intervention available to improve the learning content of LD in Nigeria, in a nutshell this research has opened up a new pathway for ceramists to tackle learning problems; provided evidenced based services for individuals with LD in Nigeria, now Nigeria has an indigenous manual to successfully provide clay therapy.

TABLE OF CONTENTS

CERTIFICATION iii

TABLE OF CONTENTS viii

LIST OF FIGURES xiii

LIST OF TABLES xiv

LIST OF PLATES xv

DEFINITIONS xix

INTRODUCTION 1

1.2 STATEMENT OF THE PROBLEM 4

1.3 AIM OF THE STUDY 7

1.4 OBJECTIVES OF THE STUDY 7

1.5 RESEARCH QUESTIONS 7

1.6 SIGNIFICANCE OF THE STUDY 8

1.7 SCOPE 9

1.8 LIMITATION OF THE STUDY 9

CHAPTER TWO 11

LITERATURE REVIEW 11

2.1 INTRODUCTION 11

2.2 LEARNING IN GENERAL 12

2.2.1 Methods of Learning 13

2.2.2 Perceptual skills and visual communication 14

2.2.3 How physical development affects learning. 14

2.2.3.1 Gross Motor Skills 14

2.2.3.2 Fine Motor Skills 15

2.2.3.3 Balance and Coordination Skills in Early Childhood 16

2.2.4 Significance of creativity on mental development or growth 16

2.2.5 Cognitive development 17

2.6 HOW LEARNING DISABILITIES AFFECTS LEARNING 19

2.6.1 Learning disability 19

2.6.2 Types of learning disabilities and disorder 20

2.6.2.1 Motor difficulties and learning disabilities 20

2.6.2.2 Mathematical difficulties and learning disabilities 21

2.6.2.3 Language difficulties and learning disabilities 21

2.6.2.4 Reading difficulties and learning disabilities 23

2.6.2.6 Writing difficulties and learning disabilities 23

2.6.3 Auditory and visual processing: the importance of the ears and the eyes 24

2.6.4 Intellectual disability (Mental Retardation) 24

2.6.6 Cerebral palsy 27

2.6.7 Learning disabilities: Social and emotional difficulties 27

2.6.8 Characteristics of Learning Disabilities 27

2.6.9 The Child's Primary Learning Style 28

2.7 INSTRUCTIONAL MODELS IN LEARNING DISABILITIES AND REHABILITATION 32

2.7.1 Applications in instructional design and technology 32

2.7.2 Direct Instruction 33

2.7.3 Strategy Instruction 33

2.7.4 The Self-Determined Learning Model of Instruction 33

2.7.5 Combined Model 34

2.7.6 Non-direct Instruction/Non-strategy Instruction:34

2.7.7 Importance of Instruction 34

2.7.8 Errorless learning 35

2.7.9 Individualized Education Programs (IEPs) 36

2.7.9.1 Designing an Individualized Education Plan (IEP) 36

2.8 LEARNING THROUGH PLAY 38

2.8.1 Types of Play 40

2.8.2 Factors which affect the development of play 41

2.8.3 The Benefits of playing with clay 42

2.9 THE POTENTIALS AND BENEFITS OF CLAY 44

2.9.1 Properties of Clay 44

2.9.2 Types and Classifications of Clays and their uses 45

2.9.3 Polymer Clay (non-natural clay) 50

2.9.4 Clay in Rehabilitation (ClayTherapy) 51

2.9.5 A forum for bonding 52

2.9.6 Medicinal Potentials in Clay 55

2.9.6.2 Constipation: 56

2.9.6.3 Clay Bath: 57

2.9.7 Educational benefits of Clay 57

2.9.8 The Benefits of Clay-beading for Improving Cognition, 59

2.10 BEAD WORK OR BEAD-MAKING 62

2.10.1 Beads 63

2.10.2 The Importance of Beads 63

2.10.3 Products Made from Beads 64

2.10.4 The Benefits of Bead Making 64

2.10.5 History of clay or ceramic beads 65

CHAPTER THREE 70

METHODOLOGY 70

3.1 INTRODUCTION 70

3.2 POPULATION OF THE STUDY 70

3.3 SAMPLE 74

3.3.1 Sampling Techniques 74

3.4 INSTRUMENTATION (TOOLS FOR DATA GATHERING) 75

3.4.1 Validation of Instruments 75

3.5 DATA ANALYSIS 76

3.6 RESEARCH DESIGN 76

3.6.1 Preliminary Investigations 77

3.6.2 Pilot Study: 77

3.6.3 Production of Sample Clay-beads 77

3.7 THE DEVELOPMENT OF THE 'CLAY FOR PLAY MODEL' 80

3.7.1 The Design Procedure of the Clay for Play Manual 83

3.8 CLAY FOR PLAY VIDEO SHOW 83

3.8.1 The Second Clay for Play Video Show 83

3.8.2 Introduction of the 'Clay for Play Manual' 83

3.9 CLAY MATHEMATICAL GAME 87

3.9.1 Demonstration 87

3.9.2 Rolling Round Clay-balls 87

3.10 APPRAISAL OF THE CLAY FOR PLAY MANUAL 87

3.10.1 Semi Structured Interviews with Parents on the Home Assignments 88

CHAPTER FOUR 89

4.0 PRESENTATION OF DATA, ANALYSIS AND DISCUSSION 89

4.1 INTRODUCTION 89

4.2 THE VARIABLES CONSIDERED 89

4.2.1 Sex of Children in the Study 92

4.2.3 Distribution of Children by Age 93

4.2.4 Results of Pilot Study: Child Study 93

4.3 RESULTS OF THE CLAY FOR PLAY VIDEO SHOW 94

4.3.1 Response of CP group 94

4.3.2 Response of the Autistic group 94

4.3.3 Response of MR group 94

4.4 DEMONSTRATION 94

4.4.1 Rolling Round Clay-balls 97

4.5 CLAY ALPHABETS 98

4.6 SQUEEZING CLAY 98

4.7 THE 'CLAY FOR PLAY MANUAL' 99

4.7.1 Mental Retardation (MR) 99

4.7.2 CP …… 99

4.7.3 AUTISTIC 102

4.8 SEMI STRUCTURED INTERVIEW WITH PARENTS 103

4.9 APPRAISAL OF THE CLAY FOR PLAY MANUAL 106

4.9.1 Findings and Observation from Literature 113

CHAPTER FIVE 115

SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATIONS 115

5.1 INTRODUCTION 115

5.2 SPECIFIC FINDINGS 115

5.3 SUMMARY AND CONCLUSION 116

5.4 GENERAL RECOMMENDATIONS 118

5.5 RECOMMENDATION FOR FURTHER STUDIES 118

REFERENCES 121

LIST OF FIGURES

Fig. I: Bloom's taxonomy of educational objectives: - - - - 30

Fig. II: Flow chart of clay processing for clay bead-making - - - - 45

LIST OF TABLES

Table2.1: Common Types of Learning Disabilities - - - - - 27

Table 2.2 Characteristics of Learning Disabilities - - - - - 28

Table 2.3 Different Learning Styles in children - - - - - 29

Table 2.4 Information included in an IEP - - - - - - 35

Table 2.5: Cognitive integration and cognitive components - - - - 58

Table 3.1 Census of Special Education in Plateau State July 2009 - - - 68

Table 3.2 Names of selected Schools and the sample - - - - 70

Table 4.1 Sex of Children in the Study - - - - - - 88

Table 4.2.2 Types of Motor Skill disorders - - - - - - 88

Table 4.3: Analysis of rolled Clay-beads - - - - - - 93

Table 4.4: Analysis of Squeezed Clay-beads - - - - - - 96

Table 4.5: Analysis of the Clay Mathematical Game - - - - - 99

Table 4.7: AOTA Checklist Administered in two States and Abuja - - - 103

Table 4.8 (a): Assessment of the Clay for Play Manual - - - - 105

Table 4.8 (b): Rating of the Clay for Play Manual by professionals- - - 105

Table 4.9: Appraisal Questions - - - - - - - 104

LIST OF PLATES

Plate I: Jean Piaget - - - - - - - - - 18

Plate II: Secondary and Primary Clay - - - - - - - 44

Plate III: Kaolin - - - - - - - - - 44

Plate IV (a): Sieving Clay - - - - - - - - 46

Plate IV (b): Weighing and soaking clay - - - - - - 46

Plate V: Illustration of Exploded Anger - - - - - - 51

Plate VI (a): The Hand: - - - - - - - - 52

PlateV (b): Family of origin sculpture - - - - - - 52

Plate VII (a): Edible Clay - - - - - - - - 55

Plate VII (b): Clay Bath - - - - - - - - 55

Plate VIII: Ceramics Beads - - - - - - - - 65

Plate IX: Different types of Beads - - - - - - - 65

Plate X (a):Cross-section of children from MTC photograph by the researcher - 69

Plate X (b):Cross-section of children from Othniel Special School - - - 69

Plate XI (a): The Researcher at the 4th International Conference - - - 74

Plate XI (b): Emmanuel drawing in Class - - - - - - 74

Plate XII: Sample clay beads - - - - - - - - 75

Plate XIII: Components of the 'Clay for Play Model' - - - - 78

Plate XIV: Cover page of the Clay for Play Manual - - - - - 80

Plate XV: (a) Watching the first Clay for Play video and testing for manual expression- 81

Plate XV :(b) The second Clay for Play video show - - - - - 81

Plate XVI: (a) Introduction of the 'Clay for Play manual' - - - - 82

Plate XVI :(b) Testing the Clay Mathematical Game - - - - 82

Plate XVII :(a) Autistic Children - - - - - - - 86

Plate XVII (b) Children with Cerebral Palsy - - - - - - 86

Plate XVII (c): Children with Mental Retardation - - - - - 86

Plate XVIII: Researcher with the nine subjects for the Clay for Play study - - 87

Plate XIX (a): "First Clay for Play" six (6) minutes video - - - - 91

Plate XIX (b): Second Ability to recall, non-verbal expression by Longtong- 91

Plate XX: (a) Distractions while watching the Clay4Play video - - - 92

Plate XX (b): Excitement while watching the Clay4Play video - - - - 92

Plate XXI: Ruby says 'I got it right' children imitating the researcher - - 94

Plate XXII: Sample rolled beads made by Autistic, CP and MR - - - 95

Plate XXIII: (a) Clay Alphabets made by subjects - - - - - 97

Plate XXIII: (b) squeezed cow, figurine - - - - - - 97

Plate XXIV: (a) Rachael's Mother assisting with the Mathematical assignment- 100

Plate XXIV: (b) Teacher James voluntarily assisting- - - - - 100

Plate XXV: Motor and Academic components of the Clay for Play- - - 111

LIST OF APPENDICES

Clay for Play Manual: Parent Assessment Form ……...139

Appraisal of the 'Clay for Play Manual'…….…….....140

Activity Analysis- Basic Form Adapted from AOTA, 2002…….....141

Clay for Play Manual ……143

DEFINITIONS

Aphasia: It is a communication disorder caused by brain damage and characterised by an impairment of language comprehension, formulation and use. It affects the sounds, vocabulary or grammar, both in speaking (expression and in understanding reception) and excludes those language disorders associated with visual or hearing deficits, mental deterioration or psychiatric aberrations. Sunder (2002)

Cognitive Reframing: Sometimes used synonymously with debating. It is the process of learning to identify and challenge irritational or maladaptive thoughts using strategies such as logical disputation

Congenital Disability: A disability not necessarily hereditary, which is present at birth or manifest soon after. A child may for example suffer an injury before birth which is congenital although not hereditary

Disability: The extent to which a person is impaired in the primary activities of daily live- Stephen (1991)

Dyscalculia: Difficulty doing mathematics, understanding time, using money

Dysfunction: Difficult function or abnormal function.

Dysgraphia: Difficulty with handwriting, spelling, and organizing ideas

Dyslexia: Difficulty processing language, have reading, spelling, speaking challenge

Gestalt psychology: A theoretical viewpoint of the organised nature of perception began by a group of German psychologists especially Wertheimer, Kohler, and Koffka. The German word Gestalt means form or configuration. Schiffman (1993)

Kinaesthetic learners: Those who learn by touching, feeling, experiencing the materials at hand. Most of the school population excels through kinaesthetic means Marie et al (1986)

Poor Motor Control: Awkward, clumsy, not colouring inside lines or writing on lines

Pincer Grasp: Ability to pick up small objects from a surface usually between one and half years to two years.

Proprioceptive: Relating to stimuli that are produced and perceived within an organism especially those connected with the position and movement of the body

The term motor development refers to growth in the ability of children to use their bodies and physical skills. The different domains of physical development generally fall into gross-motor skills, fine-motor skills and balance/coordination skills; general patterns of physical development, which may vary based on a child's age, physical maturity and developmental delays, etc.

Neurological: Having to do with the nerves or the nervous system.

Rehabilitation: Philosophically –rehabilitation is directed at increasing the strengths of clients so that they can achieve their maximum potential for independent living and meaningful careers. (Anthony *et al* 1981) Rehabilitation is referred to by thesaurus as ‘cure, therapy, treatment.

Reversals: Tendency to read from reverse other, for example saw for was, b for d, p for q

CHAPTER ONE

INTRODUCTION

Background of Study

"*The craft of clay-bead making is not as technical as painting that requires precision or good colour choice, almost all the children in the Clay for Play research at the first instance produced one or two clays beads or balls, despite their disabilities. This accomplishment can contribute to their rehabilitation*". (Dokyoung 2011)

This comprehensive definition of children with learning disabilities, was given in 1997 by (IDEA) [Individuals with Disabilities Education Act, USA]

> Children with learning disabilities (LD) have a disorder in one or more of the basic psychological processes involved in understanding or in using language, spoken or written. The disability may manifest itself in an imperfect ability to listen, think, speak, read, write, spell, or do mathematical calculations. Including conditions such as perceptual disabilities, brain injury, minimal brain dysfunction, dyslexia, and developmental aphasia.

Several studies have provided a list of challenges which children with learning disabilities also face, Gina et al (2010) Nwokoro (2007) Schuster (1985) all opined that most persons with learning disabilities have mixed dominance, directional confusion, difficulty in sequencing, distractibility, reversal, poor hand writing, short attention span and behavioural problems which make learning difficult. Feizipoor (2008), Swanson *et al* (1983) indicated

that children with LD may suffer from psychological and social problems, such as excessive anxiety, low self-esteem, poor cognitive abilities and poor social judgment.

The search for solutions to learning challenges faced by children with (LD) has attracted specialists in the field of Education, Art, Psychology, Medicine and other professionals over the years. Various intervention strategies are employed to circumvent and alleviate learning problems; while no completely satisfactory solutions have found the desired effectiveness, the field of Art & Education, however, have extensive studies which reveal success on the impact of art as therapy, overall development, notable among them are the studies of (Lowenfield and Brittain 1970; Swanson *et al* 1983; Tubbs and Drake 2007) which have proven that fine motor skills are an early prerequisite to the successful completion of such school tasks as drawing, cutting, pasting, printing, or writing.

Fine motor activities involve the small muscles used to move finger and wrists as well as eye hand coordination and coordination of the two hands. Activities to promote fine motor usage include puzzles, finger games, cutting, pasting, painting, buttoning and lacing. While cognitive activities involve play activities that help children practice thinking skills: problem solving. (Hemphill 1991; Allen 1988)

The impact of play for children particularly during the early formative years cannot be overemphasized. It is through play – by touching, seeing, tasting, and smelling that a child explores his environment and learns. Barr *et al* (1979). Therefore, play with clay or Ceramics can develop for these children a new image, a new philosophy and even a totally new structure for improved learning content, so that children with LD can be rehabilitated for maximum educational benefits

This study has provided an indigenous resource that can develop and rehabilitate the fine motor skills of children with LD through play with clay. Tubbs and Drake (2007) opined that rolling clay beads allows children with learning disabilities improve cognition, fine motor, and sensory perceptual skills. Therefore, due to the importance and sensitivity of this issue, clay bead making was adopted.

The researcher's involvement in development work for several years, amongst children with disabilities coupled with her personal experiences with her learning disabled brother, prompted the researcher to search for an intervention for LD. This research was conceived as a result of the obvious lack of multisensory teaching materials which the researcher found missing while on voluntary service in three LD schools in Plateau State. It was evident that many LD schools were unable to deliver due to non- availability of instructional materials. As a result, the researcher considered the development of an indigenous ceramic model of paramount importance.

The opinion of Tubbs *et al* (2007) that by providing a broad range of tactile, Proprioceptive, and visual input, while simultaneously improving the child's self- esteem and sense of independence has shown that Ceramics or clay work has many advantages as a therapeutic medium, and leaves plenty of room for creativity, self- expression and variation of end product. It can be graded to accommodate diverse functional levels and involves a process familiar to most. (Tubbs and Drake 2007)

The indigenous instructional ceramics model "CLAY FOR PLAY" sought to re-evaluate and re-establish the fact that rolling clay beads allows children with learning disabilities improve cognition, and develop their fine motor, and sensory perceptual skills as they explore with clay. The sensory integration model is most often used with children, particularly those with mild to moderate learning or behavioural problems. (Tubbs 2007; Kielhofner 2004)

The model proposes that "graded sensory input leads to more normal integration of the senses and thus facilitation of adaptive responses, in addition to this, the activities should be highly likely to create a successful experience, thus forming new and more appropriate neural connections; the greater the inner drive to accomplish the activity, the greater the potential for effective neural organization and integration". (Baloueff 2003; Ayres 1987) says that it usually incorporates play, of which crafts, drama, or other creative experience can be a part.

The cognitive model presumes that humans are defined by their cognitive abilities, and that these are demonstrated in their ability to learn, use language, utilize, and change material objects. Task analysis is a key component of this model. A given activity is carefully analysed for process demand; the client's ability to perform that task then indicates the cognitive level at which he or she is functioning. According to this model, illness or dysfunction means inability to learn with resulting limitation in task performance.

In a nutshell, Lowenfield and Britain (1970), emphasized the need for a well-balanced educational system in which the due of the total being is stressed, each individuals' thinking, feeling and perception is developed in order that his or her potential creative abilities can unfold. This study has developed and applied the indigenous Ceramics in structural model as a resourceful material for the rehabilitation of children with learning disabilities, with the premise that however dull a child may be, crafts may provide needed escape, personal fulfillment, or an alternative to spoken language. (Fidler and Velde1999).

1.2 STATEMENT OF THE PROBLEM

The problem of this study is the lack of appropriate indigenous ceramics instructional material for the education and rehabilitation of children with learning disabilities. In addition to this problem, there is a gap in the application of multifaceted and sensory approach for the children's rehabilitation.

> Lowenfield and Brittain (1970) state that "it is through the senses that learning can take place, yet schools have done little to educate these senses that are our only avenue for learning….. Our educational system has also done little to change the increasing loss of identity with oneself. Rewards are given to neat papers, for correct answers, for recalling the proper information at the right time. Little is done to stimulate the child to find the rewards from within the learning process: to find satisfaction in solving his own problems, to take pleasure in developing greater knowledge and understanding for its own sake, or to measure success or failure in areas of importance to the self.''

The World Health Organization (WHO) estimates that one out of four people will have a mental or neurological disorder at some point during their life time. Although children and adolescents comprise a third and half of the population in low and middle income countries and have a high prevalence of mental disorders, their access to mental health care is even more limited than for adults since most low and middle income countries do not provide any adequate care at all. (CBR Guidelines 2010)

The usual policy aimed at enhancing and enabling the disabled people is the provision of facilities and making same accessible to them. Such facilities meant to rehabilitate them could be termed means of 'equalization of opportunities'.

> "According to the United Nations, the term 'equalization of opportunities' means the process through which the various systems of society and the environment, such as services, activities, information and documentation are available to all, particularly to persons with disabilities. It further states that creating a veritable means of livelihood for persons with disabilities is a worldwide demand. Means of livelihood is a

> function of skill and education, employment opportunities, the socio economic values, culture and health status".

The National Survey of Persons with Disabilities 1996, principal report (2002) by the Federal Ministry of Women Affairs and Social Development refer to persons with Learning Disabilities as mentally retarded. The data from the survey showed that twenty seven (27) States and Federal Capital Territory (FCT) in Nigeria, Plateau State inclusive were covered. In terms of educational attainment, 70.76 percent of persons (aged 6 and above) with disability never attended a formal school, this is an indication that the disabled are highly disadvantaged compared to other members of the society. Most impairment leading to disability could be attributed to illness; the data showed that as much as 71 percent of the impairment was sequel to illness. Congenital and accident account for 18 and 11 percent respectively of impairment. The survey indicated that a total number of 79,447 respondents were covered.

The report also indicated that many persons with disabilities suffer neglect in terms of attendance to formal school, many lack access to education, medical treatment, and employment. Several mentally retarded need vocational rehabilitation but cannot access such service due to non-availability of such programs in their schools or communities. Although the National Policy on Education (1997 and 2004) provide for education for all children in Nigeria regardless of their handicapping conditions, yet many of these children are excluded and marginalized.

Ihenacho (2007) opined that developing a new curriculum in liaison with tertiary institutions will foster higher expectation for persons with learning disabilities. Therefore, the need for a well-structured Ceramic instructional model for implementation by the Individual Education Program (IEP team) i.e. Teachers, Parents, Therapists and Clinicians in Nigeria is imperative.

There are volumes of books, papers, dissertations, studies, and seminars on the application of drawing, sand, puppets, story-telling, and doll houses but there is practically no equivalent for the application and effectiveness of clay beyond initial expression and aggression reliever.

This lack of data, the absence of indigenous manuals, clinical scrutiny and empirical analysis is a glaring void; but leaves an opportunity and invitation to discovery and innovation. "CLAY FOR PLAY" is a response to that void!

1.3 AIM OF THE STUDY

The aim of this study is to develop and apply an indigenous ceramics model "**Clay for play**" for the individualized education program for children with learning disabilities.

1.4 OBJECTIVES OF THE STUDY

1. Design an indigenous ceramics manual "Clay for Play" for teaching LD
2. Apply the 'Clay for Play manual' for clay beads production with LD
3. Determine the effect of the 'clay for play manual' (by appraising it based) on the education and physical development components of the model
4. Evaluate experiences, observations and findings on clay therapy useful for independent, corporate, other educational research.

1.5 RESEARCH QUESTIONS

1. (a) What is the procedure for designing an indigenous ceramic manual?

   (b) Can the design of an indigenous Ceramic Instructional manual be beneficial to the learning content of LD?

2. How will play with clay be useful for teaching children with LD basic steps on clay beads production?

3. To what extent can the Clay for Play manual be effective in providing motor and academic development?

4. How adequate is the Clay for Play Model for further research.

1.6 SIGNIFICANCE OF THE STUDY

This research is significant in the areas of education, therapy, economic, technological, cultural, social and holistic development of LD

Education: The "CLAY FOR PLAY MODEL" highlights the component of curriculum domain which can enhance the performance skills of LD and the clay for play manual will provide art exposure and ultimately improve the learning content of LD. The low production cost of clay beads making compared to expensive art materials gives it an edge over other arts

Aesthetic: play with clay and making clay beads; will provide alternative source of product development for ornamentation, mathematics, writing and for both local and international jewellery consumers

Social: play therapy is known to improve self- esteem as poor self- esteem can interfere with learning. Clay for play will provide a platform for organised, free play and social interaction.

Technological: The use of clay for physical development i.e. (rehabilitation) will certainly assist schools, parents and caregivers and introduce a new area in ceramics research.

Cultural: The manual carefully shows hands of a black person, this gives it a local and culturally appropriate approach. The production of clay beads will facilitate the promotion and preservation of our cultural heritage.

Economic: harnessing the abundant deposits of clay in Nigeria for clay- beads production can become a sustainable source of income generation for stakeholders.

Therapeutic: clay therapy will strengthen fine motor skills and reduce the stress and suffering faced by caregivers.

1.7 SCOPE

This research developed an indigenous Ceramics instructional manual focusing on the academic and physical components of the model, for children with learning disabilities in three special schools in Plateau State. It is confined to in-school children with mild Cerebral Palsy (CP), Mental Retardation (MR), and Autism, who have mathematical, writing difficulty and mild auditory difficulty.

This research will not concern itself with the aspects of the diagnosis and testing of disabilities of LD, nor that of correcting problems of distraction to noise by passer-by or their own thoughts, sitting still, listening quietly, and concentrating which can be frustrating and challenging for children with learning disabilities. Kemphill *et al* (1991), advised against concentrating on the diagnosis and testing of disabilities as it can be overwhelming and time consuming.

Allen *et al* (1985) in the cognitive model state that therapy cannot change a cognitive disability that is caused by brain pathology in other words Learning disability has no cure, they emphasized on the need to support a child with LD. To finish a given task at a given time without abandoning it; this they added is accessed or judged an excellent job, over and above the quality of the finished work.

1.8 LIMITATION OF THE STUDY

Available literature focused on clay application in rehabilitation and clinical applications of clay therapy in the field of psychology and medicine. There was paucity of relevant literature on clay applications in the field of Ceramics for rehabilitation. An up-to-date data on the

number of children living with LD in Plateau State was not available as such reference is made to the data provided from the State Ministry of Education list of registered schools with students with LD. This include all children with learning difficulties i.e. including the blind and deaf; totalling five hundred and fifty eight (568) children.

Due to the ethno- religious crisis in Plateau State, school attendance by LD dropped drastically, influencing the sample which changed from time to time during the period of the field work from November 2011 – March 2012. 88.8 % of children studied were not given the opportunity to play freely with the clay-beads for the clay mathematical game at home because their parents feared that they may swallow or lose it in the process of playing with it as required.

CHAPTER TWO

LITERATURE REVIEW

2.1 INTRODUCTION

"Every child has the right to rest and leisure to engage in play and recreational activities appropriate for the age of the child and to participate freely in cultural life and the arts" Article 13 United Nations Convention on the rights of the child

This study on the developing an indigenous instructional model 'Clay for play' is aimed at assisting children with LD to achieve and acquire skills to improve their fine motor, perceptual and sensory skills which will be beneficial for the Individualised Education Plan (IEP) and Community Based Rehabilitation (CBR) at different environments and time settings. According to Anthony et tal (1981) philosophically…… rehabilitation is directed at increasing the strengths of clients so that they can achieve their maximum potential for independent living and meaningful careers. Bennett (1978) said that 'Rehabilitation is the process of helping a physically psychiatrically disabled person to make the best use of his residual abilities in order to function in a normal environment as possible'.

Rehabilitation of all people especially children with learning disabilities is a cardinal issue in clinical and social care services for people with learning disabilities and it has become abundantly clear that there is no one discipline that has the skills to address the complexity of issues that arise in child –care and support. Interdisciplinary and inter-agency work is therefore essential in the field of research.

The need to establish partnerships and, through such partnerships, develop and be part of the direct experiences, to alleviate the problems and pressures of people with learning disability, their families and other caregivers prompted this study.

Therefore, this chapter is designed to systematically unravel related literature which involves locating, reading, learning, as well as relating observations and opinions, and evaluating reports of researches in Psychiatry, special Education, psychology, Art and Rehabilitation Sciences through the use of textbooks, magazines, journals, case studies and witnessed occurrences.

The study will among other things peruse literature on topical issues on learning disabilities, rehabilitation, play therapy and clay therapy, the potentials in clay, bead making and instructional models most appropriate for teaching children with learning disabilities. 'Clay for play' seeks to find and harness the various benefits of Clay, and clay bead-making for the rehabilitation of children with learning disabilities.

The review of related literature is therefore categorized into four parts.

1. Learning in general and issues on Learning disabilities.

2. Instructional Models in learning Disabilities and rehabilitation

3. The benefits of clay for rehabilitation and clay therapy

4. Bead making, and clay beads for LD

2.2 LEARNING IN GENERAL

Learning:

Lloyd (1975) defined learning as a scientific construct based on observation of behaviour in repeated situations. He explained that learning or lack of it is inferred from both observation of performance and that situation evoking the performance. Therefore, learning is the relatively permanent changes in the potential for performance that result from our interaction with the environment, in a nutshell, he further said that learning influences most

of the activity that constitutes daily living. It makes possible skilled, automatic performance as well as deliberative thought. On the other hand, Pollak (1993) a developmental Paediatrician, agrees with this assertion and describes learning as "the process by which experiences affects development", i.e. children learn by repetition, copying, association (conditioning) and observation". Learning is thought to be a permanent change.

2.2.1 Methods of Learning

There are various methods of learning which over the years have influenced and changed human history, time and culture. Lowenfield emphatically says that Learning is so complex that there is no single best teaching method by which the learner learns through observation, listening, imitation, conditioning, development of thought, development of the concept of shape and size, the concept of time, perception and play.

The researches of Vygotsky 1930s, Jean Piaget 1960's and particularly Benjamin Bloom,who developed an influential taxonomy of the three domains of learning in 1956, which are still influencing the design of instruction today. Psychomotor (what one does, physically) Cognition (what one knows or thinks), and Affective (what one feels, or what attitudes one has). http://www.cognitv

Piaget was one of the influential early psychologists to study the development of cognitive abilities. His theory suggests that development proceeds through a set of stages from infancy to adulthood and that there is an end point or goal. The work of Jean Piaget puts into perspective the various experiences and ways children receive, perceive, and process information. Although several researches disagree remarkably with Piaget, however, Piaget's theories have revolutionised ideas on the development of thinking, and learning, which developmentalists agree with Piaget on his assertion that children go through definite stages of logic and thought. (Pollak 1993)

2.2.2 Perceptual skills and visual communication

The first learning experience of a child is through tactile experience. The sense of tasting, hearing and smelling is quite essential to how children respond to their environment. Human visual experience is primary to learning to understand. For a child to perceive, sense must be made of the seeing, and hearing. Pollak (1993) argues that perception involves the reception of sensory impression, remembrance of it and later adaptation and use.

The process of visual communication involves visualising to form a mental picture. Much of what we know about the interaction and effect of human perception on visual meaning is drawn from the research and experiments in Gestalt psychology. The basic elements of visual communication as enumerated by Dondis (1973) are line, colour, shape, direction, texture, scale, dimension and motion.

Skilled motor activity requires coordination of postural control, righting, balance, orientation and initiation and control of movement for all of which normal proprioception is essential. Pollak (1993) further states that when motor development is delayed, this affects play skills such as jumping, skipping, and catching balls.

2.2.3 How physical development affects learning.

Santrock, (1999). Says early childhood is an exciting time for parents and children, as a child develops and refines physical skills from running to drawing. The child's physical development can be encouraged by providing the right environment, once the skills involved are understood. Moore (2010) explains that there are two basic types of physical development in early childhood that allow the physical development of a child, based on a child's age, physical maturity and development.

2.2.3.1 Gross Motor Skills

Gross motor development, or the development of skills using large movements that involve the whole body. Brotherson (2006) states that Gross-motor skills in early childhood relate to a child's development of large muscles and the ability to move from place to place or do physical activities that involve the large muscles of the body, arms and legs. Large-muscle development in young children is necessary for crawling, walking, lifting and other types of physical activities. Gross-motor skills in early childhood include: using their large muscles in running, wiggling and jumping.

Different parts of a child's body grow at different rates. Give young children support as their large muscles in the lower body develop and eventually support them to sit or stand. Moss (2011) advised parents, child-care programs and schools to give children a chance to develop and exercise large-muscle skills.

2.2.3.2 Fine Motor Skills

Oswalt (2010) took time in explaining how two- and three-year-old children start creating things with their hands, such as towers built out of blocks and shapes moulded out of clay, and can scribble with pen or crayon. This is also the period when the child starts to become right- or left-handed by showing a preference for one hand. Three- and four-year-old children gain independence in dressing themselves as they start to manipulate zippers and snaps, and refine their eating skills by using forks and spoons.

By four or five, the child can use buttons by himself and can draw stick figures and copy shapes like circles, squares and large letters. Five- to seven-year-olds have the ability to print letters and numbers, necessary for school, and can complete self-care tasks such as brushing their teeth and combing their hair.

Similarly, Moss (2010) explains that Fine-motor skills in early childhood relate to a child's development of small muscles and the ability to control use of the hands and feet, and do activities that involve the small muscles of the fingers, toes and other parts of the body. Small-muscle development in young children is necessary for physical activities such as grasping, cutting, throwing and drawing.

2.2.3.3 Balance and Coordination Skills in Early Childhood

Balance and coordination skills are necessary for catching, clapping, eating, playing and other types of physical activities. Balance and coordination skills in early childhood include: Balance and coordination skills which develop through time from a child's birth. Coordination skills are important to a child's ability to interact and explore the environment. This ultimately will help develop hand-eye coordination and left-to-right tracking, which will help in learning to read. Repetition of physical activities, such as rolling a ball with a toddler or drawing pictures, helps a child develop balance and coordination skills. (Oswalt 2010 and Moss 2010)

2.2.4 Significance of creativity on mental development or growth

Viktor Lowenfield one of those who influenced art education to the extent that it was introduced to the school curriculum, became concerned for children's growth, their interest, and above all, working with them as children, after carefully assessing the way schools emphasised passing examination or moving to the next class, which involves mastery or memorisation of bits of information, which the learner must give back when required to do so.

He concluded that failing examinations means being deprived or disadvantaged and mean being completely isolated from stimulation, self-expression and self- identification.

Which are key components in creativity, he stated that man 'learns through his senses'. Touching, seeing, hearing, smelling, and tasting involve the active participation of the individual. Jameson (1974) also opined that the teaching of art must start with the youngster and not be involved with essentials. Changing or alleviating his drawing or painting to satisfy someone.

In art education the final product is subordinated to the creative process. It is the child's process – his thinking, his feelings, his or her perceiving, in short, The child's interaction to his environment is far more important., than the art teacher's will, design or concept. Jameson (1974) in his book 'Pre-school and Infant Art' opines that the child's life is naturally a life of spontaneous creativity. The child sings, laughs, dances, builds with blocks, climbs, explores, runs, jumps, loves, draws, paints, yet of all these natural activities, drawing and painting are the ones that are denied the child may be due to the call for equipment or space

Therefore the need to expose every youngster or learner to his or her environment, to make learning fun rather than 'serving a sentence' is urgently required. Lowenfield and Brittain (1970) and Jameson (1974) both agree that children's drawing, moulding etc. are not crude scribbling and blobbing, but a developing process. Jameson (1974) asserts that children are quite familiar with geometry due to their first scribbling's which always depicts the head or circle.

We can safety accept Deregowski's (1984) claim that factors affecting perception of distortion are those of the style or mannerism used in the picture or form, the extent of familiarity of the shape by the observer determines to what distortion may be starting or disturbing to the observer. A child familiar with the circle for example may quietly notice any distortion; while others unfamiliar with it may simply sit put.

2.2.5 Cognitive development

Cognitive development is primarily concerned with the ways in which infants and children acquire, develop, and use internal mental capabilities such as problem solving, memory, and language. Major concerns in cognitive development are the study of language acquisition and the development of perceptual and motor skills. (Kuhn 2012)

Lloyd (1975) refers to cognition as the manner in which humans acquire, interpret, organise, store, retrieve and employ knowledge. Piaget was one of the influential early psychologists to study the development of cognitive abilities. His theory suggests that development proceeds through a set of stages from infancy to adulthood and that there is an end point or goal.

There is a basic assumption that most children with LD cannot learn or improve substantially in school, however, research has shown tremendous and marked improvement in learning when the child is given or placed with the right environment, play, motivation etc. Behaviour can improve when personal development which encompasses language, adaptive, motor, sensory development, are all carefully nurtured to achieve holistic development of the learner. Schiffman (1990) from a clinical point of view asserts that many children due their handicap, especially visual, verbal and or auditory difficulty are unable to learn to discriminate which can particularly influence how children perceive or process information.

Jean Piaget (1896-1980) was a biologist who originally studied molluscs (publishing twenty scientific papers on them by the time he was 21) but moved into the study of the development of children's understanding, through observing them and talking and listening to them while they worked on exercises he set. Piaget's work on children's intellectual development owed much to his early studies of water snails.

Plate I: Jean Piaget (1896 – 1980)

Source: Cover page: Piagetian Theory and its Implication for the Helping Professions.

Piaget was a Swiss theorist who posited that children learn actively through the play process. He suggested that the adult's role in helping the child learn was to provide appropriate materials for the child to interact and construct. Piaget's view of how children's minds work and develop has been enormously influential, particularly in educational theory.

2.6 HOW LEARNING DISABILITIES AFFECTS LEARNING

2.6.1 Learning disability

Learning in a classroom environment requires sitting still, listening quietly, and concentrating which is tough for children with learning disabilities. Children with learning disabilities are easily distracted by noise, passers-by, or their own thoughts that they often miss vital classroom information. They also have challenges staying focused on tasks that require sustained mental effort. D' Arcy, (2007) stated that Learning disabilities affect the brains' ability to receive, process, analyse or store information, and can also make it difficult for a child to read, write, spell or solve mathematical problems.

According to http://www.ldonline.org "Children with Learning Disabilities" refers to children who have a disorder in one or more of the basic psychological processes involved in understanding or in using language, spoken or written, that may manifest itself in an imperfect ability to listen, think, speak, read, write, spell, or do mathematical calculations, including conditions such as perceptual disabilities, brain injury, minimal brain dysfunction, dyslexia, and developmental aphasia.

However, learning disabilities do not include, "...learning problems that are primarily the result of visual, hearing, or motor disabilities, of mental retardation, of emotional disturbance, or of environmental, cultural, or economic disadvantage. Learning disorders are caused by a difference in the brain that affects how information is received, processed, or communicated Neuroplasticity can change the brain ¾ Hemphill *et al* (2007) grouped LD into the following types below.

2.6.2 Types of learning disabilities and disorder

Types of learning disabilities are often grouped by school–area skill set or cognitive weakness. If your child is in school, it will probably be apparent if he or she is struggling with reading, writing, or Mathematics, and narrowing down the type will be easier. Kemp *et al* (2010)

2.6.2.1 Motor difficulties and learning disabilities

Motor difficulty refers to problems with movement and coordination whether it is with fine motor skills (cutting, writing) or gross motor skills (running, jumping). A motor disability is sometimes referred to as an "output" activity meaning that it relates to the output of information from the brain. In order to run, jump, write or cut something, the brain must be able to communicate with the necessary limbs to complete the action. Signs that your child

might have a motor coordination disability include problems with physical abilities that require hand–eye coordination, like holding a pencil or buttoning a shirt.

2.6.2.2 Mathematical difficulties and learning disabilities

Learning disabilities in math vary greatly depending on the child's other strengths and weaknesses. A child's ability to do math will be affected differently by a language learning disability, or a visual disorder or a difficulty with sequencing, memory or organization. A child with a mathematical–based learning disorder may struggle with memorization and organization of numbers, operation signs, and number "facts" (like 5+5=10 or 5x5=25). Children with math learning disorders might also have trouble with counting principles (such as counting by 2s or counting by 5s) or have difficulty telling time.

According to Kemp *et al* on their site http://www.helpguide.org detailed advice is provided for care- givers to get around this challenge, the need to know that most LD are 'concrete learners' as such they often like to hold, touch or take part in an experience in order to learn something new is essential. Therefore using games and objects to demonstrate mathematical concepts can be meaningful. Furthermore, using memory cards, dice, or dominoes to make numbers fun, use illustrations, acronyms and or make up a song to help LD enjoy reading.

2.6.2.3 Language difficulties and learning disabilities

Language and communication learning disabilities involve the ability to understand or produce spoken language. Language is also considered an output activity because it requires organizing thoughts in the brain and calling upon the right words to verbally explain something or communicate with someone else.

American Academy of Pediatrics, Section on Ophthalmology, Council on Children with Disabilities view signs of a language–based learning disorder to involve problems with 'verbal language skills', such as the ability to retell a story and the fluency of speech, as well as the ability to understand the meaning of words, parts of speech, directions, etc. Slow Expressive Language Development (SELD) a delay in the use of words coupled with normal understanding, is characteristic of a small proportion of children who later display normal language use.

Dyslexia is a significant topic in child development as it affects approximately 5% of the population (in the western world) Essentially it is a disorder whereby children fail to attain the language skills of reading, writing and spelling commensurate with their intellectual abilities. Dyslexic children show a range of differences in their language development, from subtle speech impairments to mispronunciations to word-finding difficulties.Lerner (2000)

The most common phonological difficulties are limitations of verbal short-term memory and phonological awareness. Such children often have difficulties with long-term verbal learning such as months of the year or learning tables. In the late 1980s the phonological deficit hypothesis has become the dominant explanation. The difficulties in early articulation, basic phonological skills and acquiring basic building blocks means that dyslexics have to invest too many resources in just coping with the basics rather than acquiring new information or skills. Early identification enables children to receive help before they fail.

A typically delayed language development may be diagnostic of autism, and regression of language may indicate serious disabilities like Rett syndrome. Poor language development also accompanies general developmental delays such as those found in Down syndrome.

2.6.2.4 Reading difficulties and learning disabilities

There are two types of learning disabilities in reading. Basic reading problems occur when there is difficulty understanding the relationship between sounds, letters and words. Reading comprehension problems occur when there is an inability to grasp the meaning of words, phrases, and paragraphs.

2.6.2.5 Signs of reading difficulty include problems with

Letter and word recognition

Understanding words and ideas

Reading speed and fluency

General vocabulary skills

2.6.2.6 Writing difficulties and learning disabilities

Segal (2010) also says learning disabilities in writing can involve the physical act of writing or the mental activity of comprehending and synthesizing information. Basic writing disorder refers to physical difficulty forming words and letters. Expressive writing disability indicates a struggle to organize thoughts on paper. Symptoms of a written language learning disability revolve around the act of writing and include. They include problems with:

Neatness and consistency of writing

Accurately copying letters and words

Spelling consistency

Writing organization and coherence

2.6.3 Auditory and visual processing: the importance of the ears and the eyes

The eyes and the ears are the primary means of delivering information to the brain, a process sometimes called "input." If either the eyes or the ears aren't working properly, learning can suffer and there is a greater likelihood of a learning disability or disorder. Professionals may refer to the ability to hear well as "auditory processing skills" or "receptive language." The ability to hear things correctly greatly impacts the ability to read, write and spell. An inability to distinguish subtle differences in sound, or hearing sounds at the wrong speed make it difficult to sound out words and understand the basic concepts of reading and writing. (Schuster 1985, Segal 2010)

Problems in visual perception include missing subtle differences in shapes, reversing letters or numbers, skipping words, skipping lines, misperceiving depth or distance, or having problems with eye–hand coordination. Professionals may refer to the work of the eyes as "visual processing." Visual perception can affect gross and fine motor skills, reading comprehension, and mathematics.

2.6.4 Intellectual disability (Mental Retardation)

The National Dissemination Center for Children with Disabilities on its site *http://www.nichcy.org/states.*htm and The Centers for Disease Control and Prevention (CDC) on *http://www.cdc.gov/ncbddd* define mental retardation as Intellectual disability. Mental retardation is a term used when there are limits to a person's ability to learn at an expected level and function in daily life. Levels of intellectual disability vary greatly in children – from a very slight problem to a very severe problem. Children with intellectual disability might have a hard time letting others know their wants and needs, and taking care of themselves. It could take longer for a child with intellectual disability to learn to speak, walk, dress, or eat without help, and they could have trouble learning in school.

The centers further state that for many children, the cause of their intellectual disability is not known. Some of the most common known causes of intellectual disability – like Down syndrome, fetal alcohol syndrome, fragile X syndrome, genetic conditions, birth defects, and infections – happen before birth. Others happen while a baby is being born or soon after birth. Still other causes of intellectual disability do not occur until a child is older; these might include serious head injury, stroke, or certain infections.

2.6.5 Autistic Spectrum Disorder (Autism)

The Centers for Disease Control and Prevention (CDC) on its website *www.cdc.gov/ncbddd* say that Autistic Spectrum Disorder (ASD) is commonly called autism; more recently described as "mindblindedness" It is a neurological and developmental disorder that usually appears during the first three years of life. Erbert (2012) also accounts that a child with autism appears to live in their own world, showing little interest in others and a lack of social awareness. Autistic children often have problems in communication, avoid eye contact and show limited attachment to others, due to an inability to interpret facial expressions or emotions.

'Talk About Curing Autism' website http://www.tacanow.org see Autism as a devastating neurological and biological disorder that typically affects children between the ages in 18 months to five years of age. They assert that Autism currently affects 1 in every 88 children today. It is also a known fact that autism affects individuals in five key areas: Communicating verbally and non-verbally, Social skills, Behaviours, Learning and Medical issues. 'Talk About Curing Autism' also list traits persons with autism also face to include:

Scatter/splinter skills of abilities – such as poor gross motor or fine motor skills and the ability to read at a very young age. Some are oversensitive or under sensitive to pain, many desire the same daily schedule, toys, type of clothes or insistent on "sameness", repeating words, phrases in place of typical language or conversation: this is known as echolalia. Persons with autism have much difficulty expressing needs – they may use pointing, gestures versus words, or tantrums, finding situations funny or laughing at times when it is inappropriate (i.e., laughing at a baby crying.) When in activity it is noticeably under active or over active, having excessive or frequent tantrums, aggressive or self-injurious and prefer to be alone.

Other issues are non-existent or poor eye contact, non-responsive to typical teaching methods, may respond negatively to crowds or not able to mix well with others and May not like hugs, or to be cuddled. Autistics can act deaf or be non-responsive to verbal cues which can hinder imaginative play or imitation; they rather engage in odd play such as; spinning objects, or using toys for something besides there their intended purpose or using an odd attraction to an item that is inappropriate for age. Having difficulty with holding a conversation, with sensitivity to loud noises, tags in clothes, coarse clothing, lights, and smells.

Frequently use peripheral vision to track items e.g., rolling car along countertop at eye-level. May also have self-limited diet due to high or severe food allergies. In addition history of chronic ear infections as an infant and severe gastro-intestinal issues; chronic loose and/or foul-smelling stools. Global Autism on their site www.globalautism.org agree with the views of 'Talk About Curing Autism' that a child with autism may resist cuddling, play alone, be resistant to change and have delayed speech development. However, they added that persons with autism tend to exhibit repeated body movements (such as flapping hands or

rocking) and have unusual attachments to objects. Many persons with autism excel consistently on certain mental tasks (i.e., counting, measuring, art, music, memory).

2.6.6 Cerebral palsy

Cerebral palsy is a group of disorders that affect a person's ability to move and keep their balance and posture as a result of an injury to parts of the brain, or as a result of a problem with development. Often the problem happens before birth or soon after being born. Cerebral palsy causes different types of disabilities in each child. A child may simply be a little clumsy or awkward, or unable to walk at all, might have a delay reaching the motor or movement milestones. http://www.cdc.gov.actearly

2.6.7 Learning disabilities: Social and emotional difficulties

Sometimes children have trouble expressing their feelings, calming themselves down, and reading nonverbal cues, which can lead to difficulty in the classroom and with their peers. For all children, but especially those with learning disabilities, social and emotional skills are the most consistent indicators of success, outweighing everything else, including academic factors.

Academic challenges may lead to low self–esteem, withdrawal and behaviour problems, but this can be countered by creating a strong support system for the child and helping them learn to express themselves, deal with frustration and work through challenges. There is the need to focus on their growth as a person, and not just on academic achievements, this will help them learn good emotional habits and the right tools for lifelong success. www.medicinet.com

2.6.8 Characteristics of Learning Disabilities

Some of these are general characteristics of LD. Mixed dominance, directional confusion, difficulty in sequencing, difficulty with time or time relationship, poor motor control, short attention span, distractibility, poor hand writing, behaviour problems and reversals, these characteristics can provide clues or suggest that a child has learning disabilities, Schuster (1985) pointed out that no child will exhibit all symptoms listed, however, having a cluster of them suggest a likelihood of having a learning disability.

2.6.9 The Child's Primary Learning Style

(Schuster 1985; Hemphill 2007 and Segal 2010) believe that everyone with learning disability or not has his or her own unique learning style. Some people learn best by seeing or reading, others by listening, and still others by doing. A learning disabled child can be helped by identifying his or her primary learning style: Is the child a visual learner, an auditory learner, or a kinaesthetic learner? Once the learning style is known, steps can be taken to make sure that, that type of learning is reinforced in the classroom and during home study.

Table 2.1: Common Types of Learning Disabilities

Name	Type of Disability	Features
Dyslexia	Difficulty processing language	Problems reading, writing, spelling, speaking
Dyscalculia	Difficulty with Mathematics	Problems doing math problems, understanding time, using money
Dysgraphia	Difficulty with writing	Problems with handwriting, spelling, organizing ideas
Dyspraxia(Sensory Integration Disorder)	Difficulty with fine motor skills	Problems with hand–eye coordination, balance, manual dexterity
Auditory-Processing Disorder	Difficulty hearing differences between sounds	Problems with reading, comprehension, language
Visual-Processing Disorder	Difficulty interpreting visual information	Problems with reading, mathematics, maps, charts, symbols, pictures

Source: Kemp G *et al* (2010) http://www.helpguide.com

Nwokolo, O. M. Journal of Learning Disabilities in Nigeria, Vol. 2 # 1 2007

Table 2.2 Characteristics of Learning Disabilities

Type	Characteristics
Mixed dominance	Not preferring the right or left hand
Directional confusion	Difficulty in telling right from left
Difficulty in sequencing	Inability to remember series of things in order, such as telephone numbers, or tell events as they happened.
Difficulty with time or time relationships	Not being able to tell time or understand "30 minutes from now"
Poor motor control	Awkward, clumsy, not colouring inside lines or writing on lines.
Short attention span	Loose interest quickly, thoughts move from one thing to another rapidly.
Distractibility	Train of thought easily broken, cannot tune out small distractions. Poor handwriting – cannot remember how letters are formed, have difficulty in copying correctly.
Behaviour problems	Frustrations due to inability to live up to his or her own or other peoples' expectations or complete assignments.
Reversals	Tendency to read from reverse other, for example saw for was, b for d, p for q.

Source: Schuster, (1985). The Church ministering to exceptional Persons: Jesus Loves Me

Table 2.3 Different Learning Styles in children

Visual Learners:	Auditory Learners	Kinaesthetic Learner
1. Learn by seeing or reading	1. Learn by listening	1. Learn by doing and moving
2. Do well when material is presented and tested visually, not verbally	2. Do well in lecture-based learning environments and on oral reports and tests	2. Do well when they can move, touch, explore, and create in order to learn
3. Benefit from written notes and directions, diagrams, charts, maps, and pictures	3. Benefit from classroom discussions, spoken directions, study groups	3. Benefit from hands-on activities, lab classes, props, skits, and field trips
4. Often love to draw, read, and write; are good spellers and organizer	4. Often love music, languages, and being on stage	4. Often love sports, drama, dance, martial arts, and arts and crafts

Source: Kemp et al (2010)
http://www.helpguide.com

2.7 INSTRUCTIONAL MODELS IN LEARNING DISABILITIES AND REHABILITATION

Instructional Design (also called Instructional Systems Design (ISD) is the practice of maximizing the effectiveness, efficiency and appeal of instruction and other learning experiences. The process consists broadly of determining the present state and needs of the learner, defining the end goal of instruction, and creating some "intervention" to assist in the transition. The outcome of this instruction may be directly observable and scientifically measured or completely hidden and assumed. There are many instructional design models but many are based on the Addie model with the five phases: 1) analysis, 2) design, 3) development, 4) implementation, and 5) evaluation. As a field, instructional design is historically and traditionally rooted in cognitive and behavioral psychology. http://www.behavioral.psychology.org

2.7.1 Applications in instructional design and technology

Instructional design, the systematic design of materials, activities and interactive environments for learning, is broadly informed by educational psychology theories and research. For example, in defining learning goals or objectives, instructional designers often use a taxonomy of educational objectives created by Benjamin Bloom and colleagues.

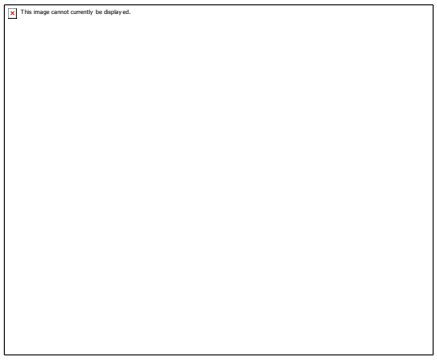


Fig. I: Bloom's taxonomy of educational objectives:

Source: en.wikipedia.org/wiki/mastery_learning

Bloom also researched mastery learning, an instructional strategy in which learners only advance to a new learning objective after they have mastered its prerequisite objectives. Bloom discovered that a combination of mastery learning with one-to-one tutoring is highly effective, producing learning outcomes far exceeding those normally achieved in classroom instruction. The method of task analysis was developed by another psychologist.

2.7.2 Direct Instruction

This group includes instructional approaches that were Systematic, such instructional targets and methods for presenting and reinforcing information. Specific techniques included breaking down the instructions and tasks into small steps, teacher modeling of a skill or task, administering feedback repeatedly, providing instruction or materials at a rapid pace, distributed practice and review using probes, providing a pictorial or diagram presentation, allowing independent practice and individually paced instruction, and individual and small group instruction. (Sohlberg et al 2005).

2.7.3 Strategy Instruction

These were instructional approaches that facilitated learner engagement. Specific techniques included the following: systematic explanations, elaborations, or plans to direct task performance; verbal modeling, questioning, and demonstration by teachers; reminders to use strategies or procedures; step-by-step prompts or multi process instructions; teacher-student dialog; and having the teacher provide only necessary assistance.

2.7.4 The Self-Determined Learning Model of Instruction

The Self-Determined Learning Model of Instruction provides teachers with a teaching model that supports them in their efforts to promote their students' self-determination. Instruction using the model provides students with a goal-setting and problem-solving strategy to achieve student-directed outcomes.

Implementation of the model consists of a three-phase instructional process: (a) set a goal, (b) take action, and (c) adjust the goal or plan. The model revolves around a set of four student questions in each phase which students' learn, modify to make their own, and apply to reach self-selected goals. There are teacher objectives linked to each student question, and educational supports identified for each instructional phase that teachers can use to enable students to self-direct learning. The model is based on a universal problem-solving strategy and can be used across multiple content areas. In each instructional phase, the student is the primary agent for choices, decisions, and actions, even when eventual actions are teacher-directed.

2.7.5 Combined Model

In this group, it's a combination of the DI and strategy instruction models

2.7.6 Non-direct Instruction/Non-strategy Instruction:

These studies did not adhere to a structured or systematic instructional model. They did not specify methods to identify instructional targets or deliver the material and were described as 'reinforcement-only,'' ''modeling-only,'' or ''social skills training".

2.7.7 Importance of Instruction

The design of instruction analyses content to identify ''big ideas,'' concepts, rules, and generalizable strategies.

1. Determine specific skills, including prerequisite skills.

2. Develop task analyses (i.e., break skills and tasks down into small steps).

3. Establish high mastery criteria.

4. Delivery of instruction: (Clearly state learning objectives) Individualized instruction, including instructional pacing.

5. Conduct ongoing assessment to gauge skill retention.

6. Develop simple, consistent instructional wording and scripts to reduce confusion and focus learner on relevant content.

7. Provide consistent feedback (e.g., immediately model the correct response after the client makes a mistake).

2.7.8 Errorless learning

The primary goal of errorless learning is to reduce substantially, if not eliminate, errors during the acquisition phase of learning. Errorless learning is contrasted with errorful learning (i.e., trial-and-error learning, discovery learning), in which the client is encouraged to guess the targeted response before being provided with the information.

(1) Breaking down the targeted task into small, discrete steps or units;

(2) Providing sufficient models before the client is asked to perform the target task;

(3) Encouraging the client to avoid guessing;

(4) Immediately correcting errors; and

(5) Carefully fading prompts.

The benefits of errorless learning are typically reported in individuals with relatively spared procedural memory (memory without recalling the experience of learning) and severe, declarative memory loss (memory involving conscious recollection).

2.7.9 Individualized Education Programs (IEPs)

The field of Special Education seems to have ratified the use of the IEP over and above all other instructional techniques.The U.S. Department of Education National Dissemination Center for Children with Disabilities gives explicit steps to be undertaken by schools which have invariably affected an adoption of such a method by special educationists in Nigeria. If a child shows clearly educational need, the schools are required by law to develop an Individualized Education Plan (IEP) that delivers some educational benefit, but not necessarily one that maximizes student achievement.

2.7.9.1 Designing an Individualized Education Plan (IEP)

The IEP enables teachers, parents, and school administrators to design an educational program customized to the child's needs. According to the IDEA, the child's IEP must include specific statements about the child. The child's IEP will contain the following statements listed on table 2.4 below.

Table 2.4 Information included in an IEP

Statement	Detailed explanation
Present levels of achievement and educational performance	This statement describes how you're the child is currently doing in school. This includes how the child's disability affects his or her involvement and progress in the general curriculum.
Annual goals	Annual goals for the child, meaning what you and the school team think he or she can reasonably accomplish in a year. The goals must relate to meeting the needs that result from your child's disability. The teachers must also help the child be involved in and progress in the general curriculum.
Special education and related services to be provided	list the special education and related services to be provided to your child. This includes supplementary aids and services (such as a communication device). It also includes changes to the program or supports for school personnel that will be provided for your child.
Participation with nondisabled children	How much of the school day will the child be educated separately from nondisabled children or not participate in extracurricular or other nonacademic activities such as lunch or clubs? The IEP must include an explanation that answers this question.
Participation in state and district-wide assessments	The state and district probably give tests of student achievement to children in certain grades or age groups. In order to participate in these tests, the child may need individual modifications or changes in how the tests are administered. The IEP team must decide what modifications the child needs and list them in the IEP. If your child will not be taking these tests, the IEP must include a statement as to why the tests are not appropriate for the child and how the child will be tested instead
Dates and location	The IEP must state (a) when services and modifications will begin (b) how often they will be provided (c) where they will be provided, and (d) how long they will last.
Transition goals and services	No later than when your child is 16, the IEP must include measurable postsecondary goals related to training, education, employment, and (when appropriate) independent living skills. Also included are the transition services needed to help the child reach those goals, including what the child should study.
Measuring progress	The IEP must state how school personnel will measure the child's progress toward the annual goals. It must also state how, parents will be informed regularly of the child's progress and whether that progress is enough to enable the child to achieve his or her goals by the end of the year.

Adapted from U.S. Department of Education National Dissemination Center for Children with Disabilities

2.8 LEARNING THROUGH PLAY

The need for the rehabilitation of children with learning disabilities requires an evaluation on the impact of play to children's learning and development. This is because research and several debates by notable researchers for over fifty (50) years state that "children's play is learning and that establishing a foundation for academic success through play is far more important than role learning of ABC or counting to ten" Eden (2010). The overall goal of rehabilitation is the restoration of the persons with disability to the fullest physical, mental, social, vocational, economic usefulness of which they are capable. Townsend (1966)

Therefore, the basic philosophy of rehabilitation is hinged on the conviction that "every human being deserves respect" Dimichael (1969) and Olubela (2008) in Bennett (1978) defined rehabilitation as "all concerted effort at equipping the individual with needful skills at functioning productively on a vocation of his/her choice". "Clay for play" finds these as the basis for providing a practical approach to rehabilitation through this research, so as to educate the senses and also improve the hands for optimal educational benefits.

One of the earliest champions of play is Fredrick Froebel (1898) who believed that play was the highest form of human activity in childhood. Froebel is considered the father of modern Kindergarten; his influence can be seen in the selection of many toys, arrangement of learning environment in pre-school and kindergarten.

Similarly, the work of Lev Vygotsky (1962, 1976) a Russian developmental Psychologist on Child development, states the importance of play, Vygotsky recognised that all play involves the use of imagination and the most important activity of childhood. He also recognised the importance of social interaction right from the earliest stage. Mildred Parten in the late 1920s at the Institute of Child Development in Minnesota collected data of children

by systematically sampling the children's behaviour. She observed them for pre-arranged 1 minute periods which were varied systematically. (www.spring.org)

Some of the most compelling arguments for play are its role in the development of creativity and imagination, play being a valuable resource for promoting equality and cultural awareness among children and play having powerful effects on virtually every aspect of human development and learning. Eden (2010) also believed that play influences all aspects of development. Without play, the development of the mind and spirit is stunted. Without play, a child can never enjoy the gift of friendship, for it is in play that a child first experiences the give – and – take of life.

Skinner (2007) advocated for the seeds of play and recreational activities to be sown for children to reach their full potential; she said that the seeds are sown in our early years at home and school settings through careful and well planned creative experiences. Dorothy and Jerome Singer (1992, 2000) in their work found out that learning was more meaningful, when the parents or caregiver was actively and playfully involved. Koz (2007) also emphatically opine that most children's lives are consumed by play things and play. Whether building towers out of blocks or constructing extravagant tea parties, they are in constant activity.

Physical, socio-emotional and cognitive development of children is dependent upon this activity. It is through play that much of children's early learning is achieved, which is why opportunity for play is a key aspect in many preschool and kindergarten programs. There are many benefits to the activity of playing. It exercises cognitive, linguistic and social skill. Through touch, exploration and trial and error, children find out about the world around them. By interacting with other children they find out about themselves and their relationship to others.

Play is also the way children develop their sense of self, sense of the world and sense of where they fit in and practice many basic social skills. With continued play, children develop confidence in themselves and their abilities and they work towards becoming self-directed persons. With a solid foundation, they will be on the right track towards continued growth in knowledge and understanding

Piaget believed that it is through play that children construct a sense of order and meaning out of their environment. They are constantly organising and reorganising new experiences and information. This process of altering previously established patterns of organisation or schemes is what Piaget calls learning. As children build social skills and begin to play more cooperatively, they begin to play games in which they devise rules.

These rules may change often, and the participants may shift with little effort. Through this type of play, children may imitate adults and experiment problems and work cooperatively with others. Piaget viewed children's play in cognitive terms while Parten (2008) emphasised the idea that "learning to play is learning how to relate to others" http://www.spring.org.uk/2008/07

2.8.1 Types of Play

There are many types of play postulated by many researchers and divergent opinions on the stages of play. Parten, for example closely observed children between the ages of 2 and 5 years and categorized their play into six types.

1. Unoccupied play: the child is relatively stationary and appears to be performing random movements with no apparent purpose. A relatively infrequent style of play.
2. Solitary play: the child is completely engrossed in playing and does not seem to notice other children. Most often seen in children between 2 and 3 years-old.

3. Onlooker play: child takes an interest in other children's play but does not join in. May ask questions or just talk to other children, but the main activity is simply to watch.
4. Parallel play: the child mimics other children's play but doesn't actively engage with them. For example they may use the same toy.
5. Associative play: now more interested in each other than the toys they are using. This is the first category that involves strong social interaction between the children while they play.
6. Cooperative play: some organization enters children's play, for example the playing has some goal and children often adopt roles and act as a group.

Many research findings on play types categorise play into four, six and seven. The first stage of play is exploration or manipulation of materials. Examples of such play are feeling sand, scribbling with crayon or pounding clay. The second stage is called symbolic play: At this stage children use objects and materials as symbols for something else. For instance, a child may join blocks to make a 'bridge' or flatten clay to make a 'cookie'. Piaget labels this play in the preoperational stage. It is also the type one would see in many preschool and Kindergarten classrooms. (Morrisey 2010; Kutner 2011; and Webb 2012)

The first four categories of play don't involve much interaction with others, while the last two do. While children shift between the types of play, what Parten noticed was that as they grew up, children participated less in the first four types and more in the last two - those which involved greater interaction.

2.8.2 Factors which affect the development of play

For play to adequately influence learning, children must be freed from the struggle for existence and do what they enjoy doing, not what they must do in order to keep alive. There

are certain factors which may hinder or inhibit learning to play, this include, sex, social class, intelligence, culture, and handicap with abnormal motor development, poor auditory skills, gross or fine motor manipulation challenge, lack of balance, poor visual and perceptual skills which are associated with learning disabilities.

2.8.3 The Benefits of playing with clay

Or (2012) views clay as a strong expressive medium ideal for enhancing children's development and holistic learning. Working with clay improves dexterity and uses both small and large muscles. Little fingers and hands are strengthened whilst working with clay due to its firm nature and the larger muscles of the arms, back and shoulders are strengthened when rolling slabs or wedging clay.

Children of all ages enjoy squishing, squelching, pinching, rolling, poking, stretching and pounding clay. Some children find this particularly soothing and it can be useful for releasing tension or frustration. In addition, ceramics gets children in touch with nature, feeling the earth, understanding where clay comes from contributes to environmental awareness. Although children often work on individual projects, ceramics can also be a very social activity. When appropriate, groups of children with mixed ages and backgrounds are encouraged to work together which helps promote verbal communication skills, confidence and social skills.

Research world over shows that developed countries have information, materials, hospitals, schools and rehabilitation centres which have benefited their citizens with learning disabilities. Many of such developed nations have long intuitively understood that the expressive quality of clay is excellent for fostering self- revelation and discussion. Tubbs, (2007) states that clay is a common ingredient in play therapy situation and it fits well with the exploratory nature of the child. Early (1993) also states that clay allows unstructured

exploration of materials. Hemphill, (1991) said Clay work, in particular clay bead making enforces the art of squeezing, pushing, pinching, patting, rolling, smoothening and manipulating.

"Clay work can achieve almost any wrist, hand, or finger movement desired, working with clay strengthens the upper extremities and can be graded from delicate manipulation. Rolling clay uses the abdominals, elbows, extensors, and flexors; in fact wedging clay can achieve shoulder flexion and extension." Fidler and Velde (1999)

Tubbs *et al* (2007) further state that clay is a natural medium for children, they play with their food squeezing and manipulating it or make mud pies in the same way they handle clay, No wander occupational therapists stress the need to allow and encourage play with clay on a 'regular basis' 'in the same way that children are encouraged to paint, draw and use scissors in early childhood classrooms to enhance their overall development.

Children's competency in drawing will be reflected in how they manipulate clay and clay tools, those who have had little experience in working with art materials or tools usually will not work as long or as independently with clay. Lowenfield and Brittain (1970)

Fitzsimmons, (1991) assert that "Art is an integral part of the whole learning process which allows every child regardless of ability to communicate feelings, emotions and experiences in a pleasurable and satisfying way".

Schuster (1985) Suggested the use of multifaceted sensory approach in classes to tell the story, show the story, sing the story and colour or work the story, using films, puppets, flannel graph, role playing and other methods like playing with clay. She further stated that, they need a variety of experiences, music and art which are good areas to work on the child's gross and fine motor skills as well as to emphasis a lesson.

Craft activities with cutting, patting, colouring, stapling and painting can centre on the story or lesson. The dysfunction which probably negates the acquisition and performance of independent living skills and individual learning skills are poor fine motor, cognitive and sensory skills. (Hemphill 1991)

Sigmund Freud's pleasure principle, states that the desire to avoid painful and disagreeable impressions, and a desire for immediate gratification of the instinct for pleasure in various forms, if achieved, this instinct can find an outlet in dreams, art, poetry, music etc. all may be well, if however, these avenues are not available, they are apt to emerge either in neurotic troubles" (Martin, 1949)

Lorenz (2008) Stated that the use of play therapy include emotional and behavioural adjustment needs of children related to acting out aggressive behaviours, family and relationship issues, domestic violence, abuse, academic performance and reduction of stress, and anxiety as it is designed to provide the child with skills and experiences that assist him or her in overcoming such difficulties. Finally, play is a child's natural means of communication and self-expression and can provide an opportunity for the child to work through a variety of emotions. (Tubbs 2007)

2.9 THE POTENTIALS AND BENEFITS OF CLAY

The potentials or benefits of clay are categorised into the following four parts listed here are educational, medicinal, psychological/therapeutic, cognitive and rehabilitation benefits of clay through bead-making. This research will not concern itself with the economic, technological and ecological benefits of clay.

2.9.1 Properties of Clay

Clay is a natural earthy material composed of very small particles of weathered rock. Clay particles are less than 0.00015 inch (0.004mm) in diameter. It is much smaller than sand

particles. Dry clay is usually powdery, solid and feels oily when rubbed between the fingers. When mixed with water, clay becomes plastic-that is, it can be readily molded.

2.9.2 Types and Classifications of Clays and their uses

Residual clay comes from gradual weathering of rock into very fine particles. The particles become mixed with water and mineral form the surrounding soil. While sedimentary clay is formed when particles of weathered rocks are carried from the place in which they were formed, usually by streams of water, and deposited in another place. This occurs in layers.Types of clay are referred to by ceramists as clay bodies.

Several books and research work on clay group clay into six groups, Kaolin group, Illite group, Smectite group, Chlorite group, Vermiculite group, Mixed-layer group (consists of all five groups above) Lath-form group. Kaolin is fine white clay consisting chiefly of the mineral kaolinite. Kaolin is used for fine pottery and porcelain. Its main use is as filler and coating material for paper. Ball clay contains kaolinite and certain micas, and has strong bonding properties. Ball clay is frequently used in making pottery; it is sometimes called potters clay. (Hammil and Gillespie 2010; Rowe 2012)

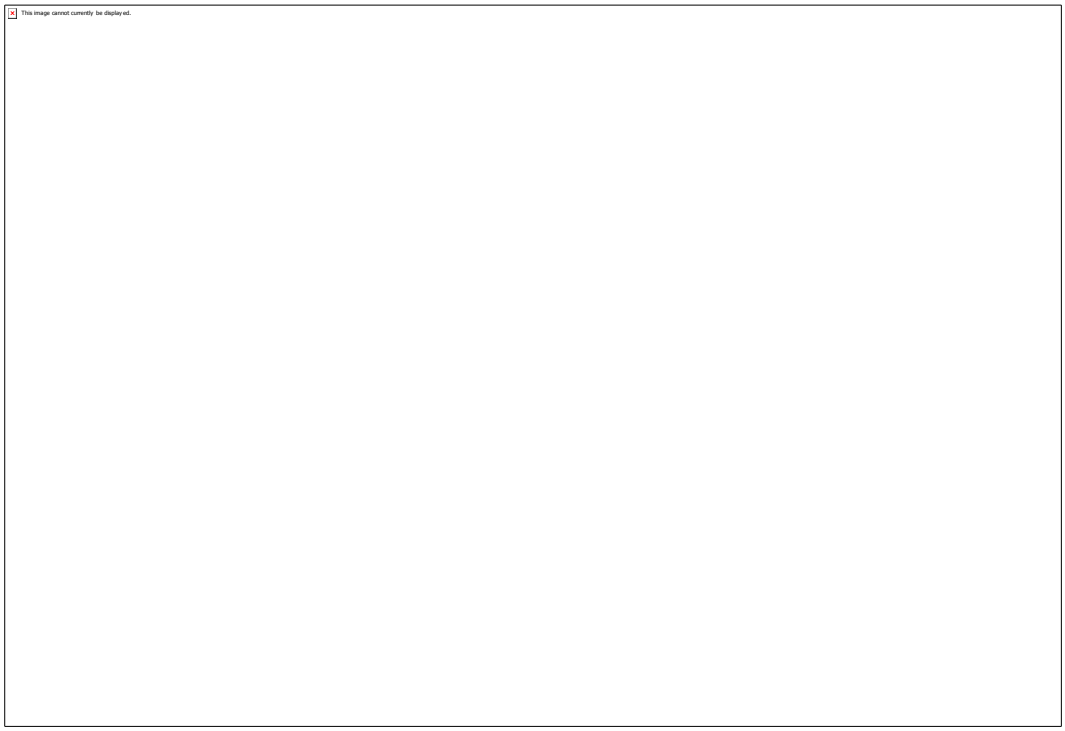


Plate II: Secondary and Primary Clay

Source: The big Book of Ceramics



Plate III: Kaolin

Source: The big Book of Ceramics

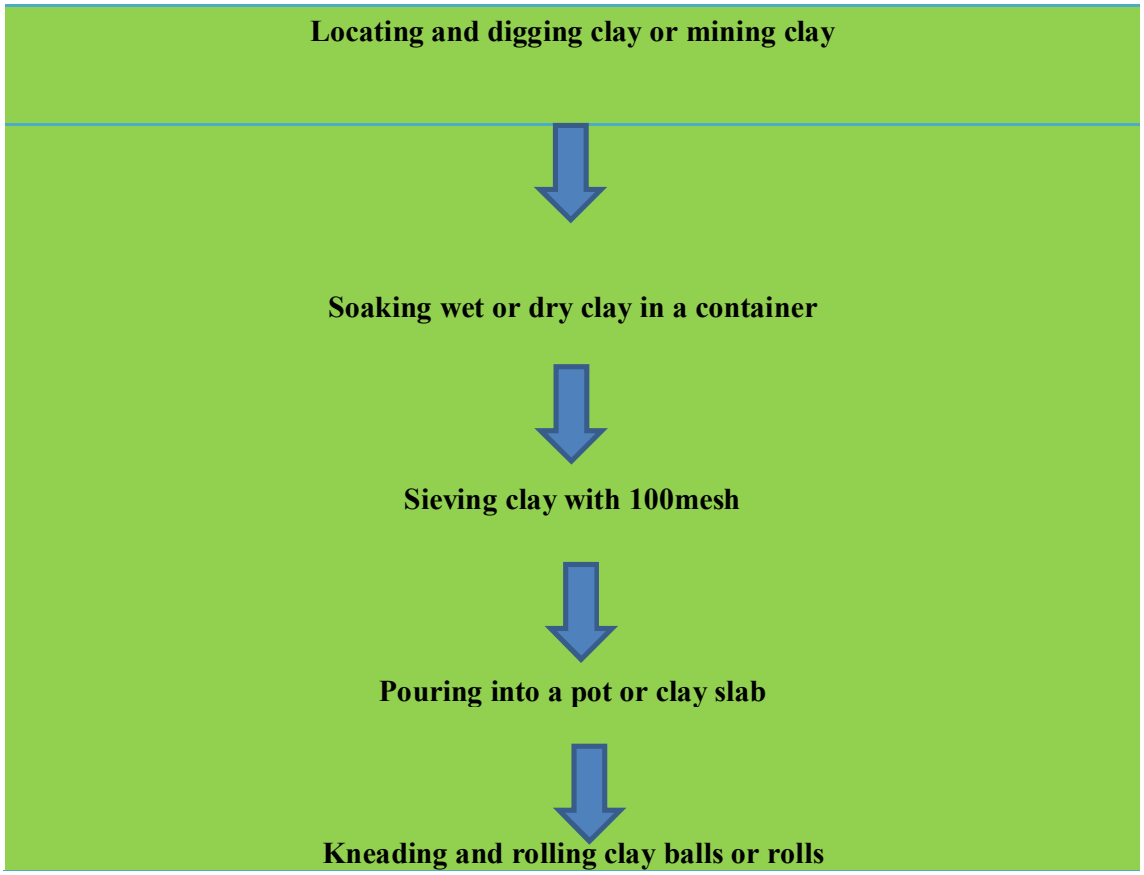


Fig. II: Flow chart of clay processing for clay bead-making



Plate IV (a): Sieving dry clay

Source: The big Book of Ceramics

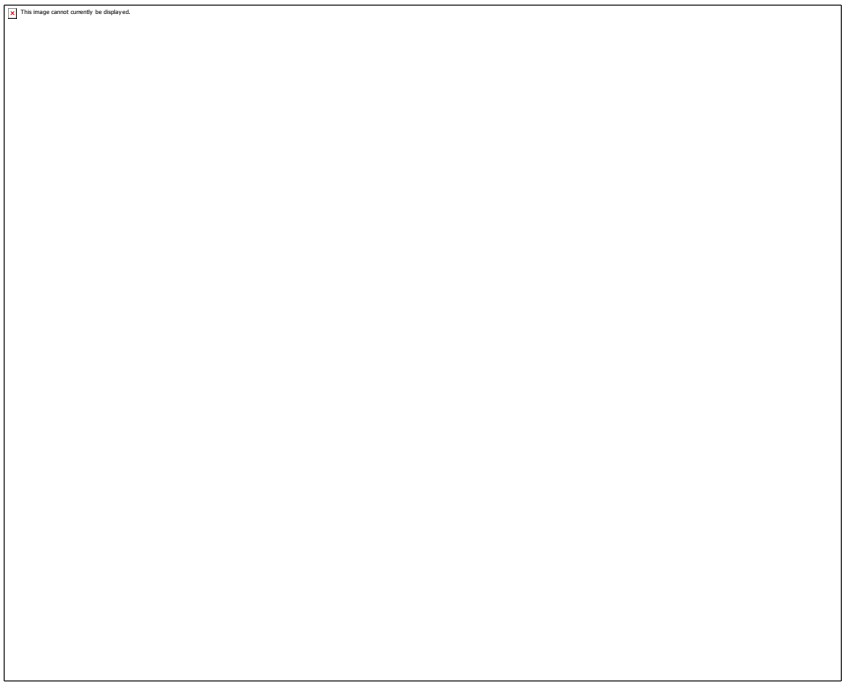


Plate IV (b): Weighing and soaking clay

Source: The big Book of Ceramics

Fire clays are basically kaolinite with some iron oxides, magnesia, and alkalis. It can resist high temperatures .It is mostly used for making firebricks, which is used to line furnaces, kilns and crucibles. Common clay contains more impurities than fire clays, and do not have as great resistance to heat. It is used for bricks, clay pipe, clay floor and wall tiles and other building materials.

Bentonite consists largely of montmorillonite. Some types that contain sodium swell when mixed with water. This used in moulds or casting metals and in materials called drilling muds that are used in drilling for petroleum. Bentonite expands when mixed with water; it is also used in engineering work to seal leaks.

Illite: The illite group is named for the state of Illinois. The best-known species of illite is glauconite, green mineral clay. It is typically found in clays of marine origin. Other colors include white and yellow. Illite: Any group of clay minerals having essentially the crystal structure of muscovite. Smectite: Smectite is characterized by its expandable properties. Unlike the other clays, only smectite can absorb toxins. This qualifies its structural uniqueness and sets it apart from all other clays. For this reason, smectite has become favourite clay for industrial and dietary use. The most familiar species of smectite is montmorillonite. It is the most preferred species of edible clay. The montmorillonite minerals occur in very small micron sized particles. They are extremely fine-grained and thin-layered, more than any of the other clay minerals.

The layers contain ions that are very loosely bound to one another and easily exchangeable. Not only will the toxins stick to its outside surface, but numerous elements and organic matter will enter the space between the layers. Montmorillonite is more complicated clay and has a higher exchange capacity than the simpler species of clay, such as kaolinite. Its ability to adsorb and absorb toxins is greater than that of the clays in the other groups.

Any given clay is usually a mixture of clay minerals, one or two minerals almost always being predominant. Clays are rarely found separately and are usually mixed not only with other clays but with microscopic crystals of quartz, mica, feldspar, and carbonates. Most clay contains montmorillonite to a greater or lesser degree. The available types of montmorillonite vary in colour, consistency, and shape.

The colour may be white, gray, or tan, with tints of yellow or green. Typically, montmorillonite will be included in a mixture of clay groups in any given material; all six groups will most likely contain particles of montmorillonite. Sources of montmorillonite include the United States, Italy, China and France. Surdivall, M. (1977).

2.9.3 Polymer Clay (non-natural clay)

Commonly known as polymer clay, White (2008) calls polymer 'Play dough.' polymer clay is not natural however, it is quite malleable like natural clay, it comes in rainbow of hues, metallic, and pearlescent colours. It can be used to make variety of jewelry pieces, and embellishment. Adult supervision is required when children work with polymer, adequate care and precaution should be given not to rub the eyes or ingest polymer while working.

In my opinion using natural clay, an indigenous alternative is safer for LD to use rather than polymer. Miller *et al* (2011) state that home oven could be used for baking polymer although this may mean cleaning with baking soda to ensure that the fumes released are thoroughly cleaned before using oven for food. Otherwise separate ovens are used. For storage, polymer should be wrapped in wax paper and stored in plastic containers. Beware that polymer reacts adversely to some plastics. Miller, Mcguire and Kato from http://www.youtube.ng/

2.9.4 Clay in Rehabilitation (ClayTherapy)

The research work of (Sherwood 2011; Paul White 2008, Tratnik 2009) were reviewed to see their various approaches to clay therapy, and to find the therapeutic benefits of using clay for healing trauma, anger, etc. Tratnik (2009) extensively debated why clay-therapy is effective in treating childhood trauma. He states that therapeutic play with children is an effective clinical intervention that has been successfully utilized by counsellors for many years. Various mediums of play therapy have been exercised ranging from free play to structured projects with great therapeutic success.

Clay therapy is one version of play therapy where clay (or Play Doh) is used as a therapeutic tool. Thousands of therapists who currently employ Clay therapy can attest to both the usefulness and the effectiveness of this new medium with children. Plate V illustrates exploded Anger. Clay imprints is a simple, fun activity that encourages muscle

strengthening in the fingers and hands and fine motor and visual perceptual skill development.

However, the question remains. Why does clay therapy work? Stated another way, what makes the addition of clay so effective as a therapeutic tool when working with children? To answer this question, existing social psychological research makes an effort to gain further insight regarding the power of clay with children. There are three steps to consider when working with children who have been abused, neglected, and or traumatized. The first step is to create and maintain a therapeutic relationship with the child.

Clay therapy is an extremely effective tool in gaining and therapeutic relationship with the child. Clay therapy is an extremely effective tool in gaining and maintaining the therapeutic relationship, which keeps the child engaged and actively participating in the clinical process.

The second step of Clay therapy is to generalize themes from clay therapy to the child's life by specifically addressing therapeutic issues of identified problems through the use of clay. White (2008), LCSW explains steps one and two in great detail in his book, Clay Therapy, A Manual of therapeutic applications of clay with children. The focus of our attention will be on the third and final directive of clay therapy, which is to engage the child in cognitive reframing and redirecting cognitive distortions and misattributions regarding their social environment. Clay therapy works for children in the process of cognitive reframing, attribution formation, and the impact of cognitive dissonance within the child

2.9.5 A forum for bonding

Tratnik (2010) States that acquired disabilities or those that are caused by injury or illness during life tend to affect the sufferer in a number of ways. These people are the most

likely to have anger issues, but fortunately, many can achieve some degree of rehabilitation in time. While the nature of these disabilities and their permanence varies, art can be beneficial in a variety of ways. Moulding clay can be used to strengthen weakened limbs, while painting can have a calming effect.

The intellectual aspects of art appreciation may also benefit patients by making them feel useful or knowledgeable. Art may also help with memory. For those with neurological disorders Children with autism can learn social skills through an art program that focuses on interaction, while children with spatial disorders can learn to do more accurately to interpret distance in a sculpting class. Dubin (2009) report that Psychiatrist Robert Bross, believes that touch, not sight is the primary sense for infants, he also suggests that passion for beads may be connected to the longing for the tactile pleasure associated with breast feeding and the nipple.



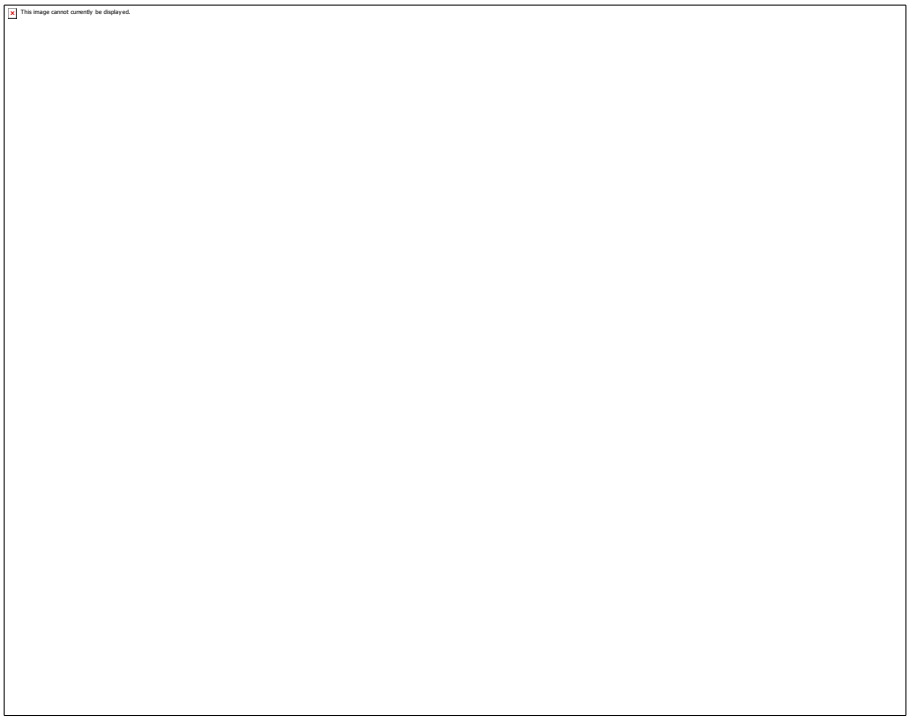


Plate V: Illustration of Exploded Anger

Source: The healing Art of Clay Therapy

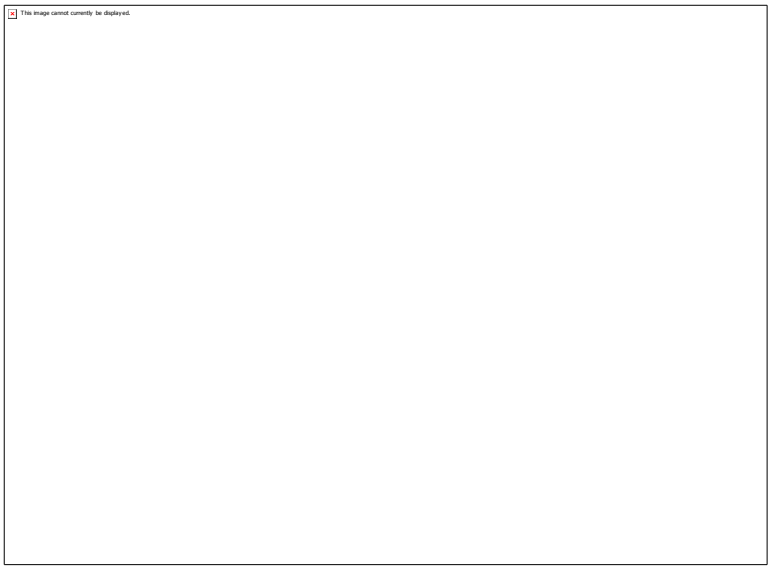


Plate VI (a): The Hand:

Source: The healing Art of Clay Therapy



PlateV (b): Family of origin sculpture

Source: The healing Art of Clay Therapy

2.9.6 Medicinal Potentials in Clay

The research work of Ran Knishinsky, Dr. Cohen, and David Wolfe, all confirm that clay is beneficial for healing allergies, hay fever, Anaemia, Hepatitis, Cirrhosis, Acne,

Eczema, Itching, Hives, Circulatory problems, Haemorrhoids, Arthritis, Rheumatism, Chronic Fatigue Syndrome, Gum Disease, Headaches, Syphilis and additional uses like water purification, algae control, soil regeneration, mildew control.

Clay is renowned to have many uses in promoting health in plants, animals and humans. Bentonite, Montmorillonite, Pascalite, as well as other types of healing clays, have been used by indigenous cultures before recorded history show that the use of volcanic ash clay internally go back to the Indians of the high Andes Mountains, tribes in Central Africa and the aborigines of Australia. Taken internally, it supports the digestive/intestinal system in the elimination of toxins. Therapeutic clays provide 100% natural detoxification for Arsenic, Dental Amalgam, Smoker's Drug, Copper and Lead, Mercury, Formaldehyde, radiation and more. (Knishinsky 2006 and, Raymond 1974)

2.9.6.1 Digestive disorders: Clay is noted to be of great benefit to any gastrointestinal disorder. It binds with and removes body toxins in the stomachs small intestine, and colon. Clay is recognized worldwide as a treatment for diarrhoea. In China, clay was used for many centuries as a cure for summer diarrhoea and cholera. In fact, as late as 1919, clay proved an invaluable medicine in the cholera epidemic that swept through China. During World War II, French soldiers ate clay to combat dysentery. Clay has also been used as an adsorptive in the symptomatic treatment of various forms of enteritis, including ulcerative colitis. Research has shown that Smectite clay has antiviral properties. Kaolin is the mineral clay in Kaopectate to relieve intestinal diarrhoea. http://www.shirleys-wellness-cafe.com/clay.htm

2.9.6.2 Constipation:

Clay produces desirable bulk in the intestinal tract, which in turn stimulates normal intestinal motions and contractions that help move food substances through the intestines. Therefore it can help protect against chronic constipation.

2.9.6.3 Clay Bath:

Specially formulated clay baths have shown to be able to literally pull pollutants out like a magnet, getting rid of years of toxic accumulation in just one bath. These clay baths have been scientifically proven to release toxic metals and chemicals from the body.

2.9.7 Educational benefits of Clay

According to Bradley, the most important educational challenge that children with learning disabilities face is reading (dyslexia), because a child that cannot read has very little chance of success in school. (Feizipoor 2005). “Dyslexia is characterized by the child’s inability to recognize words, slow and poor reading, low comprehension, with the absence of low IQ or significantly low intellect.

This disorder seems relatively common, runs in families, and is often accompanied by difficulty with writing, mathematics, or one of the communication disorders.” Feizipoor (2005) further reports that more than 25 percent of children’s failures in elementary school are due to reading disabilities. According to Bahamin (2003) in Feizipoor (2005) research findings in different countries, show that the prevalence of dyslexia is between two percent and twenty five percent.

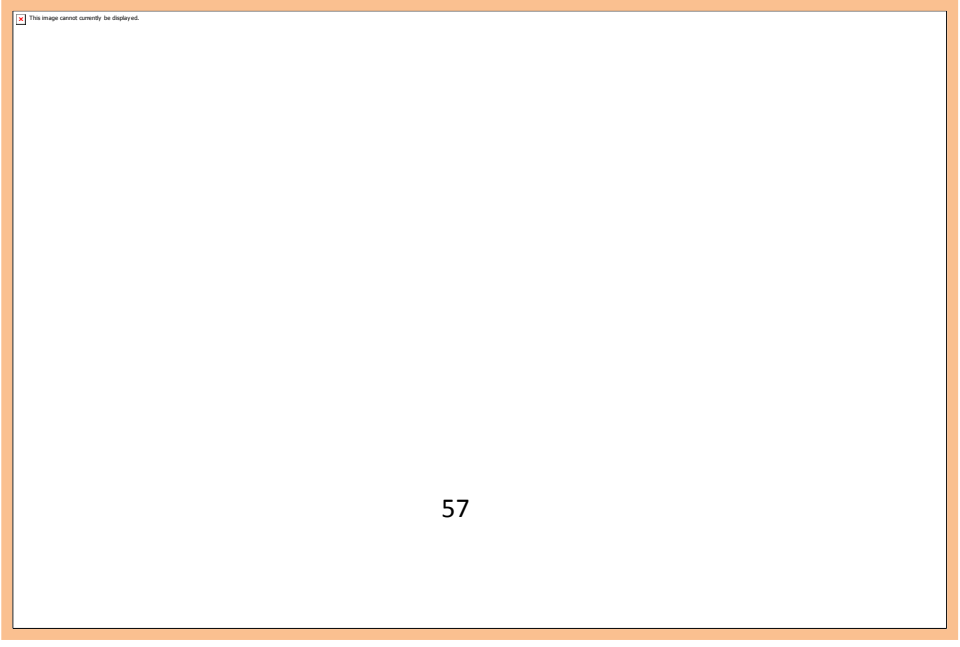


Plate VII (a): Edible Clay

Source: Photo by Esther Dokyoung in Samaru Market, Zaria 2011



Plate VII (b): Clay Bath
Source: http://www.claybath.au

A research conducted by Feizipoor (2005) on the effectiveness of Davis Dyslexia Correction Method (DDCM) in improving reading skills in Iran involved four dyslexic fourth graders who were matched on intelligence, dyslexia problems, parents' level of education, and family's socio-economic status, the selected students were at the "Orumieh Special Learning Disabilities Center", two were randomly selected to form the experimental group

and receive reading instructions for three months using the ODCM (orientation counseling and symbol mastery).

The other two continued learning with the method customarily used at the Center. Pre- and post- tests in reading were given to both groups. Results show a significant improvement in the reading skills of the experimental group.

The Davis method has two stages:

1. Orientation counseling, which carries the same connotation as what teachers and psychologists know as "concentration". In this stage, this usually takes about five days, by focusing and increasing his ability to control his attention span, the student can avoid the sense of disorientation when faced with tasks that require working with symbols (reading, writing, mathematics, etc.) The main exercises in this state are carried out by mental imagery.

2. Symbol Mastery, which is a method in which the student uses clay to make the letters of the alphabet, and punctuation marks (question mark, exclamation mark, period, etc.) to make abstract words and creates a model to put meaning on these words and practice with them. The philosophy behind this stage is that the student can create a three dimensional image of the word that is incomprehensible to him. This way, the student initially makes the shape and pattern of the word using clay, and then he creates a mental picture of the meaning of the word, and he turns that picture into three dimensional, visual image using clay.

After the student becomes aware of the word and its meaning, he pronounces the word aloud and uses it in different sentences. This way, the dyslexic individual obtains the ability to understand the meaning of the word in both verbal and non-verbal forms. Davis (2002)

2.9.8 The Benefits of Clay-beading for Improving Cognition, Manual Dexterity, and

Social Integration. Hemphill *et al* (1991) state that the neuro- motor, cognitive, psychological, and social skill areas are the performance components or stepping stones required for independent living skill acquisition. They further opine that Cognition components allow for the decision-making and problem solving needed to successfully engage in daily living, as identified by Allen (1985) (1988) in Tubbs (2007). Table 2.7 below designed by Dunn & Mcgourty (1989) identifies areas of cognitive functioning

Table 2.5: Cognitive Integration and Cognitive Components

Level of Arousal	Memory	Sequencing
Orientation	Synthesis of Learning	Categorization
Recognition		Concept formation
Attention		Problem solving
Integration of learning		Generalization of learning

Source: Rehabilitation in Mental Health: Goals and Objectives for Independent Living

Furthermore, the sensory integration model usually incorporates play, by providing the child choices to increase motivation, a sense of control, and use of imagination Kielhofner (2004) in Tubbs *et al* (2007)

Arts and crafts that require some degree of physical dexterity to assist those with physical disabilities gain a greater degree of motor skills. Beading using a thick plastic cord

and large pony beads can help the disabled person learn to use their hands together or as a sequence of movements. Moulding clay can be wonderful at helping those who have weak fingers, wrists and arm muscles or problems with grip. It is best to start with a soft clay and move up to denser or stiffer clay, so that the patient can gain strength over time.

Tubbs *et al* (2007) substantiates evidence of interventions using clay work or bead work respectively by occupational therapists to treat brain injuries, neck and back extension, and many other physical injuries, in fact, personal testimonies and anecdotal evidence of practitioners also point out the multiple benefits of these creative interventions, all relevant to rehabilitation. The assessments and craft components chart by Tubbs et al show ceramics and cooking having the highest areas, because several occupational therapy assessment used over the years use clay work or Ceramics.

Clay work is part of the complete evaluation chosen for Nelson Clark's clay test, the Azima, Carolyn Owens activity, Diagnostic test, Gillette, Goodman, Gross Activity, O'Kane Diagnostics and Shoemyen Battery. The child will normally smear, feel, squeeze clay, shape and mould Harris (1963) O'Kane (1968) mentioned by Tubbs *et al*. Clay is also viewed and accepted as most unstructured of all projective assessment because of the efforts needed to control it, it is also quite useful for large groups.

Its plastics nature allows a patient or child to make a mistake and correct it immediately. Clay can achieve any wrist, hand or finger movement desired. Rolling clay uses the abdominals, elbows extensors and flexors. Fine motor control and coordination can be enhanced by scoring the clay in slabs or coil building or applying surface design such as sgraffito or painting with under-glazes.

Clay is also suited for the blind or partially sighted due to its tactile qualities. Ceramics and other crafts like needlework and dramatic arts are said to be a bridge to, and or

components of day-to- day living experience. Hagerdorn (2001) reported that clay has a huge significance in the field of rehabilitation, which benefits humanity and in particular children ranging from those with neurological disorders or acquired disabilities.

In practice no occupational therapy model, based on its belief on human activity will exclude crafts and indeed bead-making. Occupational therapy has long used beads stringing as a bilateral fine motor task. Beading activities have been associated with children, materials for use must be those indicated as safe for use by children, some children or hostile children can use them as weapons. Many of such materials are inexpensive and can be assessed easily within the community. Tubbs *et al* (2007).

Perhaps one of the disadvantages of beadwork is the cost or expense in therapy as indicated by Tubbs *et al* (2007) Therefore, the use of clay beads can serve as alternative cheaper source, this then makes ‘ the clay for play model’, a vital resource that many schools, homes, occupational centres and hospitals can use. Even though Bead work is not specifically listed on interest checklists, the fact remains that ceramics topping the list makes a case for its use. Tubbs (2007) mentions shaping pots, beads, and jewellery as key components of ceramics in therapy.

2.10 BEAD WORK OR BEAD-MAKING

Bead work or bead making is the craft of making things with beads, Beads can be woven together with specialized thread, strung onto thread or wire, or adhered to a surface e.g. using fabric, clay, glue, paint etc. Bead-making or Beadwork was found in the tombs of Ur, from approximately 2500 B.C., Egyptian ruins reveal evidence of decorative bead use as well. Drawn glass beads developed 200 B.C.E were of uniform size and shape and due to their limited availability came to be used as currency. Beadwork has been around for

thousands of years. The netting technique or gourd stich was developed around 500 B.C.E. Tubbs *et al* (1999)

In her book' The Worldwide History of Beads' Dubin (2009) states that Beads are probably the first durable ornaments humans possessed. In tribal cultures, certain beads are worn from birth till death, and they are buried with their owners, the relationship they had to their owners is reflected in the fact that beads were symbols of afterlife. The various uses of beads cannot be sufficiently discussed in this project, however, their uses range from wearability, either as jewellery, or incorporated to objects

2.10.1 Beads

A bead is defined as a small, decorative object that is pierced for threading or stringing. Dubin (2009) says they are small, colourful, symmetrical, and often quite beautiful; they are quite standardized, inexpensive units that can be arranged with devise configurations. Beads range in size from under a millimetre to over a centimetre or sometimes several centimetres in diameter. Glass, plastic and stone are probably the most common materials, but beads are also made from bone, horn, ivory, metal, shell, pearl, coral, gemstones, polymer clay, metal, clay, resin, synthetic minerals, wood, ceramic, fibre, paper and seeds. Pair of beads made from Skull Cave beads that are approximately 108,000 years old, discovered from the Skull Cave on Mount Carmel are thought to be the first known examples of jewellery Randall (2007).

2.10.2 The Importance of Beads

The rich culture, diverse traditions and skills of Africa have long been a source of inspiration for the International Fashion Industry. Bead making in the International market is under ethical fashion, a US 1.4 billion industry; this encompasses all fashion accessories, jewelleries and footwear items produced in a socially and environmentally responsible way.

With a new emerging market of younger consumers (aged 25 – 45) enthusiastically buying high value ethical fashion, this has expanded, underscored by a rapid increase in high value, high quality beads on http://www.etsy.com/shop/BeadsofClay especially African Beads have gained tremendous approval from the West.

Bead work has helped in curbing unemployment, providing psychological healing to many women and youth globally. Bead work, indeed bead work is a vehicle for displaying our rich cultural heritage. Threading beads to make a necklace may activate multiple pathways to stored, perceptual and cognitive information because of its association with certain sensory, stimuli, past memories and experiences and visualisation of the end product. Tubbs *et al (*2007)

2.10.3 Products Made from Beads

1.	Beaded embroidery	v	Jewelry	ix	Beaded curtains
2.	Lamp shade	vi	Beaded baskets	x	Centre piece
3.	Wrist bands	vii	Door chimes	xi	Waist beads, belts
4.	Purses, bags, key rings sculptures.	viii	`Beaded chairs	xii	Bead paintings and

2.10.4 The Benefits of Bead Making

Physical: Adornment, embellishment, worn to signify age grade, marital status and status in society, symbolizing female fertility, prestige. Dubin (2009) states that as cultures grew more complex throughout the middle and South America, the need to identify rank and social position increased.

Social benefits: Bead making is a major source of both therapy for boredom, anxiety and occupational therapy: Beads distinguished ordinary men from royalty or rulers.

Material benefits: Assets, precious stones are stored as assets. The bead industry is a large industry, providing employment, and bridging several countries together with the rest of the world, opportunities to partner and with improved live hoods and poverty reduction and Access to capacity building and potentials.

Considering the great immense benefits bead making provides; in fact bead making has provided several Asian and East African countries deep seated sustainable development. Bead Making is beneficial for Income Generation. Dokyoung (2008) at a workshop in Jos said that 'Nigeria, indeed Plateau should harness its rich soil, plant and natural deposits for bead making. Clay beads can be exported from plateau to the rest of the world'.

Financial benefit: Well-designed beads sell anywhere in the world Africans crave for China beads and many Europeans rush for African beads, so the market is enormous. Criss cross beads are popular. Many people today buy beads made by vulnerable groups e.g. persons living with HIV, depression, terminal sicknesses to help provide care. Africa inspires, for example has linked several African producers of ethical fashion.

Spiritual benefits: Rosary and prayer beads useful for religions activities.

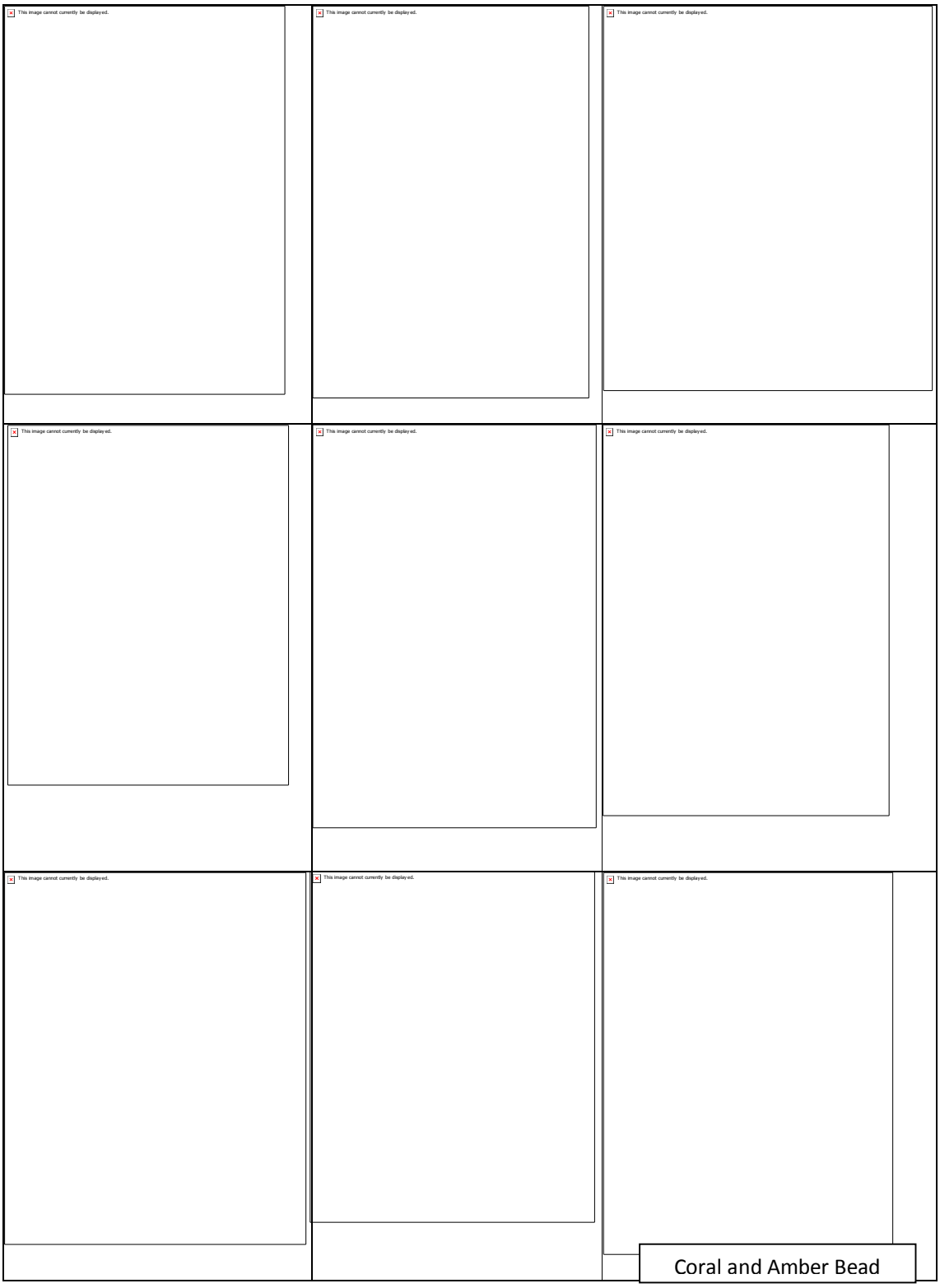
Environmental: Beautification of homes and offices with ornaments, bead curtains and chimes enhance security and give alerts of incoming persons.

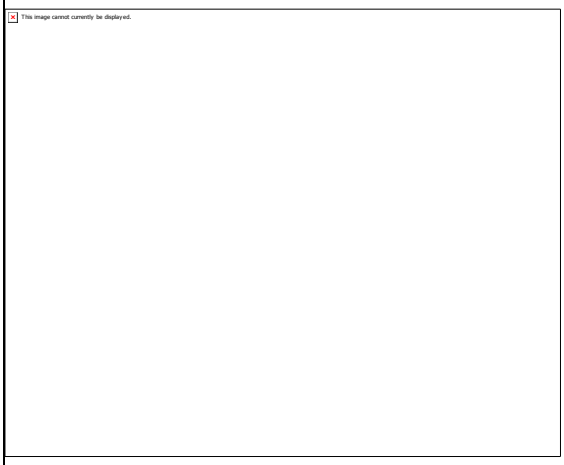
2.10.5 History of clay or ceramic beads

Ceramic beads come in a variety of shapes, from the very basic solid coloured Indian pony and solid coloured Greek disk, to the ornately hand painted and animal shaped beads of Peru. Many of the popular alphabet beads used in Mother's bracelets are made of ceramic. Some clay beads are glazed, others are not, with ethnic looking hand painted ceramic beads. In the early civilization of Mexico, Guatemala, (AD1-900) the craftsmen

made elaborate beads, ceramic figurines, painted scenes on pottery, and limestone carvings show Mayan beads. The technology of glass bead-making is among the oldest human arts, dating back 3,000 years Dubin (1987). Glass beads have been dated back to roman times.

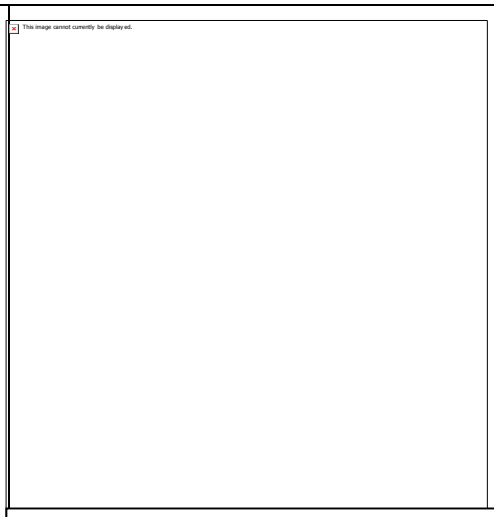
Perhaps the earliest glass-like beads were Egyptian faience beads, a form of clay bead with a self- forming vitreous coating. Sandra Paluzzi‘ The Bead Peddler’ said that Clay beads go back centuries, to at least 1000 BC. She said that the Indians standing on the banks of the Ganghes River scoop up the clay for their production.


Coral and Amber Bead

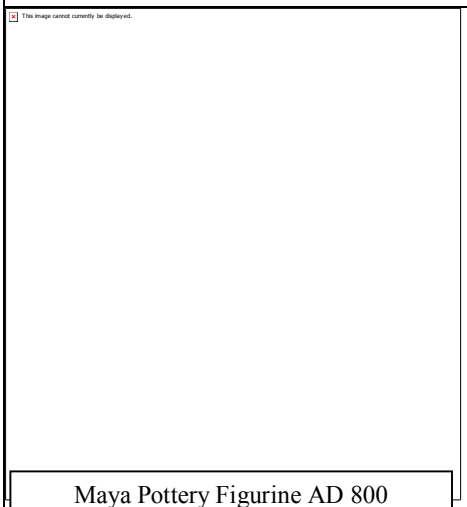


Ceramics Beads

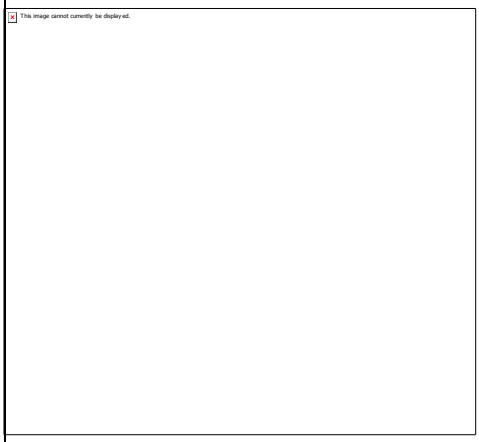
Source: www.beadingtimes .com\jim-carmen.jpg



Igbo-Ukwu, Nigeria



Maya Pottery Figurine AD 800



Igbo-Ukwu, Nigeria

Source: www.africadirect.org

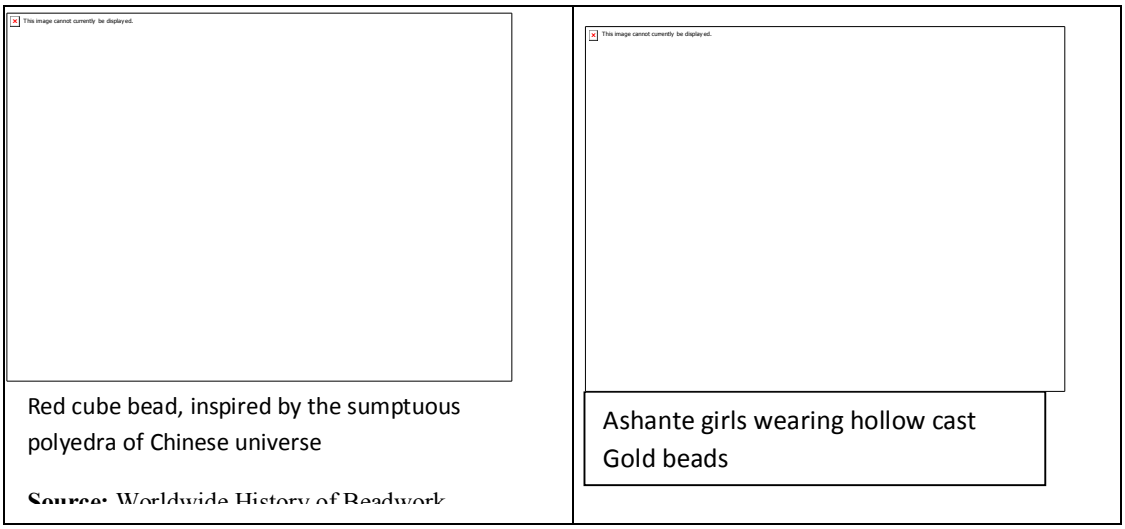


Plate IX: Different types of Beads
Source: Worldwide History of Beads

Clay was abundant and was the province of the poor. While the wealthy Europeans of the late Roman Empire wore precious stones and metals, the migratory tribal people adorned themselves with clay. Clay beads were produced simultaneously all over the world, including the Philippines, Thailand and Peru. To this day, Peru, China, Thailand, Greece and India produce a great many ceramic beads.

Traditionally, clay beads have been used in Muslim prayer strands and Thai amulets as well as in jewellery. Ceramic beads were the New Orleans Mardi Gras beads of the 1920s. Ceramic beads again became popular in the 'hippie days' of the 60s and 70s when people wanted an earthy feel to their beads. At that time, many American artists produced beads made of ceramic. When clay beads were introduced into the United States by the first European settlers, the clay beads were very popular with the Native Americans.

Clay beads have large holes that could accommodate leather thongs so they were used as decoration on horse reins. Some nations so prize their clay bead heritage that they protect the simple bead from export. For example, Guatemala has restricted the export of their Mayan ceramic beads. Paluzzi (2010)http://www.meetup.com/Baltimore-entrepreneurs/members/1298251/

CHAPTER THREE

METHODOLOGY

3.1 INTRODUCTION

The research methodology is a descriptive developmental study design. Cross-sectional method is used. The study designed and developed the 'Clay for Play Model' and tested the 'Clay for Play Manual' on children with learning disabilities. This chapter systematically enumerates procedures, materials and components on the 'Clay for Play Model' an indigenous instructional manual which when adopted in schools in Nigeria will be for the Individualized Education Program and community based rehabilitation

The review of literature clearly shows the benefits of clay-bead making for the child with learning disabilities and how it relates to improvement in school especially the development of fine motor skills which is a prerequisite to achieve learning objectives.

3.2 POPULATION OF THE STUDY

The population of the study is comprised of children with learning disabilities from three (3) special schools in Plateau State. Who either have dyslexia, Aphasia, dyscalculia, and or autism, cerebral palsy and mental retardation and other developmental disabilities. Up-to-date statistical data of the total population of LD in Plateau State was not available; this may be due to the ratification of the inclusive system of special education which encourages all special children to be schooled along with other learners, therefore, the researcher assumes there may be many children with LD in regular primary schools in Plateau state.

Data obtained from the Ministry of Education only covered children with LD from special schools registered with the Ministry of Education; totaling (568). Five hundred and sixty eight children

Table 3.1 Census of Special Education in Plateau State July 2009

S/no	Name of School	Location	Level	Total No. of children
1	Plateau School for the Deaf	Bassa LGA	SS1-3	93
2	Cocin School for the Blind	Gindiri	Primary 1-6	70
3	School for the Physically Handicapped	Mangu	Primary 1-6	210
4	Model Teaching Centre, Abattoir, Special Education Unit, University of Jos	Jos	Nursery, Prim 1-2 Hearing Handicapped Nursery1-2, Prim1-6	19 36
5	Ganaka International School for Special Education	Jos	Level not indicated Hearing, physical and visually handicapped	8 46
6	St. Jalaths School Bukuru (special section) inclusive system	Bukuru	Primary 1-6	10
7	Open Doors Special Education Centre	Jos	Early intervention CP, MR, Autism	76

Source: Plateau State Ministry of Education



Plate X (a): Cross-section of children from MTC. Photograph by the researcher

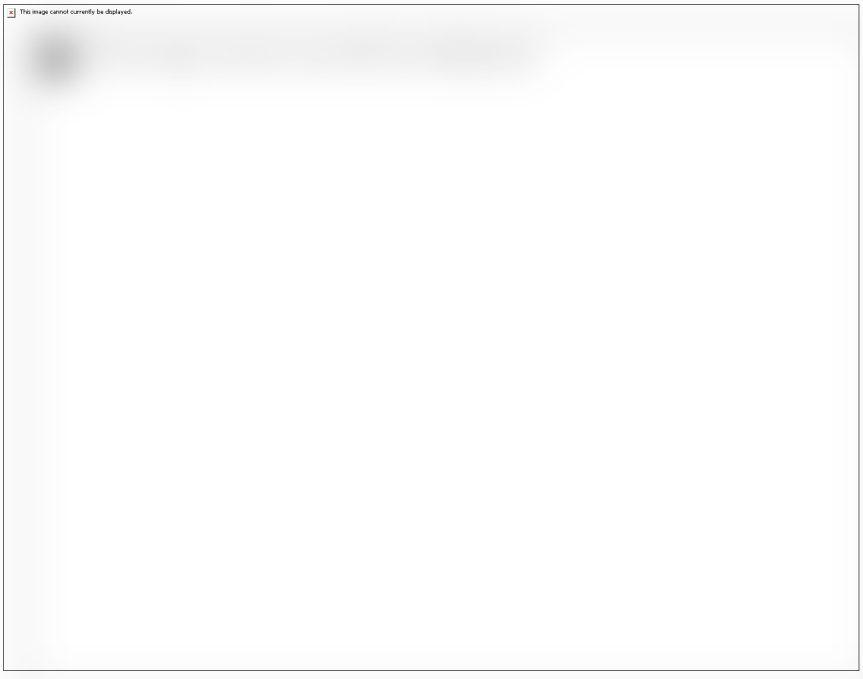


Plate X (b): Cross-section of children from Othniel Special School

Table 3.2 Names of selected Schools and the sample

Special School for LD	Model Teaching Centre	Othniel School	Open Doors
Type of School	Government Owned	Privately Owned Inclusive system	NGO
Number of LD	11	15	76
Sample size per School	3	2	4

Source: Clay for Play research 2011

3.3 SAMPLE

The sample comprised of (9) nine children with LD from three special schools.

(1) Open Doors Special Education Centre, Liberty Boulevard Jos, (2) Model Teaching Centre, (MTC) Department of Special Education, Special Education Unit, University of Jos, Abattoir offer special education services to children with special needs only. While (3) Othniel Special School, Utan Lane, Jos, runs an inclusive system of special education. A total of nine (9) subjects were considered an adequate sample for the purpose of this investigation and a total of nine (9) respondents (parents) and (20) stakeholders also participated in the appraisal of the Clay for Play manual

3.3.1 Sampling Techniques

Purposive sampling was utilized for the selection of schools and sample for the study, because the children were sampled based on a strict criteria i.e. they had to be trainable, with mild developmental disabilities. The study sought to engage LD from all school categories as such, one government, private and Non-Governmental Organization were selected. According to Abdullahi (2010) quoting Given (2008) “Purposive sampling is one of the most suitable sampling techniques, when it comes to evaluation research; as it identifies ‘who the major stakeholders (that) are involved in designing, giving, receiving or administering the program or service being evaluated”.

Four (4) children were selected from Open Doors, three children from MTC and two from Othniel totalling nine children. In Open Doors random sampling was used for the selection because several fitted the criteria, however three children were used for the space of the second CP, because the first two were not consistent in school attendance, the Autistic child who was to fill the third space in Othniel school could not be selected as he was not trainable.

100 % of the subjects had dyslexia, dyscalculia (mathematical difficulties), poor motor control, short attention span, distractibility, and behaviour problems. The sample were homogeneously mixed and categorized into three groups according to their developmental disabilities; CP, Autistic and Mental Retardation group. The proprietors of Open Doors, a professor of Special Education, an expert on intellectual disabilities, with the other two proprietors who both have master's degree in Special Education with specialty in LD selected the sample based on their identification assessment of LD in their schools.

3.4 INSTRUMENTATION (TOOLS FOR DATA GATHERING)

Three (3) instruments were used for this study; interview, observation and questionnaire. Interview and observation were utilized to test for interest and achievement and to elicit information from subjects. Observation was the main instrument used to assess the children, due to the dyslexic and auditory disabilities of some of the children their parents were interviewed representing their wards. AOTA structured questionnaire was used for the appraisal of the Clay for Play manual by 20 professionals in the field of Ceramics, Special Education, Psychiatry/Medicine, Psychology, and Education.

3.4.1 Validation of Instruments

The instruments were adopted and certified as suitable by professional special educationalists and psychiatrists in Jos University Teaching Hospital i.e. those who understand mental health condition of children with LD and their coping abilities in learning.

The validation of instrument was established by applying content sampling procedure of the AOTA activity analysis basic form on a proportional basis. The reliability of instrument was determined through the use of percentages.

3.5 DATA ANALYSIS

Data was analysed using descriptive and percentage methods, both methods have been suggested and employed in previous research work and the outcome have been found successful.

3.6 RESEARCH DESIGN

In other to achieve the desired objectives of this descriptive developmental study design, the following listed procedures were undertaken to facilitate the research design. The study was divided into three parts namely

1. Design and development of the Clay for Play Model and Clay for Play Manual
2. Field Work : This involved testing the education/rehabilitation components of the manual
3. Appraisal: assessment of the Clay for Play Manual

3.6.1 Preliminary Investigations

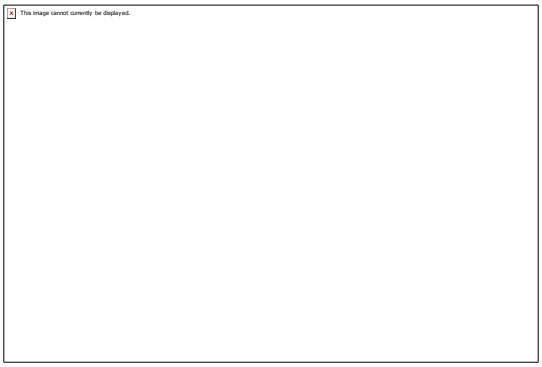
To acquire more knowledge on learning disabilities the researcher had to build her capacity through conferences attendance, consultations and mentorship by notable scholars in the field of LD both on a one –on – one basis, field visits to schools, through the internet and study of literature

3.6.2 Pilot Study:

A Child Study was undertaken on Emmanuel Goteng. Although the researcher has worked with special children for over ten years with particular focus on children with LD through her development efforts in 'the Art ability in Disability Project of Helping Hands for Women and Youth Support, Jos. The need to understudy the population also required that the researcher registered for Developmental Psychology course in the faculty of Education, Ahmadu Bello University Zaria.

3.6.3 Production of Sample Clay-beads

The researcher produced sample clay beads for the clay mathematical game, some of the beads where produced in Jos, Karshi- Abuja and Zaria. The beads were bon fired in Karshi-Abuja, and then some of the beads were fired to bisque and gloss temperature without any glazes on them in Zaria.



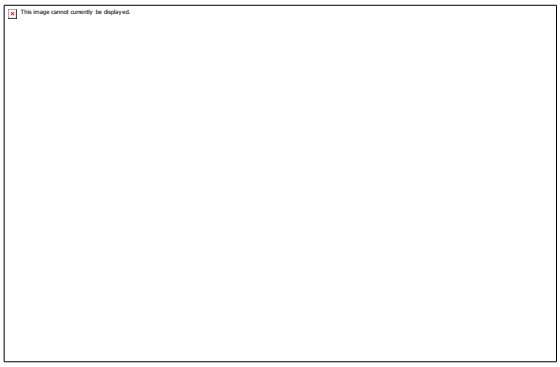


Plate XI (a): The Researcher at the 4th International Conference on Community-Based Rehabilitation. Abuja, Nigeria November 2011.

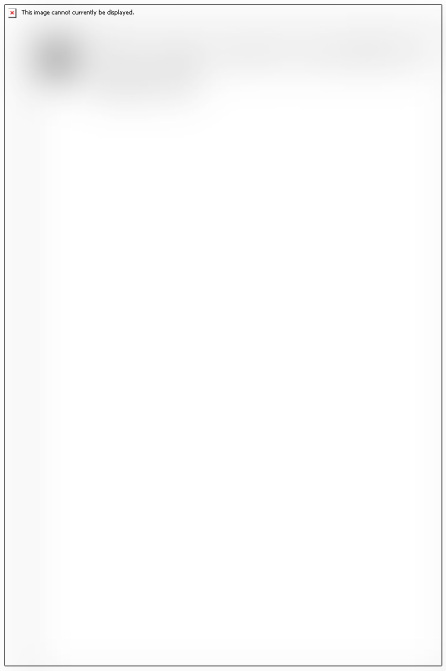


Plate XI (b): Emmanuel drawing in Class

Source: Photo by the Researcher 2011



Plate XII: Sample clay beads

Source: Clay for Play field work, Photograph by the researcher 2011

3.7 THE DEVELOPMENT OF THE 'CLAY FOR PLAY MODEL'

Clay for Play Model' Design is aimed at developing an indigenous Ceramics Instructional manual. First of all, the Egg Model of project management and Addie Model were reviewed, studied closely; several sketches were made. The researcher came up with a hunch, to design the model based on the four areas of child development domains namely cognitive, social, emotional, motor and language development. Also based on literature the researcher strongly believes if the fine motor skills of these children are developed then academic, social and learning difficulty invention will be achieved.

Motor Development → Academic→ Social Development →Learning Difficulty Invention

The "Clay for Play Model" is a capacity building process in which the principles of play are applied for the rehabilitation and education of children with LD. It focuses on the usefulness of clay as a veritable tool and a non-chemical intervention of learning disabilities for enhancing reading, writing, and Arithmetic, sensory and visual-perceptual skills, exposing children to their environment by enabling them to interact socially through individual and collective play irrespective of their disabilities, culture, class, environment and educational level.

Motor development: Fine motor and gross skills are enhanced through wedging or kneading clay, it involves the use of two hands manipulative process, the real work is done by the weight of the torso and the shoulders. So the surface upon which the work is carried out should be about thigh height. While the rolling or manipulating clay can strengthen the hands, fingers and wrists

Academic component Reading, Writing and Arithmetic (3Rs): This is through formation or moulding of alphabets, clay balls useful for learning to count and doing addition and subtraction. Vocational

component: Visual and Sensory- perceptual skills can be enhanced through tactile experience; the soft and sensory qualities of clay can aid eye-hand coordination and helps the child's imagination

Social component: social Interaction with peers during first stage of play enforces self-management and communication through cooperative play. When functional products are finished e.g. key-rings, jewelry, etc. children will see themselves as capable of engaging in a purposeful activity which is likely to develop self-esteem.

Cultural or indigenous community recreation and leisure through environmental exploration by digging out clay from a location not too far from the school can be a rewarding experience or positive reinforcement from the parents/care givers to the child. A child's interaction with the environment through exploration offers a critical opportunity for a child to know and learn more about his community.

Cognitive and behaviour component: Learning difficulty intervention. The child's support team, in consideration of the child's needs develop an Individual Education Plan (IEP). This is aimed at improving cognition, working with clay is a calming activity, and LD can work out their stress or release stress by squeezing clay. Ultimately, play with clay can be therapeutic.

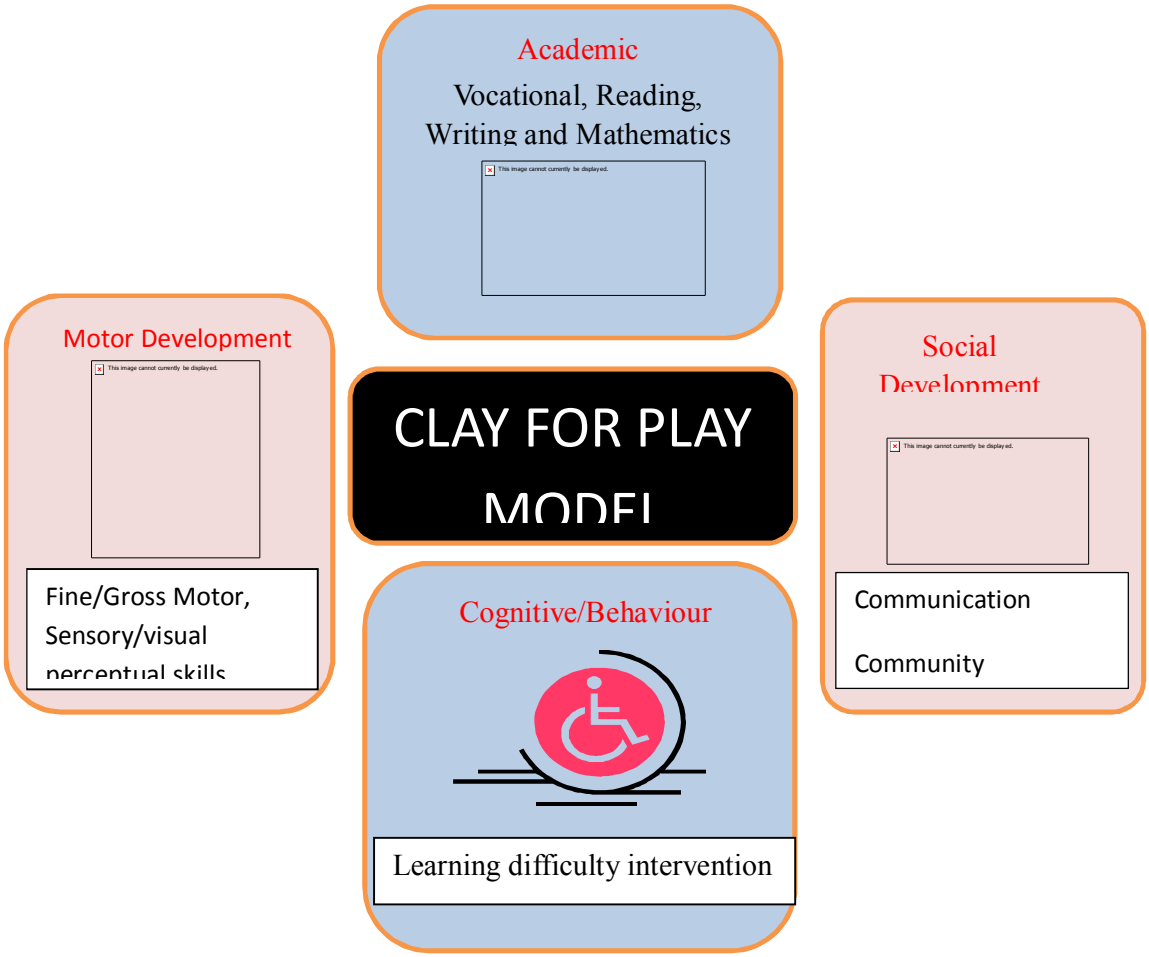


Plate XIII: Components of the 'Clay for Play Model' Developed and Designed by the Researcher 2011

3.7.1 The Design Procedure of the Clay for Play Manual

This study focused specifically on fine motor development; therefore several exercises and ways of playing with clay were developed and designed in accordance to basic ways of clay sourcing, preparation, and clay play. While the second component confused on the cognitive or academic aspects, the researcher developed the clay mathematical game, using designed and fired clay beads made by the researcher for the clay for play manual as an intervention for the Mathematical and reading discrepancies of subjects.

3.8 CLAY FOR PLAY VIDEO SHOW

The first step taken was to test the interest and or ability of the subjects on the "Clay for Play" six minutes video, in order to verify if the soft copy of the manual was of any relevance to their learning. The Clay for Play video was shown to the subjects twice; the first video was shown outside the school environment at Endless Options Office, number 13 Murtala Mohammed Way, Jos. The venue is similar to home environment to allow free play.

3.8.1 The Second Clay for Play Video Show

The second exposure took place at Open Doors Special Education Centre, to find out if the interest exhibited the previous week was sustainable, and to also test the manual expression of the subjects.

3.8.2 Introduction of the 'Clay for Play Manual'

A full coloured twenty seven paged manual useful for teachers, parents and other care givers of children with learning disabilities was child tailored. The twenty seven paged hard copy of the 'Clay for Play manual' was introduced to the nine subjects, three teachers and one parent. Due to distractions and lack of attention observed, while teaching with the manual, the

researcher had to immediately switch to showing the pictures on the manual and demonstrating at the same time.

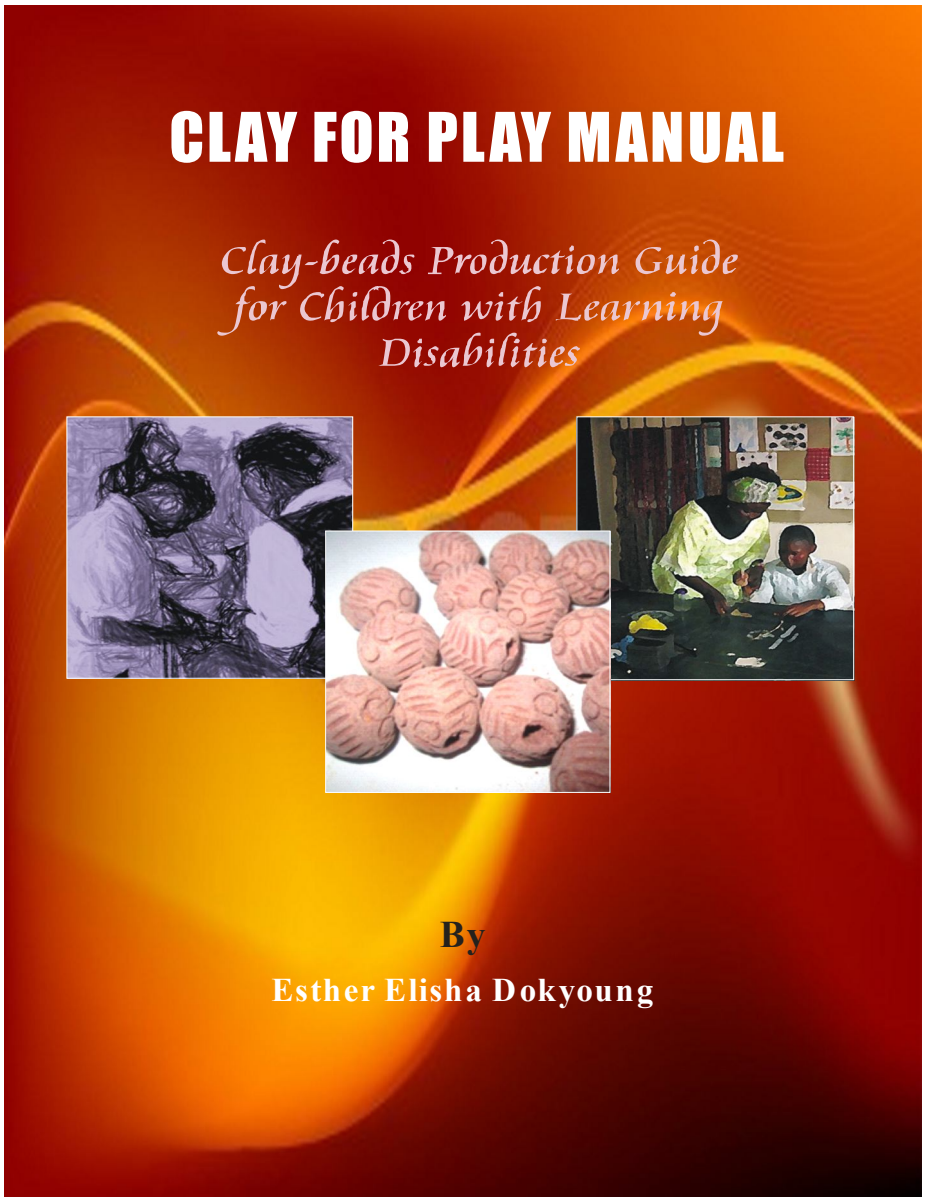
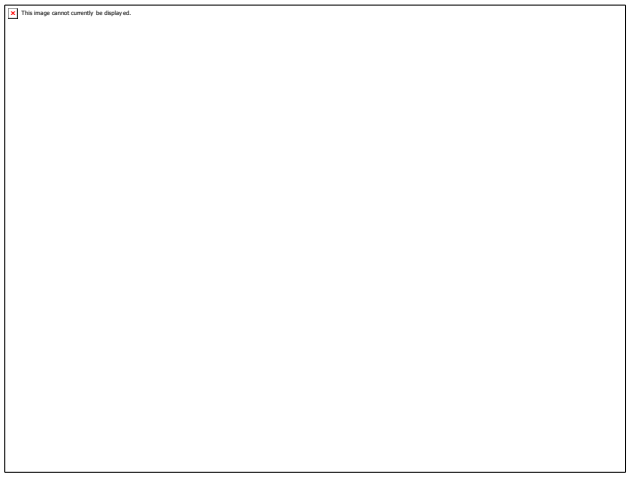


Plate XIV: Cover page of the Clay for Play Manual



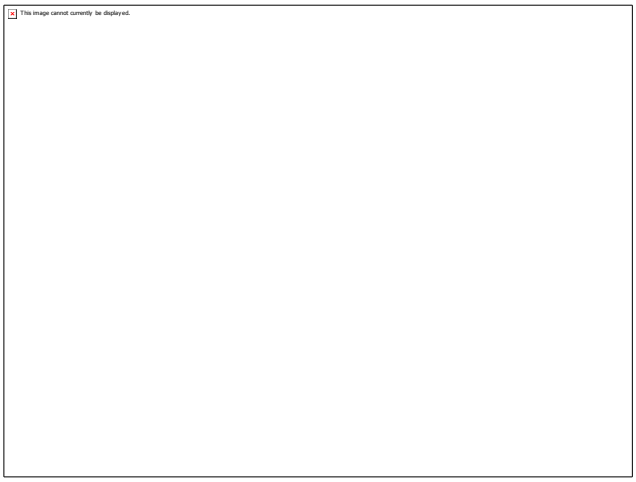


Plate XV: (a) Watching the first Clay for Play video and testing for manual expression

Source: Clay for Play field work Photograph by Maranatha Dokyoung

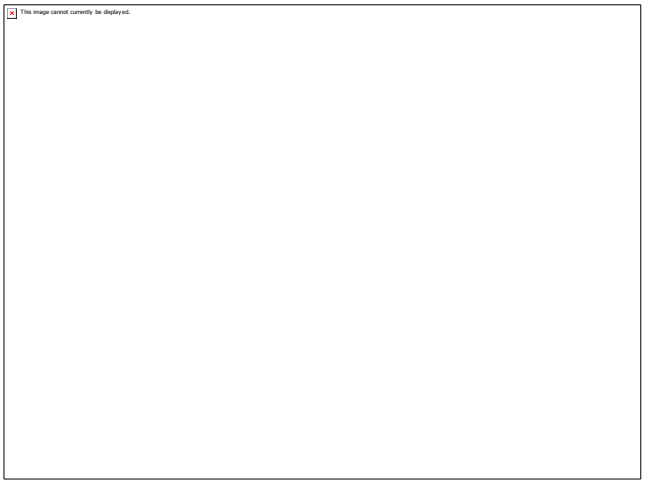


Plate XV :(b) The second Clay for Play video show



Plate XVI: (a) Introduction of the 'Clay for Play manual'



Plate XVI :(b) Testing the Clay Mathematical Game

3.9 CLAY MATHEMATICAL GAME

The researcher also introduced the Clay Mathematical Game to the subjects although they did not understand and lost concentration, so she wrote a simple mathematics class work which was administered to all of them. Ten sample clay-beads were each given to the nine subjects in a transparent container for the Clay Mathematical Game.

3.9.1 Demonstration

After the video show, the researcher demonstrated the various processes of making clay beads to the children for just five minutes to sustain their attention she immediately moved from rolling, squeezing to moulding clay alphabets . Sample clay beads were produced by most of the subjects.

3.9.2 Rolling Round Clay-balls

The researcher demonstrated, rolling circular clay balls with two hands while the subjects responded by spontaneous imitation, all subjects attempted without any instructions.

3.10 APPRAISAL OF THE CLAY FOR PLAY MANUAL

Form 3 - 1. Activity Analysis – Basic Form, adapted from AOTA, 2002: Drake 1999; Hesch et al; 2005. Occupational therapists for over fifty (50) have used checklists for basic mental function. The AOTA check list was developed to be consistent with International Classification of Functioning, Disability, and Health by the World Health Organisation in 2001.

To ensure the appropriateness of the method of instruction, steps required for activity and sequence, clarity of task, and to check the validity of the manual, twenty questions were adopted from the AOTA basic form. In view of the tactile, and problem solving qualities of the clay for play manual, it was assessed by twenty (20) individuals from varying fields, one (1) organisation and parents also appraised the clay mathematical game.

3.10.1 Semi Structured Interviews with Parents on the Home Assignments

To further test the efficacy of the clay Mathematical game, all subjects took home the same mathematical work which was practised. Letters were sent along with the clay-beads in the specially designed container for continous home practice. All parents interviewed answered four semi structured questions.

i What types of play does your child engaged in at home?

ii What is the diagnoses of your child? And how are you coping?

iii What were the challenges faced using or not using the Clay Mathematical Game?

iv Was the Clay Mathematical Game useful?

Recording the interview used the following scale below to measure the usefulness of Clay for Play manual for LD.

1. Absolute Importance

2. Little importance

3. Undecided

CHAPTER FOUR

4.0 PRESENTATION OF DATA, ANALYSIS AND DISCUSSION

4.1 INTRODUCTION

The data collected from this study were collected from the observation of (9) subjects and semi structured interviews administered to nine (9) parents. The sample from three schools were grouped under three developmental disabilities namely Autism, Mental Retardation (MR) otherwise known as Intellectual Disabilities and Cerebral Palsy (CP)

The analysis of data was divided into five parts

1. Clay for Play video show (Soft copy of Clay for play manual)
2. Demonstration on clay –bead making
3. Clay Mathematical Game
4. Structured Interviews with Parents and (AOTA) forms
5. Appraisal of the Clay for play manual

4.2 THE VARIABLES CONSIDERED

The characteristics of individual children was considered in terms of their type of developmental disabilities, in this study the individual variables considered are age, sex, specific learning disabilities in motor, mathematics, reading and or limited – non-verbal ability, socio economic status of their families, and type of school.



Plate XVII :(a) Autistic Children

Source: Clay for Play Field work 2011

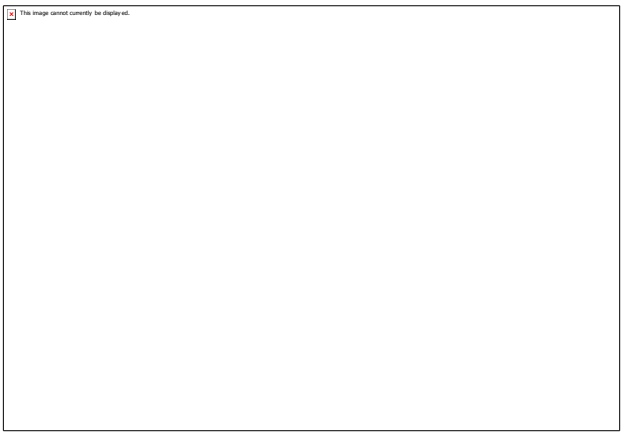


Plate XVII (b) Children with Cerebral Palsy



Plate XVII (c): Children with Mental Retardation



Plate XVIII: Researcher with the nine subjects for the Clay for Play study

Source: Clay for Play Field work 2011

4.2.1 Sex of Children in the Study

The subjects were almost equal in number. The girls were four while the boys were five in number.

Table 4.1 Sex of Children in the Study

Data	Frequency	Percentage
Females	4	44.4%
Males	5	55.6%
Total	9	100%

Table 4.2.2 Types of Motor Skill disorders

Type of Disability	**Frequency**	**Percentage**
Writing disorder (dysgraphia) just scribbling	3	33.3%
Reading disorder (dyslexia)	7	77.8%
Speech and Language disorder	9	100%
Mathematical disorder (dyscalculia)	6	66.6%

Adequate care was taken to know the types of motor challenges the subjects individually have so that they can fit to the objective of the study, the Clay for Play model proposed that clay can provide a cheap home-based therapy for fine motor exercise to subjects. All subjects (9) had one form of speech or language disorder, the CP group had more motor challenge, Rose and Longtong could write at all except to scribble, their grip of the pencil and clay is not firm. Longtong's mother while interviewed stated that the child can eat yam or potatoes using a fork but has difficulty eating rice or tuwo (corn starch meal) which requires the use of his hands.

The information gathered from the Schools indicated that all subjects also have (dyscalculia) Mathematical disorder; however three of them passed the clay mathematical test correctly. The researcher cannot conclude that the challenge was immediately corrected during the study.

1. Distribution of Children by Age

Data gathered revealed that the chronological age of subjects was between eight to eighteen years, their mental ages range between four – eight years. Data further indicates that 33.3% of the subjects were eight years old while 22,2% were eleven years old another 22.2% were twelve years old, and 11.1 % fourteen and eighteen years old respectively.

Distribution of Parents by Social Status

Social Status	Low income	Mid- income	High –income
Number	3	4	2

4.2.4 Results of Pilot Study: Child Study

Emmanuel's favourite subjects are drawing, mathematics and hand writing, he loves drawing because he expresses himself freely. Emmanuel's dyslexia problem presents a range of differences in his language development, from subtle speech impairments to mispronunciations to word-finding difficulties. He also has Slow Expressive Language Development (SELD) a delay in the use of words coupled with normal understanding, is characteristic of a small proportion of children who later display normal language use. He is often assisted by his teachers at dependent level. He is a divergent learner, who has problems with the 3Rs, writing, reading and arithmetic.

4.3 RESULTS OF THE CLAY FOR PLAY VIDEO SHOW

While the six minutes video was showing the attention span of seven out of the nine sample was poor. However, Ruby, Joshua and Rose responded correctly to what they saw in the video. Moses nodded in affirmation. Most of them counted mimicking the video.

After the video show, the researcher asked the subject what they saw; Stella said she saw someone counting. When asked where to locate clay, Rachael explained to the whole group that clay could be found by the river bank. The groups were asked if they wanted to play with clay, they all raised their hands including those who did not understand the question.

4.3.1 Response of CP group

Longtong turns back to look at the researcher, because he realised that the lady demonstrating in the video was the researcher, Attention span of Rose was poor, she could not view or look for long.

4.3.2 Response of the Autistic group

Rachael had raft attention watching the video. When asked 'what he saw in the video' Nathan just laughed and Joshua just kept stretching towards the machine and moving about.

4.3.3 Response of MR group

Emma from time to time watched and laughed, while Stella concentrated in watching.

4.4 DEMONSTRATION

After the video show, the researcher demonstrated the various processes of making clay beads to the children for just five minutes. To sustain their attention she immediately moved

from rolling, squeezing to moulding clay alphabets. In fact Joshua recalled the Clay for Play song we sang the previous week.

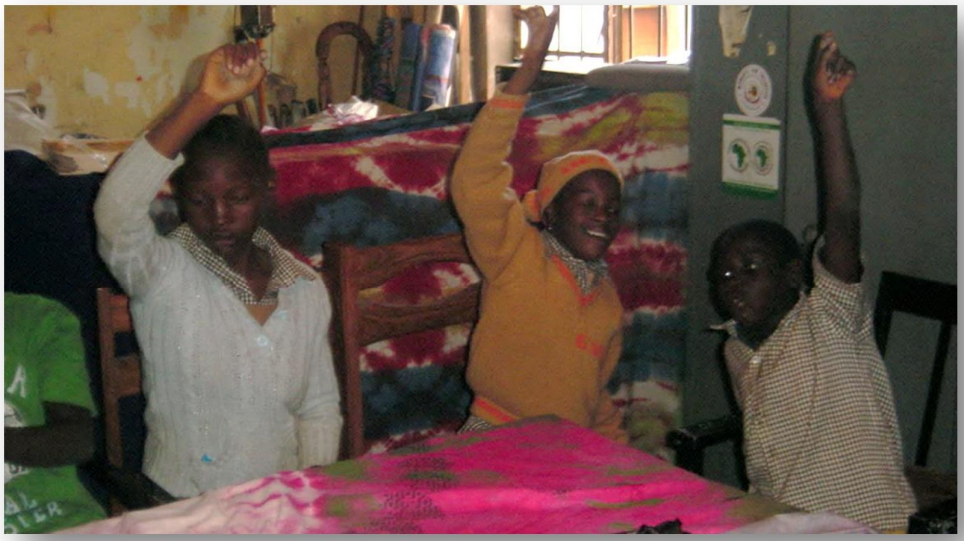


Plate XIX (a): "Responses from the first Clay for Play" six minutes video

Source: Clay for Play Field work 2011 Photograph by M, Dokyoung



Plate XIX (b): Second video show: Ability to recall, non-verbal expression by Longtong



Plate XX: (a) Distractions while watching the Clay for Play video



Plate XX (b): Excitement while watching the Clay for Play video

4.4.1 Rolling Round Clay-balls

All attempted rolling the round clay beads, although most of them only moulded coilsropes, rolling circles, or round shapes was almost impossible for the CP group, this situation fits well with the opinion of Deregowski's (1984) that states 'factors affecting perception of distortion are those of the style or mannerism used in the picture or form, the extent of familiarity of the shape by the observer determines to what distortion may be starting or disturbing to the observer, a child familiar with the circle for example may quietly notice any distortion; while others unfamiliar with it may simply sit put'.

Emma was so excited about his performance that he placed his legs on the table and kept screaming 'Jesus' 'waiyo'…….. Rose though from a different school is seen in close bonding with her group member Longtong. The researcher also introduced 'music' she composed a song on clay for play while demonstrating and dancing to make learning fun. 'La ...la.. la.. Clay for play, come let's play with clay' this made the children excited and happy, with less distractibility

Table 4.3: Analysis of rolled Clay-beads

Activity	**Autistic**			**CP Group**			**MR Group**		
Score	Poor	Fair	Optimal	Poor	Fair	Optimal	Poor	Fair	Optimal
No.of subjects	1	1	1		1	1	1	1	1
Imitation	1	3	5	-	1	-	1	3	5
Spontaneity	-	3	5	-	-	5	1	3	5
Creative performance	-	3	5	-	-	5	1	3	5

Analysis of Rolling

The physical therapy Norm-Referenced and Criterion- Referenced Tests: used in paediatrics and application to task analysis of motor skill was utilized to analyse the motor performance skills of the children. Scoring criteria: no score is given if subject is unable to perform task completely.

1– Poor: child rolls shape different from the example shown with much difficulty.

3– Fair: child tends to roll the shape but takes a long time.

5 - Optimal: The child rolls the desired shape easily and spontaneously

4.5 CLAY ALPHABETS

The subjects were shown how to make clay alphabets. First of all, they made clay rolls or ropes of clay to form the alphabets. While rolling, the CP group squashed the clay on the tables, while the autistic children were able to make alphabets, Joshua even attempted writing his name 'JOSH', and Stella also made the letter 'O' with a slight uneven seem.

4.6 SQUEEZING CLAY

All subjects were given small lumps of clay to squeeze hard, all except Longtong could squeeze the clay. With more time to practice squeezing clay objects, subjects came up with finer sculptures, the samples below were made as flat objects but creatively analysed by the researcher to free standing objects. The first picture on plate XXIII: (b) looks like a cow, while the second resembles an abstract representation of a man, and the third picture is a collection of all squeezed objects made by the subjects.

Table 4.4: Analysis of Squeezed Clay-beads

Activity	Autistic			CP Group			MR Group		
Score	Poor	Fair	Optimal	Poor	Fair	Optimal	Poor	Fair	Optimal
Number of subjects	1	1	1		1			2	1
Imitation	1	3	5	-	3	-	-	3	5
Fine motor Ability	-	3	5	-	3	-	1	3	5
Creative performance	2	3	-	-	3	-	-	3	5

4.7 THE 'CLAY FOR PLAY MANUAL'

Since this manual was also designed for home use, to ascertain if this can be a community rehabilitation tool, the children were all given take home assignment to check the efficacy of the 'Clay Mathematical game. Below is the result of the class work the children were given.

4.7.1 Mental Retardation (MR)

Using the clay-beads Emma got all the answers correct. Stella's 2 + 2 = 8, 7 - 3 = 4, 4 + 6 = 10, 9 - 1 = 11, she did not count the clay beads, Ruby did a lot of scribbling on the paper and answered to 2 + 2 = , 4 + 6 = 10, 7 - 3 = 7, 9 - 1 = 4

4.7.2 CP

Longtong and Rose have dysgraphia, writing challenge, as such they only scribbled, Rose was however able to write the equal sign on 9 - 1 = = . Moses got all the questions correct. Joshua submitted Rose' paper when she was still struggling to see if she could write,

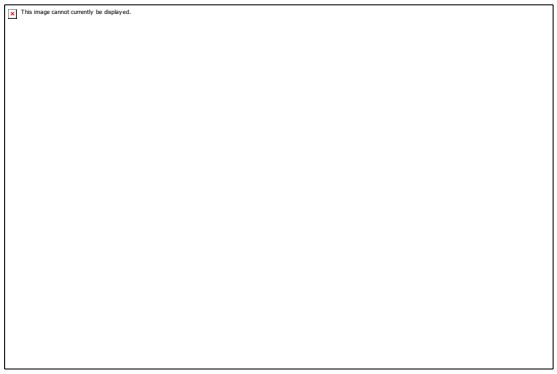
she was upset seeing that others were able to write, she cried profusely and insisted she must write the answer and requested that I write the answers for her.

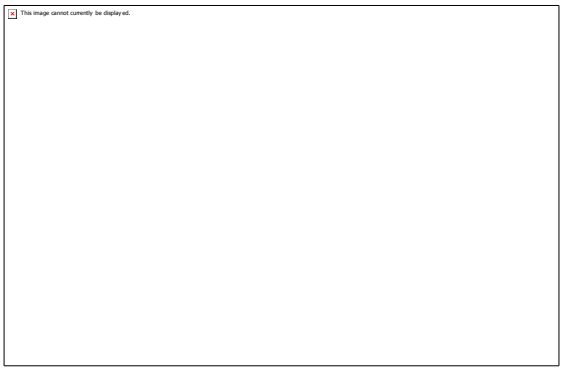




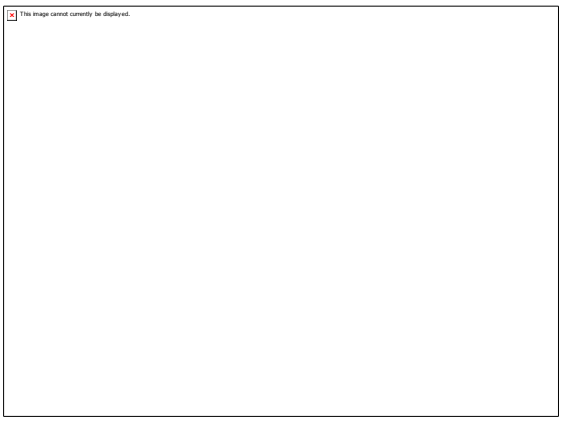
Plate XXI: Ruby says 'I got it right' children imitating the researcher













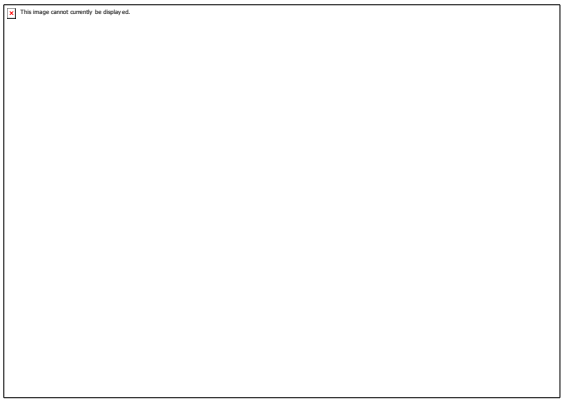


Plate XXII: Sample rolled beads made by Autistic, CP and MR

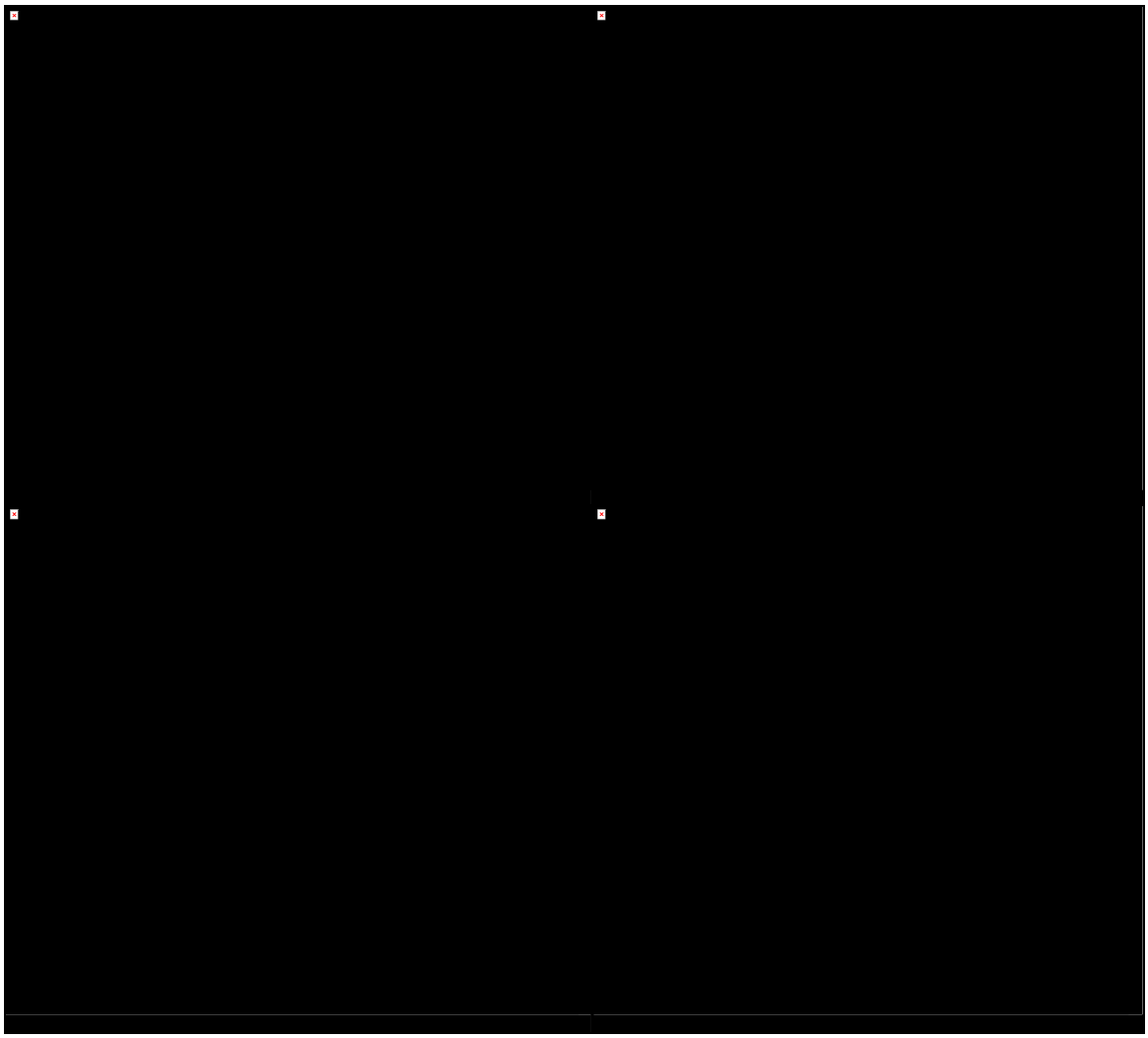


Plate XXIII: (a) Clay Alphabets made by subjects

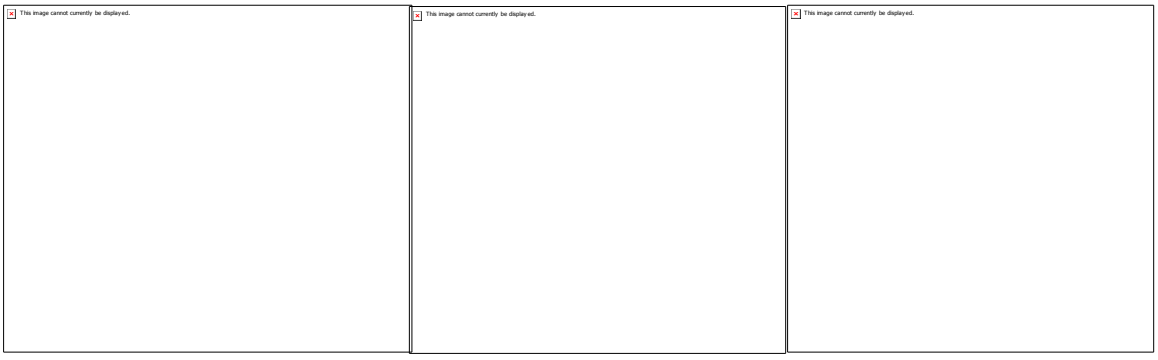


Plate XXIII: (b) squeezed cow, figurine and other samples

4.7.3 AUTISTIC

According to sensory-motor milestones by …….., a child between the ages of 11/2- 2 years should have a pincer grasp and between 3-4years should be able to scribble, we see Nathan who is 18years of age displaying a mental age of 3-4years, he only scribbled two lines. While Joshua's answer for 2+ 2 =4, 4+6=7, 7-3= 4, 9-1 = 1, Due to Joshua's hyperactivity he found it extremely difficult to concentrate on the task given. Although he can count up to 50 but his attention problems did not allow him to do the sum correctly. Generally, he was one of the brightest children during the study.

Rachael persuaded her mother to join us after the demonstration the previous day, her mother assisted her, she was able to do the sum and got all correctly. When asked to submit their papers Joshua refused to submit his, he cried and was distracting the class. At the end, they all had a drink and snack provided by the researcher.

Table 4.5: Analysis of the Clay Mathematical Game

Activity	**Autistic**			**CP Group**			**MR Group**		
Score	Poor	Fair	Optimal	Poor	Fair	Optimal	Poor	Fair	Optimal
Task									
Imitation	1	3	5	-	1	-	1	3	5
Counting	-	3	5	-	-	5	1	3	5
Correct Answer	2	3	-	-	-	5	-	3	5

4.8 SEMI STRUCTURED INTERVIEW WITH PARENTS

For most of the parents interviewed knew the diagnoses of their children. Many expressed their frustrations on their wads school progress. The forms dropped for five subjects were not submitted therefore the researcher adopted interview method to elicit information from parents. Measuring the level of importance of the manual to subjects, 100% respondents

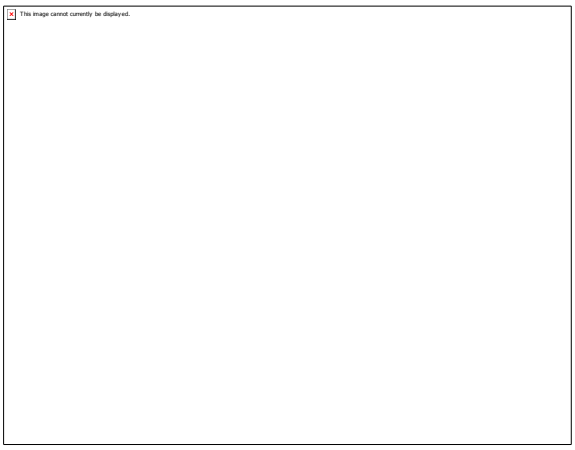
indicated that the manual and in particular the clay mathematical game was useful, and an eye opener.

The home assignment were intented for regular play at home, however 88.8% of the parents did not allow free play with clay-beads, only one parent allowed several opportunities of play. Parents reported that their children were fond of the clay-beads. The home work given nine subjects to solve a simple mathematics sum showed that only four of subjects did the assignment once or twice, while four did not do the assignment, Longtong's parents were not given the Clay for Play container from School.

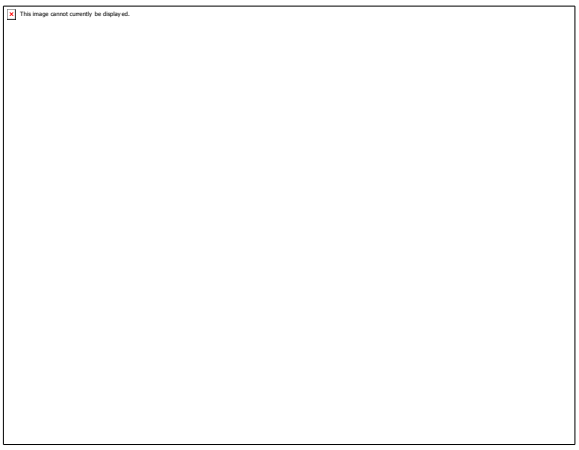
Nathan's mum lamented and saw the beads as high risk, 'he may swallow them if left alone! 'Once Nathan comes back from school he does not do any school work'. Rose' father described Rose's desire to string beads out of the clay beads given to her for the clay mathematical game, because she could not count nor write, although the study did not dive into stringing beads, however, the manual placed pictures of finished clay jewellery, which she observed and struggled to practice at home.

Most parents were unwilling to allow free play due to the reality of the children's own perception /beliefs and abnormal behaviour for example, Emma's mum feared that his friend may trick him and take away the beads, while Rachael's mum said 'she is too generous and caring, she may give them all out. Nathan and Moses mothers' feared they may swallow the beads.

Although this study did not go into selection of subjects based on the social status of their parents, the study found out that all subjects were from low to high income homes. Interestingly, the parents all acted in the same way, most of them were sceptics who afraid the beads will either be swallowed or lost if they allowed free play.



Ruby attempting the Mathematical sum



Teacher Rose assisting the CP group

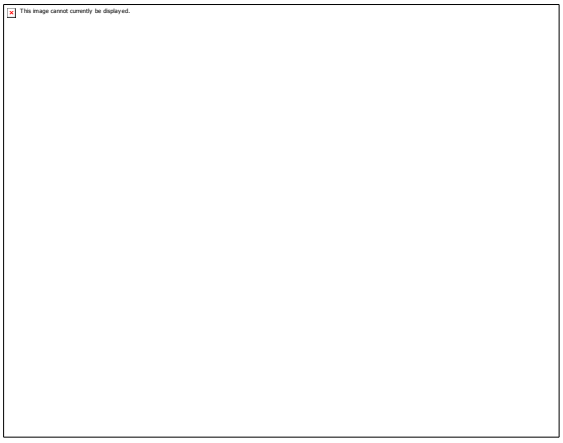


Plate XXIV: (a) Rachael's Mother assisting with the Mathematical assignment

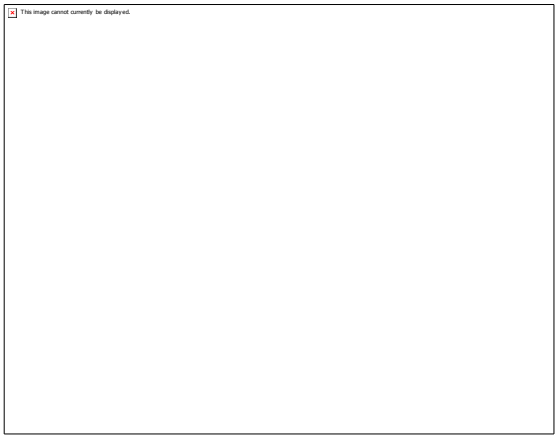


Plate XXIV: (b) Teacher James voluntarily assisting Joshua to apply the Clay Mathematical Game.

The study did not focus on the social components of the model, however, bonding and social interaction developed while the researcher drove with children from MTC to Farin- Gada to

pick children from Othniel to Open Doors in Millionaires Quarters, Rachael stated that she had never been to that part of town nor seen a fly-over before.

The children always looked forward to when the researcher will pick them from school because they saw the trips as an excursion. Even when MTC vacated, the children were always in school waiting to be taken to the venue. The research also opened up avenues of close interactions between the researcher with the families to the extent that some of the parents discussed personal matters and other issues about their wards.

4.9 APPRAISAL OF THE CLAY FOR PLAY MANUAL

The appraisal of the manual was conducted in Jos, Plateau State, Zaria, in Kaduna State and Abuja by twenty relevant stakeholders in the field of Ceramics, Special Education, Psychiatry /Medicine, psychology and two Development Agencies.

As indigenous evidence based research, the use of the AOTA Basic Form for Clients factors-specific skill requirement (Global mental functions) to appraise the Clay for Play was utilised. Primary stake holders in the field of Ceramics, Special Education, Psychiatry and Medicine, and Psychology appraised the manual. An Experts in the design of instructional materials in the Federal Ministry of Education and nine professors and persons with Ph.D., six senior civil servants from the University of Jos and Ahmadu Bello University Zaria, participated. The manual was also administered to two Development Agencies i.e. UNICEF and UNESCO; the researcher did not get feedback from them.

Table 4.7:AOTA Checklist Administered in three states in Nigeria

Plateau State	Kaduna State	Abuja	Total Number Administered	Total Number not returned
9	7	6	22	2
40.9%	31.8%	27.2%	99.9%	9%

Categorization of Organisations

International NGOs (2)	Government (1)
UNICEF and UNESCO	Federal Ministry of Education

Professionals Involved

Psychiatrists/ Medicine	Special Educationists	Psychologist	Educationists/ Development Workers	Artists
4	5	2	4	7
20 %	25 %	10%	20 %	35 %

Professional Artists

Ceramists	Graphic Artists	Fine Artist	Total Number
5	1	1	7
25%	5%	5%	35%

Categorization of Individuals by Qualifications/Rank

Professors/Individuals with Ph.D.	Senior Civil Servants	Mid-Career	Total Number
9	6	5	20
45%	30%	25 %	100%

Categorization of Individuals by Gender

Women	Men
7	13
35%	65 %

Table 4.8 (a): Assessment of the Clay for Play Manual

Rating	Very Good	Good	Fair	Poor	Indifferent
Number of Respondents	15	5	0	0	0
Percentage	75%	25%	%	%	%

Table 4.8 (b): Rating of the Clay for Play Manual by professionals

Profession	Special Educationists	Psychiatry/Medicine	Artists	Psychologist	Educationists
Rating	100% Very Good	75%Very good 25% Good	42.8% Very Good 57.1% Good	100% Very good	100% Very Good

The assessment brought out key issues from all professionals who rated the manual based on the usefulness and relevance of the manual to their respective fields. Seventy five percent rated the manual as very good, while the remaining twenty five percent rated it good. The assessors wanted more clay mathematical samples, numbers, the cover page reflecting children's colours, possibility of producing the manual in different languages, and clay beads samples made by children with LD included in the manual. Sixty five percent of assessors made useful contributions regarding the design format and lay out, the impact for motor development and self-expression of populations who suffer one or more neurological challenge.

Fifty percent indicated that children with LD must be fully oriented or have a stable personality/behaviour to effectively make some clay-beads. Due to problems of low attention span and motor control, LD need motivation and encouragement to stay focused on the activity. The researcher realised from the test that attention and memory may be important when making alphabets. The child needs to know and recognise the alphabets to enable them mould or understand the lessons on Clay alphabets. However, thought disorders may not interfere when moulding round clay- balls, clay-ropes and or squeezed items.

LD could not read neither had the capacity to interpret the manual, they needed a teacher, guardian or their parents who can read the manual and demonstrate for them to imitate. Little calculation ability is required for doing the Clay mathematical game. The use of clay beads for counting was novel to all subjects although the task of counting using abacus

Table 4.9: Appraisal Questions

S/No	Questions	No	%	Yes	%	Undecided	%
1	Must subjects be fully oriented and have stable personality to use the manual?	6	30	10	50	2	10
2	Must subjects be able to read and write to use the manual?	11	55	9	45	-	-
3	Will thought disorders interfere with learning?	7	35	10	50	3	15
4	Is language ability is required?	4	20	6	30	9	45
5	Is calculation ability required?	11	55	7	35	2	10
6	Must children have intact body?	17	85	2	10	1	5
7	How much hearing and balance is needed?	2	10	5	25	14	70
8	Does the craft provide the opportunity to discover what is valuable to the child	0	0	20	100	0	0
9	Does the craft contribute to self- esteem?	0	0	20	100	0	0
10	Does the craft provide an opportunity for testing reality of the child's perception?	0	0	20	100	-	-
11	Routine: Does the activity have an established sequence?	4	20	16	80	-	-
12	Habits: Does the activity utilize or reinforce useful habits?	0	0	20	100	-	-
13	Roles: Is the activity consistent with customary roles of the client?	3	15	16	80	1	5
14	Do you think this is a 'do it yourself' manual?	5	25	15	75	1	5
15	Does the craft offer opportunities for affective expression? Hostility/aggression (i.e. motions such as hammering, tearing, piercing)	1	5	19	95	-	-
16	Does the craft offer opportunities for affective expression? Sadness (i.e. slow movement)	4	20	16	80	-	-
17	Is the Clay Mathematical Game useful for teaching children with learning disabilities?	0	0	20	100	-	-
18	Are the types of play with clay indicated in the manual relevant for rehabilitation of children with developmental disabilities?	0	0	20	100	-	-
19	What is your assessment of the manual?	Very Good(15) Good (5) Fair(0)Poor(0)					

	Very good, Good, Fair, or Poor		
20	What additional features are needed to improve this manual?	No comment 5	Comment 15

Source: Clay for Play Field Results 2012

was familiar to some of the subjects, Stella and Moses have been using seeds for counting for a while.

The concept of continuous rolling of clay is likely to improve fine motor manipulation for children with cerebral palsy who may not have intact body image, especially on their limbs, The study did not test how much hearing and balance may be needed; and the ability to perceive or respond. However, the craft provided the opportunity to discover what is valuable to the subjects; acts of sharing by Rachael, playing with peers for Emma, show of affection by Moses, seeking approval for Ruby and discovery of the leadership skills of Joshua were all exhibited while doing the craft.

The craft of bead-making is not as technical as painting that requires precision or good colour choice, almost all the children at the first instance were able to produce one or two beads, this accomplishment the researcher believes can contribute to self-esteem. The craft offered opportunities for affective expression: hostility/aggression (i.e., motions such as hammering, tearing, piercing) Joshua and Rose both cried during the clay –mathematical game, Joshua wanted to go home with his class work while Rose cried for her inability to perform like others, she felt helpless. At home Rose resorted to stringing beads due to her counting challenge.

Preliminary investigation showed that Longtong and Rose have spasticity and athetoid challenge coupled with dysgraphia, they could barely scribble (two of CP group) and could not

print at all, however, due to the strong expressive medium in clay all subjects were able to roll clay ropes (coils) better than clay balls.

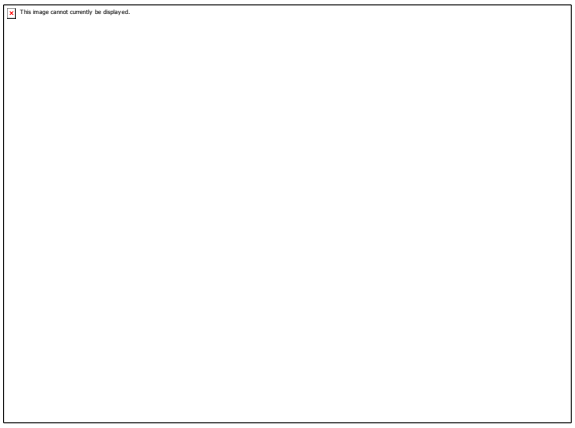


Plate (a) XXVI: Happy Joshua

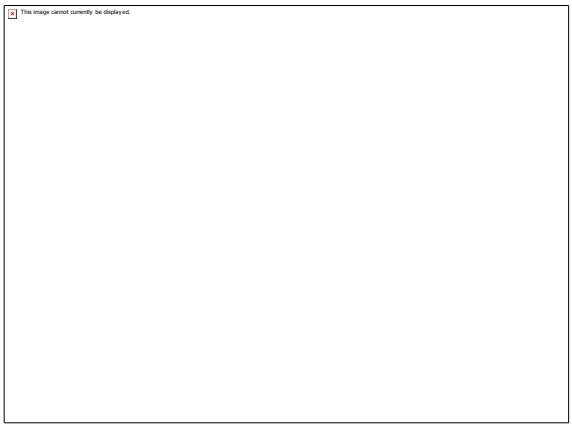
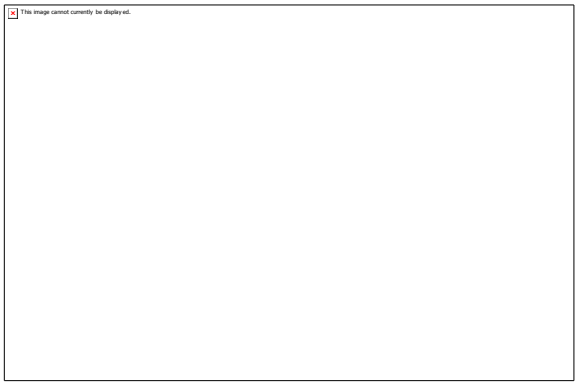


Plate (b) XXVI: The researcher demonstrates to the CP group



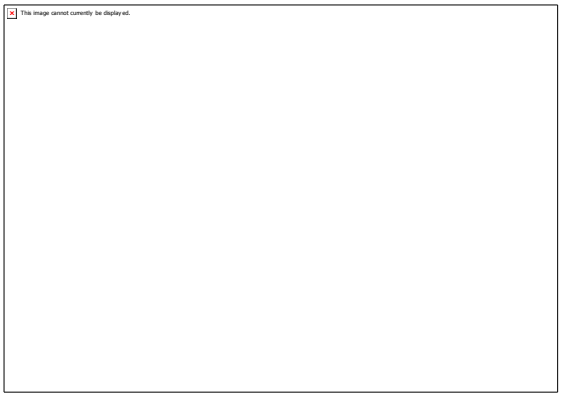


Plate XXVI (c)(d): Do you understand? The researcher seeks to know from Rose and Moses

Throughout the study period the subjects were radiant, vibrant and always excited; Clay for Play provided an avenue for real happiness (i.e., pride, hope, laughter) and love i.e., stroking, holding hands and Joshua feeding Nathan in love, Little wonder, that Rachael convinced her mother to be part of the study!

The subjects though distracted during the video show and clay mathematical game demonstrated more intimacy, excitement, always wearing smiling face due to the tactile exposure they had this affirms the claims of Argyle in the intimacy model which suggested that 'equilibrium develops from intimacy'. Where there is a joint function of eye –contact, physical proximity, intimacy of topic, smiling, etc.

The study revealed that subjects with Mental Retardation performed better in the Clay Mathematical game, rolling and squeezing clay, while one (1) of the autistic children even produced clay alphabets spontaneously without any prompt. The CP had the biggest challenge. Bead rolling was a herculean task for them, which led to emotional outburst.

Data showed that children with Learning Disabilities from low, medium and high income families were all part of the study, all had equal opportunities to play with clay, and make beads without designs or patterns. Although all subjects were given the Clay for Play mathematical assignment to be done at home 88.8 % of children were not given the opportunity to play freely at home with the clay-beads due to fear of swallowing, losing them or being stolen.

Furthermore, the groups differed in the proportion of time they spent on the activities, Clay for Play model exposed simple secrets of doing and making, using inexpensive tools which exposed the clay beads as musical instruments, subjects experimented shaking the container which gave an interesting rattle sound, this increased fun in learning which is vital

for LD. The rapport and close interactions that developed with the families of subjects, gave room to some of the parents to discuss personal matters and other issues about their wards; in fact two families gave the researcher gifts for finding time to chat with them.

4.9.1 Findings and Observation from Literature

Notable scholars have indicated that parents and children with LD often experience stress over the slow pace of progress of their children's education. Therefore, any program that reduces their pain, stress and at the same time provide therapy will go a long way.

White (2008) stated categorically that Clay has been discovered and is been employed in medicine, chemicals, computers, aviation and pharmaceuticals, the common uses has been in cement, plumbing, adhesives, roofing and floor tiles. Clay Therapy is not new in the fields of sychology and medicine, specifically in occupational therapy i.e. psychiatry in the west. This study has shown that Clay Therapy and clay for play manual may prepare professional ceramists to contribute to the advancement of scholarly knowledge etc. due to the fact that therapist are not trained with art materials

Perhaps one of the disadvantages of beadwork is the cost or expense in therapy as indicated by Tubbs *et al* (1999) However, the use of clay beads can serve as alternative cheaper source, this then makes ' the clay for play model', a vital resource that many schools, homes, occupational centres and hospitals can use. Even though Bead work is not specifically listed on interest checklists, the fact remains that ceramics topping the list makes a case for its use. Tubbs (1999) mentions shaping pots, beads, and jewellery as key components of ceramics in therapy.

Young *et al(1992)* analysed the medical model by exposing claims that variety of interventions using chemical compounds to treat disturbed behaviour may not work in all

cases. They further stated that psychological approach of psychoanalysis, psychosurgery, electroconvulsive therapy, drug therapy, may be good but humanistic holistic approaches are required for rehabilitation.

White (2008) also emphasised that Clay Therapy has been embraced internationally by thousands of child –treatment professionals. It is used in numerous educational and clinical environments with children of various ages experiencing a wide variety of diagnostic, emotional, and situational needs, he further opines that 'clay' a time-honoured medium of expression and universal toy responds to the most primal and basic need of the child: to play.

Beyond using clay therapy for children with developmental disabilities, Sherwood (2010) enumerates other persons who need clay therapy to include palliative care clients, geriatrics (aged care), stress disorders,

According to Jean Piaget, children between ages 2- 6 engage in symbolic or representational play, during this period a child requires the ability to encode his experiences in symbols and their combinations. All the children in the study had the mental age of 2 – 6 years. The use of clay alphabets therefore became interesting to most of them, Joshua on his own after watching the Clay for Play video wrote the first four alphabets of his name.

CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATIONS

5.1 INTRODUCTION

Clay for Play was designed to incorporate play to learning with clay; Clay for Play has four (4) components, namely motor or physical development, academic, social and cognitive/behaviour development. The aim of the Study was to design an indigenous Ceramics manual "Clay for Play manual". The objectives are to design and test the Clay for Play manual, a clay beads production guide for the IEP team to teach children with LD; and to also appraise the Clay for play manual based on the educational and motor development components of the model. While evaluating experiences, observations and findings on clay therapy useful for independent, corporate, and other educational research.

The summary of findings from this study is based on the indigenous ceramics instructional manual "Clay for play" which was developed and applied for the educational and community Rehabilitation of children with LD.

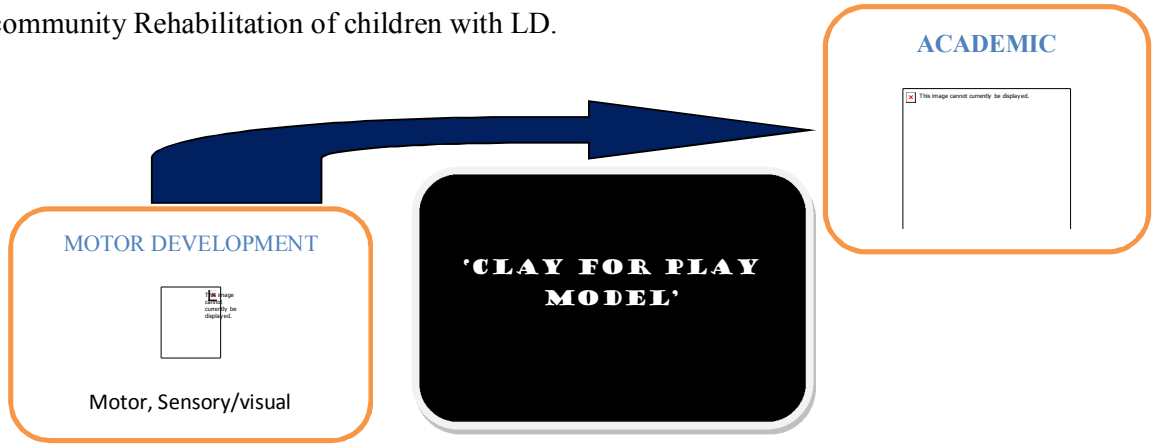


Plate XXV: Motor and Academic components of the Clay for Play model developed and designed by the researcher

5.2 SPECIFIC FINDINGS

The study observation test and appraisal of the "Clay for play" indicates that an indigenous Ceramics manual is specifically developed to improve the learning content of children with Learning Disabilities in Nigeria. A complete copy of the 'Clay for play Manual' already tested and adjudged a very good resource useful for special schools, and inclusive learning environments, Psychiatric Hospitals and communities is now available.

The study adhered to play with clay for the purpose of fine motor exercise involving hand rotation, wrist movement, coordination of the thumb and fore finger and hand-eye coordination. The study used play with clay to demystify the challenges LD face with mathematics and reading by developing games for mathematics and alphabets for reading.

Data from the assessment of the manual coupled with oral interviews indicate that the 'Clay for Play manual' will tackle the challenge of artistic impairments, clay sourcing, construction processes which parents, many therapists, regular teachers, special educationist, and caregivers have in Nigeria.

Stakeholder in the field of Special Education, and Psychiatry agreed that this research has opened up a new pathway for ceramists to tackle learning problems, evidenced based services for individuals with LD in Nigeria, now Nigeria has an indigenous manual which other developed countries have long used to successfully handle therapy.

5.3 SUMMARY AND CONCLUSION

The clay work or clay-beads made by the children in the 'clay for play research' produced a forum for social interaction with friends, family and their teachers. More research of this nature may be a way through which this children can make 'contributions' through making gifts and souvenirs and if assisted by their families, they could even make products of

beautification and ornamentation like beaded curtains, jewellery, key-rings to boost their self-esteem.

For children with LD to succeed in school, schools and parent should provide an environment that allows play, and in particular play with clay, to exercise their fine motor skills. This flexibility will allow programs that allow LD to adjust and adapt to their specific learning characteristics, challenges and differences.

The ability to read, do simple mathematics and engage in daily life depends largely on psychomotor activities. It is not only essential for the acquisition of knowledge but also a necessary condition for the full development of mentally healthy and happy children. Therefore, improving the learning content of LD through the tactile experience will definitely enhance their total well-being.

Clay for play model if adopted and fully implemented in Nigeria will become the first evidence-based research and service that ceramists can render in the field of Learning Disabilities, and Child Psychiatry to bring relief, and stress faced by parents. Nayak et al (2004) said that there is a growing recognition of the pain, stress and at the same time challenges families, as well as their children face. The need to support, respite care, intensive care management services and multi-agency treatment plan is necessary.

Obi et al (2008) in their paper opined that "Handicapping diseases have remained major problems associated with immense suffering and superstition in the African setting and there are no accurate vital statistics of the incidence of mental and physical retardation in children in Nigeria, but it is presumed to be higher than in the U.S.A. or Europe where the efforts of voluntary organizations supplement government efforts". Therefore Intensive health education is needed for the public and also for the teachers who come in contact with children with disabilities.

5.4 GENERAL RECOMMENDATIONS

To achieve accelerated educational development parents in particular need to show interest and get involved in their children's education. Therefore 'Clay for Play study' which will train parents, care-givers along with children with LD on mutual clay play will go a long in reducing the scepticism many parents have on their children; many parents during this study concluded "nothing good can come out of him or her in terms of creativity"

The Government, in particular education planners should give more attention to the nature and severity of disabilities faced by these children with special needs, by adopting policies that give specialised services, for their schooling, home care and out-door activity. Stephen (1991) urged that the focus on such special need, should not obscure the fact that the basic needs and aspirations of persons with special needs are the same as other citizens

This study exposed the non-availability of some facilities for education and rehabilitation of children with LD, such as inadequate school accommodation, transportation, teaching aids, indigenous instructional manual on creativity etc. Government should as a matter of urgency set up a Special Vocational Boarding Junior Secondary School which will tackle the many challenges parents of children with LD face when their wards complete primary School or need such services for further educational development

5.5 RECOMMENDATION FOR FURTHER STUDIES

The need to complete this study to a logical conclusion, by incorporating the remaining two components of the model, the social and Learning Disability will help the researcher produce a complete manual with clay play duration, clay mathematics, tools and equipment required, more games, environmental exploration with the IEP team, will certainly foster cooperation and yield better results.

A large scale investigation of motor development to ascertain the level of impact of clay in relation to school attainment is urgently required in Nigeria, but this is certainly beyond the resources of an individual researcher. The need therefore for a multi-disciplinary, inter-agency research involving Ceramists, Clinicians, Psychologists, Special Educators is likely to produce a policy document which will pressure the Government for the 'equalization of opportunities' of persons with disabilities.

There is need to train families on Clay for Play. In this instance involving families or care givers in the process of implementing the Clay for Play (IEP) for community based rehabilitation at (home) not just for play for the sack of play but as a reinforcement, and rehabilitation. Stephen (1991) reports that 'many families are often excluded from the therapeutic process of their children yet many of them are held responsible when the conditions of their children get worse, he said that families are often confused, with a tendency to blame both parties, he recommended Psycho-education among other things

A pilot program on clay therapy and a capacity building program for therapists, and clinicians in the Ceramics section for persons needing exercise, replacement, rehabilitation, psychotherapy, could open collaborations with Department of Medicine, Human Anatomy, Educational Psychology, Psychiatric Hospitals, Special Nursing Homes like Beth-Torrey and many others.

Just as it is advisable for a team approach to develop an IEP it will also be advisable to carry out clay therapy with a team of special class teachers, regular teachers, parents, resource room teachers and care givers to facilitate overall develop of the child with LD. Beyond using Clay Therapy for children with developmental disabilities, further studies on Clay-Therapy for psychotic patients, geriatrics, and Cancer parents should be undertaken as recommended by

Sherwood (2010) who enumerated other persons who need clay therapy to include palliative care clients, geriatrics (aged care), and persons with stress disorders.

REFERENCES

Allen, C. K. (1988) Occupational Therapy: Functional Assessment of the Severity of mental disorders. Hospital and Community Psychiatry In: Tubbs, C., and Drake, M. (2007) Crafts and Creative Media in Therapy (3rd ed.) PP. 39, 140-142.

Anthony W.A., Cohen M.R., and Farkas M, et al (2002) Psychiatric rehabilitation. Boston: Center for Psychiatric Rehabilitation (2nd Ed)

Artherton, J. S. (2011) Learning and Teaching Convergent and Divergent Learning. Retrieved 25 March 2011. http://www.learningand teaching.into/learning/converge

Autism Spectrum Disorder (ASD) *http://www.globalautism.org* Retrieved 25 July 2012.

Ayres, A. J. (1987). Sensory integration and the child. In: Tubbs, C., and Drake, M. (2007) Crafts and Creative Media in Therapy (3rd Ed.)

Azi, J. I. (2006) Interactive Child Learning Aid Project (iCLAP): Design and development of an indigenous instructional multimedia model for Nigeria. International Journal of Education and Development using Information and Communication Technology(IJEDICT), 2006, 2(4) PP. 137-143. Retrieved May 19 2011

Bada, T. (2007) Effects of visual illustration of learners. Acquisition of Fine Art concepts in Junior Secondary School PP. 137-139

Baloueff, O. (2003). Sensory integration. In: Tubbs, C., and Drake, M. (2007) Crafts and Creative Media in Therapy (3rd Ed.)

Barr, P., Buckman, G., Goodman, S., Jimenez, H., Naylor, V., Seddon, G.(1979) The Source Book for the Disabled. Frederick Muller Limited. pp. 181-183

Beaded Splendor: Migration of Bead-making and Beadwork Throughout Africa: History, Trade, and Bead-working Techniques website Retrieved September 4 2010

Bello, F. B.(1987). Ceramic Techniques for Post Primary Institutions in Kaduna State Unpublished M.A Thesis. Ahmadu Bello University, Zaria, Nigeria.

Bennett, T. (1978). Rehabilitation in Schizophrenia. Parent at the Interface between Social Units, Hotels, Boarding Houses, and Group Homes and Flats.

Bennett, T. (1988) Neuropsychological rehabilitation in the private practice setting: Cognitive Rehabilitation. 6(1) Jan-Feb 2011, 12-15.

Better Schools: Resource Materials for school heads module 1-7(1993) Commonwealth Secretariat, Paren and Stacey Editorial Consultants.

Bhaumik, S. (2008) Learning Disability Psychiatry. Challenging Behaviour: *Newsletter of the Faculty of Psychiatry of Learning Disability* 10(1) Royal College of Psychiatrists Retrieved May 19 2011

Brotherson, S. (2006) Supporting Physical Growth and Development in Young children

Brotherson, S. (2006) Understand Physical Development in Young children, Delayed Speech or Language Development

Community-based Rehabilitation: CBR Guidelines: Supplementary and Social Component, World Health Organisation 2010.

Clay Basics: Artists Studio Education from *http://www.michaels.com/*

Chavarria, J. (1994). The Big Book of Ceramics: A guide to the History, material, equipment, techniques of hand-building, moulding, throwing, kiln firing and glazing pottery and other ceramics objects. PP. 26 – 37, 48 – 71, 182 - 185.

Davies, R. (1975). Let's make a picture. (4thed.) Evans Brothers Ltd. London ISBN 0 237 35194 3 PP. 3-5

Deregowski, J. B. (1984). Distortion in Art: The eye and the mind Routledge and Kegan Paul Plc.

Derek, I. J., and David, H. (1993). Essential Pediatrics MCQs, 2nd ed. Churchill Livingstone, Publishers Edinburgh

Dikerson, J. (1978). Pottery in Easy Steps. Studio Vista London. PP. 46-47, 58-62

Dondis, A. D. (1973). A primer of visual literacy. The Massachusetts Institute Technology Press PP. 39-47

Dokyoung, E. E (2008) Bead Making for Income Generation: Paper presented at a Training Workshop by Raw Materials Research and Development Council, and Plateau State Ministry of Women Affairs and Social Development. August 19 2008.

Dorothy and Jerome Singer (1992, 2000) Imaginative and Play in the Electronic Age books.google.com/psychology

Dubin, L.S (2009). The Worldwide history of beads, Thames and Hudson Ltd. PP. 17-20, 119-153

Eden, S. T. (2010). Play Work *http://www.helium.com* Retrieved February 12 2010

Effects of Perceptual –Motor Program on Achievement from *http://www.ascd.org*

Erbert, C. (2012) Rising Stars Experience Social Success *http://www.heartspring.org*

Emeji, M. J. (2008)The Relevance of Art Education and the Education of the Nigerian Child: Implications for the Universal Basic Education Policy NSEAD/Blackwell Publishing Ltd. Retrieved March 4 2011

Feizipoor, H.(2005). The effectiveness of David Dyslexia Correction Method re-examined in Iran. Aizahara University, Iran, Vol. 1, No. 1 spring 2005

Fidler, C. and Velde, B. (1999). In: Tubbs, C., and Drake, M. (2007) Crafts and Creative Media in Therapy (3rd ed.)

Firing pots in a bonfire. Golden Hands Encyclopedia of Crafts (1975). Marshall Cavendish Ltd. London. PP. 340 – 343

Fine motor skills activities for children http://www.sensory-processing-disorder.com

Fitzsimmons S. (1991). Start with Art: Developing Creativity in Young Children. Stanley Thormes publishers Ltd.

Glang, A.; Ylvisaker, M., Stein, M., Ehlhardt, L; Todis, B. and Tyler, J. Validated Instructional Practices: Application to Students with Traumatic Brain Injury *www.headtraumarehab.com*

Gukas, H. J. and Datiri (2001) The Art of Pottery. C. C. Communications, Jos

Hemphill, B. J,, Peterson C. Q., and Werner, C. P. (1991) Rehabilitation in Mental Health: Goals and Objectives for Independent Living, Slack Inc. PP.1-14, 90 – 91

Hummels, C.C.M., and Overbeeke, C.J.(1998). Designing and Testing Human Computer Interaction: A Case Study in Virtual Clay Modelling at the 31th International Symposium on Automotive Technology and Automation (ISATA) PP. 27-34 Retrieved June16 2011

James, A. (2010) Learning and Teaching convergent and Divergent Learning http://www.learningandteaching.info/convergent

Jameson, K. (1974). Pre-school and Infant Art Studio Vista London PP. 14 – 23, 52 – 56, 66- 69

Keith, D. C., Dahlberg, C., Malec, J. F., Langenbahn, D. M., Felicetti, D. M., Kneipp, E. W., Kalmar, K., Giacino, J.T., Harley, J. P., Laatsch, L., Morse, P. A., and Catanese, J. M. A Evidence-Based Cognitive Rehabilitation: Physical Medical Rehabilitation, 86 PP. 1681 – 1692

Kemp, G., Segal, J., Cutler D; Gill E. J. and Smith, M (2010) Learning Disabilities symptoms, causes and treatment http://www.helpguide.org Retrieved February 12 2010

Kemp, G., Segal, J., Cutler D; Gill E. J. and Smith, M (2009) Parenting Children with Learning Disabilities http://www.helpguide.Org Retrieved February 12 2010

Kielhofner, G. (2004) Conceptual foundation of occupational therapy: Philadelphia F. A. Davies (3rd Ed).

Kim, S, A., Kim, M.Y., Lee, J. H. and Chun, S.(2008)Art Therapy Outcomes in the Rehabilitation Treatment of a Stroke Patient: A Case Report. Art therapy: Journal of American Art Therapy Association 25(3) PP. 129 -133 AATA. Inc. Retrieved February 26 2011

Knishinsky, R (2006) The Basic Cause of Disease http://aboutclay.com Retrieved December 12 2012

Knishinsky, R. (2011). Our Earth, Our Cure Clay Therapy Healing Clay - Healing Earth *http://www.shirleys-wellness-cafe.com/clay.htm* Retrieved February 25 2011

Koz, A. Playing for Children *http://www.helium.com* Retrieved February 25 2011

Kumin, L. (2003). Early Communication Skills Children with Down syndrome: A guide for Parents and Professionals 2nd ed. Woodbine House, 6510 Bethesda

Kutner, L. (2011) Types of Play. Pampers Parenting Network website

Learning Disabilities, Dyslexia and Vision. American Academy of Pediatrics, Section on Ophthalmology, Council on Children with disabilities http://pediatrics.aappublications.org/content/124/2/837.full.html Retrieved May 19 2011

Lere, M. M. (2007) Journal of Learning Disabilities in Nigeria, 2(1)4 -7Centre for Learning Disabilities and Audiology, Jos.

Lorenz, D. C. (2008) Can I Play? Using Play Therapy for Children and Adolescent with Disabilities. Paper presented at the 2008 American Counseling Association Conference, Honolulu, Hawaii.

Learning Disabilities, Dyslexia and Vision. American Academy of Pediatrics, Section on Ophthalmology, Council on Children with disabilities http://pediatrics.aappublications.org/content/124/2/837.full.html Retrieved May 19 2011

Lere, M. M. (2007) Best Practices in the Education of Children with Learning Disabilities *Journal of Learning Disabilities in Nigeria*, 2(1): 38 -43

Lorenz, D. C. (2008) Can I Play? Using Play Therapy for Children and Adolescent with Disabilities. Paper presented at the 2008 American Counseling Association Conference, Honolulu, Hawaii.

Lowenfield, V., and Brittain W.L. (1970) Creative and Mental Growth In: Macmillan Company Colier-Macmillan Limited, London: (Fifth Ed) PP. 14-1669, 100-104, 178 -187

Martin, R. R. (1949). The Book of General Knowledge, The English Universities Press Ltd, London

Mental Retardation. The National Dissemination Center for Children with Disabilities *www.nichcy.org/states.htm.*

Mental Retardation, Information for families. The Centers for Disease Control and Prevention (CDC) *www.cdc.gov/ncbddd*

McReynolds, C. (2002) Psychiatric Rehabilitation: The Need for a Specialized Approach. International Journal of Psychosocial Rehabilitation. PP. 7, 61-69

Miller, S. A, and Church, E. B. (2003) Ages & Stages: How Children Build Skills through Art

Moloney, J. (1970). Creative Crafts: The Cookery Book Club, St. Giles House, London PP. 6, 20, 30-31

Montgomery, P. C., and Connolly, B. H. Norm-Referenced and Criterion-Referenced Tests: Use in Paediatrics and Applications to TASK analysis of Motor Skill http://www.ptjournal.apta.org/content/67/12/1873

Moore, E. (2010) What is Physical Development? *http://www.ehow.com*

Morris, J. M. (1959). Reading in the Primary School An Investigation into standards of Reading and their Association with Primary School Characteristics. Newnes Educational Publishing Co., Ltd. PP.1-3, 23-29

Morrisey, B. (2011) Types of Child's Play. http://www.kidsdevelopment.org

Moss, L. (2011) Physical Development and the Health of children *http://www.ehow.com*

Norman, J. M. (1970). Child Study: Some Practical Techniques for the Teacher: *Oxford University Press* (2nd Ed.) PP. 1- 6, 33 – 35, 70 – 77

National Survey of Persons with Disabilities 1996: Principal Report 2002 Federal Ministry of Sports and Social Development. Nigeria

Nwokolo, O. M. (2007) Understanding Learning Disabilities: Intervention and Prevention Strategies. *Journal of Learning Disabilities in Nigeria,* 2(1): 9 – 15

Obi J.O.and Ogbe M.A. (2008): Educational rehabilitation of mentally and physically handicapped children in Benin City, Nigeria. *http://www.ncbi.nlm.nih.gov/pubmed*

Ozoji, E. D., and Nwazuoke, I. K.(1995).Professionalism in Special Education in Nigeria, National Council for Exceptional Children(NCEC) Department of Special Education, University of Jos. PP.203- 211.

Palmer, F. M. (2005). Art in the Realms of Mental Retardation. Tahir Advertising Agency Kano PP. 22 - 26,

Parten, M. (1933). Social Play among Preschool Children. Journal of Abnormal and Social Psychology, 28, 136-147www.spring.org

Paluzzi, S. (2010)http://www.meetup.com/Baltimore-entrepreneurs/members/1298251/

Obi, J.O. and Ogbe M.A. (2008): Educational rehabilitation of mentally and physically handicapped children in Benin City, Nigeria. *http://www.ncbi.nlm.nih.gov/pubmed*

Or, M. B.(2012) Clay sculpting of mother and child figures encourages mentalization http://science.direct

Ozoji, E. D., and Nwazuoke, I. K.(1995).Professionalism in Special Education in Nigeria, National Council for Exceptional Children(NCEC) Department of Special Education, University of Jos. PP.203-211.

Palmer, F. M. (2005). Art in the Realms of Mental Retardation: Tahir Advertising Agency Kano PP. 22 - 26,

Parten, M. (1933). Social Play among Preschool Children: Journal of Abnormal and Social Psychology, 28, 136-147 http://www.spring.org

Peterson, R. L. (1975). Learning Scott Foresman and Company, Glenview, Illinois, PP. 35, 79, 105

Pollak M (1993). Textbook of Developmental Pediatrics Churchill Livingstone Inc. PP.25 – 31, 241 - 243, 283 – 325

Polymer Clay Basics from www.stampington.com/html/beginningb

Psychiatric Rehabilitation: The need for a specialized Approach from http://www.psychosocial.com/

Radke, B. (2008). Community Mental Health: CBM Policy Document and CBM Implementation Guidelines.

Raymond, D. (1974) Our Earth, Our Cure; from *http://www.shirleys-wellness-cafe.com/clay.htm*

Reed, S. K. (1982). Cognitive Theory and Applications. Brooks/Cole Publishing Company

Richter, L., Foster, G. and Sherr, L. (2006) Where the Heart is: Meeting the Psychosocial Needs of Young Children in the context of HIV/AIDS. The Haque, The Netherlands: Bernard van Leer Foundation

Santrock, J. W. (1999). Life span Development: McGaw Hill Press (8th Ed). PP. 138 -143

Segal, J. (2010) What to Expect in the IEP Process http://www.medicinet.org

Segal, J. (2010) What is Learning Disability http://www.medicinet.org

Schiffman H R (1990) Sensation and Perception: An integrated Approach. (3rd Ed) John Wiley and Sons

Scott, L. (2005). Disability is an Art, *http://www.disabilityisanart.blogspot.com* Retrieved December 12 2007

Schuster, C. S.(1985) The Church ministering to exceptional Persons: Jesus loves me. Beacon Hill Press of Kansas City PP. 61- 70,72 -78, 88,

Skinner, S. (2007). Creative Activities for the Early Years. Paul Chapman Publishing Inc.

Sherwood, P. (2010). The Healing Art of Clay Therapy. Australian Council for Educational Research Ltd. Press PP. 1-11, 26 -27, 43 -57, 74-89

Sohlberg, M., Ehlhardt, I., and Kennedy, M. (2005) Instructional Techniques in Cognitive Seminars in Speech and Language, 26(4) http://www.ancds.org/pdf

Stephen P (1991). Rehabilitation and Community Care: Strategies for mental health Routledge Chapman and Hall Inc.

Surdivall, M. (1977). Hand-built Pottery Wayland Publishers, 49, Lansdowne place, Hove, East Sussex, BN3 1HF, England PP. 7- 18

Sunder S. (2002). Textbook of Rehabilitation: Jaypee Brothers Medical Publishers (P) Ltd (2nd Ed.) New Delhi

Swanson, B. M. and Willis, J. D (1983). Understanding exceptional children and youth: An introduction to special education. Rand McNally college publishing company Chicago PP. 163 -179

Thorpe, E. H. (1973). Basic Pottery for the Student. St. Martin's Press, New York. PP. 9-19

The Effect of Perceptual –motor program on Achievement www.ascd.org/ASCD/pdf/journals/ed_lead/el_197212_hedges.pdf

Tratnik, T.(2010) Why Clay-therapy is Effective in Treating Childhood Trauma *http://ebookbrowse.com/why-clay-therapy-is-effective-in-treating.*

Tubbs, C., and Drake, M. (2007) Crafts and Creative Media in Therapy (3rd ed.) Slack Inc. 6900 Grove Rd. Thorofare, NJ 08086 USA. PP. 5 -20, 42 - 46, 79 - 96

Young, E. M. and Quinn, E.(1992). Theories and Principles of Occupational Therapy: Churchill Livingstone Publishers. PP 127 – 144

Weston, A. P., Wolfe, D. and Diamond, J. (2004)The use of Clay for Treatment in Medicine and Veterinary Medicine http://www.shirleys-wellness-cafe.com/clay2.htm

What to expect in the IEP process *http://www.helpguide.org* June 16 2011

White, R. P. (2006).The Clinical Application of Clay with Children Guilford Press, 72 Spring Street, New York, NY 10012 website

APPENDIX ONE

CLAY FOR PLAY MANUAL: PARENT ASSESSMENT FORM

Dear Parent/Guardian

Your child has been undergoing a training using the clay for play manual, a research material developed and designed by Esther Dokyoung to test the Impact of clay beads for the education and rehabilitation of children with learning difficulties from three schools in Jos, Plateau State, Nigeria.

Please your child has been given a take home assignment which he/she should return after the holiday. The assignment is accompanied with the guide on clay mathematical game useful for counting, addition and subtraction. The clay for play container has ten clay-beads provided by the researcher to your child; the container should be returned in January which will be replaced to your child at the end of the research with additional clay-beads made by your child.

Please allow your child maximum opportunity to play with the clay-beads, however adequate attention should be given so that the child does not swallow the beads. We wish to request that you kindly observe your child to give us a feedback. You may wish to report on how the child experiments with the beads, negligence or hesitation towards the beads, any benefits and or improvement observed.

Thank you

Esther Dokyoung

+ 234 803 393 0193

December 2011

APPENDIX TWO

APPRAISAL OF THE 'CLAY FOR PLAY MANUAL'

Esther Dokyoung, a post graduate student of Department of Industrial Design, Ahmadu Bello University, Zaria, is conducting a research on the "Development of an indigenous Ceramics Instructional Manual, using clay for teaching and rehabilitation of children with learning disabilities". The aim of the study is to design, test and appraise the Clay for Play manual. The 'clay for play manual' is a step by step guide designed for use in school or at home by parents, teachers and other caregivers for children with learning difficulties and developmental disabilities i.e. mental retardation (MR), Cerebral Palsy (CP) and Autism

Your voluntary participation is kindly solicited to assess the 'Clay for Play manual' hereby provided for your unbiased assessment. Kindly use the checklist attached for the appraisal, the manual with the appraisal forms should be returned back to researcher when completed. We believe the information provided by you will guide the researcher in her assessment of the efficacy of the manual and to make available an indigenous ceramics instructional manual 'Clay for Play' and to improve the learning content of Learning Disabilities

If you would like additional information concerning this study before or after it is completed feel free to contact me or my project supervisors listed below by phone or mail.

Esther Dokyoung
Department of Industrial Design
Faculty of Environmental Design
Ahmadu Bello University
E-mail: endless_arts@yahoo.com
Mobile: +234 803 393 0193

or (Endless Options)
Helping Hands for Women and Youth Support
13 Murtala Mohammed Way, Jos, Plateau State, Nigeria

Prof. A H Ahuwan
Department of Industrial Design
Faculty of Environmental Design
Ahmadu Bello University
E- mail: ahuwans@hotmail.com

Barnabas Danborno, Ph. D.
Department of Anatomy,
Faculty of Medicine
Ahmadu Bello University
E- mail: sbdanborno@abu.edu.ng

Signature of participant agreeing to appraise the manual

APPENDIX THREE

ACTIVITY ANALYSIS BASIC FORM

Adapted from AOTA, 2002: Drake (1999) Hesch et al (2005)

Name of Activity

1. Brief description

……
……

……..

Occupation of Assessor

……

Designation

……

Sex ……

Contact Details ……

……

Phone ……

ASSESSMENT OF THE CLAY FOR PLAY MANUAL

S/N	Checklist	No	Yes	Explain
1	Must subjects be fully oriented and have stable personality to use the manual?			
2	Must subjects be able to read and write to use the manual?			
3	Will thought disorders interfere?			

4	What language ability is required?			
5	Is calculation ability required?			
6	Must children have intact body to practice the play indicated in the manual?			
7	How much hearing and balance is needed?			
8	Does the craft provide the opportunity to discover what is valuable to the child			
9	Will the craft contribute to self- esteem? How?			
10	Does the craft provide an opportunity for testing reality of the child's perception?			
11	Routine: Does the activity have an established sequence?			
12	Habits: Does the activity utilize or reinforce useful habits?			
13	Roles: Is the activity consistent with customary roles of the client?			
14	Do you think this is a 'do it yourself' manual?			

15	Does the craft offer opportunities for affective expression? Hostility/aggression (i.e. motions such as hammering, tearing, piercing)			
16	Does the craft offer opportunities for affective expression? Sadness (i.e. slow movement)			
17	Is the Clay Mathematical Game useful for teaching children with learning disabilities?			
18	Are the types of play with clay indicated in the manual relevant for rehabilitation of children with developmental disabilities?			
19	What is your assessment of the manual? Very good, Good, Fair, or Poor			
20	What additional features are needed to improve this manual?			

Q