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Cognitive (Intellectual) Growth

Biological developmental theories (Hall and Gesell) rely heavily on genetic and evolutionary facts; sociological theories attempt to explain development in terms of social and cultural forces and their effects on individuals; psycho-analytic theories place greater emphasis on unconscious motivational forces in interaction with environmental forces and draw heavily on the work of Freud; cognitive developmental theories are concerned primarily with describing and explaining the processes by which individuals progress in their intellectual (cognitive) understanding of the world.

Starting from conception till death each one of us is changing continuously due to the impact of biological processes as well as owing to the influence of our environment. As time passes the physical growth occurs and a human child becomes a full growth adult. This can well be visualised. But side by side the other developments go on continuously. Those developments are rather felt than seen, for example, during the first year of age the child, who is unable to speak, uses sophisticated language when he grows up. This happens due to his rudimentary ability to solve problems and communication with others. So the sophisticated language and intellectual skills differentiate our species from all other forms of animal life. Changes occur in physical, mental, social, emotional and such other levels. A child reared up in a good social environment will develop a sound personality and can overcome the bitter realities & feelings of fear, anger, anxiety etc. with an ability to better adjustment to the complex of life.

By the 1920's psychology of the development of child was dominated by the thought of [illegible] the father of behaviourism. His impact,

along with that of Freud, Binet, Hall, and many others lead to the establishment of clinics to assess children and advise parents. Till then much was not known about children's thought, language and intellectual functioning. Waston discarded those internal events as appropriate topic for research. But after using the concept of mediation it was learnt that the external behaviour of man begins, and the reaction shown to the environment is to a great extent influenced by internal processes. So while importing education to children, it is important to know the ability of the child to build internal models of the world and to inculcate these models in order to learn from the past experiences and draw conclusions about future. The development of such ability in the child is known as *Cognitive Growth.*

In modern psychology cognitive development occupies an important place by fasciliting researches on child's internal ability and supplying datas and methods to educationists and teachers to manipulate them in knowing the cause of certain type of behaviour as well as affecting them with a change. Cognitive growth includes in its arena thought, memory, intelligence and language of the child. Singularly important to this branch of study has been the work of Jean Plaget (b. 1896), the dominant figure in contemporary development psychology. Just like Freud.

Jean Piaget, the Swiss developmental psychologist, has concerned himself with theoretical and experimental investigations of the qualitative development of intellectual structure. He has engaged in a long-term study of ontogenetic change and has developed a highly original theory of intellectual and perceptual development. J Piaget has studied the child's language, reasoning, moral judgement, cognitive structure, and intellectual development through careful and extensive observation of the child's spontaneous behaviour. The work has tended to be more descriptive than predictive.

Piaget believes that intellectual operations never exist in isolation from a governing totality, an organizing principle which it is vital to discover. He has studied the structures of developing intelligence as opposed to its function and content. Content is the observable behaviour while function is the process by which the new is assimilated and the old is accommodated to the new. Piaget has postulated the existence of cognitive structures between function and content and has gone on to study in detail the developmental changes in these structures, seeking to identify levels of cognitive development.

Piaget advocates that only after early infancy when the child is a little grown up, he establishes his relation with the environment by manipulating various sights and sounds he comes accross. But in early infancy his vision and hearing do not bear much importance in regard to the interaction with his surrounding. As the child grows he develops his ability of attention, concentration, perception and above all sense of time and space. This proves the increasing mental and intellectual ability of the child. He even uses symbols in responding various stimulees of the environment.

By the help of a simple example we can very well explain the mental growth of child and his use of symbols. In early infancy when a child cries to get an object–say a toy, he stops crying when the object is given to him. But when he is a little bit grow up his demanded for the toy can be met by giving some other objects other than a toy. Gradually the child becomes able to inculcate his time sense and apply his past experiences and work for his distant goals. Thus with the increase of age mental growth is demarcated by piaget through various stages which indicates that there is continuity in mental growth.

In mental growth four sources play their respective roles. They are experience, environment, maturation and heredity. According to Piaget environment and heredity are the two main factors that profoundly influence development and in most of the cases they act in perfect harmony. Since the time of Darwin the notion of adaptation has beared much importance in biological as well as Psychological studies. All animals adjust to ecological changes and maintain their interaction with the environment. Men also have their own methods of adaptation. But in course of adaptation we use our mental ability more and monitor our intelligence in crossing a hurdle set by nature.

The child also adopts itself to the changing circumstances of his life. His cognitive adoption is carried out on the basis of two main processes. Piaget termed them as *essimilation and accommodation.* The child forms a certain idea of the world in his mind and that internal model is put to use by him when he faces a novel situation in his real life. Here past experience plays a main part. This is called *assimilation.* But when the past experience of the child is not enough to tackle a new problem or to face a new situation he learns, he adds something to his already existed image of the world. By that he adjust himself to the changed circumstances. This is known as *accommodation.*

The process of adaptation takes into consideration the process, such as assimilation and accommodation. These two are related with and complementary to one another. By assimilation the child deals with his environment and tries to understand it. And by accommodation he actually responds to the situation in a revised way. These two processes are simultaneously present in every act.

The model of the world or the already formed internal idea in the child's mind about his environment is very important in the study of cognitive development as sponsored by Piaget, in his theory the term, that expresses this notion is 'Schema' Schema is different from each type of behaviour of the child. The breast feeding behaviour of the child may be taken as an example.

In early infancy the mother presents her breast to the child and he sucks it. But gradually he learns to grasp it and takes his mouth near it in order to suck milk. The same action or the pattern of behaviour is generalised when the child is feed by a bottle instead of mothers breast. This action of sucking involves many other action such as action of reaching finger curnling, grasping, movement of lips and tongue etc. For each of these action a different *Scheme* is formed in child's mind. The schemes are formed isolated from each other but act in complete harmony. The gradually change in course of time keeping pace with the increasing of age.

Piaget advocated that to know an object one will have to act upon it, either physically or mentally. These mental or physical actions can display objects or connect combine take part and resemble them. Performance of these activities upon objects are known as schemes.

A particular action is not a scheme. A scheme is what can be repeated and generalized, in particular acts. For example, when a child develops acts of sacking as discussed above he also learns to such many different objects in a varieties of ways. In pushing scheme also a child learns to push many different object, with or without the use of various impulses. The moment the child learns the act of sucking and pushing Piaget describe the child as having constructed the required scheme. Intelligence according to Piaget, is not passive unfolding of heredity and experience. Rather if a physical and mental co-ordination is child the increasing ability of the child co-ordinate his actions. These ability and capacities of the child once known as the child's scheme.

Equilibration

Seeking mental balance is known as equilibration. "Equilibrium on balance that is saught lies between assimilation and accommodation. Equilibration functions as thermosted that maintains a balance between cold and hot. In the body it functions to keep a balance between the states as activity and rest".

Piaget opines that equilibration is a dynamic not a static function. It moves from a simple scheme to complex scheme through the dead action of assimilation and accommodation. Frustration and curiosity in the development of a child is the sign of disequilibrium. His intelligence becomes stable, only when he reaches the final stage. According to Piaget intellectual sophistication is acquired and adult views of the world is gained after passing four distinct stages or cognitive development. The Swiss-Psychologists propagated his stage theories according to the following rules.

(i) The stages are clearly defined and in a constant order of succession. This order does not bear the personal interpretation of the researcher but the personal observation of him.

(ii) The progressive consruction by the child is reflected in the theory. There is no question of total performation.

The stages of develop proceeds in a logical way. A later stage never starts before the previous one is got through. Secondly though the role of maturation has not been completely denied, its importance has been lessened by using the factor of experience that prepare the child for the next higher stage.

According to Piaget the four stages of cognitive development are :–

(a) Sensory motor period (0 to 2 years)

(b) Pre-operational period (2 to 7 years)

(c) Period of concrete operation (7 to 11 years)

(d) Period of formal operation (11 through childhood).

The age bars are not rigid or universal. It is subject to change in accordance with the change in environment and background of the child.

(i) **Sensory Motor Period:** After birth it is said that, the stock of experience of a new born is not. But as he is capable of performing

certain reflexes, he can't be said as completely helpless. Certain reflex actions like sucking, grasping, jerking of the knee to the tap of the doctor's hammer are already with him. He faces reality by integrating sensory and motor experience. By the end of the period the child will be able to open a box after observing the act performed by others.

Three kinds or three degrees of circular reaction takes place during this stage. They are primary, secondary and lertiary. In the first stage the child repeats various acts blindly and then in the second stage make an active experimentation by applying his stock of sensory motor intelligence and finally he develops certain inventiveness. During this period the child attains the constancy in observing object but his attributes are not constant yet.

Piaget has divided the sensory motor period into six successive substages as discussed below:

Stage 1: During the first stage of life the child is busy in exercising ready made sensory motor equipments by organising his reflex actions such as sucking, crying, grasping etc. These activities become increasingly smooth and systematic and proceed towards greater sophistication. In this regard Piaget observed in the case of his own child *Laurent* that he could distinguish and localize the nipple against the background of bare skin areas. When he is hungry he grasps the nipple and suck it rapidly. This is a clear example of recognition and desire emination indicating sensory-motor intelligence.

Stage 2: During the first to approximately the four month of life the infant begins to display primary circular reaction. In course of displaying reflex actions if the child comes across a new experience, he trives to recapture the experience by re-enacting the original movement again and again. A rhythmic cycle is observed in such an action of the child. It can be take for ascertain type of experiment conducted by the child by applying his sensory motor device for reacting to his environment in a novel and more sophisticated way. Repetitive actions such as thumb-sucking, grasping are a good example of primary circular reaction. In this stage assimilation and accommodation become differentiated.

Stage 3: The third stage ranging from the 9th to the 8th month of life is characterized by Secondary circular reactions. In this stage

the child tries to make an activity permanent which we learns accidentally. The observation of the child becoms more intense and intentionality as well as goal orientation is clearly observable in his various actions. After doing a work the child waits for the result to occur. Sometimes he searches for an object which is absent in his immediate surrounding. For example we hang a rattle above the child and tie a string to it by pulling which the rattle will be shaked and will produce sound. We then let the child pull the string and shake the rattle once. Then if we place the other end of the string by the side of the child on the bed, the child will search for it. After finding it out he will pull it by applying his previous experience. Then he will wait to hear the sound and when it is silenced he will pull the string again. From this we can learn that for the first time the co-ordination between vision, movement and sound takes place at this time. Towards the end of this stage the child can differentiate between means and ends.

Stage 4: Between the eight and twelveth months of life the child displays coordination of secondary *Chemas* and at the threshold of intelligent behaviour. He enriches his experience and accelerate his cognitive growth by showing instrumental behaviour. During this period the child learns to remove obstacles and reach his goal. He can set aside the bottle and reach the nipple. He can imitate a response of other person that is novel to him. He brings co-ordination between Hand-mouth and Hand-eye. He can attend to sudden sound and sight. By co-ordinating the sensory motor action, the infant is able to form an idea about the world and its reality in the most primary form which can be described as *the first spark of intelligence*. In this stage almost all the activities of the infant is intentional rather than accidental.

Stage 5: The fifth stage which covers the life time of 12 to 18 months gives rise to tertiary circular reactions. The stereotyped and mechanical way of behaviour that is displayed in fourth stage get sophisticated and a certain meaningful relationship is established between action and object. The child manipulates and handles an object in different ways and styles to perceive it and get knowledge about its novelty. To achieve his goal the child adopts the trial-and-error experimentation and actively searches for new means.

He is also capable of applying his insight to a little extent and enable himself to reach the goal. For example, if a toy is kept on a pillow the child will pull the pillow towards himself to get theory.

Stage 6: The most important characteristics of the last stage of sensory-motor period that is form eighteen to twenty four months of age is the use of insight to solve a problem instead of trial-and-error experimentation. This is a stage when invention of new means takes place through mental combinations. As in previous stages the child had been able to manipulate means to reach the ends, he now becomes interested in the cause and effect study. He observes the effects and infer causes from it and vice versa. If a particular problem solving behaviour in certain surrounding is learnt he tries to solve the problem in a novel way if the surrounding is changed. The insightful behaviour which the child displays is termed as representation. The child forms an internal model of the outer world in his mind and tries to solve various problems by manipulating internal symbols. He also develops a tendency to imitate others and repeat the behaviours and actions of them. A person serves as a model for the child whose vocal and visual movements are followed by him. Thus the sensory motor period starts from reflexive reactions and ends with painful, co-ordinated and goal oriented actions.

(ii) **The Pre-operational period:** During 2 to 7 years of age the child internally represents objects and events and thinks what he imitates from others or what he perceives in the outer world. He forms certain images internally and manipulate them as "signifiers". So his symbolic thought starts from this period. But as the perception of the child in this period does not cover all the aspects and characteristics of the object or event it is onesided and the thinking Process is irrational. The logical thinking is not fully developed and hence the child cannot operate it fully in providing solutions to a problem. So it is called pre-operational period.

The perception process of children at this stage bears some characteristics. They are discussed below.

Egocentrism : The children at this period fail to look at a problem from the point of view of others. He perceives a thing from his own angle by applying his own thinking process and thinks that everyone

thinks the same way he does. Egocentrism diminishes during the pre-operational period, when the child comes in contact with friends, siblings and classmates whose perception, he finds is different from his. In an experiment conducted by Piaget and Inhelder, some children were seated in a corner of a room and in the middle of the room three toy mountains of unequal heights were displayed. At the opposite corner of the room a doll was seated. Then the children were asked to show how the display looked to the doll seated in the opposite corner. Piaget and Inhelder found that the children indicated the perception of the doll to be the same to their own perception.

This experiment shows that the pre-operation child's perspective on the world is generally limited. This happens due to immaturity of thinking process, which always suffers from a certain type of misunderstanding termed as conservation problem.

Conservation problems : Conservation means that a substance is not changed when it is divided into parts. But the pre-operational child fails to solve conservation problem logically. For example, we may ask to the child which is heavier, a kilo of cotton or a kilo of Iron?" A primitive Phenomenology told us that a kilo of Iron felt heavier than a kilo of cotton and most of the children give the same answer. Psychologists have described this as the **"Size-weight illusion".** But this misunderstanding does take place not only in case of children but also in case of some adults. But most of the children of pre-operational period suffer from this illusion. So conservation in case of child is a specific confusion which affects matter, weight and volume and it has been found that one of these aspects of perception is over estimated and given more importance while the others are underestimated.

There are many experiment as findings by which the conservational problem of a pre-operational child is clearly understood, if two balls of clay, recognized as equal are divided in various ways they are perceived, as unequal. For instance if one is made into a number of small balls, these seem to contain "*More clay*" than the remaining large ball. If they are rolled into longer or thinner sausages the perception will also be different. The child does not have the idea that changes in shape of clay, on dividing it into parts, will not change the amount of clay.

To study conservation of weight, a balance may be used. Two balls of clay are shown to be of equal weight after balancing them.

Now one is divided and the child is asked whether or not its weight is the same as or different from that of the comparison ball of clay that has remain unchanged. They believe that the many small pieces of clay, weight more than the single ball.

To study the conservation of volume children are presented with two identically shaped beakers of milk and the same amount of milk was poured into them. Then the milk of one beaker is poured into a third beaker which differs in shape from the other two. Though this tansition occurs entirely in the child's presence, he is likely to say that the first and third beaker do not contain the same amount of milk. But when the milk is again poured from third beaker to the first beaker the child perceives them to be the same.

The question, why does the pre-operational child fails to conserve has been answered by Piaget and his associates. They suggested that failure in conservation is due to the child's inability to recognize the operation of certain processes in physical world. Secondly he fails to see the reversibility of certain physical operations.

Piaget's work on the development of the conservation concept is perhaps more important than any other aspect of his work because by this he had tried to demonstrate the child's way of reasoning.

Centration: This is a characteristic of pre-operational children that prevent their conservating. This concept refers to centering of focusing of attention of the child on one dimention of particular object or problem. He is unable to shift his attention towards other details of perception of a thing. For example, if a child is shown a glass of water, he calculates it's volume by taking into consideration the height of water in the glass. He does not focus his attention on width of the glass. If the same amount of water is poured into a flat beaker, the child would say that the beaker contains less volume of water. So it is clear that the child cannot budge the height and the width of water at the same time and can't descenter his attention, when compensatory change takes place. Generally to the child the meaning of the words like "bigger" or 'more' is 'taller'. It will not be correct to say that there is a confusion in child's mind regarding word usage but it will be correct to say that his mind is developed to such a limit that he is capable of observing only one particular dimention of an object at a particular time.

The period of Concrete Operations : The third stage of cognitive growth starts at the age of seven and continues upto the age of eleven.

This period shows the down of logical thinking in the child. The pre-operational child gives stress upon perception, whereas the concrete operational child's thought is regulated by logic. The ability to decenter and recognize transformations are his main characteristics. But the logical thinking of the child is only directed towards what he sees before him. He cannot apply his logic to abstract problems and complex verbal problems. For example, if he shows three trees of unequal sizes to a child and ask him which one is bigger or smaller, he will answer correctly but in the absence of concrete things. If we verbally tell the child the heights of three trees and ask the same questions, he may not be able to answer. Supposing we ask the child that 'A' is taller than 'B' and 'B' is taller than 'C' then who is the tallest of all? He cannot answer the question.

Technically speaking the child at this stage acquires three qualities, namely, to seriate to classify and to correspond.

As the child is able to arrange objects in some sort or order, we can give him same numbers to arrange in increasing order and we succeeds in doing that. This is called to *seriate.* He has mastered both the relationship *'greater than'* and *'smaller than'*. To classify refers to the ability of the child to distinguish similar objects from the mixture of both similar and dissimilar objects.

To correspond means to achieve the grouping operation. For example in a one-to-one correspondence test two series on sets of elements were given. The first set has some arranged elements whose related elements are there in the second set, but in disorder. Now the child can arrange the second set on order that correspond correctly to the first set.

In this stage the child has an ability to represent the world symbolically in an advanced manner. He has the ability to conserve, last much egocentrism and above all he has developed sensitivity to contradictions. Inherent in his or her own thought. He is bound up with the world as it is and they cannot get any further untill they begin to delineate all possible explanations at the outset of considering a problem. Only then do they try to discover systematically, which of the explanations really applies. This advanced way of thinking that takes into account the abstract elements and the possible alternatives that is not present in the immediate surrounding of the child is part of what makes the thinking of the formal operational child more powerful than that of concrete operational child.

The period of Formal Operations: The period of the age from 11 through adulthood is characterized by the ability to engage in formal reasoning on abstract level. In course of this period the child moves from middle childhood to adolescence and his thought processes move from concrete operations to propositional thinking. The child applies scientific method in drawing hypothesis by verification, organising the principles into some sort of net work. The system of mental operations reaches a high degree of equilibrium at this stage. Adolescent's thought is flexible and effective. While solving a complex problem he stocks to different possibilities.

The ability of the child to think logically is to a great degree advanced and that shows his further advancement in intellectual growth. The concrete operational child uses trial and error method to find solution to a problem whereas the formal operational child uses his insight more to solve it. The concrete operational child begins to solve a problem with little foresight, without a detailed plan and without considering all of the possibilities. But the formal operational child plans the test, designs the experiment, observes accurately and at last draws logical conclusions from his observations.

The child at this develops a new system of grouping the factors presented to him to solve a problem. Piaget commonly calls it a four-groups represents identify, negation, reciprocal and correlation transformations. In order to shed light on the cognitive development of the child in the period of formal operations. Inhelder and Piaget conducted an experiment on their child subject with the help of a pendulum.

Experiment:– The experimenter presented the child with a pendulum that is a heavy metal hanging from a string. The child can swing it, by holding the other end of the string. He was given the freedom to increase or decrease the length of the string and weight of the metal according to his own sweet will. But he had to find out the cause of quickness in the swinging of the pendulum. The law of physics says that the swinging becomes quick when the length of the string is shorter. But the child had no knowledge about this. He has to find it out by his own endeavour. How the child tries to solve this problem, indicates the growth of intelligence in him.

Observation:– The concrete operational children failed to solve the problem systematically. So they gave it up. Their approach was

unsystematic and chaotic. So they could not find out any real clue to the answer. On the other hand the formal operational children conducted it systematically. First he took into consideration all the factors that make the pendulum swing. He thought about the length of the string weight of the metal, amount of the force applied to swing it, it's height from the ground etc. Then he constructed a particular image in his own mind, which he applied as a hypothesis. If one hypothesis proved wrong he formed another hypothesis and tried it. At the time of experimentation he used to change one or more factors by keeping other factors constant. For example, after trying with a long string he tried the same metal with a short string. In this process he gained knowledge that changing more than one factors at a time would not yield any result. So he started to focus his attention on only one changing factor at a time. The subject of Piaget, who was fifteen years of age, at last proved that the quickness in the swinging of the pendulum depends upon the length of the string.

It was observed that some children, who had not reached the formal operational period could solve the pendulum problem. But they needed a lot of information and direction to be supplied to them. Hence it has become an established fact that formal operational child's characteristics are related to those of good scientists as intellectual sophistication is acquired to it's maximum during this stage.

In another experiment 'Piaget' presented the formal operational child with five flasks each with a type of bleaching water of which the 1st and 3rd and the 5th, if added would produce a colour. Without knowing this clue the child started his experimentation. He first tried to mix them in pairs. Then he attempted to mix three of them at a time.

At last he is able to produce the acquired colour by mixing appropriate bleaching agents.

When the child reaches the stage of formal operations, his mind is equivalent to the adult mind. Here the cognitive growth is completed and reaches its saturation point.

Educational Implications of Piaget's Theory of Cognitive Growth

The theory of cognitive development, as sponsored by 'Piaget' has been proved more fruitful than any other theory extended by any other psychologists. It is because his description about the mental growth

of the child is more practical and proved better than that of any one else. Philosophers like Commenilla, Rousseau and Pestalozzei etc. had expressed their thought in the same line with Piaget. But his theories are more scientific. Since he took children as his subjects and conducted a longitudinal study on them so his hypothesis can be put into use in educational curriculum, which will enable the students to build up a balanced and organised personality as well as help them to adjust to their changing social environment in a better way.

Some educationists consider the opinion of 'Piaget' as a radical approach in the sphere of education and opine that the system as developed by Piaget is quite different from the conventional system of education. But practically the system of Piaget has been proved more influential than the classical systems. The main principle underlying Piaget's system is that at every level the educational system should keep relation with the cognitive growth of the child. In other words the syllabus in schools should be so prepared to the cognitive level of the children.

According to Piaget, before imparting education, the educator must take into consideration four basic facts—firstly the potentialities of infancy, secondly the role of growth, thirdly the mental process of the child and finally the reaction of the child to his social environment. Education becomes fruitless if the educator turn a blind eye towards these factors. In the other hand if these factors are understood well it would enhance the efficiency of the educator.

Piaget's principles accept the classical and conventional aims of education. It only discards the conventional procedure and shows it's drawbacks and weak points. At the same time it suggests to adopt scientific methods of teaching and learning.

In the opinion of Piaget if the child fails to accept his perceptions in an organised way, a state of discrepancy is created. This difference helps the child to grow as he tries to accommodate to the differences. If from time to time discrepancies occur and the child tries to accommodate them, his mental ability is restructured and balanced. Hence perceptional discrepancy, of the child. To accommodate these discrepancies is a problem for the child. He tries to solve the problem and ultimately learns at ask. If a learning situation is completely coping in nature with the mental set up of a child, he learns nothing. In the other hand if it is completely incompatible. the child also learns nothing.

So the proper educational system should not be completely similar or completely conflicting with the mental set up of a learner. At the time of adjusting to a new situation the learner should be provided with necessary guidance and direction by the educator.

Piaget has mentioned four periods of mental growth and each has it's own limitations. When the child is in the next higher stage the learning becomes fruitless. All times the teacher may get correct response to the question of higher level but that answer is not established on clear understanding of the child. Sometimes the child becomes able to master the course of higher level but he can't apply it in practical situations and transfer of training is not possible. So the teacher, according to the stage of cognitive growth of the child, should supply him with datas, that would enrich his experience. Thus a strong foundation for the next higher stage is laid.

In the opinion of Piaget, education, at every level, should correspond the activities of the child. Only development in regarding or writing does not indicate the cognitive growth of the child. It can be marked from his posture, activities and behaviour. Such behaviour does not mean what he sees and shows, rather it must be spontaneous. Behaviourism, must rise from his motivation and initiation. The teacher is there to create such condition and environment as to motivate the mental ability of the child learners must be supplied with necessary equipments. Hence the teacher acts as an organiser of group activities, as a creater of the environment, as a measure of thinking process and as a supplier of equipments. Educational system should be child-centred. By following deductive and inductive methods of teaching the teacher should act as a friend, philosopher and guide to the child which will sponsor creative and original thinking in the child.

The programme to be undertaken for the development of the cognitive level of the child are discussed below:

(1) Many physical changes occur during pre-adolescence and adolescence period. This is the best period for physical build up. So different programmes should be undertaken to increase physical growth and apply them in constructive works. Besides these at regular interval physical check up should be conducted and rules of hygiene should be taught to the children.

(2) Secondly children coming from poor undeveloped social environments suffer from economical, nutritional problems. Proper

attention must be given for their physical upliftment. It is said that a healthy mind resides in a healthy body. So all the arrangements including provisions for food should be made to make the child the owner of a sound physique.

(3) During adolescence, students often become puzzled and feel pressured due to some problems. Sex problem is one of them. So proper sex education with ethics and morality should be imparted to them, which will enable them to develop a healthy relationship with the opposite sex.

(4) The main responsibility of the school is to provide the students with a proper atmosphere in which they can show their behaviour freely and their inner qualities can be spontaneously expressed through their activities. By this their mental growth becomes possible. For this facilities of library free discussion, debating societies and social works should be organised. Proper attention should be given to all the requirements of adolescence period within the surrounding of the school.

(5) Students should be facilitated to develop all their creative original and inner skills and qualities in the school. So provisions for music, song, dance should be made and craftsmanship should be maintained. Attention should be given to individual differences and thinking process of each child should be encouraged. Through his teaching the teacher is required to act as an ideal before the students. He should encourage the students to develop a positive attitude towards life.

(6) Students should be supplied with all possible guidance, help and direction in solving their personal, educational and vocational problems. While helping the child to solve his problems, the teacher should keep in his mind the fact that Piaget, among his different periods of cognitive growth has given primary to concrete operation and then to formal operations. Concrete operational period is the time for the child to gain experience. The experience gained at this period helps abstract thinking at later period. Hence the student should be directed to acquire concrete knowledge about a particular problem and he thinks about it.

In the end it can be said that education is not a machine that produces materials. The application of psychology in education can be

done by thinking about a problem and drawing hypothesis. After the hypothesis being drawn they cannot be applied in the practical field without difficulties. That means there is no security that a hypothesis will bear cent-per-cent result and will be proved everywhere. Piaget did not formulate his hypothesis to apply them in educational field. Hence it is the responsibility of a teacher how he is going to manipulate them in the teachings—learning process. In this regard the ability of a teacher is more important than the theories of Piaget in education. Individual and cultural differences are there in the cognitive growth of children. These differences should be very accurately and very sincerely taken into account by a teacher. Only by this the best result can be drawn out of a student. So instead of applying the rules of psychology mechanically the teacher should stick to the experience, cultural environment and mental ability and then calculate the cognitive growth of a child.