THE EFFECT OF NURSERY SCHOOL EXPERIENCE ON CHILDREN'S INTELLECTUAL DEVELOPMENT.

By

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DEDICATION

This paper is dedicated to:

HELLEN MODUPE OLUSHOLA MELLE (MISS)

and

RACHEL DELE MELLE (MRS.)

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CHAPTER 1

INTRODUCTION

Upon being asked at what age the education of a child should begin, N.L. Gage (1963)[1] quoted Oliver Wendell Homes to have replied:

"One hundred years before the child's birth".

During this passing decade there has been a steadily increasing interest in improving and expanding educational opportunities for, in particular, young children in Nigeria. Group experiences away from home have become a popular and acceptable means of supplementing a child's home education and of offering alternative child care arrangements for working parents. More and more numbers of children are enrolled in a whole spectrum of programs that range from properly organised nursery schools to inadequately managed or poorly staffed preSchool centers.

The prevalence of preSchools in most urban and some rural communities has contributed to a growing curiosity about programs for young (preSchool age) children. But given the potpourri of different educational philosophies and curricula, what can be concluded

[1] N.L. Gage (ed.): "Handbook of Research on Teaching" Rand McNally & Company Ltd., Chicago. 1963; (P.814).

about the "effects of PreSchool experiences on the children who attend them?" Another important question to ask is "what differentiates the programs that demonstrated positive effects from those that did not?"

The primary goal of nursery Schools or preSchool settings is to provide sound education experiences for young children; though programs differ very widely in the specifics of their educational philosophy and their curriculum contents. A typical nursery school stresses social skills, the learning potential of play, and the value of creativity in the use of materials and equipment, with relatively little emphasis placed on formal instruction.

Most of the children attending nursery or preSchool centers are between $3\frac{1}{2}$ to $6\frac{1}{2}$ year of age. They attend the School half-days (8^{00}a.m. - 12^{00}noon) and are grouped, usually into two, by age. The goals of the program are outlined in the National Policy on Education[1] (Lagos, 1977), as:-

(a) effecting a smooth transition from the home to the school;

(b) preparing the child for the primary level of education;

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[1] Federal Republic of Nigeria National Policy on Education. Federal Ministry of Information Printing Division, Lagos. 1977; (P.6).

(c) providing adequate care and supervision for the children while their parents are at work (on the farms, in the markets, offices, etc.)

(d) inculcating social norms;

(e) inculcating in the child the spirit of enquiry and creativity through the exploration of nature, and the local environment, playing with toys, artistic and musical activities, etc.;

(f) teaching co-operation and team spirit;

(g) teaching the rudiments of numbers, letters, colours, shapes, forms, etc., through play;

(h) teaching good habits, especially good health habits.

It is the rule rather than the exception for the young child to be enthusiastic about nursery school. The nursery school teachers are unusually friendly and attentive to their children, and have both time and inclination to talk with their children about things of great importance to the children themselves. These teachers are usually women - naturally loving, patient, cheerful and accomodating to children. The nursery school program is very flexible and informal; the children interact freely, play or work alone or in small groups, and talk casually with each other.

PreSchool activities are chosen for their interest to the children. Some activities that presumably contribute to the child's <u>intellectual development</u> are provided. Such may include science activities, premath and prereading activities, social studies, language experiences, and practice in cognitive skills (e.g. observing, problem-solving and reasoning). Some other activities contribute primarily to the child's Social development (e.g. play materialswhich entice the children into social interactions). Yet other activities help the motor development and aesthetic interests of the children.

MATERIALS:

In planning the nursery school program there is deliberate attempt to provide an abundance of concrete first-hand experiences for the child because much of the young child's learning appears to depend upon direct contact with real things in the environment. Objects of interest are brought into the school for children to observe, manipulate and study, and materials are made available that encourage the children to play at performing tasks.

The typical nursery school room consists of activity and play centers; not being furnished with individual pupil desks. These centers include a section of the room furnished with tables and chairs for use with special projects, games, prizzles, small toys and construction materials. Another center or area is a doll-play and home-making area with dress-up clothes and child-sized household equipment, a block area with plenty of space for "building" and low shelves for toys and equipment.

PIAGETIAN SCIENCE-RELATED CONCEPTS:

Such man (1961) of the University of Illinois, invokes much of the work of Piaget in discussing the rationable behind his approach to inquiry training. Karplus (1965) director of the Science Curriculum Improvement Study at the University of Califonia, in a publication, Theoretical Background of the Science Curriculum Improvement Study, cited Piaget's work as part of the theoretical basis for the materials he and his associates are developing.

The awareness of Piaget's work has grown greatly in these last two decades and its influence has been strongly felt in the development of elementary school Science programs. But this trend has been mainly in the Western Countries; only recently the impact is increasingly being felt in Nigeria. It was out of the studying (during the researcher's M.Ed. course work) of both the works of Piaget and the new approaches to teaching of elementary science that the idea and interest of this independent study grew.

CHAPTER 2

BACKGROUND LITERATURE

It would be quite interesting to have studies on parental reasons for choosing to or not to send a child to nursery school. One reason could probably be that mothers who wish to be free of children care in order to be engaged in an employment, may be more interested in providing nursery school for their children than mothers who enjoy and prefer child care. Another reason for desiring preSchool attendance for their child might be that the parents value the development of social skills and believe that the nursery school will facilitate it. Similarly, it may also be that parents who send their children to nursery schools are more highly achievement-oriented than parents who do not. Thus, comparisons between children who attend and who have not gone to preSchool centers may be as dependent on the reasons of the parents for sending them to school as on the school experience itself. Whichever way we look at the issue, a lot of controversy exists on the effects of nursery school experience on intelligence (intellectual, social, aesthetic or/and motor developments).

Since intelligence depends upon the observing, thinking, and conceptualizing that the child carries on, it is reasonable to assume that contact with professionally trained adult teachers (e.g. Grade II and N.C.E. mothers), providing a rich stimulating environment for children, should enhance the conceptual development and intellectual activity of children. Between 1930 to early 1940s Wellman and others (1943) at the IOWA child Welfare Research Station made a number of studies of changes in children's I.Qs provided with nursery school opportunities. In Walsh's Study (1931) it was shown that nursery school children had more curiosity and interest in their environment than non-nursery school children. With this, other things being equal, one would expect the child with such qualities to develop his intellectual resources more effectively than the child who is more apathetic and passive in relation to his environment. Therefore, if the nursery school, by the use of environmental resources, stimulates curiosity, then we should expect conceptual development to progress more favourably with nursery school attendance than in a home situation which may provide less stimulation.

Reviewing the research on the effects of nursery school on intelligence, Hunt (1961, pp.27-33) succintly expressed his hope by saying: "Various bits of the evidence reviewed hint that if the manner in which encounters with the environment foster the development of intellectual interest and capacity were more fully understood, it might be possible to increase the average level of intelligence with the population substantially" The statement of Jones (1954) in his review of the literature on environmental influences on mental development is of relevance here: "It is quite reasonable to expect some I.Q. gains among children released from a static and unstimulating environment, whether this release is provided by nursery school, a foster home, or other environmental change" And, since children raised in such static environments often have low I.Qs. at start with, one must be certain that gains on retest are atrributable to more than simple regression effects - most likely to nursery or foster experience.

Wellman (1945) and McCandless (1967) maintain in their findings that there are consistent intelligence gains for children who attended nursery schools - that the gains are permanent and are positively correlated with later academic performance. Hebb (1972) makes the same point in discussing the contribution of experience to I.Q. (or intelligence B.)

Rupert Klaus and Susan Gray (1967) and their colleagues associated with the "Early Training Project" at the George Peabody College for Teachers in Nashville, Tennessee, developed a special summer nursery school for environmentally disadvantaged children. The curriculum of this nursery school aimed to teach children the language skills, attitudes and motives required to cope with elementary school At regular intervals, examiners tested the group attending nursery school and also other groups who do not attend. The test performances clearly separate the children who got the nursery school from those who did not, and the superiority of their test performances is reported to continue through the first year in elementary school. Similarly, in Motherhood and child care, (1974, p.73-75), Juliet M.I. Macauley, has this comment: "When parents can afford the expense, a Nursery School - - - has many advantages for the child. It provides the child with a sound foundation for the formal education that is to come in later years".

Studies by Hattick (1937), Joel (1939), and Kawin and Hoefer (1931) have shown that children attending nursery school eliminated more "undersirable" infantile and dependent habits during the year than a matched group of peers who did not go to nursery school. Jersild and Fite (1939) studied social participation in children who had attended nursery school for a previous year and children who were starting nursery school for the first time. Those who had been in nursery school longer were more sociable at the beginning, but the new children made rapid gains in social participation By the end of the school year the two groups were equal in social activity, as judged by the time spent in co-operative play, sharing, and conversation. When a child is increasing his social participation in the nursery school environment one would expect that he is also increasing his intellectual skills.

Bonney and Nicholson (1958) reviewed various studies of the effects of preSchool training on children in later life, and found that intellectual attainments and sociometric scores of former nursery school pupils (now in elementry classes I, II and III) were significantly higher than those of their age mates who had not attended nursery school.

A very interesting series of articles from the Merrill-Palmer Institute (Brenner, 1957; Brenner and Samelson, 1959; Hofman, 1957, 1958) considered characteristics of kindergarten children which indicated degree of readiness for elementary I. as well as the kinds of expectations and requirements which elementary schools set up for children. From these case descriptions or studies, generalisations emerged in favour of children who attended kindergarten to be likely to be more highly successful in primary I than their peers who did not attend kindergarten.

On the other hand Anderson (1940), Bird (1940), and Jones and Jorgensen reported that nursery schools attendance or preSchool experiences did not show gains in children's intelligence.

Olson and Hughes (1940), in their interesting study, found that there was no significant difference in the intellectual growth from a matched sample of non-nursery school and nursery school children from privileged home backgrounds, This suggested that the home background of the children they studied was already of such a nature that the nursery school could add litt little to it.

In an article entitled "how much can we boost I.Q. and scholastic Achievement?" Jensen (1969) questions the effectiveness of compensatory education in elevating I.Q. Some studies, as shown by Munn's review (1974), are of the opinion that the large-scale programs of nursery education have not been in operation sufficiently long to indicate their effectiveness, either in raising I.Qs or in improving school performance.

Attendance at the usual nursery school, (Munn, 1974; Matteson, 1931) has had no convincing effect upon I.Q. Positive findings in nursery school studies could result from similarities between what the children learn in nursery school and what is called for in tests. That is to say, they may have become "test wise" and have had a temporary advantage on this basis.

In the maze-learning experiments of Mattson (1933) there were comparable groups of boys and girls. The data from these experiments were analyzed to discover possible sex differences in rate of acquisition. Mattson found the acquisition curves for boys and girls to be almost identical, both for time and for error scores. In the experiments by McGinnis (1929), the boys were initially ahead of the girls, who soon equalled them in skill. This indicates that generally there are no significant sex differences, and if at all there are, not over a significant period.

There are yet other theses or studies which claim that preSchool experience has significant effect initially but that the effect fade out after six months or so depending on individual children, school environment and teachers' methodologies. Nelson, Lois (1973) and Lovell K. (1962) are with this motion.

These researches and reviews were carried out in the Western Countries, except two of them - Juliet I. Macauley, 1974; and Zacc. O. Bamidele, 1978 - which were carried out in Nigeria by Nigerians.

CHAPTER 3

THE PROBLEM AND THE HYPOTHESES

This independent project is an investigation of the development of four science-related concepts in children who attended nursery school, matched with children who did not attend. The children are now in elementary I and elementary II at L.E.A. School, Bakin Kogi II, Kafanchan, Kaduna State. The concepts used in the study have been defined by Piaget and have been used in a large number of studies concerning the intellectual development of children. They are:-

(1) Conservation of number;

(2) Conservation of continuous substance;

(3) Conservation of length; and

(4) Conservation of area.

The conservation concept is one to which Piaget has given a great deal of attention. His influence has generated many investigations by others. The researcher's interest and attention have been aroused by some of these Piaget-related studies. Among the questions of problems confronting the researcher are:-

(a) Is there any significant difference in the development of (performance on) these Science-related concepts, between the pupils who attended nursery school (or pre-school centres) and those who did not?

(b) Is there any relationship between the development of these concepts and the socio-economic status of the pupils.

(c) Are there significant differences in the effect of nursery school attendance on the boys and girls? i.e. is the effect sex discriminating.

Nursery School education is only recently becoming a part of our formal system of education. Attendance is not at all required by law, as it is for primary schooling. Most of our preschool centers are privately run and supported, and are independent of government interference. Some parents and guardians are yet to be convinced of the need to send their children to nursery schools. "What benefits accrue to the child, from attendance at nursery school?" This is a typical question that a number of studies have attempted to evaluate; to determine whether some of the goals of nursery school mentioned under Introduction Chapter (see pages 2-3) are better achieved by children in the nursery school settings than by children who remain at home during the preschool age period ($3\frac{1}{2}$ to $6\frac{1}{2}$ years). It is the same question to which the researcher now addresses himself.

Another very important question being asked is, "what differentiates the programs that demonstrate positive effects from those that do not?" With all the these questions in mind, the researcher finds it extremely necessary and of great educational benefits to carry out this research project. The findings of the study may provide suggestion for possible answers to the identified questions, on the effect of nursery school attendance on children's cognitive development.

HYPOTHESES:

The following hypotheses form the bases of the study. The Null-hypothesis of each hypothesis is stated after it.

(1) The children who attended nursery school will perform significantly better than the children who did not, on the conservations of number, continuous substance, length and area tasks.

NULL-HYPOTHESIS:

There will be no significant difference in the performance of the two matched groups on the four conservation tasks.

(2) The children from high socio-economic background will perform significantly better than the children from low socio-economic background on the four science-related concepts.

NULL-HYPOTHESIS:

There will be no significant difference between the two matched groups in their performances on the four tasks.

(3) There will be significant difference between the boys and girls, in their performances on the conservation tasks.

NULL-HYPOTHESIS:

There will be no significant sex discrimination in the four conservation tasks performances.

(4) The effect of nursery school attendance, on the four conservation tasks, will be significantly higher in primary I than in primary II.

NULL-HYPOTHESIS:

There will be no significant difference, on the effect of preschool experience, between primary I and primary II in the four tasks.

(Level of significance for all the hypotheses are $P \leq 0.05$).

CHAPTER 4

METHODOLOGY

I. THE PILOT STUDY:

A pilot study involving random selection of twenty-four (12 boys and 12 girls) children in classes I and II was first carried out by the investigator. The 24 children's responses to the four cognitive tasks were rated by two examiners independently. Each examiner independently assigned either a rating of conserver(I), transitional(IA), or non-Conserver(II) to each child's response. The pilot study was designed to provide a method for determining the reliability of the scoring process, using the classificational system mentioned above (i.e. conserver, transition, non-Conserver).

II. THE SAMPLE:

A sample of forty pupils was randomly selected from classes I and II of Bakin Kogi II L.E.A. School, Kafanchan. The names of the girls and boys, in class I, who attended nursery school were collected from the Headmaster. They were assigned numbers. Using a random number table, 5 boys and 5 girls without nursery experience were selected. The same procedure was carried out in primary II.

By this means, the sample of forty subjects runs thus:-

CLASS I (N= 20)		CLASS II (N= 20)		TOTAL
Nursery	Non-Nursery	Nursery	Non-Nursery	
5 girls	5 girls	5 girls	5 girls	20
5 boys	5 boys	5 boys	5 boys	20

TABLE 4.1:- THE SAMPLE AS REPRESENTED BY CLASSES AND BY NURSERY Vs NON-NURSERY ATTENDANTS.

III. TESTS, TEST ADMINISTRATION AND SCORING:

The study is designed to test each child on four cognitive tasks involving conservation of:

(a) number;

(b) continuous substance;

(c) length; and

(d) area.

Each task entailed manipulating specific materials generic to the task and responding to questions posed by the experimenter. The questions were derived from Piaget's original research and some of the replication studies. The questions sought to determine whether the child understood equivalency and reversibility as involved involved in number, continuous quantity, length and area tasks and to ascertain whether the child was in the pre-operational or concrete operational stage of cognitive development.

The experimenter spent about 15 minutes with each child. Each of the tasks was administered to each child individually by the experimenter in the order mentioned above.

On each of the tasks, each subject was classified as a "conserver", a " transitional" or a "non-conserver" The criteria for those three classifications were as follows:-

(a) Conserver:- The subject evidences either a specific or a general reversibility of mental activities when responding to questions pertaining to the conservation.

(b) Transitional:- The subject shows both reversibility and non-reversibility of mental activities when responding to questions pertaining to the conservation tasks.

(c) Non-Conserver:- The subject evidences no reversibility of mental activities during questioning and responses to the conservation tasks wrongly.

Reversibility:- It means that the subjects can mentally reverse actions that they have observed.

Validity Of The Tests:

It appears appropriate to discuss the validity of the tests - the question of what the conservation tasks measure. The question is "Do the responses given by a child reflect the structure of his intellect?" In the case of length task, for example, the question could be raised as to whether the child is just confusing the terms "length" with the concept "sticking out".

It is, however, observed that every non-Conserver on this task (length) picked the rule that he had asserted was the longer when he was confronted with the "pretend problem" of trying to reach a piece of sweet that he had dropped on the ground.

Similarly in the other conservation tasks, when the children were responding on a pretend basis, they responded to the last question in the task in ways that were very consistent with their previous responses whether they were non-Conserver or conserver responses.

RELIABILITY OF THE TESTS:

In order to obtain interobserver reliability in coding the children's responses, the first twenty-four (12 boys and 12 girls) responses to the four cognitive tasks were rated by two examiners independently. This provided a method for determining the reliability of the scoring process using the classification sytem mentioned (i.e. conservers, transitionals, and non-Conservers). Each examiner independently assigned either a rating of conserver(I), transitional(IA), or non-Conserver(II) to each child's response. The reliability was determined by the percentage of perfect agreement between the raters on assigning ratings to each child's performance. The agreement between raters was 87%. This small scale pilot sampling of twenty-four responses indicated that interobserver reliability was sufficiently high to warrant proceeding with classifying the remainder of the pupil responses to the four conservation tasks.

It should be noted also that this method of classification was suggested by piaget.

In order to determine the reliability of the performance of the subjects on the four conservation tasks, the performances - in Mathematics and Primary Science - of the Primary II pupils in their last (end of Primary I promotion examination) sessional examination were collected from the Headmaster. The investigator added their respective marks on the two subjects. Their marks were correlated with their respective performances on the conservation tasks. A correlation of reliability obtained was 0.78.

A similar reliability correlation could not be obtained for the Primary I pupils since they had not taken any class tests or examination. However, the investigator approached the teacher of Baptist Day Nursery School for the performance of some primary I pupils who just left the Nursery School three months earlier (July - Oct. 1978). The marks of six boys and four girls given were correlated with the pupils' respective performance on the four cognitive tasks; the resulting reliability was 0.69

GENERAL APPROACH TO THE TASKS:

When presenting the conservation tasks the following approaches and mood were generally adopted.

1. The experimenter was seated opposite the subject at a low table.

2. The subject was set at ease. The investigator smiled at the subject, asked him his name and chatted a moment. About one to two minutes were spent to establish a friendly rapport with the child. The initial protocol was standardized and followed as closely as possible the statements below:

   "we are going to play some games, and I will ask you some questions as we play. There aren't any tricks in any of these, and I am not looking for any particular answer; just tell me exactly what you think". This was conducted by the investigator in Vernacular (Yoruba and Hausa except for two Ibo boys who could not unstand either Yoruba or Hausa properly). An Ibo teacher was employed as an interpreter to two Ibo boys.

3. The experimenter was friendly but also remained precise and alert, so that he might catch the half-uttered phrase that is the key to the child's thoughts concerning a particular tasks.

4. The investigator resisted the temptation to lead or praise the subject. The child was not told "that "that's right" or "fine" when he made a response. To avoid silence (to which most children are unaccustomed) the investigator simply parrotted back the child's response by saying "you think (child's answer)".

5. The experimenter did not introduce any inflection in his voice or made any gesture or movement that might lead the subject to a particular response.

6. If the child did not establish one-to-one correspondence, then the task was terminated. (These tasks have no meaning unless the recessary equivalences are established). The experimenter watched carefully for the equivalence points in each of the four tasks.

7. If at anytime during the presentation of a task it became obvious that the subject had misunderstood some question or if the subject suspected some trick, the experimenter made attempt to remedy the discrepancy in the child's mind.

THE TASKS:

The detailed descriptions of the four conservation tasks now follows in order:-

(1) CONSERVATION OF NUMBER:

Equipment

10 blue pieces of paper

10 red pieces of paper.

Figure 4.1 Dimensions of each of the 20 pieces of paper.

The experimenter placed eight red pieces of paper on the table in front of the subject. The pieces were placed in a straight line with an appoximate one-inch space between each piece (see Figure 4.2).

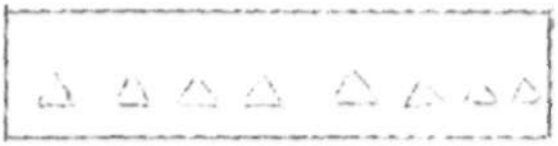

Figure 4.2.

Then the experimenter gave the subject ten blue pieces of paper and said, "I want you to make a row of blue pieces beside the row of red pieces. Make your row so that there is one red piece for each blue piece" (Figure 4.3).

Figure 4.3

If the subject established the one-to-one correspondence, then the experimenter took the two extra blue pieces and removed them from sight. Then the experimenter asked, "Are there the same number of red pieces as black pieces?" The child's answer was "Yes" before the task could continue.

If the child did <u>not</u> establish the one-to-one correspondence, then the investigator would say, "Are you sure there is one blue piece for each red pieces?" If the subject <u>still</u> maintained that there was the same number of red and blue pieces, then the experimenter terminated the task by saying, "Let's try another game".

When the subject had established the necessary equivalence, then the experimenter said, "Watch closely, I am going to move the red pieces". The experimenter then proceeded to arrange the red pieces in a group, ensuring that there was no stacking of one pieces on top of another (see Figure 4.4).

Figure 4.4

The experimenter then asked:- "Are there more red pieces, more blue pieces, or the same number of red and blue pieces?"

When the subject had responded, the experimenter then asked: "Why do you think so?"

Then the experimenter again proceeded, saying "Watch closely, I am going to move the red pieces". The experimenter then moved the red pieces into a row that was parallel to and at least twice as long as the row of blue pieces (see Figure 4.5).

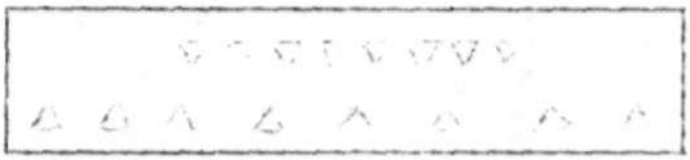

Figure 4.5

Figure 4.5

The experimenter then asked again:-

(a) "Are there more red pieces, more blue pieces, or the same number of red and blue pieces?"

(b) "Why do you think so?"

After the subject had responded, the investigator said, "Let's pretend that these (pointing to red pieces) are sweets wrapped in red paper and that these (pointing to blue pieces) are the same kind of sweet wrapped in blue paper. Suppose I tod you that you could have either the sweet wrapped in red paper or sweet wrapped in blue paper. Which sweet would you rather have?".

(c) "Would we get the same amount of sweet or not?"

(d) "Why do you think so?"

(2) CONSERVATION OF CONTINUOUS SUBSTANCE:

Equipment

6 squares of paper - all the same colour (pink) and same type of paper (card board).

One 1"XX 1" square

One 2" X 2" square

Two 3" X 3" square

One 4" X 4" square

One 5" X 5" square.

The experimenter placed on the table in front of the subject the six pieces of paper, two of which were equal (i.e. two 3" x 3" squares) and four of which were very different in size. The subject was asked to choose two pieces that contained the same amount of paper. The four unequal-sized papers were then removed from right. The experimenter said, "Now you take one paper, and I'll take one paper. Will that be fair? Will I have the same amount of paper as you?"

The answer to this question was "Yes" before continuing.

After the subject admitted to the equality of amount of paper, the experimenter said, "watch closely I am returning all the six pieces of paper to the table" The experimenter then placed the six squares of paper on the table and said, "Iam going to take one piece of paper (experimenter took one of the 3" x 3" squares and placed it on his side of the table) and I am going to give you the other pieces of paper".

The experimenter(E) then put the other pieces of paper near the subject(s) as shown in figure 4.6.

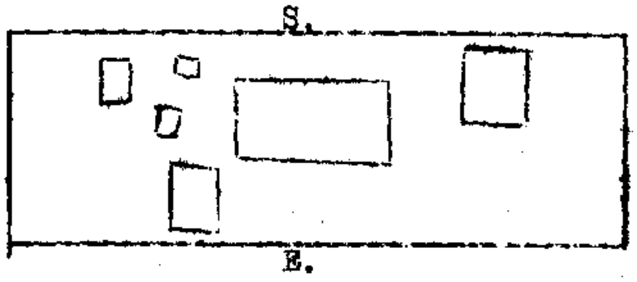

Figure 4.6

Then the experimenter said, "Pick one of your pieces of paper that has more paper than my piece of paper".

(The experimenter noted the subject's response on the response sheet; then had the subject place the selected piece back on the table).

Next, the experimenter said, "Pick one of your pieces of paper that has less paper than my piece of paper".

(The experimenter recorded the subject's response; and had the selected paper returned to table.)

NOTE:- The subject was allowed to compare the pieces of paper at any time during the task when he wished to do so but the experimenter never suggested comparison.

(3) CONSERVATION OF LENGTH:

Equipment

Two equal rods (1ft. rulers) - both are parallel and their ends are even.

In this experiment, the experimenter showed the subject two rods of equal length on the table in front of the subject. The rods were parallel and both their ends were even (see Figure 4.7).

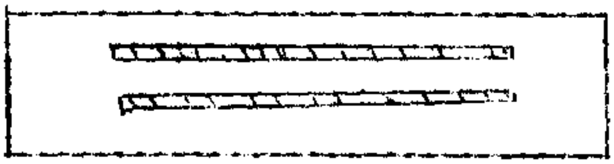

Figure 4.7

The experimenter then asked the subject if the rods were the same length or not. The answer to this question had to be "yes" before the experimenter continued. After the subject had agreed that the rods were of the same length the experimenter displaced one rod approcimately half its length parallel to the other one (see Figure 4.8) and asked the subject the following questions:-

(a) "Are the rods still the same length, or is one rod longer than the other one?"

(b) "Why do you think so?"

(c) "Are you sure?"

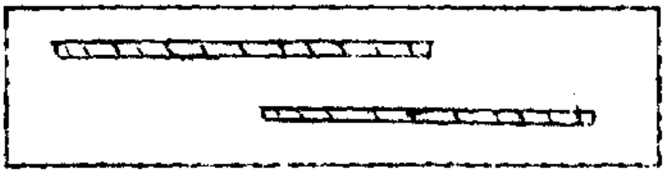

Figure 4.8

Figure 4.8

The experimenter continued by displacing the same rod approximately the same amount in the same direction and repeating the above questions. At this point the experimenter said to the subject, "Let's pretend you dropped a piece of sweet on the floor and it was too far away to reach (the experimenter would make a gesture of reaching) and you needed the longest stick you could find to reach your piece of sweet. Which rod would you use?" After the subject's response the experimenter said, "Why did you choose that rod?"

(4) CONSERVATION OF AREA:

Equipment

1 square piece of green paper (6" x 6")

4 wooden cubes ($1\frac{1}{2}$" x $1\frac{1}{2}$" x $1\frac{1}{2}$").

The experimenter showed the subject a toy form (the green pieces of square paper). The experimenter then placed the green paper on the table and said, "Let "Let's pretend this is grass".
The the experimenter placed the four cubes on the grass (see Figure 4.9) and said, "Let's pretend these are houses and that there are cows standing about eating the grass. Look at all the grass that the cows have to eat".

eat".

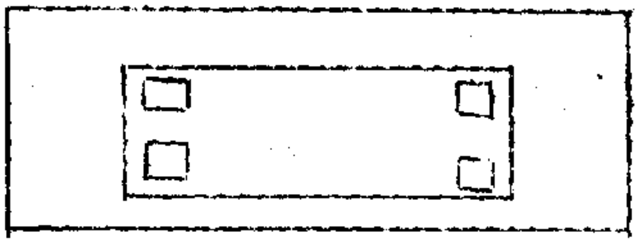

Figure 4.9

The experimenter then said, "now, let's place the houses like this" (The experimenter placed the houses as shown in Figure 4.10).

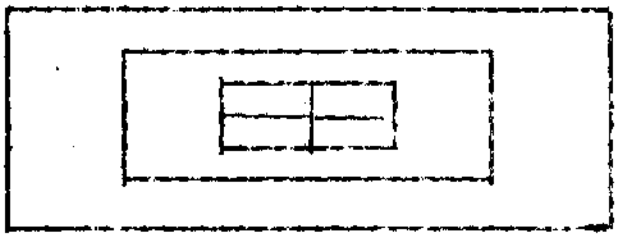

Figure 4.10

The experimenter then asked the following questions questions:-

(a) "Now, do the cows have more grass to eat, the same amount of grass to eat, or less grass to eat?".

(b) "Why do you think so?"

(c) "Are you sure?"

The experimenter then arranged the houses as shown in figure 4.11 and said, "Let's place the houses like this".

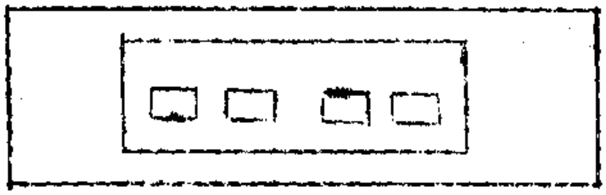

Figure 4.11

The experimenter repeated the three questions above.

PARENTS' QUESTIONAIRE:

In order to determine the relationship between the subjects' Socio-economic backgrounds and their performances on the four Science-related concepts, "PARENTS' QUESTIONAIRE" was constructed.

The questionaire was given to the researcher's supervisor and four others to validate. The questionaire (see Appedix) included items on the parents' (of the subjects) biographical details, educational backgrounds, professional experience and incomes, and their children's preSchool experiences.

The questionaire copies were given to the subjects to take home to their parents or guardians for completion. Commencing from that evening and lasting for five days, the investigator made personal contacts with 34 parents and guardians (for 37 subjects) who were in the neighbourhood. He explained the purpose of the research to them and the essence of providing correct and honest responses to the items of the questionaire. The investigator completed the questionaire items of the parents who were not literate enough for them by asking them questions or/and interpreting the statements of the questionaire.

As the investigator visited the parents and guardians of the subjects he made a personal and on-the-spot estimates of the families' Socio-economic backgrounds by assessing the property he observed with the families. This, though a face-value evaluation, helped him to check the honesty and reliability of the responses to the questionaire.

All parents and guardiances who were on salary levels GL.01 to GL.06 were stratified into the low Socio-economic status group. The petty traders were put in this group. Those on salary levels of GL.08 to GL.14 without other sources of income were graded as medium class. Those on salary level above GL.12 plus other sources of income over ₦3,500 per annum were excluded from the medium class. Any parent or guardian earning salary at level GL.15 and above was considered to belong to the upper class. Contractors and those on level GL.12 to GL.15 plus other sources of incomes more than ₦3,500 per annum were stratified into upper class.

From the educational levels coupled with the respective years of professional experiences the investigator estimated the salary grade levels of the parents and guardians. These estimates were correlated with the responses the parents and guardians personally made. A reliability correlation of 0.88 was obtained. That was considered to be satisfactory for the purpose of this study.

DATA MATRIX:

The study was designed so that the data could be analysed by a two-by-two contigence tables. The scores of one and two were assigned to performance on the Science-related tasks as "non-conserver" and "conserver" respectively. In this way, the subjects were placed into two groups, nursery and non-nursery.

To determine the relationships between the performance on the tasks and the Socio-economic backgrounds of the subjects, a two-by-three analysis of variance was designed. In this way, the subjects were placed into two groups, the conservers and the non-conservers, with three levels of Socio-economic status - high, medium, and low. The justification for using trichotomous data in an analysis of variance design is twofold:-

(a) Similar analysis have been reported in the Literature by Robert E. Lepper (1967-1968), Elkind (1961) and others;

(b) The use of analysis of variance with this type of data is supported by King's and R.E. Lepper's (1968) works.

Using a random-number generator, according to Lepper, King assigned at random zeros and ones to the cells of a two-by-three analysis of variance design to determine if the resulting F ratios were consistent with existing F ratio tables. He found that the F ratios generated by the random assignment of zeros and ones were conservative at both the 0.05 and 0.01 levels of significance.

Therefore, this design seems justified and any significant differences found between groups or levels in this analysis will be conservative.

CHAPTER 5

ANALYSIS OF DATA AND RESULTS

(1) The performance of the subjects on the four conservation tasks were obtained and classified as shown in Tables I(a) and I(b) below.

TABLE I(a): OBSERVED FREQUENCIES OF THE SUBJECTS ON THE CONSERVATION TASKS, AND THE CHI SQUARE TESTS RESULTS.

CONSERVATION TASKS	GROUP	NURSERY	NON-NURSERY	TOTAL	X^2-RESULTS (d.f = 1 (p = 0.05
Number	Conservers	20	13	33	8.531**
	Non-Conservers	0	7	7	
	Total	20	20	40	
Continuous Substance.	Conservers	19	17	36	1.111
	Non-Conservers	1	3	4	
	Total	20	20	40	
Length	Conservers	12	5	17	5.012*
	Non-Conservers	8	15	23	
	Total	20	20	40	
Area	Conservers	11	1	12	11.904**
	Non-Conservers	9	19	28	
	Total	20	20	40	

(* This value is significant at the 0.05 level)
(** These values are significant at the 0.01 level)

The null hypothesis that there would be no significant differences between the nursery and non-nursery subjects when they were matched on their performances on the conservation tasks was not rejected for the task of conservation of continuous substance (X^2-test value = 1.111 but was rejected for the tasks of conservation of number, length and area. In these cases, the differences favoured the pupils who had nursery or preSchool experiences.

Table I(b) represented the overall performance between nursery and non-nursery pupils on the four tasks - constructed out of Table I(a).

TABLE I(b): THE OVERALL PERFORMANCE BETWEEN NURSERY AND NON-NURSERY SUBJECTS ON THE FOUR COGNITIVE TASKS.

GROUP	NURSERY	NON-NURSERY	TOTAL	X^2-RESULT (d.f. = 1 ; p. = 0.05)
Conservers	62	36	98	
Non-Conservers	18	44	62	17.80**
Total	80	80	160	

(** This value is significant at the 0.01 level)

According to Table I(b) above, the followings could be asserted:-

(a) Among conservers, there were significant differences between the nursery and non-nursery attendants.

(b) Among non-conservers, there were significant differences between nursery and non-nursery pupils.

(c) Among Nursery-conservers and Nursery - non-Conservers, there were significant differences.

(d) Among non-nursery conservers and non-nursery non-conservers, there were no significant differences observed.

These results were expected since one would expect significant differences between nursery and non-nursery pupils whether conservers or non-conservers. The high value of the X^2-test for the overall performance (X^2= 17.80, significant at 0.01 level) between the nursery and non-nursery pupils on the four conservation tasks (combined) was a clear indication that the null hypothesis that there would be no significant differences between them (nursery and non-nursery) should be rejected outright.

(2) Table II(a) represented the data associated with Socio-economic Status of the Subjects (their parents and guardians). Out of the forty pupils, six, eleven and twenty-three belonged to the upper, medium and lower socio-economic classes respectively.

TABLE II(a): FREQUENCIES OF THE SUBJECTS ON THE CONSERVATION TASKS BY SOCIO-ECONOMIC STATUS GROUPS.

TASKS	GROUPS	UPPER CLASS	MIDDLE	LOWER	TOTAL.
Number	Conservers	5	9	19	33
	Non-Conservers	1	2	4	7
	Total	6	11	23	40
Continuous Substance.	Conservers	5	9	22	36
	Non-Conservers	1	2	1	4
	Total	6	11	23	40
Length	Conservers	3	5	9	17
	Non-Conservers	3	6	14	23
	Total	6	11	23	40
Area	Conservers	2	3	7	12
	Non-Conservers	4	8	16	28
	Total	6	11	23	40

The "F" ratios which resulted from the analysis of variance are shown in Table II(b) below. The "F" ratios were tested at the P=0.05 level of significance.

TABLE II(b): RESULTS OF ANALYSIS OF VARIANCE: CONSERVATION OF THE TASKS Vs SOCIO-ECONOMIC STATUS.

Conservation tasks.	"F" ratios between levels of Socio-economic status.
Number	1.61
Continuous Substance	2.24
Length	1.20
Area	1.41

The null hypothesis that there would be no significant differences between the high, medium, and low Socio-economic status groups was not rejected for the tasks of conservation of number, continuos substance, length and area, i.e. all the four tasks (see Table II (b).

(3). The scores of the children on the four conservation tasks were tabulated for each sex, according to the frequencies and percentages of children responding at each level on the four tasks. The data is presented in Table III below.

Chi-square tests of association between boys and girls indicated no significant differences in the level of scores between the sexes on any of the four science-related tasks.

TABLE III: FREQUENCIES AND PERCENTAGES OF RESPONSES ON THE FOUR CONSERVATION TASKS BY SEX.

(Median Age:- MALE 7.1 years; FEMALE 6.9 years).

CONSERVATION TASKS.	SEX	N	CONSERVERS		NON-CONSERVERS	
			n	%	n	%
Number	MALE	20	16	80	4	20
	FEMALE	20	17	85	3	15
Continuous Substance.	MALE	20	18	90	2	10
	FEMALE	20	18	90	2	10
Length	MALE	20	10	50	10	50
	FEMALE	20	7	35	13	65
Area	MALE	20	6	30	14	70
	FEMALE	20	6	30	14	70

The data indicated a high degree of similarity in the performance of boys and girls on each of the four conservation tasks. The null hypothesis that there would be no significant differences in the performance of boys and girls on the four tasks was therefore not rejected.

It appears that performance is more a function of maturation, experience with the environment and mental development than sex. Cognitive processes, as indicated by pupils on these four conservation tasks, therefore, appear to be little influenced by sex characteristics, sex differences, or preferences.

(4) Tables IV(a) and IV(b) were constructed on the performance of the children on the four cognitive tasks, to test the forth hypothesis, that there would be no significant differences between Primary I and Primary II pupils, when matched.

TABLE IV(a): OBSERVED FREQUENCIES OF PRIMARY I AND PRIMARY II ON THE CONSERVATION TASKS, AND THE CHI SQUARE TESTS RESULTS.

TASKS	GROUPS	PRIMARY I.	PRIMARY II.	TOTAL	X^2-TEST RESTULTS
Number	Conservers	13	20	33	5.72^{*}
	Non-Conservers	7	0	7	
	Total	20	20	40	
Continuous Substance.	Conservers	16	20	36	4.45^{*}
	Non-Conservers	4	0	4	
	Total	20	20	40	
Length	Conservers	4	13	17	8.29^{**}
	Non-Conservers	16	7	23	
	Total	20	20	40	
	Conservers	3	9	12	4.286^{*}
	Non-Conservers	17	11	28	
	Total	20	20	40	

(Median Age: Primary I = 6.3 years; Primary II = 7.8 years)

* These are significant at the 0.05 level

* * This is significant at the 0.01 level

According to Table IV(a), the null hypothesis that there would be no significant differences between Primary I and Primary II pupils when they were matched on their performances on the conservation tasks was rejected for the tasks of conservation of number, continuous substance, length and area (i.e. all the four tasks).

Table IV(b) was computed from Table IV(a); the overall performance between Primary I and Primary II pupils on the four cognitive tasks.

TABLE IV(b):- THE OVERALL PERFORMANCE BETWEEN PRIMARY I AND PRIMARY II PUPILS ON THE FOUR CONSERVATION TASKS.

GROUP	PRIMARY I.	PRIMARY II.	TOTAL	χ^2-RESULT (d.f. = 1 (p. = 0.05)
Conservers	36	61	97	16.37**
Non-Conservers	44	19	63	
Total	80	80	160	

(** This value is significant at the 0.01 level)

According to Table IV(b) above, the followings could be said;

(a) Among conservers, there were significant differences between Primary I and Primary II pupils;

(b) Among non-conservers, there were significant differences between Primary I and Primary II subjects;

(c) Among Primary II conservers and Primary II non-conservers, there were also significant differences.

(d) Amogn Primary I conservers and Primary I non-conservers, however, there were no significant differences observed.

The forth null hypothesis that there would be no significant differences in the overall performance of Primary I and Primary II pupils, when they were matched on the four conservation tasks was rejected at the 0.01 level. This was an indication that the effect of pre-School experiences might continue through elementary school but that the gains over non-nursery attendants might probably not be permanent through out life. For how long the effect would be significant could not be obtained from this study and as such demanded for further investigations in the senior - and post-primary classes.

The results of this study seemed to agree largely with what had been predicted on the basis of Piaget's results. According to Piaget, genuine learning is produced by development, which, in turn is influenced by four factors, viz:-

(1) Maturation;

(2) Experience - physical experience involving gaining knowledge of objects by observing and manipulating them directly;

(3) Social transmission - not Socio-economic status but acquiring of knowledge by such techniques as reading or instruction;

(4) Equilibration, in which Piaget continually stresses activity on the part of the child.

In this study, the third factor (acquisition of knowledge through reading or instruction), was kept constant while hypotheses were tested on the other three. That the pupils who attended nursery schools, and the Primary II pupils performed significantly better than non-nursery, and Primary I pupils, respectively (see Tables Ia and Ib; Tables IVa and IVb, respectively), on four conservation tasks was in accordance two what Piaget's results had expected. The results of this study also indicated that cognitive development did not depend on innate factors such as sex (see Table III). These were also in agreement with what had been predicted by Piaget's results.

CHAPTER 6

CONCLUSIONS, IMPLICATIONS, SUGGESTED FURTHER STUDIES AND SUGGESTED BOOKS FOR NURSERY AND ELEMENTARY SCHOOL TEACHERS.

(a) CONCLUSIONS:

The responses given by the subjects on the conservation tasks were very impressive. The investigator was particularly impressed by the certainity with which the conservers responded to a given conservation task. A subject who was a conserver on a task was usually impatient with the questions and with the tasks in general. Typical conserver responses to the number task were, "of course, the red and blue pieces are the same", and when asked why they thought so, the response was usually, "well, you didn't remove any or add any", or "all you did was spread (or bring together) the red (or blue) pieces, you didn't change the number", or "if you want to prove it, rearrange them back as in the first case (one-to-one arrangement)".

When asked on the continuous substance task, typical conserver responses were, "of course, this paper (pointing to the 3" x 3" piece) is the same with the one you are holding". When asked on the conservation of length task as to which ruler they would rather use to reach their piece of sweet, they were quick to say it did not matter, since the two rulers were equal in length. The responses to the other conservation tasks by the conservers all followed similar pattern. The responses were made quickly, and the investigator, many times, found it unnecessary to ask why the child responded in the way he or she did because it was volunteered in his or her initial answer. The conservers were, therefore very easy to identify on each conservation task.

The response patterns for the non-conservers were more similar to those of the conservers than to those of transitionals. For instance, the conservers typically responded both more quickly and with a greater number of voluntary explanations in their initial responses than the transitional children did. The non-conservers were at a rather stable level of equilibrium with the conservation tasks; the responses to all parts of a given task were non-conserving ones. An example of these was a typical response on the number tasks. When the red (or blue) pieces had been brought together into groups the common response was, "there are more blue (or red) pieces of paper now because you put the red (or blue) pieces in a group". In every case when the non-conserver of number was asked which sweet he would rather have. the sweet wrapped in red or the sweet wrapped in blue paper, the conserver chose the sweet wrapped in blue paper. When asked about the equality of the number of red and blue pieces of paper the non-conservers would count the red pieces (to eight) and as well as the blue pieces (to eight) but would still say, "Yes, there are more blue (or red) pieces". It appeared that the process of counting had little or nothing to do with the subject's idea of how many pieces there were.

On the other hand, the responses made by the transitionals on a given task were very different from those given by either the conservers or the non-conservers. Their responses varied from one part of the task to another - from conservation to non-conservation responses, or vice versa. For instance, the conservation of length task, a typical transitional's response, after the rulers were displaced with respect to each other was, "they are still the same length", and when asked why, a frequent response was, "because all you did was move them". But after a further displacement, the response usually changed to, "now this one is longer", and when asked why, the response was, "because this one was moved and now it is longer". From a manipulation of a task to the next manipulation, the children would vary their level of equilibrium with no discernible conflict between the two levels of equilibrium.

The investigator observed that the responses recei received to the tasks in this study were, for the most part, very similar to the responses reported in other related studies mentioned in the literature.

DEVELOPMENT OF CONSERVATIONS:

The main aim of this study was to determine the effect of nursery school or preSchool experience on the development of four Science-related concepts - number, continuous substance, length and area. It was predicted (null-hypothesis) that there would be no significant differences between the performance on these four cognitive tasks of the children who had nursery (or preSchool) experiences and those who did not have. This prediction was found true on the conservation of continuous substance but was observed not to hold for the other three tasks.

It appeared that the subjects succeeded in giving a conservation of substance response not mainly on the basis of specific past experiences but on the basis of the cognitive structure of reversibility. This was, however, not the same thing with regard to the conservation of number, length, and area tasks. It appeared that when a child developed the logical structure of reversibility, he or she attained the conservation of continuous substance, while, through interaction with the environment, he or she attained conservation in the more experience-dependent cognitive tasks of number, length and area.

The results that there were no significant differences on the tasks between the socio-economic groups (see tables II(a) and II(b)) suggested that matching on the basis of the pupils socio-economic backgrounds is not important to the attainment of conservation on these tasks.

If the significant differences observed on these tasks between the nursery and non-nursery attendants were not on the aspects of their innate differences (socio-economic backgrounds and sex), then one is able to explain much more of the data collected in this study The superior performance of the nursery-attended group over the non-nursery attendants on the three consevation tasks (number, length, and area) is explainable in terms of the differences in their experiences - interaction with stimulating environment on the side of nursery-attended children.

The data analysis indicated that the matching of the performance between the boys and girls on the four cognitive tasks showed no significant differences. It thus appeared that cognitive performance was more a function of maturation, environmental and mental development rather than sex. Boys and girls seemed to approach the tasks in a similar manner, and as the responses and the data indicated, utilized similar thought processes.

The fact that there were significant differences (even at the 0.01 level) on the performance in the four tasks between the Primary I and Primary II pupils (see Tables IV(a) and IV(b)) explained the data of this study further. The first row of Table IV(b) showed a large frequencies-gap (61 to 36) between Primary II conservers and Primary I conservers, on the overall performance in the four tasks. The significant differences on the performance on the experience-based conservation tasks was hence self-explanatory.

In summary, the results of this study have shown no reflection in any innate differences in the subjects. They have also clearly shown that the nursery-attended pupils performed at a significantly higher level on the three cognitive tasks of number, length and area. Since these three conservation tasks are experience-dependent tasks and since the differences observed in this study appear to be accountable for the differences in the environmental backgrounds of the subjects (rather than socio-economic or sex differences), school experiences could be designed for the main aim of off-setting differences in children's backgrounds.

The results and the interpretation of this study have a great deal of implications for both science curriculum, the nursery and Primary School levels and for further research.

(b) IMPLICATIONS:

The purpose of this study was to discuss the relevance of Piagetian system as a conceptual framework for educators in terms of identification of the child's cognitive capability, the creation of developmentally based and experience-based teaching strategies, and the construction of a sequential curriculum. Perhaps the feature of Piagetian theory which was most attractive for undertaking this study was its focus on the intimate interaction between infants and environment. It is a theory of intellectual development, where development is broadly conceived as an adaptation to the physical, cultural and social environment. Further more, the theory is very important to educators because it conceives intelligence as being developmental, experience-dependent, and describes the acquisition of knowledge in terms of defined stage sequential behaviours.

Piaget would certainly have the utmost sympathy with enquiry that aimed at establishing the optimum setting for mental growth The order of stages in the mental growth is what Piaget is concerned with, but whether they will be passed through with less or more speed, or zest or all-round gain, or whether the later stages will be attained at all, is a very wide-open question.

The task of education, as implied by Piagetian psychology, and indeed by this study, must above all enable the child to carry much further what he is stron strongly impelled to do in any case. The child urgently needs to try and build up in his mind a model of his surrounding world which will permit him to foresee at least its main course, to be prepared for it and to move and plan freely within it.

Another very essential implication of this study lies in the fact that the child does not move on all fronts simultaneously. The child may be in one stage in one conservation task and another stage in another tasks.

The determinants of these variations are quite many - biological, environmental, social, etc., backgrounds of the child.

Piagetian theory on which this study is based has several implications for curriculum development. Curriculum is the core of the education enterprise. It is the knowledge that the child is expected to assimilate and to accomodate. The theory's model contains principles very relevant for program planning in general, as well as subject matter in particular, despite its apparent emphasis upon science and mathematics Curriculum must be sequentially planned within and between class levels at school Curriculum planners are concerned with establishing sequences relevant to the learner's readiness state, and appropriate to the inherent logic of the subject matter. These two conditions interact according to Piagetian theory. This theory can therefore be used as a basis for establishing curriculum planning guidelines.

Experience and observation indicate that what the child learns depends in part on what he already knows and thus can bring to the new situation. This idea gives some clues about the importance of a developmental curriculum. Hence the call for a more realistic co-operation and co-ordination between the Nursery School and Elementary School programs planners. The elementary school curriculum should, in fact must, be decided partially on the basis of a nursery-school through secondary school sequence. The best science programs are planned by groups represnting all school levels. When nursery, primary, and secondary school teachers work together in deciding content, in selecting books, and in determining ways to work, a better program results. Under such circumstances there is less likely to be gaps, disturbing overlapping or duplication of subject matter.

During recent years a shifting tendency has been observed for the government to take more and more responsibility for the upbringing of the children, which may have resulted in some parents loosing a sense of their own responsibility in this matter. In nursery school work, emphasis is always laid upon the fact that the school does not attempt to take the place of the home. This it will not and can never do. The nursery school function is to be a complement to the home, so that together the parents and teacher may make for the child the best possible privision for happy and healthy living.

As of now, only few parents pay regular visits to the schools. Parents have been found to be more sympathetic towards the teachers' problems, after visiting the school and seeing the various difficulties that nurs nursery and primary school teachers have to face in making provision in large classes with limited accomodation, for each child to develop his gifts and to progress at his own maximum rate. In material matters parents can be very helpful and generous. When parents know the needs of the school they are glad to contribute to the collection of waste materials (e.g. empty match boxes, milk tins, dead Berec batteries, etc.) for the children's constructive work; to hand on toys and books as their own children grow out of them; and sometimes to raise funds to buy equipment to supplement that provided by the Local Education Authority. That was the practice when most of the schools were managed by missionary and private bodies. The parents should reactivate that very progressive spirit.

Nearly all educationists and psychologists attach a great significance to play than hitherto. It is now widely accepted that play can be the handmaiden and the helpmate of education and that a little child learns most naturally and most willingly through the medium of play. By means of free play, he gradually perfects his growing intellectual abilities and socio-emotional growth. Some play materials have been suggested. Preschool pupils need toys to increase muscular development, toys for creative and constructive play, toys, for initiative and dramatic play and toys for sense training. They toys may include climbing frames, a swing, a shute, a slide, a sew-saw, planks, boxes and blocks, trucks, trolleys, barrows, tricycles and other wheel toys. Also to be available in Nursery Centre ~~and~~ are paint and paper, chalks, crayons, plasticine, clay or dough, sand and water, wood, hammer and nails, a play house or doll's house; dolls and doll accessories, tea sets, trains, cars, etc., domestic articles; a box of odds and ends and dressing-up materials. Peg boards, puzzles, fitting toys and nested toys may be provided for sense training. Similar materials may be provided for Primary I and II pupils. The Nursery School and the play Centre can do valuable work and should form part of any education authority's Scheme for the welfare of its child population.

In summary, I think our aim, whether as teachers, parents, curriculum planners or psychologists, should be to try to develop the potentialities of a child so that by providing very stimulating experiences he may achieve the most satisfactory intellectual and personality development possible. If so then the earlier in his age the better. Furthermore, let the first foundations of all things be thoroughly laid so that the whole superstructure may not totter.

(c) SUGGESTED FURTHER RESEARCH:

The results of this study make it imperative for the investigator to mention a few topic ~~suggested~~ he suggests for further studies, viz.

(i) Further studies to determine whether the effect of preSchool experiences on the performance of conservation tasks would be permanent or not; and if not permanent, for how long?

(ii) Further researches of a similar design to this study, using different cultural backgrounds (e.g. white Vs black children; Yoruba Vs Hausa children).

(iii) Further studies to identify clearly what particular variables in child's environment are important to the development of the experience-dependent conservation tasks.

(d) SUGGESTED BOOKS FOR NURSERY AND ELEMENTARY SCHOOL TEACHERS:

1. BOORER R.D.: When Children Learn. Evans Brothers Ltd., London. 1974 (112 p.).

2. BOWLEY H. AGATHA & MAcCALMAN D.R.: The Natural Development of the Child E. & S. Livingstone Ltd., Edinburgh & London. 1960 (206 p.).

3. DOREEN J.C. & HESS R.D.: An Activities Handbook for Teachers of Young Children. Houghton Milfflin Company Boston. 1972 (200 p.).

4. LEE CATHERINE: The Growth and Development of Children. Longman Group Ltd., London 1973. (196 p.).

5. MACAULEY J.I.: Motherhood and Child Care. Ethiope Publishing Corporation. Benin City, Nigeria. 1974 (p.).

6. MAYNARD J. NORMAN: Child Study. Oxford Univ. Press. Ely House, London. 1956 (229 p.)

7. MELLOR EDNA: Education Through Experience in the Infant School Years. Basil Blackwell London. 1970; (248 p.).

8. MOORE & KILMER: Contemporary PreSchool Education. John Willey & Sons, Inc. New York & London. 1973.

9. MUSSEN H. PAUL: Psychological Development of the Child. Prentice-Hall, Inc. Englewood cliffs, New Jersey. 1963; (109 p.).

10. SUSAN ISAACS: The Nursery Years: The mind of the child from Birth to six years. Routledge & Kegan Paul Ltd., London. 1932 (138 p.).

APPENDIX A

Teachers' College,
P.O. Box 100,
Kafanchan.

2nd October, 1978.

The Chief Education Officer,
Jema'a L.E.A.
Kafanchan.

Dear Sir,

I shall be very grateful if you can allow me to use classes I and II of Bakin Kogi II L.E.A. Primary to carry out a research work.

The experiment will last for about two days (5th & 6th October, 1978). The aim of the M.Ed.research is to investigate the effect of Pre-School experience on the performance of pupils in Primary I and Primary II. Only forty-two pupils will be randomly selected and used.

Thank you for your co-operation.

Yours sincerely,

BOMSora

(MELLE B.O.)

cc: The Chief Inspector of Education,
Jema'a L.E.A.,
Kafanchan.

The Headmaster,
L.E.A. Primary School,
Bakin Kogi II
Kafanchan.

APPENDIX B

PARENTS' QUESTIONAIRE:
THE RELATIONSHIP BETWEEN PUPILS' SOCIO-ECONOMIC BACKGROUNDS AND THEIR COGNITIVE DEVELOPMENT

M.Ed. RESEARCH PROJECT.

PLEASE RETURN THIS QUESTIONAIRE TO:

MELLE B.O.

DEPARTMENT OF EDUCATION

A.B.U.

ZARIA.

By: 25th October, 1978.

CHECKED BY:________________

CODED BY:__________________

ABOUT THIS QUESTIONAIRE

THIS QUESTIONAIRE IS TO EXPLORE THE RELATIONSHIP BETWEEN THE SOCIO-ECONOMIC BACKGROUNDS AND THE COGNITIVE DEVELOPMENT OF SOME CHILDREN (CLASSES I & II) OF BAKIN/KOGI II, KAFANCHAN.

WE BELIEVE THAT THIS IS THE FIRST STUDY OF CHILDREN IN JEMA'A FEDERATION, ABOUT THEIR SOCIO-ECONOMIC BACK-GROUND AND THEIR COGNITIVE GROWTH. THE SUCCESS OF THIS STUDY DEPENDS ON YOUR SINCERE AND HONEST CO-OPERATION. WE HOPE THAT YOUR ANSWERS TO THE QUESTIONS WILL HELP US IMPROVE OUR NURSERY PROGRAMS AND PRIMARY EDUCATION.

PLEASE FILL IN THE BLANKS AS HONESTLY AND ACCURATELY AS YOU CAN. MARK A CHECK (X) IN THE APPROPRIATE BOX FOR THE NEAREST CHOICE OR ANSWER TO YOUR OWN.

YOUR ANSWERS WILL BE HELD IN STRICT CONFIDENCE. NO INDIVIDUALS OR GROUPS WILL BE IDENTIFIED IN THE REPORT OF THE STUDY, AND IF YOU SO WISH YOU MAY NOT INDICATE YOUR NAME IN THE QUESTIONAIRE.

NOW TURN TO THE NEXT PAGE AND PROCEDE TO COMPLETE THE QUESTIONAIRE.

PLEASE DO NOT LEAVE ANYTHING BLANK.

BIOGRAPHICAL DETAILS

SECTIONS 1.0

1.01 NAME (Optional)________________________________

1.02 SEX (OF CHILD)_______MALE ☐ _______FEMALE ☐

1.03 AGE OF YOUR CHILD CONCERNED:

6 YEARS ☐

7 YEARS ☐

8 YEARS ☐

9 YEARS ☐

10 YEARS ☐

1.04 NUMBER OF CHILDREN IN YOUR FAMILY:

ONE CHILD ☐

2 OR 4 CHILDREN ☐

5 OR 6 CHILDREN ☐

7 OR 8 CHILDREN ☐

OVER 8 CHILDREN ☐

1.05 POSTION OF THIS YOUR CHILD IN THE FAMILY:

1ST (OLDEST) CHILD ☐

2ND CHILD ☐

3RD CHILD ☐

4TH CHILD ☐

5TH CHILD ☐

6TH OR MORE CHILD ☐

1.06 THE CHILD'S RELATION WITH YOU:- YOU ARE HIS/HER

PARENT ☐

GUARDIAN ☐

SECTION 2.0 EDUCATIONAL BACKGROUND, EXPERIENCE AND INCOME (YOURS, AS A PARENT OR GUARDIAN)

IN THIS SECTION WE ARE INTERESTED IN KNOWING THE DETAIL OF YOUR EDUCATIONAL BACKGROUND, YOUR PROFESSION, EXPERIENCE AND YOUR INCOME.

PLEASE INSERT A CHECK (X) IN THE APPROPRIATE BOX OF THE ITEM.

2.01 LEVEL OF EDUCATION:

NEVER WENT TO SCHOOL________________ ☐

ATTENDED PRIMARY SCHOOL, NOT COMPLETED____ ☐

ENDED WITH PRIMARY SCHOOL ______________ ☐

COMPLETED SECONDARY OR TEACHERS' COLLEGEL__ ☐

OBTAINED GRADE I__________________ ☐

COMPLETED N.C.E. (A.T.C.) ______________ ☐

OBTAINED B.A./B.Sc./B.Ed. ______________ ☐

OBTAINED MASTERS DEGREE______________ ☐

OBTAINED DOCTORATE DEGREE (Ph.D.)__________ ☐

OTHERS_______________________________ ☐

(Please specify, if others)__________________

2.02 PROFESSION:

TEACHER ------------------------------ ☐

DOCTOR/NURSE -------------------------- ☐

ENGINEER ------------------------------ ☐

TECHNICAN/MECHANIC ------------------- ☐

TRADER -------------------------------- ☐

CONTRACTOR ---------------------------- ☐

CLERK --------------------------------- ☐

TYPIST -------------------------------- ☐

MESSENGER ----------------------------- ☐

OTHERS -------------------------------- ☐

(Please specify, if others)-----------------------

2.03 WORKING EXPERIENCE:

ONE YEAR ☐

2 YEARS ☐

3 OR 4 YEARS ☐

5 - 7 YEARS ☐

8 - 12 YEARS ☐

13 - 18 YEARS ☐

OVER 18 YEARS ☐

2.04 INCOME (SALARY) NOW:

G.L. 01 - 03 ☐

G.L. 04 - 06 ☐

G.L. 07 ☐

G.L. 08 - 09 ☐

G.L. 10 - 13 ☐

G.L. 14 - 17 ☐

2.05 INCOME FROM OTHER SOURCES, APART FROM 2.04 ABOVE

LESS THAN ₦200 PER YEAR ☐

₦200 - ₦500 PER YEAR ☐

₦500 - ₦1,000 PER YEAR ☐

₦1000- ₦2,000 PER YEAR ☐

₦2000- ₦3,500 PER YEAR ☐

OVER - ₦3,500 PER YEAR ☐

SECTION 3.0 <u>YOUR CHILD'S PRESCHOOL EXPERIENCE</u>

IN THIS SECTION WE WANT TO KNOW IF THIS YOUR CHILD ATTENDED A NURSERY (OR PRESCHOOL) SCHOOL OR NOT, AND FOR HOW LONG, IF HE/SHE ATTENDED.

PLEASE ANSWER THE QUESTIONS TRUTHFULLY.

3.01 DID THIS YOUR CHILD ATTEND ANY NURSERY SCHOOL OR PRESCHOOL?

YES ---------------- ☐

NO ---------------- ☐

3.02 HOW LONG DID HE/SHE SPEND IN NURSERY?

6 MONTHS----------- ☐

1 YEAR ------------ ☐

2 YEARS____________ ☐

2½ YEARS____________ ☐

3.03 AGE AT WHICH HE/SHE STARTED NURSERY SCHOOL:

LESS THAN 4 YEARS OLD ____________ ☐

ABOUT 4 YEAR OLD ________________ ☐

ABOUT 5 YEARS OLD ________________ ☐

ABOUT 6 YEARS OLD________________ ☐

ABOUT 7 YEARS OLD________________ ☐

MORE THAN 7 YEARS________________ ☐

3.04 NAME OF THE NURSERY SCHOOL(s) HE/SHE WENT:

(Please specify) (1)________________ ☐

(2) ________________ ☐

3.05 HOW FAR IS YOUR HOUSE TO THE NURSERY SCHOOL?

LESS THAN ½ MILE ☐

½ MILE - 1 MILE ☐

1 MILE - 2 MILES ☐

MORE THAN 2 MILES ☐

3.06 BY WHAT MEAN WAS HE/SHE GETTING TO THE NURSERY SCHOOL?

BY PRIVATE CAR ☐

BY TAXI ☐

BY MOTOR-CYCLE ☐

BICYCLE ☐

ON FOOT ☐

ANY OTHER COMMENTS:____

____

____

____

THANK YOU.

APPENDIX C

M.Ed. Research Work.

Subject's Response Sheet: Some Piagetian Tasks.

A. PERSONAL INFORMATION: NUMBER:______

Name:______________________________

Sex:________MALE ☐ ________FEMALE ☐

Age:__________ $6\frac{1}{2}$ ☐ 7 ☐ __________ $7\frac{1}{2}$ ☐ ______ 8 ☐

__________ $8\frac{1}{2}$ ☐ 9 ☐ __________ $9\frac{1}{2}$ ☐ ______ 10 ☐

Class:__________ I ☐ II ☐

Group:________Nursery ☐ Non-Nursery ☐

B. PERFORMANCE ON THE TASKS:

NOTE: C = Conserver

T = Transitional

N-C = Non-Conserver

1. Number Task:______C ☐ ______ T ☐ ______N-C ☐

Comments:______________________________

____

____

2. Continous Task:___C ☐ ______T ☐ ______N-C ☐

Comments:______________________________

____

____

3. Length Task:________C ☐ ________T ☐ ________N-C ☐

Comments:____
____
____

4. Area Task:________C ☐ ________T ☐ ________N-C ☐

Comments:____
____
____

Thank you.

Melle B.O.
DEPT. OF EDUCATION
A.B.U., ZARIA.

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