OBSERVABLE BEHAVIOUR IN PRE-SCHOOL CREATIVE PLAYS AS BASIS FOR TECHNOLOGICAL READINESS

BY

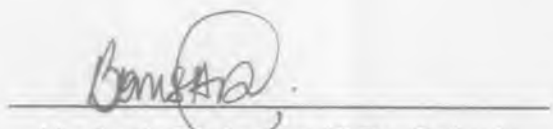
DAVID, ABODUNDE SUNDAY

A THESIS SUBMITTED TO THE POST-GRADUATE SCHOOL,
AHMADU BELLO UNIVERSITY, ZARIA
IN PARTIAL FULFILMENT OF THE REQUIREMENT FOR THE AWARD OF THE DEGREE OF MASTER OF EDUCATION IN EDUCATIONAL PSYCHOLOGY

NOVEMBER, 2000

DECLARATION

I Abodunde Sunday David Bonibaiyede hereby declare that his thesis has been written by me and that it is a record of my own research work. It has not bee presented in any previous application for a higher degree. All quotations are indicated by quotation marks and the sources of information are specially acknowledged by means of references.



Abodunde Sunday David-Bonibaiyede

Nov. 2000

APPROVAL PAGE

This research work "**Observable Behaviour in Pre-school Creative Plays: as Basis for Technological Readiness**" has been read, Approved and found worthy of meeting the requirement for the award of MASTER IN EDUCATION (PSYCHOLOGY) degree in the Department of Education of Ahmadu Bello University, Zaria, and is approved for its contribution to knowledge and literary presentation

Dr. M. Balarabe
Chairman, Supervisory Committee — Date 23/2/2001

Dr. (Mrs) E. F. Adeniyi
Member, Supervisory Committee — Date 2/4/2001

Dr. (Mrs.) A. O. Okatahi
Member, Supervisory Committee — Date

Dr. Ben-Yunusa
Head, Department of Education — Date 2/4/2001

Prof. S. E. Ojo
Dean Post Graduate School — Date 23/1/06

DEDICATION

This project is dedicated to:-

(i) God – for grace bestowed and favour shown

(ii) My wife: Veronica Titilayo Bonibaiyede for her trust, and sacrifice

(iii) All friends who stood by me in my hour of trial, sorrow, and need.

Abodunde Sunday David-Bonibaiyede

November 2000

ACKNOWLDEGMENT

I express gratitude to the Lord God and Saviour Jesus Christ for giving me the grace of being alive and His unfailing guidance all through the programme.

I do wish to acknowledge the invaluable encouragement, and guidance of my supervisors: Dr. M. Balarabe, Dr. (Mrs.) E. F. Adeniyi, and Dr. G. A. Adeyanju who also encouraged me to start the course and tirelessly supervised to completion. To them I owe much gratitude. In the same vein I humbly express my gratitude to Dr. (Mrs.) Okatahi and Dr. Ayaniyi and other Lecturers from other departments notably Dr. M. Afolabi, Dr. A. O. Adeyanju for their encouragement throughout the course. I also thank Dr. M. Musa, Dr. Asiribo, Mr. And Mrs. Otitoju who in no small ways helped me through the statistical analysis.

My profound gratitude goes to the family of Professor and Mrs. A. O. Ogungbile who took me in, as a son. To them I prayed the Lord God Almighty to provide for and surprise them beyond all expectations. I am also extremely grateful to Professor C.A. Folayan for his financial assistance.

The researcher wishes to seize this opportunity to acknowledge the family unceasing contribution through the efforts of Pastor John Bonibaiyede and Samuel Olumohunle for the assistance rendered.

I want to thank all my friends who stood by me when my morale was at its lowest ebb. These are Mr. And Mrs. S.K. Aiyeku, my in-law, Mr. And Mrs. M. Okah a long standing friend, Prof. And late Dr.(Mrs.) Owonubi, Dr. Wale Badakin and niece E.T. Adebayo, Mr. And ;Mrs. S. Agun, Mama Saliman (Madam Idris) my good sister Sulihat

Idris, Mr. Adegboye, Dr. and Mrs. Akale, Dr. and Dr. (Mrs.) S. Alabi, Mr. J. Ochu, bro. Bako, Mr. And Mrs. J. Owolabi, Bro. T. Yawud and Mr. And Mrs. M.J. Umehchivi.

I do wish to thank all my good friends Mrs. B. Bahago, Hajia Binta Salihu, Mal. Aguda, Abubakar Umar for their unselfish sharing of knowledge and information, Dn. And Mrs. B. Omotayo, Dn. J. Ayantebo, Mr. And Mrs. Opawole, Bro. E.S. Banu, Itesiwaju Society of FBCM for their encouragement, prayer and support and also my cousin Sister Elizabeth Ojo who did the final copy.

Finally, I praise God for giving me a wife who sacrificed throughout the period this programme has lasted. To my TEMI, V.T. Bonibaiyede, I say thank you so much..

Sunday A. David-Bonibaiyede

Nov. 2000

ABSTRACT

The research sought to find out through observation of children plays that were of relevance to technological concepts.

In other to carryout the research questions, hypotheses were formulated in measurable terms to aid the research achieve the goals of the study.

Two schools were used for the pilot study and the result helped to establish the validity and reliability of the instrument. Three schools were finally used in carrying out the real project from where data were gathered.

The statistics used for the analysis of collected data were percentages, for reliability of scores. Pearson Product Moment Correlation was used to test for relationship of item codes while a two way T-test was engaged in testing for differences of play pattern between the genders and potential for technological readiness.

Knowing fully well that not all plays are creative (e.g. unoccupied and on locker behaviours) the researcher was able to identify such plays as solitary, parallel, association and co-operative plays that have in one way or the other an influence/impact on technological readiness.

The research was able to identify valuable and observable behavioural patterns, which children exhibit in creative plays, which relates to potential development of technological skills. Such behaviours were observed to have bearings for preparing children's readiness for technological skills.

It was also discovered that a child's play pattern relates to his potential readiness for technological skill. Furthermore, there was a significant difference between the play pattern of male and female children which seem to develop a differential at the level of

readiness for technological skills. It was also established that there is a relatedness between both Dynamic factors, performance factors and technological readiness.

Recommendations were made based upon the study findings. A request for further study at similar level of education, higher levels of primary and secondary institutions were made.

November 2000

Sunday A. David-Bonibaiyede.

TABLE OF CONTENTS

CHAPTER TWO: LITERATURE REVIEW

CHAPTER THREE: METHODOLOGY

LIST OF FIGURES AND TABLES

Definition of Terms

Early childhood:- refers to the child from birth to age 6

Early childhood Education: This is any programme designed for children of age 3-6.

Emotional Adjustment: Product of play for example happiness, contentment, etc which provides elimination of boredom without imposed restriction and which, helps a child to realise his wishes.

Pre-School Education: Pre-school education is that care given to children between 3-6 using play as the main medium of instruction and learning.

Life Long Education/Functional Education: Education which leads to a career in which an individual specializes for a living.

Creative Play: Is that which enable a child discover, manipulate and to sustain the world of things – an awareness of self and capabilities.

Dramatic play: These are plays, which occur when children play home, school, hospital, soldier, hunter, etc; which is sometimes called role-play. It is used as an anxiety reduction agent. Dolls and other miniature objects can be used to represent humans.

Free play: This is a free choice activity that children engage in. They are not questioned about concept or asked to point out the nature of learning and is out of the teachers` control.

Informal Play: Plays that occur in an environment that contains people and materials with whom children can interact, with its atmosphere reflecting a natural seething. Talks and interaction are spontaneous while play and learning concept to some extent are pre-determined by the leader.

Out door play: Plays intended for children to let out steam, excess energy for example running, skipping, jumping. Stress and tension can greatly be reduced through it and it can enhance muscular development and body co-ordination.

Class Play: This consists of plays such as block play, sand play, water play, mud/clay, cooking, sewing, using wood, or didactic toys, drawing, painting, colouring, puzzle fixing, etc.

Personal Adjustment: As in emotional adjustment that: through which satisfaction is derived.

Technological Development: In the context of this study, is the technical/vocational orientation of a person which has to do with material manipulation: cooking, bending, arrangement, setting of blocks, drawing, designs, etc.

Creative skill: The ability of a child to manipulate tools/toys to the highest advantage of creation for example the pencil work, mud, sand, water, block play, clay work.

Dynamic factors/Creative ideas: These consist of desires, motives, attitude and opinions such as inquiry, open-mindedness, critical mindedness, problem solving ability, achievement of thinking and emotional adjustment.

Inquiry: an overt behaviour engaged in as a means of gaining knowledge through questioning, looking and thoughtful attitude as opposed to questions, which shows little or no thinking.

Critical mindedness: An attitude which seeks to know source of an information, constructive questioning of authority, validity of a statement before accepting such as final.

Performance factors/Technical initiative: Same as creative skills, which include tool handling, manipulation and concentration.

Handling of tools: Careful handling of tools or play material hand posture/positioning.

Tool manipulation: Habitual habits that are valuable in creative skills.

Concentration at manipulation: Ability to be able to concentrate to a point of self-forgetfulness during a play process.

Self-Appraisal: Ability to evaluate one's own work, calling to ask if the end product is good enough.

Initiative: The ability to work or engage in one own play with/without supervision or seeking for aid from peers or teacher.

Play Pattern: These are the various types of play engaged in by a subject for example solitary play, parallel play, associative and co-operative which aids technological concepts.

Technological Readiness: a state whereby children can engage in technological work safely or without difficulty for an early start.

Study Flight: Learning through observing children at play as they move from one stage to the other without instruction from an adult.

CHAPTER ONE

INTRODUCTION

1.1 Background To The Study

Play is not a luxury but a vital necessity, which is necessary like breathing, bathing and sleeping. It is a process engaged in by all intelligent creatures. Play has been described, as a means of learning by discovery and practising the skills needed to survive in the world. The first toy available to children are their bodies and mother's bodies from which they learn by manipulating creative ideas and activities. The hidden curriculum of children contain all forms of learning activities that are stored in their minds. One may not be consciously aware of them, such learning determines many of one's action but they are retained throughout adult life.

Children often play in different situations; role-playing, day dreaming, dramatic plays which arose out of a child precept-image and action process. The level of which determines his creativeness from which we have been told the values accruing therewith as emotional and social adjustment.

Every child is born curious but unlike the birds and other animals who grow to live on instinct, the human child grows by learning. Harley (1952) states that play is "the way a child learns what no one can teach him." Play reveals itself at the earliest ages and affects all other developments. Children's play has always been of interest to Psychologists: when we watch children, we notice that there is nothing more important to them than to have the opportunity to play. The excess energy in children are exhibited in their aimless shouting and direction less rushing around. This is mostly seen when they are given the opportunity of freedom after a quiet moment; for them states Scarfe, (1962) "Play is education."

The origin of play is innate. Activities in every living being most especially the mammalian class as seen in the mother dog with its puppies, or between puppies are typical example. Play is central among monkeys, cat and chimpanzees. Play is an inborn phenomenon, which can only be interrupted by feeding and sleep. An early exhibition of play in a three-month-old child can be noticed when putting apparel on him. The continuous banging of things, the dropping of items and watching apparel are nothing but novel activities a desire to know. A child's desire to play is often seen in its tah, tch, tch, ta, ta, ta, and other types of lip thrilling at new found skills.

The curiosity for play develops into an act of learning, which eventually lead to proficiency. The act (play) creates a desire of knowing but when does playing with a toy become a tool and when does this tool become an instrument of skill? Looking at play one wonders if technological skills are not embedded in its diverse form, as technological innovation is a product of one's ability to fantasize or daydream.

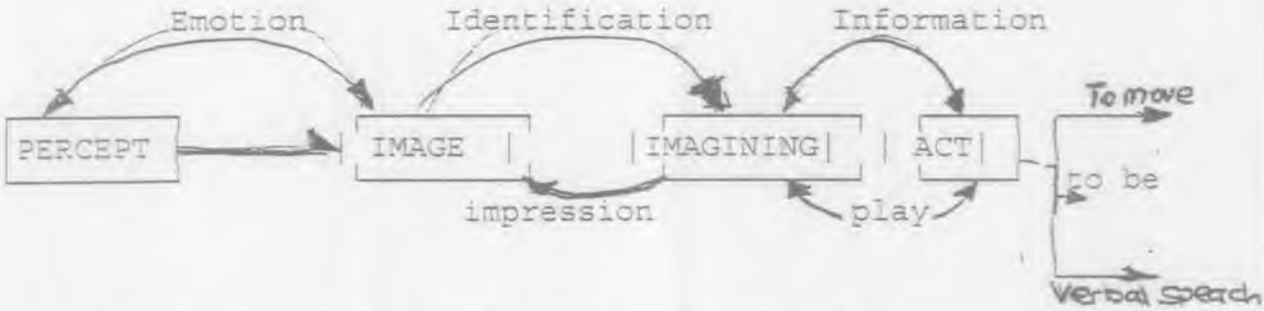
Just as play can be used to foster democratic tendencies by encouraging children to play in group (co-operative and associative plays) so also can certain aspects of play be of great relevance in the stimulation of technological preparedness in children.

Children in free play are sometimes noticed to have put things together which beats the imagination of adult (observers) and on most occasions one is tempted to ask "who taught you?" Be it in sand play, mud, clay, pastry, water play or object assembly. These plays make one to ask if such diverse plays and drawings could not have formed the basis for technological concepts. To help a child elicit the right response for creative play calls for respect for the child's right to play instead of adult rudeness in interrupting children's play forcing them to be submissive and well behaved. Our rudeness consists of not allowing

children carry through most of their plays which constitute the foundation for a practical functional living. When we deprive children of this greatest joy of childhood, the urge to realize the effective environment-interaction is hindered (White, 1963). Therefore, there may be frustration or loss of confidence as limit has been placed or created in the child's tendency for exploration.

Creativity, writes Heafele in Forste, (1971:3) "is the ability to make new creation and that which has social worth." Adeyanju, (1985:15) said creativity is the ability to produce original ideas or new solutions to problems". The value of creative play is the backbone of pre-school educational goals: improving self-image, fostering intellectual, emotional and social development.

Children especially those of poor socio-economic background on most occasions use milk tins, insecticides containers, wire and corn stalk to make cars, and lorries of various shapes and patterns. Kites are also made from papers, and bread packs. If play is the expression of the mind, (Perception and imagining) these manipulations can be said to have fulfilled Courtney's paradigm of percept – image – action (fig. 1.1a 1.1b) as the child builds on previous information for examples answers to what is taking place in his head of what is (car, truck, aeroplane Doctor, nurse,) become actualised through object building- constructive play.



⇒ Fig. 1.1a the Paradigm of Percept - Image - Act.

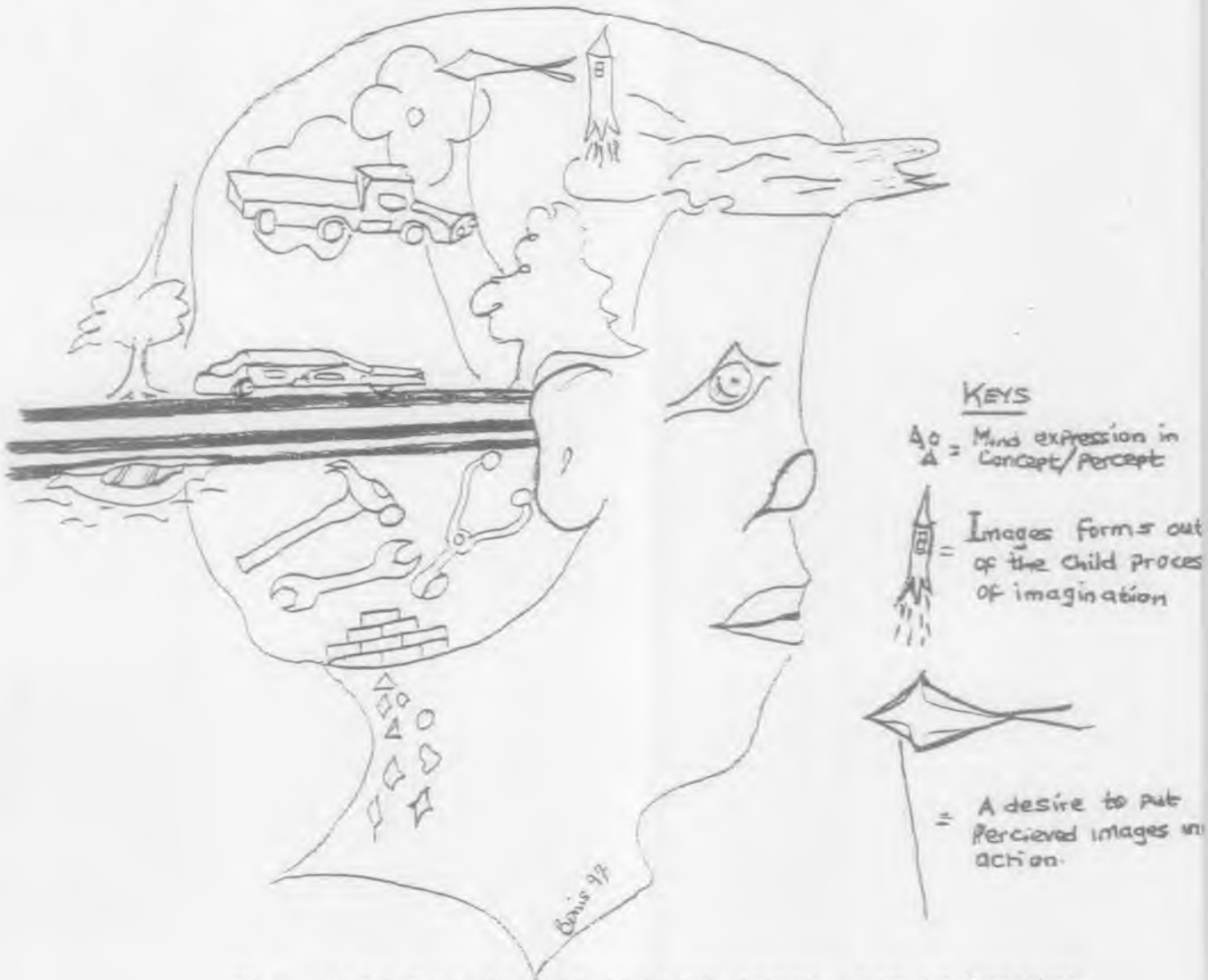


Fig. 1.1b Paradigm of percept-image -act in drawing.

The act of being pushed around by peers provides children with great fun corresponds to what Gravey (1971) in Siann and Ugwegbu, (1983:34) referred to as "an attribute of play: play is enjoyable and therefore makes the player want to engage in, the enjoyment act as intrinsic rewards". From the above one can say that creative play enhances physical attribute, social learning, life practical and functional education. This awareness of creative play value is what Crane, (1973:15) elaborated as:

(i) A realization that most of the social behaviour of children is the result of their learning as members of a play group.

This corresponds with group-work co-operation in technological (product) development.

(ii) Attitudes, beliefs, goals, customs and language are learned through play whose cultural value has great effect on technological development.

(iii) Through creative play, children are able to explore their differing role and come about the importance of division of labour, which is necessary in technological development.

Piaget has also shown us that schema is built on previous experiences as the latter contains the element of the earlier. Without adequate schemes later ones can be warped and twisted. In creative play, children who tend to initiative learning often have their attention sustained and what is learnt is retained for longer period of time. This principle can further be enhanced if the creative children's product are kept or displayed so that fresh ideas or initiative can get spurred from them.

From the above, the researcher will want to define creative play as that which enable a child to discover, manipulate, and to sustain the world o things; learning the dos and don'ts of interpersonal relationships with peers and age groups; an awareness of self and capabilities.

Among the values of play is the development of motor skills (distance eye-body coordination in water play, clay work, drawing, puzzle fixing, block play, and other creative acts) which will be hard to teach by formal training. All these contribute in one way or the other as a base for technological preparedness.

During creative play, a child can tell you what he wishes he were and what he would want to be: walking in adult shoe. This will lead him to different types of role play e.g. "I am the teacher, I want you all to listen and repeat after me", "I am an astronaut" hence he commands a space ship, "I am a doctor" with his stethoscope; a nurse" with her drug tray or "an army officer" intimidating others in the group.

Creative play can also be produced using paper and pencil as in drawing, colouring, painting, printing, clay work, modelling, tent-making, hut building, nailing and hammering. These constitute that which can be built upon to strengthen children imagination to higher creative endeavour.

1.2 Statement of the Problem

It has been observed that in the educational system the pre-school child are not exposed to adequate creative plays, which should evoke technological innovation or preparation. This is evident in the percentage ration or our children in both primary/secondary schools. When asked what they hope to become in life, majority have always given Accountancy, banking and financing at the expense of physical engineering courses. It is this problem that leads to the research effort of finding out by observation of nursery school plays, the things that constitute the basis for technological readiness among pupils. With the awareness that children learn through play, problem arises in measuring the level of technological readiness can be observed in a child during play in the nursery school.

1.3 Objectives of the Study

Many people are yet to comprehend the value of creative play in social, emotional and body co-ordination development of a child. The research is intended to:

1. Identify some valuable and observable behaviour pattern which children exhibit during open creative play which may relate to potential technological skills.
2. To observe and document behaviour of children in creative play which are directed to technological readiness
3. To secure data through the use of observation for analysis of creative play as a base for technological preparedness/readiness.
4. To find out through observation of creative plays the effect of gender play pattern on a child potential readiness for technological skills.
5. To find out the relationship between dynamic factors and performance factors as they relate to a child readiness for technological work.

1.4 Research Questions

The study sought to answer the following questions

1. Does a child play pattern relate to his potential competence in technology?
2. Will a male/female play pattern be related to his/her potential in technology?
3. Will a child's creative actions (dynamic factors) be related to his potential in technological skills?
4. Will a child's performance factor (technical initiative) relate to his potential for technological readiness?

1.5 Hypotheses

The following hypotheses were formulated to guide the study:

(1) There is no significant relationship between a child's play pattern and his readiness for technological work.

(2) There is no significant difference between a male/female child play pattern and his/her potential for technological readiness.

(3) There is no significant relationship between a child's creative activities (dynamic factors) and his potential for technological work/skills.

(4) There is no significant relationship between a child's technical initiatives (Performance factors) and his potential for technological readiness.

1.6 Significance of The Study

The study will help decision makers to (i) understand the need to re-evaluate the nursery school curriculum (ii) up-grade the required equipment standard of Nursery schools towards enhancing technological readiness, (iii) enforce operators of nursery schools to implement same (ii) above. (iv) enable policy makers to formulate policies that will assist in creating a better intellectual, environment for practical oriented children who will be highly prepared to continue to grow with technological aspiration in their primary, secondary and tertiary educational careers.

1.7 Basic Assumptions

In the planning and execution of this project, the following assumptions are made:

1. That a child can exhibit his own ability elaborately during the period of play.
2. That there will be no personal interpretation of any of the subjects by the observer while the children are engaged in play.
3. That the research assistance is competent in recording exhibited behaviour.

4. That none of the subjects will be compelled or intimidated to engage in a play he/she is not interested in.
5. That the teacher does not dominate the play.
6. That there is no sex stereotyping of children's play.
7. that the environment will be conducive to the children to engage in play.

1.8 **Scope**

The study is a study of some selected nursery schools (Foundation Nursery School, Namu Nursery School; and Ruby Nursery School) all in Maiduguri Metropolis. These are children in kindergarten (Nursery 3) level and of age 5-6. Since pre-school education belongs to the Non Governmental Organization (NGO), the sample drawn will only cover such schools that are equipped to elicit such observable behaviour that will enhance technological preparedness.

1.9 **Limitation**

A limitation error may occur in qualifying for the sample size at attendance percentage of 80% due to marking error such as a child who may come after registration yet still referred to as absent or should attendance recording be delegated or an outright present marking for all the children.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

In this chapter, the researcher presents a brief history of pre-school education from the early seventeenth century (1600 A.D) when Martin Luther advocated for the education of children through the end of the Nigerian civil war (1970) when the Nigerian government began to encourage early childhood education to present day preschool educational practices within our Nation's boarders. The importance of technological development to a nation economical development was examined and also presented.

2.1.1 Pre-School Education

The history of preschool education can not be separated from that of kindergarten education which started in the early seventeenth century when Martin Luther (1624) urged public support for all children and John Amos commenius (1628) Great Didactic where values of education for all children based on the law of nature were professed. Jean Rousseau (1762) in his Emile says education should take into account some considerations based on the natural growth and interest of the children Emphasis was laid on home education and learning through John Pestalozi's (1801) discovery. The first kindergarten was established in Blankerburg, Germany by Friendrich Freobel (1832), which spread to the USA in 1855 through Mrs. Cart Schurz in Water-Town, Wisconsin. In the year 1896, John Dewey whose programme is based on child centred learning with emphasis on life experience started the laboratory school at University of Chicago, Illinois.

teaching method: that children learn best by themselves in a properly prepared environment. The first research was conducted on pre-school education in 1912 by Arnold and Beatrice

Gessel. The first open-air Nursery was founded in 1914 in Great Britain by Margaret and Rachael McMillan whose contribution was on healthy living. With the publication of Erickson (1952) on stages of growth and task development, we were made to understand that the locomotive genital is the right stage for initiating activities, enjoy achievement and competence.

The launching of sputric space Craft in 1957 by the then Soviet Union, Spurred the United States of America National Defence Education to re-design her nation's educational programme to meet national needs particularly the sciences. This resulted in the American's interest in other educational system including the Soviet Union whose success of spacecraft was adduced to education opportunities which is available at an earlier age when compared with the United State of America Public Schools.

This alsocorrelates with the then Czechoslovakia's approach which had already gone far on the effective use of play and Didactic toys approach of the father of Nations' J.A. Comenius.

The discovery by educators and psychologists that deprivation are somehow permanent hence an early preparation is seen to be essential for the disadvantaged. The Nigerian Government came to realize the importance of early childhood education after the Nigerian civil war of 1966-1969 where it was discovered that Igbo children were advance creative than their age. This came to being by their Greek like philosophical approach to early apprenticeship system in different works of life. This could still be found to be true that most students who enrolled today in Technical College are those who right from an early age are inquisitive about creative development.

2.2 Types of Pre-School Education

Pre-school institutions are privately owned by individual or organisations e.g. church/mosque/women group/firms or university run as community service or as part of welfare scheme for employees (as mainly practiced in Socialist countries and Israel Kimbulz). There are three major types of pre-school namely Day Care, Nursery, and Kindergarten.

DAYCARE CENTRES: They are institutions which provides care which does not have much educational content. They take over children from families who could not conveniently keep their children at home due to work schedule. There is no age limit. They look after children from morning until parent pick them up.

NURSERY SCHOOL: Nursery schools admit children who are 3-5 years old. They provide programme which have educational values and which lead to the over all development of the child. Organizational values and which lead to the over all development of the child. Organizational based Nursery schools far better than the privately owned as they have more space and better qualified staff than those run by individual proprietor. Admitted children are normally grouped to the age group – Nursery 1,2,3 that equates ages 3,4, and 5.

KINDER GARTENS: The Kindergarten admits and caters for older children in the 4 – 6 year age bracket. In many instances, the Kindergarten is the preparatory arm of a primary school hence a more determined effort is made to provide readiness skills for primary instruction.

2.2.1 Forms, Types, Kinds and Purpose of Play

If play is the way in which a child learns what no one can teach him, which the father of kindergarten Froebel, (1774) considered as the highest level of a child's development as nature unfolding event occurs. Morrison (19.....236ff) classified some forms of play as

informal, free play, dramatic, medical/play therapy and outdoor of which four are found to be of great value or relevance to innovative design/technological development (Fig.2:1).

Type	Nature of Play	Characteristics of Play	Critical Factor of Play	Examples
I	Exploratory Manipulative (Object and Pattern Play)	Exploration of single object sensori-motor enjoyment. stimulation. form basis for all play	Variety and complexity of toys. Adult allowed relation to press.	Looking. listening tasting touching and mixing.
II	Instructional (Means-end)	Play to purposely accomplish things. How tools (object-object) manipulation to produce effects.	Variety of material Freedom to try things out. Adult who encourage children to develop relationship.	Puzzle activities. firm board using object as instrument.
III	Construction-Creative	No single set of combination media material determines the organization as a pre-determined goal action of a new from of structure.	Language development opportunity and play.	Role playing. dress up activities of make belief role.
IV	Symbolic and Socio-dramatic	Mental play used of language to symbolize things. visual. imaginary use of words and phrases carrying out idea of things through play.	Language development. props for play and opportunity to play.	Using tricycles as tricks. dress-up activities make-belief roles.
V	Language	Play with language. Trying out language. rules of sound. grammar and how words represent things.	Using language activities. Nursery rhymes e.g. children's literary and conversation stimulation.	Play with grammar form and with meanings e.g. calling a dog a cat.

Fig. 2.1 Play in infancy and early pre-school (Play types)

- Source: Fowler (1980:148-58).

Parton (1932:247-251) has helped in classifying play into six different forms.

These are:-

1. Unoccupied Behaviour: the child apparently is not playing at all but occupies self in watching anything, which happens to be of interest to him. When there is nothing taken placed, he plays with his own body, gets on and off chairs, just stand around or sit in one place glancing around the room without doing anything observable.
2. On Lookers Behaviour: The child spends most of his time watching others at play. Often he talks to the children, ask questions or give suggestions but does not enter into the play himself. He sits/stands within speaking distance of the group so that he can see and hear all that is taken place.
3. Solitary play: This child plays alone and independently with toys that are different from those used by other children within speaking distance. He makes no attempt to get close to or speak to the other children. Most of the time he is mostly unaware of what goes on around him due to his concentration. This can serve as basis for self dependence and ability to work single handedly with or without supervision (italic mine).
4. Parallel Play: The child plays independently but the activity he chooses naturally brings him among other children. He plays with toys which are like those which the other children around him are using but plays with toys as he sees fit and does not try to influence the activities of the children near him. This has also be found to influence creative ideas.
5. Associative Play: The child plays with other children. There are borrowing and lending of play materials, following one another with trains, truck and wagons, cars and buses with little or no attempt to control others in the group. Though

children interact with each other by asking questions or sharing materials, they do not play together.

6. Co-operative play: Children are actively involved as a group in playing together for the purpose of making material product, striving to attain some competitive goal, dramatizing situations in adult group life or playing formal games and methods of attaining it called for a division of labour. This kind of play is the least frequently witness at pre-school level.

The purpose of creative play according to Hendrich, (19...,314) are that play develops the creative aspect of the child personality; contains rich emotional value, enhancing social development and fostering both physical intellectual development. To achieve this starts with the home where children questions should not be treated as trivial/socially embarrassing least they become discouraged as being unacceptable. This creative art equates the process of sinking taps into our past experiences and putting things together into new patterns, new ideas, or new product (Smith, 1966:4). For not to answer a child's time which Haywood, (1964) in Papalia and Olds, (1979:237) says "The worst thief is he who steals the playtime of children."

2.3 Technological Readiness

Just as education is seen as the key that unlocks door to modernization, technological development is the gateway out of poverty in the life of a nation country. Technological development just like economic development is ultimately the result of human effort which takes skilled human agent to discover, exploit the natural resources in developing technological concepts and to produce goods which enhances the continuity of trade. This development seems to stress the point that the importance of education, training and creation

of skills can not be over emphasized for there can be no economic development without technological advancement of which education plays both the seed and the flower.

The inability of Nigeria to develop economically, can be hinged on the country's inefficient and non-investment in technological education viz for lack of foresight in tapping from the crude knowledge of children's play at pre-school level. It is impossible to go to the moon on a broomstick but in a spacecraft, so it is that a nation is called a beggar nation because it leaders lack foresight in the development of technological amenities. The significance of technological readiness for the nation and not just for our pre-school education can only be reached if we adapt the slogan that all Nigerians should think technology, dream technology, talk technology, and finance technology innovations. This technology will free the nation permanently from economic bondage.

In different parts of the world, there is a form of advancement of one product over previous ones. Any nation that toys with this aspect will make herself a dependent nation on those which seeks to progress. For example, the Island of Taiwan has successively transformed itself from an unknown appendage of China into a nation to reckon with due to the huge technological investment and achievement she has made. Hong Kong is like a dream world to the world and particularly to mother China, so also are Singapore, Taiwan, Japan and South Korea which was rebuilt from war ashes to become a world power of economic and developmental growth. Malaysia took Palm tree fruit from Nigeria to cultivate; today she is the leading country in the exportation of palm produce while Nigeria has turn round to become an importer of same instead of exporting. Japan is what she is today because it focused much on technological advancement which takes its priority from early childhood education through tertiary institutions. Brazil and Nigeria entered the arm race industry the

same year (1960) today, Brazil is an exporter of sophisticated weaponry while Nigeria has degenerated to importing virtually every item of warfare. Nigeria has lost her giant of Africa status to just independent South Africa and worst still the National Gross Product (NGP) of Nigeria has sank to less than $210 per annual dropping us to the 16th position from the 1st in Africa (1994 World Bank Prosperity Index in National Concord April, 1996:16).

Concession has to be made to the industries so as to improve the economic life of the people, and to improve the economic status calls for the improvement on the national education sector. NUT, ASSUP, ASSU should be encouraged not to go on strike by meeting their needs as what ever ill that come over them produces a greater woe upon the national technological and economic life line; hence educational reform which is strategic to development is required. This calls for the achievement of balance in our educational programme from pre-school to the highest level of tertiary institution and also involving all industrial experts in the formulation of the right syllabi for our educational institutions as it is done in Japan, Hong Kong, United States of America, Great Britain and Germany.

The effect of technological development will be felt in all sector e.g. in Agriculture; farming will become simplified as mechanized farming will aid higher yield and better post harvest preservation techniques. Having the right agricultural inputs will cause a downfall in food prices. If more electrical/mechanical engineers were produced from our polytechnic and universities, our hydro-electric power stations in Kanji and other power stations would efficiently function hence less or no power cut, NNPC engines would become functional making petrol to become available at all time which will reduce the cost of gas, transport, petroleum product vis-à-vis commodity and food prices. A sound technological development

would foster good maintenance culture. This habit is nurtured at the early stages of life as the child passes through early childhood education.

Today, the price of an automobile is beyond the average civil servant purse, this can only be eased through aggressive technical know-how and development. At a time like this, road side mechanic, panel beaters, auto-electrician should be involved in the production of various automobile that is suitable for our roads.

As man continues to search for means to make life more comfortable, for himself, we all in one way or the other are enjoying the fruit of technology viz we use the services of cars, train, aeroplane, ship, radio, satellite which has made the world a global village, telephone, musical instrument, computer and even robot for end product accuracy in design and production.

Through technology, we have good pipe borne water supply instead of streams and shallow wells, also cooking has become simplified through the use of kerosene, gas, and electric and of late thermal cookers and microwave instead of firewood and charcoal. Farm products such as vegetable and dairy products can now be preserved through refrigeration, pasteurisation and freezing. Grain can better be stored through fuctocination. Tubers such as yam, cassava, and potatoes can now be stored for longer period by turning them into powder and flour.

The fruit of technology is more than stated above as it is evident in modern building system and designs. What shall we say of medical technology such as the testube babies, sperm, egg and blood banks device invented by a Nigeria, soldier for recycling blood, breathing assistance devices, hearing aid devices, invention of vaccines and the on-going research work on Aid vaccines.

The effect of technology is felt without colour bar, or age group. To appreciate the fruit which technological development brings therefore calls for an encouragement of an innate desire in man to play and specifically creative play for "if creative product has about it anything unique, it is the quality of surprise" Brunner (1976:641) which technological development is.

2.3.1 Creative Play And Technological Readiness

Persistency is an in born phenomenon in the heart of man and it is a fortunate occurrence that a child natural interest persist despite adult attempt or devices to stifle them out. Give a child the opportunity to exhibit his excess energy in real life action, he will usually forsake food and rest for his own make belief play. Arbuthon 1947 in Ward, (1954:5) summarized this "as fulfilling one of the needs of the children to achieve something worthy". The little handicraft a child engages in offers the child opportunities for changeling his emotion into constructive uses; so long as a child is engaged in something worthwhile, he derives both aesthetic and spiritual satisfaction that goes with him into adult life. The significance of this to technological readiness is that creative play enable a child to be able to devote all his attention (concentration) to a practical job at hand and he is able to sustain same at any given time.

Creative play strengthens imagination, the importance to technological readiness as the child grow is the ability to put into record or design form, that which come to mind in graphical/diagrammatic forms. A story was told of how the inventor of sewing machine got his ideas through day dream. Imagination is an important foundation in design technology which also influences or affect production technology. This is verified when Lowenfield

(1952) cited in Ward, 1957:6) "that most adult loose their creativeness as they can not be presented and unified with the mind."

In creative play, a child learns how to work one with another. By this team-work spirit he learns to know the pleasure of being necessary to others. As the child learns that others are needed to accomplish a task, when this is translated into technological out look; it can be equated with sensitive growth (divergence) toward the thoughts and feelings of others.

In no field is the freedom of expression better expressed than in creative work, so also it can be stated that what is needed today is how to encourage the child to translate their thought into craftwork either through drawing, painting, or colouring. This is the premise upon which technological concepts or innovation can easily be fostered. As children are been introduced to the use of various materials e.g. sand, water, mud, clay, wood, sawdust, it further increases their initiative and resourcefulness in sourcing new raw material for technological development.

Creative play encourages the spirit of give and take (as obtained in cooperative play) so also is the need to let children know that they need others to grow progressively, which can also equate with a value for democratic procedure in and out of classroom or workshop. Evidence the world over shows that technological advancement is hindered under repressive regimes or in an unstable political environment, as investors will run away. A typical example is that in which Nigeria find itself despite the investment enhancement been given to investors e.g. tax freedom, deregulation of the parallel forex market, free hand to send profit home yet both foreign and local investors are backing off. Talents which abound in those critical of the government are only suppressed the more instead of been encouraged under both civilian and the military regime. Democratic procedure gives room for competitive

development as it's found in USA, UK, France, Japan, Canada, Germany as democratic reforms encourages foreign investment: Taiwan, Russia, Poland, Hungary; and China are currently experiencing this advantage.

Another value of creative play is that it can be pursued without playmates. This is also what takes place in technological programmes as the ability to work independently is of great importance.

2.4 Concept, Principle and Characteristics of Creative Play

Having briefly stated the kinds of play and its significance in 2.2.1, here I will be concerned with that which has relevance to the development of technological concepts. Creative play been stated to have great value in contributing to the personal adjustment which is hastened through solitary, parallel, associative and cooperative plays, the characteristics of which is deciepated by Parten's classification.

In early creative plays, children make things from mud, clay sand, paint, wood, hay and sticks, paper, pencil and crayon. As they grow, the progress from block building to painting, modelling, drawing puzzles fixing, hut/tent making, dam building etc. Though boys and girls use the same material, their construction reflects traditional sex-appropriate patterns. This idea was discovered by Coates that girls are more generally field independent than boys in the use of pre-school embodied figure test. This was reached by Erickson when he reported that girls seemed to be specially interested in open inner spaces as evidenced by their structured representation of home interior without walls, using elaborate entrances and oriental gateways which contrast with boys building dams, towers, rail-road, roads, bridges and other solid and high constructions. It will also be noted that girls prefer playing home, hospital while boys are ready at any moment to play hunter or soldier.

2.4.1 Problems of Children In Creative Play.

Neglected and abused children are often reluctant to get involved in play as they remain withdrawn and apathetic. To such, the quality of their play is likely to be constricted and poorly organized. Lack of imaginative play is also typical of children with infantile altruism as they play most of the time in restrictive, rigid manner, resenting interference of their activities. They are on most occasions not able to elaborate their fantasy or ideas that may come to play within their minds. The effect of this behaviour on technological advancement is that children are much more given to criticize negatively the work of others which they on their own could not engage in.

Another hindrance to creative play is the number of hours children spend watching the television. This is known as the great cause in the disappearance of childhood as the TV presents information that is available to all in an undifferentiated form. The television erodes the dividing line between childhood and adolescence in four ways:

- It requires no restriction to groups it forms
- It does not make complex demand on either mind/behaviour.
- It does not segregate its audience.
- Electronic media finds it impossible to withhold secrets and without secrets there can be no such thing as childhood (Postman, 1982:80).

2.5 Psychological Perspective

Pre-school years are time for play of which parents are encouraged to allow their children enjoy for in so doing they give them opportunity in being smarter, quicker and altogether effective. This Morrison (19...236) view as an opportunity to hinder learning which Papalia and Olds, (1979:237) described in their saying "the worst thief is he who steals

the playtime of children". Though some studies have been carried out on play, none has been written on its relationship to technological readiness. Therefore citations on the values of creative play will be by inference to the potential development of technological concept.

The belief held by Piaget that play serves as function for assimilation is seen by Forman and Hill in Morrison (19....237) as a great contribution to constructive process which in itself increase the competence of the child. For competence learned through play makes even more creative acts possible - "competence leads to more and higher level of competence". The concept of free creative play advocated by Froebel the father of Kindergarten that children be allowed to engaged in building, carpentry, sewing and sweeping as the spontaneous play of children does not only create emotional relief but discloses the future inner life of the man in him. This implies that a child who on his own volition engages in creative play has a greater tendency to become a potential technologist in the future when given the right guidance Froebel in Morrison, (19....44-47). This also tallies with Party Smith Hills view on free use of material in creative play with her introduction of large blocks and centres where children could engage in house keeping, sand and water play and other activities as they wish (Morrison, 19.....261).

John Comenius the Father of Nation's in Hendrich, 19....35) believe that man was born in the ;image of God, it is therefore man's obligation and duty to get educated to the fullest extent of his abilities in meeting the God like image ;hence education which begins in the very early of life when children can be shaped and fashioned. For him "like wax when soft can easily be fashioned and shaped, but readily cracks when harden: Like a young plant can be planted, transplanted, pruned and bent, this way or that; when it becomes a tree these processes are impossible". This implies that a child can be moulded into a desired profession

in life when given the right tools to work or play with which also tallies with our proverb that a fish can be bent when fresh but breaks when dried. This also correlate with J.B. Watson (1958) educational philosophy when he said "give me a dozen healthy infants well informed and in my own special world (World of Play) to bring up, and I will guarantee to take anyone at random and train him to become any type of specialist I might select: Doctor, Lawyer, Artist, Merchant, thief, Engineer regardless of his parent penchant tendencies, abilities, vocation and/or race of his ancestors" (Watson in Papalia and Olds, 1979:9).

The belief that children's play can serve as basis for technological readiness was further strengthened by Dewey and Montessori that a child in a prepared environment has an opportunity to learn the use of tools and objects from which a child begins the process of education and develops other interest into inquiry and discovery in Morrison (19…..50,74-77).

What shall we say of Pestalozzi and Luther who in Morrison, (19…..42,34) advocated vocational education for children right from early stages of life. Pestalozzi in his educational practice said his method is as that which simply follows the part of Nature which leads the child slowly and by his own effort from sense impression to abstract ideas for to teach a child to look upon every object that is brought before them then as a unit and as separate from those with which it seems connected. Through this he believes that the normal potential of a child will be developed. For Luther the greatest care should be given to the education of the young because the security of a nation does not consist alone in it's great treasure, firm walls, beautiful houses and munitions of war because a careless leader who comes to power can not use it to sustain the nation but to cause her great injury. Instead the highest welfare or safety and power of a nation consist in able, learned wise, upright cultivated citizens who can secure,

preserve and utilize every treasure to advantage. For him the utilization of material rest in developing a strong technological potential which is unbiased..... for the establishment of schools everywhere both for boys and girls for the maintenance of civil order and proper regulation of household; needs accomplish and well trained men and women – for to him men come from boys and women from girls who are taught and well brought up. This views can ;not but be true as this is the practical issue. Nigeria is experiencing today. This calls for a complete overall of our educational system from pre-school upward so that leaders with visions can be raised for the sustenance of the country for to raise a generation of technologically oriented people, quality education from pre-school is imperative.

Piaget Perception of the pre-operational child account for his constant and recurring act of questions of why things happen and how things work, act as basis for vocational choice because a child believes in his parent and teacher which Faw, (1980:279) says arouse ;from familiarity. Adapting this Piagerian thought were Kamii and Devies who inferred that independence autonomy (as in solitary and Parallel) Curiosity, initiative are ingredients for the growth of inculcation of technological ideas (Kamii and Davies cited in Morrison 19:137).

2.6 Previous Studies

Though there is no recorded behavioural and observation research work on creative play as bases for technological readiness, studies have been conducted in some technical areas of craft, design and technology with the aim of re-diversion/redrawing the curriculum as a child (learner) based problem solving mechanism same of ;which are found to be of great importance as similar to the research task of observing children behaviour at preschool creative plays as ;basis for technological readiness.

Grant (1983) was discussing the starting point for pupils entry into technology when he stated that the traditional approach of hand craft course is practically concerned with acquisition of knowledge; knowledge about materials, construction and techniques though practiced in schools but largely irrelevant to the need of boys and girls by education's. His view is that both the traditional and designed structured technology approach emphasize the intellectual skills involved in design making in technological context. The assumption involved in practical solution of technical problems through play, pupils will some how become aware of the impact of technology on the society and society influence on the direction of technological change stressing on skill knowledge and value importance. The GATE project (GATE: 1982) in the best of craft, design and technology (1987:4) found out that when social respect for technology in school design and make activities is emphasized, children will readily assimilate and put into practice that which is learnt through the learning medium of play. It is also the view of Grant (1983) that craft, Design and Technology when approached from the angle of issues and situation for example, Design and produce a burglar alarm, the emphasis will change from object to people and from impersonal to personal (this brings in the value system: issue relevant to technology and the appropriateness of technology to solution) as pupils tends to make valuable judgement about the nature of technology which may even lead to a rejection of technical fix to a proposal of social solutions. This he concluded when he stated that;

> Pupils can proceed to `design and making' activities with the knowledge that their work has a social relevance outside the school workshop and that their moral decisions controls technological activities. This approach would ensure that pupils are fully involved in the design process in that they acquire knowledge related to materials and scientific principles above all encourages young people to criticize technology, define their own and to pursue their own interest.

Reynolds (1986) related his experience with a group of 12-16 year old (239 boys and 562 girls) at Present school, where students were guided but given free hand to design a solution using antics of their imagination, divergent thinking and originality (project-observational drawing in seas-based theme) enthused:

> We do not prescribe the way an individuals interprets the brief (sea-based object) but once the briefs are chosen, using a range of techniques-reduction, enlargement, re-arrangement, identification of positive spaces, juxtaposition of elements, shapes and 3-dimentional modelling. Design no longer presupposes uniformity; the dominant feature of the teacher is to encourage pupils to generate a variety of possible solutions to any given problem, communicating through ideas, images and materials.

In a project conducted by Standard (1986) Design education is seen not as a subject area, not even the prerogative of a particular group of subject teachers but as a dimension of the curriculum to which many teachers can contributes as it is open to everybody to enjoy with understanding and insight; the man-made world of places, products and images, providing seed bed from which will come the range of future professionals designers as it highlight the significance of values and respect for cultural and personal diversity, creating room for compromise and reconciliation, developing human skills that are dependent on coherent and purposeful interaction between perceptual, analytical, prepositional, communicating, t3chnical and manual skills.

In the work of Rogers and Gentle (1986) making changes in Best of craft, design and technology (1985:25) observed that patterns formed in the mind of children become the basis for further action and are the foundation for much of their understanding. These developments are clearly registered in their drawing, mark making, and organization of materials – objects and things. The drawing of young children reveals their immediate needs and direct experiences of the world. He also feels that there is a need to give children confidence in the use of images and construction.

Bosanko (1987) was of the view that many school teachers have been involved in CDT to some extent without even realizing it as they worked with children who identifies problems and posed solutions, through designing, making and evaluating models that illustrated their investigations. He further extrapolate that this experience should be built on at the primary level and be made like English a "learning across the curriculum" as advocated by Plowden (1967) when he said:

> A building model could pose a problem of structure and stability, measurement and calculation, design and construction leading to patterns of bricklaying, strong walls and arches, investigating building techniques-ancient and modern .... one will have to decide whether or not to forget the normal and follow the natural curiosity of children and widen your work of study flight.

Bansanko was to report a research student who is afraid of CDT in studies in craft design and technology (1988:137).

> "In my own class, my basic aims are to give children a sense of control over technology science, and the social world by giving them the responsibility for identifying their own problems, and arriving at solutions for this I did not or do not have a written syllabus or scheme should this happen, it means there is a correct answer somewhere in the back of the teachers mind. Hence, I give the children the privilege of embarking upon an idea we can see may lead nowhere... They themselves must reach the decisions that their original assumptions was wrong/right... The ability to tolerate ambiguity is a prerequisite for high level problem solving and therefore, I as a teacher have to be working and learning with the children as an internal member of the design team, rather than an overseer or director.

From the same research work, BCDT 1988:139 a first year junior pupil was said to have decided to make a model windmill, the teacher was expecting a paper box model but the girl made a prototype with a wind handle at the rear which enables it to sail round. She was not satisfied as it could not function, she cut open to put cogs made out of cotton reels and lolly sticks stucked into them with a vertical shaft and two more reels at the bottom representing the millstones. When the handle was turned the top millstone turned the flour

which had been carefully put into the top cotton reel trickled out from between the bottom millstones.

When asked where she got the idea she said, she saw the picture in a book, visited a water powered milled from which she developed her theories to solve an inner desire-windmill. From her experience other children developed interest in cogs and pullets leading to experiments, which investigated energy transfer. From the above it was discovered that "children gained much experience in mechanics, language, arts, mathematics, geography, history, manipulative and practical skills" pg. 140.

A research work sponsored by Nottinghamshire curriculum Development support services (CDSS) at Nottingham primary school. Cole and Bowen was to report that "Fresh perspective was discovered on our views of children learning through CDT as there was no doubt that young children could design, and their relative freedom from preconceptions often lead them to perfectly satisfactory solutions that older persons would simply fail to see."

Summing up their experiences, they said "We have come to recognize that the process of design; make, evaluate and re-design is fundamental to our culture and that children should have the opportunity to participate in it through out the period of compulsory schooling."

It was discovered by David Lund in his work with children with special educational needs in BCDT (1988:246) that a handicapped child could also benefit from CDT programme as most children enjoys doing things in a practical way rather than academic way hence it could be true also in educating the lessable/handicap. Citing from school council (1980) report in Art, craft and modelling, CDT came top in the following areas for disturbed children.

(i) relief of tension

(ii) personal enjoyment

(iii) sense of achievement

(iv) giving insight of personal and emotional problems.

The school council (1975:18) recognise the above as true when it said "it is a well established principle that the learning of slower children needs to be based on concept rather than abstract".

This also correlates with Egglestone (1953:61) suggestion that "not only is CDT useful but it could lead to be the key subject for the whole education of the backward child, which harnessing the practical interest of the boy/girl accelerates the whole of his educational development."

Lund also shared the view of Basanko and Grant when he said that there is no better way of starting learning than through "practical concrete learning" giving an example of asking a child to design and make a toy lorry.

That apart from learning about materials and tools to be used, why not include history of transport, some simple science, fitting electric light (re-wiring) road safety, etc. This correspond to Greene (1979:19), idea when he said:

> Learning must be in some manner emancipator in the sense that it equips individuals to understand the history of the knowledge structure, encountering the paradigms in use in the human interest and particular moment of human time. It should be possible to learn the significance of technique and to understand the danger of instrumental controls through confrontation with centres (sic) of technology through plays even with bureaucracies.

One of the early proponent of using practical work through play for the handicapped child is Wills (1941) who said "Practical and craft activities is the most useful medium for therapy" while Laslett (1977:132) said "the wide variety of materials and tools in the craft room meet the children's needs and moods... this at once indicates the therapeutic

possibilities of craft. Collaborating this were Wilson and Evans (1980:180 in BCDT (1988:248) when they said "when the hands are occupied, conversation on personal matters often arises more easily and with less embarrassment than formal counselling sessions." Laslett was to crown this when he said "craft lessons/play (sic) give children opportunities to increase their skills, to co-operate with other people and to realize their own limitations and compatibility. The finished product reflects both their practical skills and their personal qualities" pg. 133.

2.7 Summary

The historical perspective of pre-school education has been presented from as early as the seventeenth century to modern times and the nation's desire to pursue education from the pre-school level. The importance of creative play and it relevance to technological readiness of the preschool child has also been highlighted. So also is the psychological though in creative play both in principle and practice in relation to potential development of technological readiness among pre-school children emphasized.

Early research works in design education through play indicated that technological readiness is feasible and produces a value system of technology.

Productivity has been highlighted as the weapon against inflation and economic strangulation which the researcher states can not come by without adequate technological education starting with adequate preparation from the foundational level of education – pre-school.

CHAPTER THREE

METHODOLOGY

3.1 INTRODUCTION

The purpose of this chapter is to describe the research design and methodology of the research. The chapter deals with observable behaviour of pre-school creative plays as basis for technological readiness in two selected pilot study and three nursery/primary schools in Maiduguri.

3.2. Research Design

The research design for the project is a combination of Time and Event Sampling of Oslen (1929) and Barker (1960) in Medinnus (1976:22ff); originality of Drawing and Painting of Good Enough (1928) and Thomas, (1920) New Technique of Studying Social behaviour.

Observation method was used in carrying out this work on the scope of creative plays as basis for technological readiness. The advantage of this method over other methods (interview, case study, and or documentary) is in the fact that children of ages five or six who are in Nursery 3 (N3) are too young to be interviewed as many may be too shy to communicate. There may be lack of statistical data or record for a case study and the children are too young for communication requiring documentation.

The observation method ;afforded the researcher and his assistant the opportunity to carry out an unobtrusive investigation of behaviour exhibited by the children during plays. The scoring was categorized under three headings: Play pattern (4 points) creative ideas/dynamic factors (5 points) and performance factor/technical potential (6 points) giving a cumulative of 15 points score per child.

3.2.1 The Population

The subjects were pre-school age children from Baptist Nursery/Primary School and St. Johns Nursery/Primary Schools for the pilot study and Ruby, Namu and Foundation Nursery/Primary School in Maiduguri of Borno State (Nigeria). The subjects were made up of both sex. There were two types of pre-school: private and co-operate. Each had three types of Nursery 2 (N2) and age 5 for Nursery 3 (N3). Of these, nursery three pupils were the targets of the researcher. There were about 360 children in the two study schools and the three experimented schools.

3.2 Sampling Procedure

Subjects consist of pre-schoolers in the two pilot study nursery schools and the three experimental schools in Maiduguri metropolis. The choice of institution was based on availability of nursery schools equipment (play toys, sand bay, water bay, block of various shapes, etc), which can aid children to act naturally in behaviour exhibitions. A simple randomisation of the qualified schools was conducted to provide strategically located schools within the metropolis. The researcher believed that the strategic locations of the schools would aid reliability of observation techniques. These schools were designated school 1 and 2, for the pilot school, A,B and C for the experimental schools.

3.3.1 Sample Size

There are 260 pupils in the experimental schools in nursery three (N3). A minimum of 30% from each of the experimental schools (Ball and Gall, 1975). School 1 – Baptist Nursery, 60 school 2; St. John Nursery school = 40; School A Foundation= 90; School B Namu 105; and School C Ruby = 65.

To qualify for participation, a subject must have score 80% attendance in the previous term. A simple randomisation will be used in each of the schools in selecting respondents using Krejcie and Morgan (1970).

The earlier cited authority Ball and Gall (1975) takes care of the actual number of participants while the later Krejcie and Morgan, (1970) takes care of who among the class population who meets the 80% attendance mark participate in the programme.

Table 3.1. - Respondents sample size from the population size of 100 (pilot Study) and 260 in Nursery three (N3) level.

Schools	No. Of Pupils (Population)	Sample Size
1 2	60 40	12 10
Sub-Total	100	22
A B C	90 105 65	28 32 20
Sub-Total	260	80
Total Participants	360	102

3.4 Methodology

Observable behaviour of pre-school-age children in creative plays as basis for technological readiness was carried out by observation with a preceding pilot study. One assistant aided in the study.

There were six visitations to the schools designated in 3.3.1 with the aim of familiarizing the researcher and his assistant in creating an atmosphere of unobstructive observation between the subject and the research team.

School A (Foundation Nursery) was visited 14 times, school B (Namu) 16 times while school C (Ruby Model) was visited 10 times giving a cumulative visitation period of 40. Two subjects were observed at each visitation. There was no reported drop-out throughout the ten weeks observation period.

Plays observed were block play, drawing, paper cutting, use of didactic toys, sand play, water play, and paper matche. The research atmosphere was conducive for proper behaviour exhibition of the subjects. The researcher kept a running profile of behaviour manifested. A systematic observation approach; such that only two subjects were observed per visitation was used. A subject was observed in terms of defined units of behaviour exhibited (1 point per subject per exhibited behaviour). The average of which is the child's score using the observer's agreement formula (No. of agreement divided by 2=subject's score). The total number of a code item listing of a specific kind of behaviour during the series shall represent group score for that kind of behaviour. The total number of all kinds of behaviour which appeared for a given individual was regarded as his score i.e. an individual behaviour in respect of a particular item of behaviour is his score for that item. Each unit of behaviour was selected and defined so that repeated occurrence during observation periods might be recognized and recorded. This unit of behaviour was assigned code numbers for convince during an observational period and entered on daily record sheet.

Of the 30 minutes free play time, the first 5 minutes was allowed to run unscored to allow for play entry and the last 5 minutes be allowed for round up, clearing and cleaning up. This was to guide against certain interference factors, which may distort exhibited behaviour.

In other to sustain accuracy of observation an observer were able to focus their attention on a subject/subjects among other children who were also engaged in play (reason why a maximum of two subjects per visitation is conversed). The observers worked with open-mindedness so as to be able to discriminate item listing as stated above. Preferably, an observer with a technical background which will aid him to recognize technically oriented, behaviour that may be saliently exhibited.

Though two observers did not share the same view, they strove to get familiar with item listing so as to be able to arrive at an unbiased scoring. Since observation score was in terms of defined codes during the children play time, the length of observation period will be the same for all (individual or groups) that were observed. This allowed for direct comparison of frequencies (scores which in turn to aid the analysis of result. Subjects were observed under the same condition.

3.4.1 Validity of the Instrument

In order to ensure the validity of this study, measurable variable was constructed and moderated by my supervisors to meet the standard for predictive, construct, content and concurrent validity. This is to say that the validity of this research effort was based on the correlation of data obtained in the used of instrument in section 3.5. These can be used to predict future events on research subject(s) based on observation made.

For content validity, the instrument used can produce a representative of items, eliminates over lapping content. This makes the result obtained to be compatible.

3.4.2 Reliability of the Instrument

To ensure the reliability of this research, a consistency of measure over time was

engaged by the researcher and his assistant. They went to test run the variables before the pilot study was carried out. This serves as prerequisite for the actual research work.

The result of the test-retest reliability measure gave a reliability index of 0.8959.

3.5 **Instrumentation**

In order to make a valid and reliable measure of observation on the scope of creative play as basis for technological readiness, a combination of Time and Event sampling of Oslen (1929) and Barker (1960) in Modinnus, (1976:22ff); Originality of drawing and painting of Good Enough, (1928): and Thomas, (1929) new technique of studying social behaviour were used.

These were grouped under items 1-3 thus:

Item 1 = (Play pattern) with code numbers la- ld

Item 2 = Dynamic factors/creative ideas with code number 2a-2e

Item 3 = Performance factors/Technical initiative with code numbers 3a-3f.

Item 1: Play pattern is made up of creative plays that have relevance to technological display. Such plays may include solitary play, parallel play, associative play and co-operative play. The objective is to be able to highlight play patterns which children engage in and which enhance technological aspiration.

SOLITARY PLAY.....I A

This code should be scored against a child who engages alone in play independently with toys, using different Didactic toys, block, or other materials that may be available.

Parallel Play.....1b

A child who plays independently with toys or materials similar to others yet not trying to influence the activities of other children around him should be scored 1 b.

Associative Play.....1c

The child who engages in borrowing and lending of play materials, asking questions and sharing materials yet without seeking to dominate or control others within the group should be scored 1 c.

Co-operative Play.....1d

The subject who engages in playing with others for the purpose of making material product and striving to attain some competitive goal; plays that call for a division of labour should be scored 1 d.

Item 2: Dynamic Factors – Creative Ideas.

Dynamic factor consist of ideas/desires, attitudes motives and opinions such as inquiry, open mindedness, critical mindedness, achievement of thinking and emotional adjustment. This item is to be used when the class is engaged in class play e.g. block play water play, sand play, drawing, cooking, sewing, etc.

INQUIRY.....2a

A pupil who shows any evident behaviour, asking questions which show thoughtful attitude as opposed to questions which show little or no thinking such as what do you do with this? Why should it be done this way? or question which indicate that the pupil is using inquiry as a means of gaining knowledge/information, showing curiosity, should be scored 2a.

Open-Mindedness.....2b

This should be scored for children who show evidence of willingness to abandon pre-determined ideas in favour of ideas, which seem to be more or nearly correct e.g. accepting good and clear evidence instead of useless argument, welcoming information or suggestions new projects, evidences that modifies false beliefs, respecting the views of others and

accepting their ignorance in a given situation showing traits that are free from prejudice, accepting criticism kindly and benefiting from same.

Critical-Mindedness.....2c

Subject who exhibits attitude out-weighing evidence with respect to its importance soundness and adequacy e.g. are you sure this is good? Where can you find this? Asking for source of information before accepting it, questioning authority constructively, questioning the truth of a statement before accepting as final should be scored 2c.

Recognizing an Achievement.....2d

Score this child 2d for showing evidence of recognition of the value of thinking e.g. a child who call others to come and see what he/she has done, look at my own, come and see, etc.

Emotional Adjustment.....2e

2e should be scored against any pupil who show evidence of contentment, happiness, satisfaction and concentration in play. Also those holding toys exploratively, showing eagerness to play, showing release from anger and frustration expressing feeding in fantasy.

Item 3: PERFORMANCE FACTORS – TECHNICAL INITIATIVES

This item shows pupil's response, which evidenced technical abilities. It will be used during normal class play session for the recording of behaviour that reveal subject performances. This includes handling of tools or play material, ability to manipulate tool or object of play, concentration resourcefulness, etc.

Handling of tools.....3a

Subjects who show correct handling of tools or play material, such as in hand posture/positioning, finger dexterity (movement), careful handling of tools of play should be scored 3a.

Manipulation of tools.....3b

Subjects who show evidence of habitual performance which are valuable in creative play such as skills in manipulation of different types ;of toys, block play, scissors, painting, brush drawing, colouring etc. Subjects who show reasonable degree of skill in construction practice e.g. sand play, cutting of papers, should be scored 3b.

CONCENTRATION.....3c

Subjects who show deep concentration while working at play earns the score 3c.

Self-Appraisal.....3d

Enter this code 3d for each subject who show signs of evaluating own work e.g. teacher look at my own, is this good? Do I get it right? Is this colour good? Pupils testing own work with others or comparing for quality.

Resourcefulness.....3e

3e should be scored for subjects who show evidence of resourcefulness e.g. suggesting/trying new ways of doing things, substituting material when those called for in a play are not available (improvising) subjects using own originality in making up plays to demonstrate his point or own judgment of ideas to replace/substitute directives when activities fail.

Initiative.....3f

Score 3f for subjects who prove they can continue on their own e.g. parallel/solitary play. Subjects playing without aid from teacher or friend or those working on assignment.

NOTE: These item codes should be studied by the checkers so that they will be familiar with the objective of each in order to ease the scoring procedure.

3.6 Description of Data Collection Procedure

Two observers were used in this research with no prior discussion of any aspect of the observation except briefing on the instrument. A comparison of observation of scores was done between the investigator and his assistant using the following points i.e.

(i) The inter-item-rater agreement percentile formula (Thomas, 1952) to check scorer's reliability (SR)

$$SR = \frac{\text{no of agreement (ag)}}{\text{No. of ag + No. of disagreement}} \times \frac{100}{1}$$

(ii) A child (subject) score in each code item is scored divide by no of observer i.e.

$$\frac{\text{No. of agreement (ag)}}{2} = \text{Subject Score (SS) (frequency count)}$$

3.7 Description of Data Analysis Procedure

The result was calculated in percentage in order to ensure statistical reliability, the Pearson co-efficient of contingency as reported by Parrett (1926:195-209) was used at the 0.01 level of significance

3.9 RESULTS OBTAINED FROM THE PILOT STUDY

The pilot study was conducted in Baptist Nursery/Primary School and St. Johns Anglican Nursery/Primary School, Maiduguri, Borno State. The subjects were pre-school children at the nursery three level (N3). The pilot study targeted population is 100: Baptist Nursery (60) and St. John Anglican Nursery 40.

A minimum of 20% sampling size was taken from each School 1 = Baptist (12); School 2=St. John (10) (Ball and Gull, 1975) giving a cumulative subject total of 22.

3.9.1 **METHOD**:

Before the commencement of the study there were five visitations to the concerned schools for the purpose of creating an unobstructive observation relationship between the subjects and the research team. Trial recording was also carried out to hep the scorers in the real study scoring method.

In all, the research team visited school 1 six times for the pilot study and five times for school 2. This amounted to eleven visitations for the 22 subjects. There was no recorded drop out amount the subjects during the work.

The play observed were block play, drawing, paper cutting and modelling, drawing and colouring, use of didactic toys and sand play. It was observed that due to the dry season (lack of adequate moisture content in the soil) sand could not be moulded.

3.9.2 **Pilot Study Scorers Reliability**

Though the method was a subjective procedure which seems to take on an objective character as evidence indicates that the other person acting as checker is obtaining results comparable to that of the researcher, a trial situation was undertaken even before the pilot study. The researcher and his helper exercised precautions in providing checks upon themselves by studying and understanding the codes they are using to ensure accuracy in selecting code/items under which reactions were classified in accurate recording. The amount of agreement between them indicated the level of scorers/item reliability. To avoid the possibility of an item not being reliably scored, an inter-item check was made from the results of subsequent observations.

Table 3.2 **Scorers Reliability (Summary)**

Code	Description	Percentage (%)
Item 1	Play pattern	92.13
Item 2	Dynamic factor	84.64
Item 3	Performance factor	91.00
Over-all	Level of technological readiness	89.59

Table 3.3a: Pilot study percentage of agreement between checker and investigator on matching behaviour observed. (Reliability).

S/No	Subject Code Initial	Item 1 play pattern	Item 2 Dynamic factor	Item 3 performance factor	Level of technological readiness
1	001	(1) 100*	(3) 60	(2) 50	70 (6)
2	002	(1) 100	(3) 60	(6) 100	85.67 (10)
3	003	(1) 100	(3) 60	(6) 100	86.67 (10)
4	004	(2) 100	(2) 50	(6) 100	83.33 (10)
5	005	(1) 100	(4) 80	(6) 100	93.33 (11)
6	006	(1) 100	(3) 60	(5)82.33	80.67 (9)
7	007	(1) 100	(2) 50	(6) 100	83.33 (9)
8	008	(1) 100	(4) 100	(4) 100	100 (9)
9	009	(1) 100	(4) 80	(4) 100	93.33 (9)
10	010	(1) 100	(3) 100	(6) 100	100 (10)
11	011	(1) 100	(3) 60	(6) 100	86.67 (10)
12	012	(1) 100	(3) 100	(6) 100	100 (10)
13	013	(3) 75	(4) 80	(6) 100	91.67 (13)
14	014	(1) 100	(3) 60	(4)66.67	75.33 (8)
15	015	(1) 100	(4) 80	(5) 100	93.33 (9)
16	016	(1) 100	(4) 80	(6) 100	93.33 (10)
17	017	(1) 100	(3) 75	(4)66.67	77.22 (8)
18	018	(1) 100	(4) 80	(6) 100	93.33 (11)
19	019	(1) 100	(4)100	(6)100	100 (11)
20	020	(1) 100	(3) 60	(4) 100	86.67 (8)
21	021	(1) 100	(4) 80	(6) 100	93.33 (11)
22	022	(-) 100	(1) 100	(-) 100	100 (1)
	Total	2175	1655	2055.47	1969.67
	% $\bar{X}$	97.02	75.2 09	93.43	89.601

97.02% → Item 1 93.43% → Item 3

75.80% → Item 2 90.1 → Individual X percentile.

(-) Frequency Count (Subject Score)

* Percentage of Agreement.

Table 3.3b: Result sheet of overall observation (Distribution Pattern)

S/NO	Subjects Names in initial code	AGE 1	Solitary Play 1a	Parallel Play 1b	Associative play 1c	Co-operative play 1d	ITEM 1 INDIVIDUAL SUB-TOTAL	Inquiry 2a	Open Mindedness 2b	Critical Mindedness 2c	Recognition Reinforcement 2d	Emotional Adjustment 2e	ITEM 2 INDIVIDUAL SUB-TOTAL	Handling Tools 3a	Tool Manipulation 3b	Concentration 3c	Self-Appraisal 3d	Resourcefulness 3e	Initiative 3f	ITEM 3 INDIVIDUAL SUB-TOTAL	INDIVIDUAL TOTAL	Subjects Percentage (%)
1	J·A	5			1		1	1	1			1	3			1		1		2	6	40%
2	E·A	5+	1				1		1	1		1	3	1	1	1	1	1	1	6	10	66·7
3	O·R	5+	1				1		1	1		1	3	1	1	1	1	1	1	6	10	66·7
4	D·A	5+	1	1			2	1	1			1	3	1	1	1	1	1	1	6	11	73·7
5	H·F	5		1			1		1	1	1	1	4	1	1	1	1	1	1	6	11	73·7
6	I·A	5		1			1		1	1		1	3	1	1	1		1	1	5	9	60·0
7	M·M	6	1				1		1			1	2	1	1	1	1	1	1	6	9	60·0
8	Y·A	6	1				1		1	1	1	1	4	1	1	1			1	4	9	60·0
9	M·A	5+			1		1	1	1	1		1	4	1	1	1	1			4	9	60·0
10	M·K	5+	1				1		1		1	1	3	1	1	1	1	1	1	6	10	66·7
11	G·M	4½		1			1		1		1	1	3	1	1	1	1	1	1	6	10	66·7
12	A·A	5+		1			1			1	1	1	3	1	1	1	1	1	1	6	10	66·7
13	U·M·	5+	1	1	1		3	1		1	1	1	4	1	1	1	1	1	1	6	13	86·7
14	Y·J	5+			1		1		1	1		1	3	1	1	1	1			4	8	53·3
15	B·B	5+	1				1		1	1	1	1	4	1	1		1	1	1	5	11	73·3
16	A·I	5	1				1		1	1	1	1	4	1	1	1	1	1	1	6	11	73·3
17	P·A	5			1		1	1	1			1	3	1	1	1		1		4	8	53·3
18	K·O	6	1				1	1				1	2	1	1	1	1	1	1	6	9	60·0
19	E·B	5		1			1		1	1	1	1	4	1	1	1	1	1	1	6	11	73·3
20	O·G	5+				1	1	1	1	1		1	4	1	1	1	1			4	9	60·0
21	L·D	5+	1				1		1	1	1	1	4	1	1	1	1	1	1	6	11	73·3
22	O·C	5	-	-	-	-	0	-	-	-	-	1	1	-	-	-	-	-	-	0	1	6·3
	TOTAL (ITEM)		11	7	5	1	-	5	9	8	10	22	-	21	20	20	17	17	16	-		
		ITEM 1						ITEM 2						ITEM 3								

From the above result, the mean % for item 1 is 97.02%, for item 2=75.80% and for item 3 = 93.43%. This confirms that the scorers were in no way partial hence their scoring was reliable.

It is also seen that the individual performance percentile is also high within the range of 70 – 100% giving a mean percentile of 89.60%. The scorer's reliability is therefore upheld and stated to be acceptable.

Methods	VARIANCE	ALPHA Level IN PART
Correlation between forms	0.5735	0.5714
Equal length spearman Brown	0.7290	0.5714
Unequal length Spearman	0.7470	1.000
Guttman Spilt-Half	0.6994	

Table 3.4 Reliably Correlation.

The result for the pilot study reliability from the computer using Guttman split-half gave a vartiance 0.6994 at 1,000 value.

CHAPTER FOUR

DATA ANALYSIS AND INTERPRETATION

4.1 INTRODUCTION

This chapter presents results from the collected data from Namu Nursery School, Foundation Nursery School and Ruby Model Nursery School in Maiduguri of Borno State, Nigeria. The collected results was analysed and interpreted. A 30% sampling size was taken from school A (Foundation Nursery (28%) of 90). School B (Namu Nursery (32) of 105) and School C (Ruby Model Nursery School (20) of 60), (Ball and Gull 1975). This gave a total of 80 pupils/subjects ready for observation.

4.2 TESTING OF HYPOTHESES

The hypotheses were tested using the Pearson Product Movement Correlation (PPMR) at a significant level of 0.05. The pilot study on observable behaviour was significant at 0.01.

(1) There is no significant relationship between a child's play pattern and his readiness for technological work.

(2) There is no significant difference between a male/female child's play pattern and his/her potential for technological readiness.

(3) There is no significant relationship between a child's creative activities (dynamic factors) and his potential for technological skill/work.

(4) There is no significant relationship between a child's technical initiatives (performance factors) and his potential for technological readiness.

Table 4.2 - Hypotheses based on relationship (A summary).

Hypotheses	Variable	Sample size	Correlation	P-value
1 Play pattern vs. Tech.	v1 & v7 (f)	80	0.5254	0.000
Readiness	v2 & v8 (p)	80	0.5678	0.000
3 Dynamic factors vs	v3 & v7 (f)	80	0.5298	0.0831
Tech. Readiness	v4 & v8 (p)	80	0.5385	0.000
4 Performance factor vs	v5 & v7 (f)	80	0.5254	0.000
Tech. Readiness	v6 &v8 (p)	80	0.5674	0.000

Key (f) = variable of frequency counts.

(p) = Variable at percentage count.

Table 4.3 Variable.correlation Matrix: A summary.

* Correlation is significant at the following symbolic level: *** = 0.001
** = 0.01
* = 0.05

v8								1.000
V7							1.000	0.0104
V6						1.000	0.2596*	0.4594***
V5					1.000	0.5500***	0.5214***	0.2101
V4				1.000	-0.0386	0.0563	0.0831	0.5385***
V3			1.000	0.1907	-0.3942***	-0.2224*	0.5298	-0.1189*
V2		1.000	-0.1020	-0.0558	-0.0803	-0.1982	-0.2020	0.5674***
V1	1.000	-0.1844	0.1407	-0.1270	0.1339	-0.0014	0.5254***	-0.2015
	v1	v2	v3	v4	v5	v6	v7	v8

Key

v1 = play pattern frequency count
v2 = play pattern percentage count
v3 =Dynamic factors frequency count
v4 = Dynamic factor percentage count
v5 = Performance factors percentage count
v6 = Performance factor percentage count
v7 = Level of tech. readiness frequency count
v8 = Level of tech. readiness percentage count
v1,v3,v5,v7 = frequency
v2,v4,v6,v8 = percentage

4.3 HYPOTHESIS ONE: CORRELATION BETWEEN PLAY PATTERN AND TECHNOLOGICAL READINESS

"There is no significant relationship between a child's play pattern and his potential for technological readiness." From the analysed data significant level of 0.000 (frequency count = v1 vs v7) and 0.5674 coefficient at a significant level of 0.000 (reliability percentage v2 vs v8) see table 4.2 & appendix 2). Both analyses which show appositive correlation answers the research question "does a child's play pattern relate to his potential competency for technological readiness?"

The null hypothesis which says there is no significant relationship between a child's play pattern and his potential readiness for technological work was rejected to uphold the alternative hypothesis that there is a significant relationship between a child's play pattern and his potential readiness for technological skills.

4.3.1 Discussions of Findings: Hypothesis One

The result obtained in hypothesis one that there is a significant relationship between a child's play pattern and his potential for technological readiness, also answers the research question in the affirmative is noted to have agreed with the view expressed by Arthorn in Ward, (1945:5). It was he who said that children would have fulfilled a worthy course as the play they engaged in offered them the opportunity of changeling their emotion on something worthwhile. This was further highlighted by Froebel the father of kinder garden (Morrison 19-261). According to him, creative play help to disclose a child's future inner life. This further tallies with Smith Hill's view that children should be allowed to engage in water play, block work, and other creative activities.

The strengthening of the belief that creative play enhances technological readiness was supported by no less a psychologist as Dewey and Montessori (Morrison 19-:50). "A child in a prepared environment has an opportunity to learn the use of tools and objects." Similarly, views were held by Pestalozi and Luther (Morrison 190:42,34) who felt that a child who is allowed to develop – through the part of nature (play which is a child`s endeavour) develops from a sense of impression to abstract ideas and the use of tools. A similar idea was expressed by Roger and Gentte (1986) in BCDT 1985:25.

4.4 HYPOTHESIS TWO: GENDER PLAY PATTERN AND TECHNOLOGICAL READINESS.

"There is no significant difference between a male and a female play pattern and their potential for technological readiness." This hypothesis was analysed on two bases;

(a) Gender correlation and

(b) Gender readiness vs technological work.

A two sample T-test was used to analyse the data at a significant value 0.05. The following correlation was arrived at:

Table 4.5a T-test play pattern by Gender.

Variable	Sample size	x	S.D.	DF	T	P-value
Male	37	92.8	12.50	78	-1.97	0.0507
Female	43	97.52	9.097			

From the result above, the hypothesis that "there is no significant difference Between the play pattern of a male and a female child is rejected. This shows that there is a difference between the way a male child plays and the way a female plays.

When this result was further tested to find out if there was difference in gender readiness for technological work and play pattern, the following (table 4.6) was arrived

Table 4.5b:-T-test of gender and Readiness for Technological skills.

Variable	Sample size	x	S.D.	DF	T	P-value
Male	37	93.70	5.292	78	0.68	0.5230
Female	43	92.98	4.631			

This showed that there is a significant difference between gender readiness for technological skills.

The rejection of the hypothesis that "there is no significant difference in the play pattern of male and female readiness for technological work confirmed that there is certainly a significant relationship between play pattern and technological readiness.

4.4.1 DISCUSSION ON HYPOTHESIS TWO

The findings of hypothesis two shows that there is a significant difference between gender play pattern and readiness for technological work.

From the gender perspective, this null hypothesis was rejected, as there was a significance difference in the way a male child plays compared to a female. This agreed with Coats in Henrich (19-) which is supported by Erickson (1952) Lowenfield (1952) in Word (1951:6) which indicated that girls showed to be specially interested in open spaces (divergence) as evidence by their structured representation of home interior with walls, oriented gate ways construction, playing hospital which contrast with boys building of dams,

tower, rail-roads, bridges and other solid and high constructions. This means that though boys and girls uses the same material, their construction reflects traditional sex appropriate patterns.

But given the correlated significance of 0.0507 one is tempted to say that in the long run if both genders are given the same encouragement, atmosphere and material the difference would not have been noticed.

4.5 HYPOTHESIS THREE: CORRELATION BETWEEN DYNAMIC FACTORS AND TECHNOLOGICAL READINESS.

"There is no significant relationship between a child's creative activities (dynamic factors) and potential for technological readiness. The data analysed between v3 and v7 (frequency count) see appendix 2 & Table 4.2 showed a co-efficient of 0.5298 at a significant level of 0.0831. Base on the frequency count the hypothesis should be upheld. But when the percentage variable (v4 and v8) was correlated, the correlation co-efficient was 0.5385 at a significant level 0.000 to reject the hypothesis.

Though the hypothesis was rejected at frequency count level, it was rejected base on reliability percentage count which is stronger given the following reasons.

(a) in a 1000 times trial effort = 8.3% assurance (Hypothesis not related)

(b) in a 1000 times trail effort = 100% (Hypothesis related)

The 8 % assurance predicted on a thousand trial effort of the frequency count is certainly negligible when compared by the reliability percentage.

Therefore the hypothesis is accepted to have answered the research question "will a child's creative actions (dynamic factors) be related to his potential in technological skills?"

4.5.1 DISCUSSION ON THE HYPOTHESIS THREE

Based on the frequency count, the hypothesis that there is no significant relationship between a child's dynamic factor and his potential readiness for technological skills, would have been upheld, but for the reliability percentage that was highly related. The upholding of the hypothesis led to memory lane of correlation between dynamic factors and performance factor v3 and v5/v4 and v6, which gave a correlated significance of 0.000 of a negative 0.0563. This proves the old adage that if wishes were horses everyone will have what he/she wishes or dream to be. The desire of a child may wish to be may not necessarily come to be. This view is what Taylor and Shcherder (1989) in Taylor et al 1997 in American Psychologist, 1998:430 expressed as mental stimulation which addresses two fundamental tasks of self-regulation and copying namely the management of affect or emotional states and the ability to plan and solve problems. This also tallies with the practical experience of Michael Tarr American Psychologist, 1998:385 whose father's frequent whispering into his ears was think science, engineering and mathematics not history, at a tender age had stimulated him into creative plays (tasks) that forced his mind on reading science at age 12, engineering at 17 and finished with a Ph.D in Brain and Cognitive science.

Having examined the relationship between the dynamic factor and the performance factor, it was noticed that relationship between the dynamic factor and a child's potential readiness for technological skills be rejected base on strength of correlation coefficient of v4 and v8 (0.5385 of p-value 0.000) over frequency count of v3 and v7 of co-efficient 0.5298 of p-value 0.831. It therefore follows that the intervening variable that affects the relationship between dynamic factors and performance factors is also at play in the relationship analysis between dynamic factor and the level of technological readiness.

The collaboration of such views reflects that of eminent educator and psychologist as J.B. Watson who said give me a dozen healthy infants who are well informed (ability to play/fantasied) and in my own special world (world of play) to bring up and I will guarantee to take anyone of them at random and train him/her to become a specialist that might be selected. (Watson in Papalia & Olds, 1979:9). This implies that if one can guarantee a specialist end product right from the foundation of training, it therefore implies that our chosen significance of 0.000 is a valid choice. A similar view was expressed by Feltz and Lander, 1983 in Taylor 1997 of American Psychologist, (1998 431) when she said that physical practice is superior to mental practice of motor-skill yet mental practice produces superior learning when compared with no practice at all and the combination of both mental and physical practice appears to be maximally effective for horning skills and making progress.

This implies that a child's idea (dynamic factors) should be well matched with both material and physical practice (performance factors). This is also verified when Lowenfield 1952 cited in Ward, (1957:6) most adults loose their creativeness (which can also happen to children) when they cannot be presented and unified with the mind.

From this approach, one can therefore state that the cause(s) of this hypothesis unrelatedness at frequency count is the unavoidable provision of physical, material practice and unification with the mind which could have matched the children creative ideas hence the acceptance of the correlated significance of 0.000 of the co-efficient 0.5385. Therefore there is a significant relationship between a child's dynamic factor and his potential readiness for technological skills.

4.6 HYPOTHESIS FOUR: CORRELATION BETWEEN PERFORMANCE AND TECHNOLOGICAL READINESS

"There is no significant relationship between a child's performance (technical initiatives) and his potential for technological readiness." It is evident from the analysed data (v5 and v7), which gave a correlation co-efficient of 0.5674 (appendix 2 & table 4.2) at a significant level 0.000 that the null hypothesis there is no significant relationship should be rejected. The rejection of the hypothesis does answer the research question "will a child's performance factor relate to his potential for technological readiness?" The positive correlation of both frequency count and reliability percentage at a significant level of 0.000 affirms it significance hence the alternative hypothesis is accepted.

4.6.1 Discussion on Hypothesis Four

The rejection of the hypothesis that there is no significant relationship between a child's performance factor and technological readiness does answered the research question which states that "will a child's performance factor relate to his potential for technological readiness?"

The rejection of the hypothesis at a significant level of 0.000 verify's the relatedness of performance factor with the child's readiness for technological work. This is supported by the view of Feltz and Lander in American Psychologist, (1998 431) when they stated that physical practice enhances skills and the making process. This also is in line with the stance of Kamii & Davies cited in Morrison (19-:137) of the Piagerian thought that curiosity, initiative, are ingredient for inculcation of technological ideas.

CHAPTER FIVE

SUMMARY OF FINDINGS. CONCLUSION AND RECOMMENDATION.

5.1 The chapter summarises the findings of the study observable behaviours of pre-school age children in creative play as basis for technological readiness. The summary and conclusion of the work is given, along with the researcher's recommendations.

5.2 SUMMARY OF FINDINGS

The objective of the study was to find out through observation of pre-school age children plays that are related to technological readiness, knowing that all plays are not creative.

Some of the identified plays that have bearing with or that can influence technology are solitary, parallel, associative and co-operative plays. Dynamic factors (creative ideas) that are observable in children's play were also identified as inquiry, open-mindedness, critical mindedness, recognising achievement and emotional adjustment while performance factors (Technical Initiatives) were identified in form of manipulation, handling of tools, self-appraising, resourcefulness and initiative.

The study had a joint origin in creative and developmental psychology of children. Related literature highlighted the importance of creative play as giving insight to personal and emotional problems, relief from tension, personal adjustment, sense of achievement, management of effects, maintenance of problem solving activities.

The statistical methods employed were percentage, two-way T-test for differential statistics and Pearson Product Moment Correlation (PPMR) for the relatedness of the items.

Four hypotheses were tested to ascertain the relatedness of play pattern and technological readiness, dynamic and performance factors and technological readiness. A differential hypothesis to find out if male and female play patters differ and to find out with the result obtained if a difference exists between play patterns and technological readiness was also analysed.

It was found from the results obtained that there is a relationship between play pattern and a child's potential for technological readiness. Hypothesis two indicated that there is a difference between gender play patterns. The argument that, what would be the result; if both male and female subjects were subjected to the same favourable atmosphere, well equipped playground or workshops?

The study rejected the notion that there is no significant difference between play pattern by gender and potential readiness for technological skills.

The research also showed that there is relationship between both dynamic factors and performance factors (hypotheses 3 and 4) and technological readiness.

5.3. RECOMMENDATIONS

(1) During the course of the research, the researcher observed that over 85% of pre-school institutions in Maiduguri have no facilities for enhancing technological/scientific ideas. The majority belief of the proprietors is that children are enrolled to free parents from the burden of their children/ward at home. For this reason, these schools have only dancing, singing and rhytmatic reading, which the

children cannot understand. Of the fifteen that requested for registration only seven has submitted their application forms.

(2) The researcher will therefore wish to make it a compulsory task for entrepreneurs who may wish to establish Nursery/Primary schools to have a good play ground, sand bay, water through and equipment for both water and sand measurement, provision of didactic toys, different forms of blocks (square, rectangular, circular and triangular) of various sizes.

(3) The Inspectorate arm of the Federal Ministry of Education (pre-school) should visit schools to enforce the implementation of the regulation establishing pre-school education.

(4) The Ministry of Education should empower the curriculum arm of the National Curriculum Planners to organise workshops and seminars for pre-school operations in conjunction with re-known creative and developmental psychologists to help fashion out a forward looking programme that will lead the nation into technological advancement and self sufficiency.

(5) There should be a policy statement or plan from the Federal Ministry of Education that design and making be made sole concretise work to be done at the pre-school level and a language across the curriculum at both primary and secondary level of education.

(6) The researcher do wish to recommend that pre-school care givers and instructors be given special allowances which will act as an inducement towards the retainment of well qualified personnel.

5.5 RECOMMENDATIONS FOR FURTHER STUDIES

i. Similar studies should be carried out in other pre-school institutions across the country especially in both corporate and university sponsored nursery schools to compare findings.

ii. More research should be engaged in at both lower primary (class 1-3, ages 6-8) and at the senior primary (classes 4-6; ages 9-11) to determine whether there is consistency in the pattern of results.

iii. The products of a research grouping should be tapped and a continuous work carried out on them through their secondary and tertiary levels to confirm research-finding prediction.

REFERENCES

Adeyanju, G. A. (1985). "The Relationship of personality and Learning styles with school Attainment of Pupils in Primary schools." A Published Ph.D Educ. Psych. Thesis, A.B.U. Zaria

Andrew, B. (1973). The vital years of the child , London Souvenir Press.

Bosanko, R. (1987). Who is afraid of CDT in best Craft, design and technology 1988: 139 20th Anniversary Volume Trent; Trenthan Books.

Broman, L.B. (19....) The early years in childhood Education. Chicago Ran McNally College Publication Co;.

Brunner, Alison & Rathy (1976). Play: Its Role in Development and Evolution. New York Penguin Books.

Cole, P. and Bowen R. (1985). Design and making in Nottingham Primary School, Nottingham, Curriculum Devt. Support and Services. Mundelta Centre, Green Street, Nottingham NG2 2LA.

Collin, F., Maxine, C., and WYN, W. (1985). Schools on Trial. London: Open University Press.

Courtney, R. (1968). Play, Drama, & Thought Cassel New York: International Publication.

Crane, B. (1973). Day Dreams. Child Education, London: Evans Brother Ltd.

Day, M.C. and Parker, R.K. (19....). The preschool in action: Exploring Early childhood Programme (2nd Ed.) Boston Allyn & Bacon Inc.,

Derek, Bicker, Staffe (1977). A practical course in Educational child Development. London: Evan Brothers.

Durojaiye, S. M. (1977). A practical course in Educational child Development. London: Evan Brothers.

Durojaiye, S. M. (1977). Practical Methods for Nursery School. Ibadan Oxford University Press, Nigeria.

EGGleton, J. (1988). Best of craft, Design and Technology Trent: Trentham Books.

Faw, T. (1980). Theory and Practice of Child Psychology (Schanmis Outline Series in Social Science) New York; McGraw-Hill Books, Co.

F.M.E. (1981). National policy on Education (Revised) Lagos: National Education Research and Development Centre.

Fowler, (19....). Infant and Children: A guide to Education in group setting. Baston: Allyn and Bacons.

Garrett, E. (1926). Statistics in psychology and Education. New York: Longmans, Green and Co.

Grant, M. (1983). Starting point in studies in Design Education Craft and Technology. Vo,. 15: no.2 Spring 1983. Trent: Trenthann Books.

Greene, M. (1978). Landscapes of Learning, London: Teachers College Press.

Haefele (1962). Creativity Innovation Reinhold Management Ref. Series. New York: Reinhold Pub. Co.

Hendrich, J. (19....). The whole child: Early Education for eighties. 3rd edition, Merrill Publishing Company, Columbus.

Hodgkin, R. A. (1985). Play and Exploring: Education through the discovery of order. London: Methuen and Company Ltd.

Holt, J. (1967). How children learn. England: Pengium Books Ltd.

Hurluck, B. (1977). Child Development. New York: McGrawth Co.

Jeffree, D. M. & McConkey, R. (1974). Extending language through play. (Special Language). New York: Forward Trends.

Kamii C. & Devries R. (19....). Physical Knowledge in pre-school Education. New Jersey: Prentice-Hall Inc.

Lorton, J. W. and Wally, B.L. (1979). Introduction to early childhood education, New York: D. Van Nostrand Co.

Medinnus G.R. (1976). Child Study and Observational Guide. New York: John Willey Sons, Inc.

Norman J. M. (1970). Child Study. London: Oxford University Press.

Onibokun, Okoye, Aloo, & Onwuchekwu (1981). Nursery Education. Ibadan: Heinemann Educ. Books, Nigeria Ltd.

Osuala, E. C. (1987). Introduction to Research Methodology: 2nd edition. Onitsha Africana-FEP Publisher Ltd.

Nursery Education: ACE Series. Ibadan: Institute of Education, University of Ibadan.

Papalia, D.E. and Olds, S.W. (1979). The child's World: Infancy through adolescent (2nd Ed.). New York: McGraw-Hill Book co.

Parten, (1932). Social Play among Pre-School Children: Journal of Abnormal and Social Psychology.

Petrovsky, A (1973). Age group and Pedagogical Psychology. Moscow: Progress Pub.

Piaget, (1962). Play, Dreams, Imitation in Childhood . New York: W.W. Norton Co., Inc.

Poulton, G.A. & Terry (19....) Pre-school Learning in the community. London: Routledge & Kegan Publication.

Reynolds, T. (1986). Craft and Design at Pensnett School in Studies in Design Education Vo,. 19 No. 1, Autum, 1986.

Quanty, C.B. & Anthony (1974). Observing children: A Child development Manual. New York: Alfred Pub. Co. Inc.

Scarfe, N.V. (1962) Play is Education Childhood Education Nov. vol. 39.3. Washington D.C. A Publication of Childhood Education International.

Shaffer L. F. (19....). Children Interpretation Cartoons. New York: Bureau of Publication Teachers College Columbia University.

Siann & Ugwegbu, (1983). Educational Psychology in a changing world (3rd Ed). London: Unwin Yayman.

Slade, P. (1954). Child Drama. London: University of London Press.

Standen, T. (1986). The Design Dimension Project in Studies in Design Education. Trent, Vol. 18 No. 2 Spring, 1986.

Taylor, Joy (19....). Organizing & Integrating the Infant Day. London: George Allen & Unwin Ltd.

The African Forum for child Literacy in Science and Technology. Kenya.

Trost (19....). Early Childhood Education Rediscoverd. New York: Holt Rinchant & Winston Inc.

Thomas, S. (1929). Some New techniques for studying social behaviour. New York: Bureau of Publication Teacher's College, Columbia University.

Valentine, C.W. (1967). A General Introduction to Psychology of Childhood. London: Pengium Books Ltd.

Werner (19.....). Perceptual Motor Development Equipment: Inexpensive Ideas & Activities. New York: John Willey and Sons Inc.

Wills, W. D. (1941). The Hawkspur Experiment. London Allen and Unwin.

White R.W. (1963). Current Perspective in social psychology (ed) Motivation reconsidered the concept of competence. New York: E.P. Houander and Hunts.

Wright, R.L.D. (1976). Understanding statistics: An Informal Introduction for the behavioural Sciences. New York: Harcourt Brace Jovanovich Inc.

APPENDIX 1

School (1):- BAPTIST NURSERY SCHOOL MAIDUGURI
KIND OF ACTIVITIES:- Sand play, modelling, drawing, colouring and painting
Recorders:- Messrs Bonibaiyede David Sunday and J.K. Obadare.
Class Teacher:- Miss Elizabeth Eweniyi

S/N	Respodent Names in code	MINUTES OBSERVED						SUMMARY
		5	5	5	5	5	5	
1	J·A	1c 2b	2a	3c	[illegible]	3e 2e		1(1) 3(2) 2(3)* = 6
2	E·A	1a	3a 2b	3d	3c 2e	3f 3e	2c 3a	1(1) 3(2) 6(3) = 10
3	O·R	1a 3a	3b 3c 2b	2c 2e	3d	3f		1(1) 3(2) 6(3) = 10
4	O·A	1b 3b 3d	2b 3c 3b	1a	3e	3d 3f	2e	2(1) 3(2) 6(3) = 11
5	H·F	1b 3a 3b	2b 3c	2e 2c	3d 3e	3f	2e	1(1) 4(2) 6(3) = 11
6	I·A	1b 2b	3b 3a	3c	3e 2a	3f	2c	1(1) 3(2) 5(3) = 9
7	M·M	1a 3a 3b	3d 1c 2b	3c 3f	3c		2e	1(1) 2(2) 6(3) = 9
8	I·A	1a, 3a	2b 3b	2c	3c 2a	3f	2e	1(1) 4(2) 4(3) = 9
9	M·A	1c 3a	2b 3a 2c	2e 3a	3c 3d			1(1) 4(2) 4(3) = 9
10	M·K	1a 2a 3a	3c	2e 2f	2a 3c		2e	1(1) 3(2) 6(3) = 10
11	G·M	1b 3b 3a	3c 3a	3d 2d	2b		2e 3f	1(1) 3(2) 6(3) = 10
12	A·A	1b	2c 2a	3a 2c	3e 3c	2a 2a	3f	1(1) 3(2) 6(3) = 10

SCHOOL (2) ST. JOHNS Nursery School, Maiduguri
KIND OF PLAY:- Paper Cutting, Water play, Drawing, Block play, Painting, and Colouring
RECORDERS:- As in School 1.
Class Teacher:- Ngozi Chukwuamaka.

S/N	Subjects Names in code.	MINUTES OBSERVED						SUMMARY
		5	5	5	5	5	5	
1	U·M	1a 1c 2a	2c 2d 3a	3b	3a 3f	3c 3d	2e 3e	3(1) 4(2) 6(3) = 13
2	T·J	1c 2b	2a	3a 3b		3c	2e 3f	1(1) 3(2) 4(3) = 8
3	B·B	1a	2c 2b	2d [illegible]	2b 2e	3c 3e 3a	3a 3f	2(1) 4(2) 5(3) = 11
4	A·I	1a	2c 3c 3b	1b 3a	2d	2b 3e	2e 3f 3d	2(1) 4(2) 6(3) = 12
5	P·A	1c 2b	2a	3a 3b		3c 3e	2e	1(1) 3(2) 4(3) = 8
6	K·O	1a	2b 3a	3b	3a	3f 3e	2e 3c	1(1) 2(2) 6(3) = 9
7	E·B	1b 1c	3a 2b	3b 3c	2a	3d	2e 3c	1(1) 4(2) 6(3) = 11
8	O·G	1a	2b 3a	3b 3c	2a	2e	3a	1(1) 3(2) 4(3) = 8
9	L·D	1a	3a 2b 3b	3c	2c 2d	3f 3e	2e 2d	1(1) 4(2) 6(3) = 11
10	O·C	—	—	2e	—	—	—	He looked contented watching others play.

* See instrumentation for key (pg 42)

APPENDIX 2 Percentage of agreement between checker and investigator on matching behaviour exhibited per item observed.

S.No	Subject's Name in codes	Sex	Play pattern	Dynamic factor	Performance factor	Individual readiness indicator
-	-	-	Item 1	Item 2	Item 3	
1	F·O	M	(1) 100	(3) 85·7	(4) 66·7	(8) 84·1
2	T·I	M	(2) 80	(3) 85·7	(5) 83·3	(10) 83·0
3	Y·U	M	(2) 100	(4) 80	(5) 83·3	(11) 87·7
4	M·A	M	(1) 100	(3) 100	(5) 83·3	(9) 94·4
5	H·Y	F	(1) 100	(2) 50	(5) 91·6	(8) 80·5
6	O·O	M	(2) 80	(3) 100	(5) 100	(10) 93·3
7	C·O	F	(2) 80	(4) 80	(6) 83·3	(12) 81·1
8	J·A	F	(1) 100	(4) 80	(6) 100	(11) 93·2
9	M·O·I	M	(1) 100	(4) 100	(4) 88·8	(9) 96·3
10	V·O	F	(1) 100	(3) 85·7	(6) 100	(10) 95·0
11	K·M	F	(1) 100	(3) 100	(5) 100	(9) 100·0
12	M·H	M	(2) 80	(3) 85·7	(6) 100	(11) 85·51
13	T·T	F	(1) 66·7	(4) 80	(5) 100	(10) 82·21
14	S·A	M	(1) 100	(4) 80	(5) 100	(10) 93·3
15	V·O	F	(1) 100	(2) 80	(6) 100	(9) 93·3
16	M·E·M	M	(1) 100	(3) 75·0	(3) 80·5	(7) 93·53
17	B·I	F	(1) 100	(3) 75·0	(6) 100	(10) 91·7
18	E·L	F	(1) 100	(3) 75·0	(5) 83·3	(9) 86·1
19	C·N	F	(2) 80	(4) 80	(5) 83·3	(11) 81·1
20	C·P	F	(2) 80	(5) 100	(6) 100	(13) 93·3
21	O·U	F	(1) 66·7	(2) 66·7	(6) 100	(9) 74·4
22	A·N	F	(1) 100	(5) 100	(6) 100	(12) 100
23	E·J	F	(1) 100	(4) 80	(4) 88·8	(9) 89·6
24	I·A	M	(1) 100	(3) 85·7	(5) 83·3	(9) 89·67
25	J C	M	(1) 100	(4) 88·8	(4) 100	(9) 96·3
26	C·E	F	(2) 100	(4) 80	(5) 83·3	(11) 87·67
27	Y A	M	(1) 80	(2) 100	(6) 100	(9) 93·3
28	S O	M	(2) 100	(3) 75·0	(5) 83·3	(10) 86·1
29	K·I	F	(1) 100	(4) 100	(3) 83·3	(10) 94·4
30	C il	F	(2) 100	(4) 80	(5) 100	(11) 93·3
31	C·O	F	(1) 66·7	(4) 80	(4) 88·8	(9) 78·5
32	V A	F	(1) 100	(4) 80	(4) 66·7	(9) 82·2

13	D·I·A	m	(1) 100	(5) 100	(6) 100	(11) 100
14	A·D	F	(1) 100	(2) 80	(6) 100	(9) 93·3
15	J·D	M	(1) 100	(3) 85·7	(6) 100	(10) 95·2
16	D·S	m	(1) 66·7	(3) 85·7	(5) 91·6	(9) 81·3
17	S·O	m	(1) 100	(2) 100	(6) 100	(9) 100
18	A·O	F	(1) 100	(4) 100	(6) 100	(11) 100
19	U·E	F	(1) 100	(2) 80	(4) 66·7	(7) 82·2
20	R·S·A	m	(1) 100	(4) 100	(4) 66·7	(9) 88·9
21	C·A	F	(1) 100	(4) 80	(4) 88·8	(9) 89·6
22	B·P	F	(1) 100	(4) 100	(5) 83·3	(10) 94·4
23	C·O	m	(1) 100	(3) 85·7	(4) 66·7	(8) 84·1
24	O·S	F	(1) 100	(4) 100	(6) 100	(11) 100
25	A·P	F	(1) 66·7	(4) 80	(6) 100	(11) 82·2
26	I·P	m	(1) 100	(5) 100	(4) 100	(10) 100
27	E·A	F	(1) 100	(3) 85·7	(6) 100	(10) 95·2
28	A·E	M	(2) 80	(4) 80	(6) 100	(12) 86·7
29	C·B	F	(1) 100	(4) 80	(4) 100	(9) 93·3
30	J·O	m	(1) 100	(3) 100	(4) 100	(8) 100
31	C·U	F	(1) 100	(5) 100	(7) 66·7	(10) 88·9
32	R·P	F	(1) 100	(2) 100	(6) 100	(9) 100
33	J·S	F	(1) 100	(2) 80	(6) 100	(9) 93·3
34	J·S	F	(1) 100	(3) 85·7	(6) 100	(10) 95·2
35	S·O	m	(1) 66·7	(5) 100	(2) 100	(8) 88·9
36	H·N	F	(1) 66·7	(5) 100	(3) 80·6	(9) 82·4
37	A·A	F	(1) 100	(5) 80	(4) 66·7	(9) 82·2
38	S·A	m	(1) 66·7	(4) 80	(6) 100	(11) 82·4
39	J S	F	(1) 100	(1) 80	(6) 100	(11) 93·3
40	G A	m	(1) 100	(2) 100	(5) 100	(8) 100
41	S S	m	(1) 66·7	(3) 85·7	(6) 100	(10) 84·1
42	A·K	F	(1) 100	(4) 80	(5) 91·6	(10) 90
43	J·E	m	(1) 100	(5) 100	(4) 66·7	(10) 83·9
44	E·I	F	(1) 100	(2) 80	(6) 100	(9) 93·3
45	D·N	F	(1) 100	(2) 100	(6) 100	(9) 100
46	D S	F	(2) 80	(4) 80	(5) 100	(11) 86·7
47						

	V E	F	(1) 100	(4) 80	(6) 100	(11) 93·3
	K·Y	M	(1) 100	(4) 80	(3) 80·6	(8) 86·2
	A·B	F	(1) 66·7	(5) 100	(5) 83·3	(11) 83·32
	C·J	m	(1) 100	(3) 85·7	(5) 83·3	(9) 89·7
	M·P	M	(1) 100	(4) 80	(4) 100	(9) 93·3
	I·O	m	(1) 100	(4) 80	(5) 83·3	(10) 87·7
	S·A	m	(1) 66·7	(2) 100	(6) 100	(9) 88·9
	S·A	m	(1) 100	(2) 80	(5) 91·6	(8) 90·5
	O-U	m	(1) 66·7	(3) 100	(5) 100	(9) 88·9
	V·Y	m	(1) 100	(4) 80	(4) 88·8	(9) 87·6
	B·O	F	(1) 100	(2) 80	(5) 100	(8) 93·3
	W·Y	m	(1) 100	(4) 80	(5) 83·3	(10) 87·7
	Y·F	F	(1) 66·7	(3) 85·7	(6) 100	(10) 84·4
	J·M	M	(1) 100	(2) 100	(6) 100	(9) 100
		(42) 73%				
		92-13				

APPENDIX 3

APPENDIX 3 Result sheet of overall observation (distribution pattern)

S.no	Subject names in code	Age	1a Solitary Play	1b Parallel	1c Associative	1d Co-Operative	sub total	2a INQUIRY	2b Open Mindedness	2c Critical Mindedness	2d Recognizing Achievement	2e Emotional Adjustment	sub total	3a Handling up Tools	3b Tool Manipulation	3c Concentration	3d Self-Appraisal	3e Resourcefulness	3f Initiative	sub total	individual total	% of response per subject	rank
1	F·O	5+	1	–	–	–	1	1	1			1	3	1	1	–	–	1	1	4	8	53·33	
2	F·I	6	–	1	1	–	2	–	–	1	1	1	3	1	1	–	1	1	1	5	10	66·67	
3	Y·U	5+	1	1	–		2		1	1	1	1	4	1	1	1		1	1	5	11	73·33	
4	M·A	5+		–	–	1	1		1	1	–	1	3	1	1	1	1		1	5	9	60·0	
5	H·Y	5+	1	–	–	+	1	1	–	–	–	1	2	1	1	1		1	1	5	8	53·33	
6	O·O	5+	1	–	1	–	2		1	1	–	1	3	1	1	1	1	1	–	5	10	66·67	
7	C·O	5+	1	1	–	–	2	1	1	1	+	1	4	1	1	1	1	1	1	6	12	80·0	
8	J·A	5+			1		1	1	1	1		1	4	1	1	1	1	1	1	6	11	73·33	
9	M·O·I	5+				1	1		1	1	1	1	4	1	1	+	+	1	1	4	9	60·0	
10	V·O	6	1				1			1	1	1	3	1	1	1	1	1	1	6	10	66·67	
11	R·M	5+				1	1			1	1	1	3	1	1	1		1	1	5	9	60·0	
12	M·H	5+	1	1			2		1		1	1	3	1	1	1	1	1	1	6	11	73·33	
13	T T	5+		1			1		1	1	1	1	4	1	1	1	1		1	5	10	66·67	
14	S·A	5+	1				1		1	1	1	1	4	1	1	1	+	1	1	5	10	66·67	
15	V·O	5+	1				1				1	1	2	1	1	1	1	1	1	6	9	60·0	
16	M S·M	5			1		1	1	1			1	3	1	1	1				3	7	46·67	
17	B·I	5+			1	1		1	1			1	3	1	1	1	1	1	1	6	10	66·67	

18	S · L	S¹				1	1		1		1	1	3	1	1	1	+	1	1	5	9	60.0	
19	C · N	6	1		1		2	1	1	1		1	4	1	1	1		1	1	5	11	73.33	
20	C · P	5	1	1			2	1	1	1	1	1	5	1	1	1	1	1	1	6	13	86.67	
21	Ö · U	5	1				1				1	1	2	1	1	1	1	1	1	6	9	60.0	
22	A · N	6			1		1	1	1	1	1	1	5	1	1	1	1	1	1	6	12	80.0	
23	E · J	5			1		1	1	1		1	1	4	1	1		1		1	4	9	60.0	
24	I · A	5¹		1			1		+	1	1	1	3	1	1	1		1	1	5	9	60.0	
25	J · C	5			1		1	1	1		1	1	4	1	1		1		1	4	9	60.0	
26	C · E	5¹	1		1		2	1	1		1	1	4	1	1	1		1	1	5	11	73.33	
27	T · A	5⁺	1				1	1		1			2	1	1	1	1	1	1	6	8	60.0	
28	S · O	6	1		1		2	1		1		1	3	1	1		1	1	1	5	10	66.67	
29	K · I	5⁺		1			1	1		1	1	1	4	1	1		1	1	1	5	10	66.67	
30	C · U	5¹	1	1			2	1	1	1		1	4	1	1	1		1	1	5	11	73.33	
31	C · O	5			1		1	1	1	1		1	4	1	1			1	1	4	9	60.0	
32	V · A	5		1			1		1	1	1	1	4	1	1			1	1	4	9	60.0	
33	D · J A	5		1			1	1	1	1	1	1	5	1	1		1	1	1	5	11	73.33	
34	A · D	5¹		1			1	1	1		1	1	4	1	1		1	1	1	5	10	66.67	
35	J · D	5	1				1				1	1	2	1	1	1	1	1	1	6	9	60.0	
36	D · S	5	1				1	1	1			1	3	1	1	1	1	1	1	6	10	66.67	
37	S · O	5¹		1			1	1	+		1	1	3	1	1		1	1	1	5	9	60.0	
38	A · O	6	1				1				1	1	2	1	1	1	1	1	1	6	9	60.0	
39	U · E	5¹	1				1	1		1	1	1	4	1	1	1	1	1	1	6	11	73.33	
40	R · S · A	5	1				1				1	1	2	1	1	1			1	4	7	46.67	
41	C · A	5		1			1	1	1		1	1	4	1	1			1	1	4	9	60.0	

32	B P	6		1	+	1	1	1		1	1	1	4	1	1		1	1	1	5	10	66.67	
33	C O	5			1		1	1		1		1	3	1	1			1	1	4	8	53.33	
34	D S	5	1				1	1	1		1	1	4	1	1	1	1	1	1	6	11	73.33	
35	A P	6	1				1	1	1		1	1	4	1	1	1	1	1	1	6	11	73.33	
36	I A	5				1	1	1	1		1	1	4	1	1		1	1	1	5	10	66.67	
37	E A	6		1			1			1	1	1	3	1	1	1	1	1	1	6	10	66.67	
38	A E	5t	1		1		2	1		1	1	1	4	1	1	1	1	1	1	6	12	80.0	
39	C B	5				1	1		1	1	1	1	4	1	1			1	1	4	9	60.0	
40	J O M	5t		1			1	1	1			1	3	1	1			1	1	4	8	53.33	
41	C H	5		1			1	1	1	1	1	1	5	1	1			1	1	4	10	66.67	
42	R P	5	1				1				1	1	2	1	1	1	1	1	1	6	9	60.0	
43	J S	5	1				1				1	1	2	1	1	1	1	1	1	6	9	60.0	
44	J S	5	1				1	1			1	1	3	1	1	1	1	1	1	6	10	66.67	
45	S O	5t				1	1	1	1	1	1	1	5	1	1					2	8	53.33	
46	H N	5t				1	1	1	1	1	1	1	5	1	1			1		3	9	60.0	
47	A A	5			1		1	1	1	1		1	4	1	1			1	1	4	9	60.0	
48	S A	6	1				1	1	1		1	1	4	1	1	1	1	1	1	6	11	73.33	
49	T S	5t	1				1	1	1	1	1	1	5	1	1	1	1	1	1	6	12	80.0	
50	G A	5t	1				1	1				1	2	1	1	1		1	1	5	8	53.33	
51	S S	5	1				1	1			1	1	3	1	1	1	1	1	1	6	10	66.67	
52	A K	5		1			1	1	1		1	1	4	1	1		1	1	1	5	10	66.67	
53	J E	6				1	1	1	1	1	1	1	5	1	1			1	1	4	10	66.67	
54	E I	5t	1				1				1	1	2	1	1	1	1	1	1	6	9	60.0	
55	D N	5	1				1	1			1	1	3	1	1	1	1	1	1	6	10	66.67	

66	C · S	5¹	1				1				1	1	2	1	1	1	1	1	1	6	9	60·0		
67	V · E	5¹	1	1			2	1	1		1	1	4	1	1		1	1	1	5	11	73·33		
68	K · Y	6		1			1	1			1	1	4	1	1	1		1	1	6	11	73·33		
69	A · B	5¹			1		1	1	1		1	1	4	1	1		+	1		3	8	53·33		
70	C · J	5¹		1			1	1	1	1	1	1	5	1	1		1	1	1	5	11	73·33		
71	M · P	5				1	1	1			1	1	3	1	1		1	1	1	5	9	60·0		
72	I · O	5¹			1		1	1	1	1		1	4	1	1			1	1	4	9	60·0		
73	S · A	5¹		1			1	1	1		1	1	4	1	1		1	1	1	5	10	66·67		
74	S · A	6	1				1				1	1	2	1	1	1	1	1	1	6	9	60·0		
75	O · U	5	1				1				1	1	2	1	1	1	+	1	1	5	8	53·33		
76	V · Y	5¹		1			1	1			1	1	3	1	1	1		1	1	5	9	60·0		
77	B · D	5			1		1	1	1	1		1	4	1	1			1	1	4	9	60·0		
78	W · Y	6		1			1				1	1	2	1	1	1		1	1	5	8	53·33		
79	Y · F	5		1			1	1	1		1	1	4	1	1		1	1	1	5	10	66·67		
80	J · M	5¹	1				1				1	1	2	1	1	1	1	1	1	6	9	60·0		
			ITEM 1								ITEM 2				ITEM 3									

APPENDIX 4.

Recording Sheet

The appropriate daily recording sheet is found to be of great relevance for this time/event sampling. The required paper size is 275 x 425mm.

SCHOOL: _____ DATE _____

Kind of Activities: _____

Recorder: _____ Class Teacher: _____

S/No	Children's Name in Code	Minutes Observed						Summary of Observe-
		5	5	5	5	5	5	

APPENDIX 4: DAILY RECORDING SHEET SHOWING NAMES IN INITIALS CODE FOR A 30 MINUTES PLAY PERIOD CIRCUMFED INTO

Appendix 5: Percentage of agreement between checker and investigato on matching behaviour per item observed.

Recording Sheet
CHECKER'S NAMES:

S/No	Subject Initial	Item 1	Item 2	Item 3	Average % Code Score
1					
2					
3					
4					
5					
6					
7					
8					
.					
.					
.					
.					
.					
.					
Total					
Mean					