CHAPTER VI
CHAPTER VI
DISCUSSION OF THE FINDINGS, IMPLICATIONS AND SUGGESTIONS

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6.1 INTRODUCTION:

On the basis of the analysis and interpretation of data presented in the previous chapter the discussion of the findings in the context of theoretical background and reviewed literature has been presented in the present chapter. The sequence of the variables in discussion is similar to that of the previous chapter.

6.2. SECTION A : CHILD RELATED VARIABLES:

In the present study, one of the objectives was to observe the effect of child related variables like age, sex and intelligence on child's cognitive development. The results of the study indicated that while there was no sex differences on the performance tasks for number, length, weight and area, but age had significant influence. In the eight conservation tasks, there were great number of full conservers among older groups in both the sexes. With age, the frequency of full conservers tended to go up. Thus children of the four age levels though differed from each other on their performance on conservation tasks, those of older groups being higher than those of lower age groups. It is general in the line with the results obtained by other investigators, Elkind (1961), Gruen and David (1972), Uzagiris (1964), Miller (1976), Gold Schmid, Rao (1977), Kale and Danke (1974), Sinha (1989), Vernon (1972), Miller and West (1976) and others.
Though there is a general support for sequential development of these concepts as has been suggested by Piaget, but the present findings have demonstrated that the age level at which it become operational differ from culture to culture and under different environmental circumstances. The present study thus get supported from the study of Rao (1977), Feigenbaum (1963), Anderson and Butzin (1978), Vaidya (1969) and many others. As such maturational level of the child cannot be regarded as sufficient reason to explain these variations in attaining conservation. From the results of the present findings it has been observed that sex difference was not found significant. In acquiring the conservation of number, at the early stage of development, boys seemed better in prediction and explanation but girls seemed better in judgement, but as the age increases the developmental trend in prediction judgement and explanation in both the sex seemed to be more or less same. The mean percentage of the attainment of conservation of number for the age group 6-10 years were found to be 46.25. In case of the acquisition of the length concepts, the developmental trend for prediction were same for boys and girls, but in case of judgement and explanation boys exceed the girls in earlier age, but gradually the rate of development become more and less equal. The mean percentage of full conservers were found to be 31.25 for boys and 30.00 for the age groups 6-10 years of primary school children.

For the concept of weight too, the gradual developmental trend observed. In the very early stage the boys and girls predicted in more or less in the same way, but in case of judgement sometimes boys exceed girls score again sometimes girls exceed boys. Gradually the development become more or less same. The mean percentages for all
conservers for boys was 23.75 and girls were 20.25 for all the age groups (6-10 years).

One interesting finding of the present study is that, in the development of the concept of weight, girls exceed boys in the earlier age group 6-8 years, but gradually the rate of development become more or less same. This difference of percentage of attainment of boys and girls in weight concept is difficult to explain but it is possible that girls spend more time with their mother helping them in doing household activities which involve weight practices which in turn help them performing better in weight tasks.

Development of area concept was found very poor in both boys and girls for all age groups. In the very early age i.e. in the age groups of (6-7 years), the sign of development of area concept was not noticed. Though gradually it begins to develop but the percentage of full conserver was only 8.75 for boys and 6.25 for girls for the age groups 6-10 years.

The development of concept also attained in order of sequence i.e. number concept occurs before the concept of length, weight and area as observed in the present study which are in accordance with the Piaget's theory of cognitive development.

Another noteworthy finding of the present study is that, the performance of children on commonly used conservation tasks was well below that of the Western children and even from the Indian children (Narayan Rao 1976). If the 60% criterion for concept formation used by Sacket in (1971) is taken, it can be seen that most of the children of primary schools in the State are found to be either in pre-operational or
transitional stage in all the concepts as 56.66% boys and girls are found as conservers in number concept, 52.33% boys and 51.66% girls for the concept of length, 45.00 and 44.66 for weight concept and 20.00 and 19.33 for the area concept. Thus in the present sample the performance is distinctly lower in all the concepts.

The direct comparison with the results obtained by the study of Narayan Rao and other Indian investigators is not possible because of the absence of the data of percentages of the children attaining full conservation at different levels.

Since the present study did not include the children beyond the age of 10, it is not possible in the part of the investigator to ascertain the age at which the concept is formed among the children of Assam.

A relatively lower level of attainment of conservation may be due to as Piaget has suggested, a number of factors like biological and maturational, equilibration, general socialisation and educational cultural transmission. It may also be attributed partially to the educational system in Assam which seems to emphasise rote learning and text books transmit knowledge rather than construct knowledge and there by give little emphasise on the development of mental operation. However the present study was not designed to isolate the role of the above mentioned factors.

It is also evident from the result that there are three stages through which children's thinking develop as suggested by Piaget. The first is distinguished by the fact that the concept is not formed. This stage is characterised by two types of responses —
1. The child does not seem to understand the questions asked. Instead, he tries to play with the materials given to him, not paying attention to what he was asked to do.

2. The child denies that the two lines when arranged differently are identical as the previous one. He gave an incorrect answer. Incorrect answer shows that the thinking of the child was dominated by perceptual catering on single dimension. Sometimes, he gives non-sense explanation.

Both types of responses are found in all age groups taken into consideration, mostly among children whose age ranges from 6-8 years. However, the frequency of this responses decreases with age. This group of children are regarded as non-conserver as they are not able to attain the conservation of different concepts.

The second stage is a transitional stage. Where the child understands some of the relations, able to agree with the identity of number, length, weight and area when transformation was made, but is unable to relate them to one another. He concentrates on one factor only and neglects the rest which Piaget calls "centration." This uncertainty of responses suggested that the children are at transitional stage. The reason given by them are based on compensation as the children are found unable to explain their answers.

The third stage is distinguished by the formation of concept of number, length, weight and area and appearance of operational thinking. The criterion used in this study for the attainment of the concept of number, length, weight and area is to realize the identical nature of the two objects shown, to predict if one object is deformed then both the
object will be same or not, to judge whether there are "more or less" of the two objects after deformation and also to explain about the response made by them in judging the question ask to them. If the children attained conservation, they can give correct answers based on reversibility of thought. Those who are able to apply their logical thought to the concrete situation created during experiment are regarded as conservers.

This occurrence of the three stages i.e. within operational development in both sexes agree with Piaget's findings with Swiss children and with other cross cultural investigations.

The types of reasoning used by the children in answering the identity, prediction judgement and explanation for both sexes are more or less same. The children who are found to be conservers used three types of arguments for the number, length, weight and area concepts. These are

1. **Identity - (example)**: They are equal just now and they are the same. You did not add anything or take anything.

2. **Compensation (example)**: This match stick is longer at this end but that match stick is longer at the other end).

3. **Reversibility - (example)**: you have rolled it into a snake, but it will be same if you make it ball again. Again, if we put the thread like they were before, they will be equal, so they must be equal).

Thus the children who are full conservers integrates all the relevant information into a synthesis of the overall situation which is reflected in an accurate understanding. The children who are found to be non-conserver fail to co-ordinate all the information into an
integrated view that includes both past and present states. Hence they tend to base their judgement on the perceptual aspects of the situation. The non-conserver children for example by looking at the water level reach the conclusion of an inequality of quantity. When the investigator asks for reason, they refer to the action which lead to this unequal situation that of pouring rather than explaining. The children who are at transitional stage cannot explain certainly about their responses.

Intelligence of the child seems to have positive relationship with cognitive development for all age groups. The value of r's are \((r = 0.35, r = 0.31, r = 0.30, r = 0.36)\) with \(N = 40\) for age groups 6-7 years, 7-8 years 8-9 years and 9-10 years. Though the values are low, but found significant at 0.05 level which confirms with the findings of Za'rovr (1971), De-varies (1987), Ayers at el, Bevli (1983), Kumari Indira and B.S. Dagar, Rao Narayan (1976), Feignebaum (1963) Bat-Hau-al (1972) etc.

The investigator used 'Draw A Man Test' for measuring intelligence. Most of the children draw the human figure somehow except two of the selected sample. One was in grade two and another was in grade four. When the investigator asked them they replied in a very funny way. Their responses are vague and their speech was found incoherent. They seemed pale and weak. When enquired about them to the respective school authorities the investigator found that they are poor acheivers in class. When the investigator meet their parents personally, they are found mentally retarded. They also perform poorly in conservation tasks.
The investigator also noticed that there are some children who found to be poor achievers in class, performed very well in the conservation tasks. This poor achievement may be due to having poor facilities at home which schools cannot make up.

6.3. SECTION - B PARENT RELATED VARIABLES.

In this section results of the parent related variables like socio-economic status of parents, parent child interaction, parental behaviour and facilities provided at home has been discussed.

On the basis of the findings it has been observed that F value found to be significant for all the age groups except 6-7 years which indicates, (Table 15(b)), socio-economic status of the family has great impact on cognitive development. This finding gets support from the earlier study by Peluffo (1962, 1967), Wei (1966), Delacy (1970 a, 1970b) Updesh Bevli (1970, 1978). Frank B. Murray. M. Puspa, Jackuck, K. and Mohanty A.K., Rao - Narayan (1977), Muralidharan R. etc. However the result contradicts with the result of Za’rover where no positive relationship of socio-enonomic status with cognitive development was found.

The comparison of high and middle and middle and low SES groups showed that, Table 15(c), there is no significant difference in cognitive development, but high and low SES children Table 15(c), differed significantly. This situation might have occured either due to low status occupation, income and education of the family members. Those who are from low SES group have to face with many adverse circumstances which lack interest in creative thinking and unfavourable
environmental situations at home, hinder the proper cognitive development than that of the children coming from high income family.

Parent child interaction can be regarded as a predictor of cognitive development. Children belonging to high interactive group parents exhibited better cognitive scores as compared to the low interactive group parents (Table 15) with all age groups in the present study. This is in the line of the study done by Norman F Fruburg, Rogan (1983), M. Puspa etc.

It is interesting to note that parental behaviour does not seem to have positive influence on cognitive development, as in the present study, no significant difference in cognitive scores of children was found having dominating and considerate parents shown in Table 17.

Facilities provided at home found to be highly significant for proper cognitive development for all the age groups taken into consideration. Better the facilities higher the development, poorer the facilities slower the development. This may be due to the fact that those parents whose socio-economic status is high can afford better facilities at home. The high SES parents can afford to provide all the necessary materials like recommended books, story books, need based aids, proper environment at home which may enhance cognitive development. It may be presumed that educated parents will have better interaction with the child and will show higher level of aspiration which help in cognitive development.
6.4 SECTION : C SCHOOL RELATED VARIABLES :

The present study also attempts to study the effect of school related variables like school environment, types of schools i.e. government and private, teacher student interaction, methods of teaching as well as facilities for play provided at schools. These variables are taken into consideration because school can be regarded as the second home for the primary school children. It can also be regarded as the comprehensive formal agency of education which is expected to provide the child with all kinds of experiences he needs to develop his capabilities.

The present study demonstrated the significant influence of all the school related variables on cognitive development. Table 21(b) shows that school environment seems to have direct influence on cognitive development. The good and poor school environment influence the cognitive scores of the children. This differences of scores having good and poor school environment found significant for all age groups taken into consideration. Though the scores of children having good and average school environment does not differ significantly but the difference of scores between average and poor environment found significant for older age groups except for younger groups. Table 21(c).

The study also demonstrated that good teacher-student interaction, facilitate cognitive development. It is evident from the Table 22(c) that better the interaction, higher the cognitive development, poorer the interaction, poorer the cognitive development.

Method of teaching, Table 23(c) and facilities for play, Table 24(c) shows to have great influence on cognitive development. Hence
the all school related variables like school environment, teacher student interaction, facilities provided for play and method of teaching in schools are found to have positive relationship with the cognitive development. The schools, where atmosphere seems to be good having all the facilities, good staff, proper method of teaching which enable the teachers to engage the children in intellectually and socially satisfying activities, naturally facilitates cognitive development from those school whose environment is dull, lack proper facilites for teaching. Good method of teaching encourage reflective thinking. A teacher who encourages the children to face problematic situations and provide them opportunity to solve the problems by utilising progressive method of teaching, the children feel intellectually as well as immensely excited which in turn help in enhancing cognitive development. This finding also gets support from the study of cognitive development by Kirk (1977), Bevli (1983).

Differences were noted between the children of private and government schools in development of conservation. It is observed that the children who are from private school seem to be more socialized and can freely interact with the investigator. Their responses are found to be more confident whether it may be right or wrong. Where as, the children from government school lacks confidence in responding as well as in interacting with the investigator. They feel hesitated in responding, even though they knew the answer. The investigator has to encourage them frequently in eliciting proper response. This may be due to lack of proper interaction of the children with their parents at home and teacher at schools Piaget also viewed that, intellectual development occurs as a result of interaction with the environment. This may take the from of
either physical interaction with the world of concrete objects or psychological and social interaction with the world of human.

It is evident from the study that private school charges more fees which enable the school authorities to provide better teaching facilities, for play, good method of teaching and overall conducive environment to enhance cognitive development than that of the government schools which are suffering from financial crunch. As a result the school environment becomes dull and unattractive lacks proper infrastructural facilities and poor interaction of teachers which discourages proper intellectual development in children.

However the above findings obtained in the present study cannot be generalised to the entire population of children of that age group (6-10 years). The result reported in this study should be generalised to those subjects whose description are more or less same as the sample taken into consideration.

6.5. IMPLICATIONS OF THE FINDINGS:

Education as a social science is concerned with many factors in the society. So when the question of implication comes to the field of educational research, it is required to analyse the whole educational system prevailing in that society taking concerned about the aims, objectives resources as well as existing social context. Moreover it cannot be said that whatever a particular research finding explore can be directly applicable to the prevailing system of educational set up. It is not so much easy to proceed directly from theory to practice or vice versa. Most of the research findings in social sciences thus have indirect implications.
The present study is based on Piaget's theory of cognitive development of primary school children of greater Guwahati area of Assam, concerning the concrete operational stage, of age group 6-10 years. This study can be regarded as first of its kind in the entire north eastern region. Hence, the finding of this study cannot be generalised. More research in this area is needed including a large number of samples drawn from the same environment but extended to wider areas to make the findings of the present study generalised to the primary school children of Assam.

However, the present study found to have some educational implications for the teachers as well as the parents who seldom heard about Piaget and his theories. It has also great implication for those who are associated with the primary education of the state.

The findings of the study implies that, the programme of the primary schools as it is organised in this state upto the time of the present study in different institution has not been found beneficial to facilitate the cognitive development of the children. The objective of education especially at the primary stage's have to be redefined. Accordingly curriculum of the primary school level have to be refined and re-structured and much importance have to be given for proper cognitive development. The context of curriculum and method of teaching have to be made more effective. A special programme of activities giving proper importance on appropriate concept and operations should have to develop to nourish cognitive development of the primary school children.

As cognitive development of children occurs as a result of interaction with the environment either in the form of physical interaction with the world of concrete objects or psychological and social interaction
with the environment, but from the finding of the present study it can be assumed that schools of this state failed to provide variety of concrete expressions and opportunities for active manipulation of things which promotes cognitive development.

Another implication of the study is that, as the children of this stage are found lagging behind in attaining concept, they are actually far away in adapting, interpreting and extending their environment as compared to the children of other states of our country, who has already acquired a number of concepts at the same age. This difference of attainment in conservation of different concepts which has been taken into consideration has great educational implication particularly for curriculum development.

Another implication of the present study is that, if the basic concepts investigated in the present study are acquired lately by the present samples, it is quite likely that, the other scientific, logical and mathematical concepts which are not studied will also be acquired lately by the same age groups. Consequently the suitability of the curriculum meant for the primary school children raised question. However this question would be need more extensive study, yet educationists of this state should keep this point in their mind when dealing with the children of this stage as the concepts which has been taken for the study is the basis for developing other scientific concepts.

Well adopted Piagetian tasks could play a large part in schools as diagnostic test for children's cognitive status to determine grade placement, subject readiness and remedial instructional programme along with other procedures.
Parent related variables and school related variables which was taken into consideration for the present study found to have great effect on cognitive development of child. Parents of the low socio-economic status should be made aware to develop positive attitude towards the development of their child. They should try to provide minimum facilities to their children to enhance the sense of security and satisfaction in their mind which is indispensable for proper cognitive development. It is also important for the school authorities to be aware that, socio-economic background of the children has some influence on the cognitive development. Hence the school authorities and teachers who are involved in the process of education should see that, low SEP children could be provided basic necessities and environment in school so to make up the differences they have at home for facilitating their development as far as possible.

Parent child interaction as well as the teacher-student interaction has great effect on cognitive development. This implies that parent should try to interact with their child in every possible way like playing with them allowing them to manipulate different objects encouraging the child to accompany them with day to day activities meeting their queries, discussing with them regarding different natural phenomena other than school subjects, encouraging them to take part in games and sports and helping them is doing different extracurricular activities. Parent should create environment at home which help the child to interact properly with the physical world of concrete objects.

Though parental behaviour do not found to have any effect on cognitive development, but parent should be considerate enough to allow their children to grow according to their own potentialities. Today
parents seem to be over-protective and dominating and giving much pressure to their child to get highest possible marks in their examinations. They are giving much importance on scholastic achievement rather than all round development. They are imposing their own ambitions, wishes upon their small and innocent child neglecting the child's own capacities, interest, originality etc. They are also not allowed to play according to their own choice which kill their initiative in all sphere paving the way for poor cognitive development. Hence parents should be made aware about this fact by the school authorities by arranging parent-teacher meet at least once in a year like the advance schools in our country and in Western countries.

School related variables like school environment, teacher-student interaction, facilities for play, method of teaching were found to have direct effect on cognitive development. Hence schools have a greater role to play in enhancing cognitive development. Rogan (1983), suggested that schools in developing countries could be more effective in contributing if they encourage physical and mental development. He found that acquisition of conservation skills may depend on factors such as physical and mental interaction with the environment and the types of reasoning to which the child is exposed. Here, the viewpoint of Lavatelli (1970) is also worth mentioning. Lavatelli has shown that school can raise the level of equilibration (self activity) in children by providing a free choice of activity. She also feels that since early school curricula include classification, number, and space and seriation activities, all teacher should be made aware of the separate thought process involved in each area and the order in which they emerge. She continues ......

"Awareness of how structures grow will provide guidelines for the teacher
in choosing materials and in knowing what to say to children as they use materials" The teacher of the primary schools of this state could be made aware about this fact.

Thus the school as the most significant and comprehensive formal agency of education is expected to provide the child with all kinds of experiences he needs in order to develop and sharpen capacities, master his developmental task adequately. The atmosphere of the school should be attractive, encouraging enriched and stimulating so that child will be quite curious about the reality. Enrichment of the environment does not mean material increase, but to enhance opportunities for cognitive and exploratory activities. If the children can engage themselves in intellectually and socially satisfying activities they will become confident enough to forge ahead in their thinking on the basis of incomplete information, facts, clues and concepts. The school authorities should have to give emphasise in these points.

In our present educational system it has been observed that the sole aim of schooling has been to feed the students with ready made materials for examination, educating and transmitting facts mechanically rather than developing concepts. Thus education which are imparting in modern schools is aiming only at knowledge transmission rather than knowledge construction. It is actually not possible in the part of the teacher to enhance cognitive development simply by transmitting ready made knowledge to the children. Thus the main job of the teacher is to realise the capacities of our children by a series of appropriate exposures to a wide range of environmental experiences. Teacher should maintain a reflective atmosphere in the classroom by permitting the child to face problematic situations and also providing them opportunities for
reflective thinking. Teacher should also try to adopt different method of teaching like inviting questions and receiving answer, narrating experiences using charts, diagrams, audio-visual aids organizing quiz, debating, tutorials etc. Teacher should also try to develop some game or play materials using locally available cheap materials which can help in developing cognitive abilities of children. Here the viewpoint of Ada Schermann (1969: 275) regarding the goals of education can be quoted. Ada Schermann has clearly pointed out the importance of cognitive goals in school as follows —

"Today society is looking to the educational system to attempt to raise the level of each child's cognitive ability. Individual needs must be taken into account, it is not sufficient to provide child with equal opportunity for the child to exercise the skills he brings with him to school and to faster those which he lacks".

The investigator in this study found that not a single teacher of the primary schools in this state heard about Piaget. They were also not found interested in the experiment done by the investigator on the children of those schools.

This implies that, teacher education programme basically for the primary school level should be reorganised which can help the teacher to have some theoretical aspects of knowledge on Piagetian theory so that the teacher could be able to understand the importance of providing necessary opportunities or create environment for enhancing cognitive development in children. Through this programme teacher should be able to develop necessary skills and competencies which will encourage them to take teaching in a new perspectives.
Curriculum planners of this State for primary education should give emphasise on the developmental characteristics of Piagetian stages in preparing their curriculum. The objective of education in this stage have to be refined, to bring into focus about the cognitive development, along with other aspects of development. Curriculum content of many subjects like science, social studies, mathematics etc. can be selected in such a way which could help the children for proper cognitive development. A properly designed special programme of activities with focus on appropriate concepts and operations can be developed for this stage for promoting proper development.

Lastly State government should give due emphasis for development of the primary education in the State at any cost on all the perpective. Because primary stage of education in the most crucial stage in formal education for all round development of the child. So this stage should be given proper importance, which could able to provide the child with all kinds of experience, a child need in order to develop and sharpen capacities, master his developmental tasks adequately. Primary schools in the state should try to enhance the development of the children that has already taken place during the pre-school period. The programme should be developed in such a way so that over emphasise on the mechanical skills on the 3 r's can be reduced which tend to arrest, even curb the natural process of cognitive development of children.
6.6. LIMITATIONS OF THE STUDY AND SUGGESTIONS FOR FUTURE RESEARCH:

Search for knowledge is a never ending process. No research study undertaken with certain variables can be regarded as complete particularly in social sciences due to various constraints. In the present study the investigator follows more or less the same method which has been followed by Piaget and most of his western followers as well as the replication studies done by the Indian researchers. As the attainment of the conservation ability was determined by presenting some tasks before the subject and asking some question related to those tasks, the investigator was very cautious and take proper care and attention as far as possible in adopting such method to present the biased, distorted and misleading responses. Even so as the study is a confirmatory in nature, it could arise some problems since each situation varies. The present study was undertaken with the following limitations, with the basis of which the following suggestions has been made —

1. The present study was concerned with the concrete operational level of cognitive development of the children of age group 6 to 10 years, from 7 schools of greater Guwahati area with total number of 160 children. The sample were selected only from those schools where the authorities of the schools allowed the investigator to carry out the study. Hence, extensive study on cognitive development of primary school children can be done by taking large number of sample to make the study real and factual as well as to make the findings of the study generalised to the entire population of that age group of children of Assam.
2. Cross sectional method is used in the present study. Suggestions are put forward, therefore for longitudinal indepth study approach on the same variables.

3. The present study has been done on primary school children irrespective of caste, creed etc. Studies can be done on the children of different sub-cultures like tribal, non-tribal, having different religions as well as the children coming from different professional background, rural and urban.

4. Age of the children cannot be claimed exact in the present study as it was determined on the basis of the information given by the parents. So to find out the norms at which level the children become concrete operational, studies can be done with intended age group i.e. 6-12 years.

5. The three major variables like child related (age, sex, intelligence), parent related (SES, parent child interaction, parental behaviour, and facilities provided at home), School related variables (school environment, teacher-student interaction, method of teaching and facilities for play, provided at schools) and their impact on child's cognitive development are studied. Future researchers can take some other child related, parent related and school related variables to determine the exact factors responsible for differential rates of intellectual development.

6. The present study was not designed to find out the interaction of different variables taken into consideration. Studies can be done to find out the interaction of the different variables taken into consideration.
7. In the present study, parent-child interaction was studied on cognitive development. Father's and mother's interaction cannot be observed separately. As mothers are with the children extensively during their childhood days, so studies can be specially designed to observe the impact of mother's behaviour, personality characteristics, style of interaction with the child on cognitive development.

8. Studies can be done to find out the basic deficiencies lie in the present primary school curriculum so to redesign the curriculum by focussing on the gradual sequence of concept acquisition, thereby providing ample scope for nourishing cognitive exercise in different areas for maximum developmental benefits.

9. Studies can be done to develop Piagetian model of teaching for primary school children which can help in enhancing cognitive development.

10. Studies can be done to re-organise primary school teacher's educational programme with giving special importance on Piagetian theory along with the other aspects.