

Study on the School Children Under Different Strata, in Different Situations: Analyze the Characteristics and Compare with Jean Piaget Theory of Cognitive Development

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Abstract

Learning is a process of acquiring new or modifying existing behaviourskills, value or performance. The ability to learn is possessed by all human beings, whereas a child ability to learn is affected by various factors such as gender, socio-economic conditions, etc. It also depends upon the child's stages of development. Educational Psychologists has developed a number of theories and concept relevant to classroom learning. These Psychological Theories suggest different ways of childs development. It provides a model to understand human thought, emotions, and behaviour which is helpful in solving problems and in handling individual differences. Jean Piaget 's theory of cognitive development states that children moves through different stages of mental development. this theory focus not only on understanding how children acquire knowledge but also on understanding the nature of intelligence. The purpose of conducting the school-based activity is to test the cognitive development of pupils, on the basis of Jean Piaget's theory of cognitive development which was carried out in Government High School Dilong, Mokokchung, Mayangnokcha Government Higher Secondary School, Senayangba Government Higher secondary school, GMS Yimyu and Children English School, Mokokchung. The school based activity covers Elementary, Secondary and Higher secondary students belonging to age group of 12 years and above. This school based activity was done as a part of B.Ed curriculum where school students from different Strata, socio-economic background were identified and conducted a several tests to know the cognitive level of students at formal operational and concrete operational stage of Jean Piaget theory of cognitive development at elementary, secondary and higher secondary level. The activity or the test conducted with the students includes Logical tests, problem solving test, Reasoning test, Abstract Imagination, etc. This activity help teachers realized that curriculum should be developed in accordance with child's cognitive level and also plan teaching methodologies and innovative activities according to their stages of development. It help teachers to recognize the factors effecting the cognitive development of the learners.

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I. INTRODUCTION

Poet Noah Perry once asked,"Who knows the thought of a child?" More than anyone, the famous Swiss Psychologist Jean Piaget (1896-1980)knew.What processes do children use as they construct the knowledge of the world? Piaget stressed that these processes are especially important in this regard: schemas, assimilation, and accommodation, organization and equilibration. Piaget stressed that the principal goal of education is to create man who are capable of doing new things, not simply repeating what other generations have done. Education should create man who are creators, inventors and discoverers. The aim of education is to form minds which can be critical, can verify and do not accept everything they are offered. Writing in his book: To understand is to invent-The future of education for the international commission on the Development of education UNESCO, Piaget stated, "The author of these lines is by no means a professional educator, but rather a psychologist led by his research to study the problems of the formation of man."According to him, Child development entails the biological, psychological and emotional changes as the individual progress from dependency to increasing autonomy. It is a continuous process with predictable

sequences, yet having a unique course for every child. It does not progress at the same rate and each stage is affected by the preceding developmental experiences.

According to different psychologists, children actively construct their knowledge through interaction with the physical and social environment. For the School Based Activity Piaget's theory of cognitive development was considered. Each of Piaget's stages is age related and consists of distinct ways of thinking. Piaget proposed four stages of cognitive development as given-

STAGE	AGE	WHAT HAPPENS AT THIS STAGE
1. <u>Sensorimotor</u>	0-2 years	*coordination of sense with motor response, sensory curiosity about the world *object permanence is developed
2. Pre-operational	2-7 Years	*symbolic thinking(a type of thinking in which symbols are used to represent objects, persons etc. that are not present) *use of proper grammar and syntax to express concepts *eco-centric

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		*imagination and intuitions are strong but complex abstract thoughts are still difficult *Sense of conservation is developed
3. Concrete operational	7-11 years	*the child can now reason logically about concrete events and classify objects. *child is no longer ego-centric *ability of serialization *carry out the complex operation or tackle problem as long as they are concrete or not abstract.
4. Formal operational	12 years and above	*Theoretical, hypothetical and factual thinking, logical and reasoning strategy and planning become possible * Concepts learned in one context cannot be applied to another * Generalization are arrived at abstract rules.

The activity was to observe School children under different strata- gender, locality, socio-economic conditions etc. at different level i.e., elementary, secondary, higher secondary: Analyze the characteristics and compare with the Piaget theory of cognitive development.

Many theories had a major impact on the theory and practice of education. It has helped to create a view where the focus of attention is on the idea of developmentally appropriate education. Piaget's theory has made a major contribution on this aspect.

Piaget theory of Cognitive Development suggests/ states that children moves through four stages of mental development. This theory focuses not only on understanding how children acquire knowledge but also the nature of intelligence.

II. DELIMINATION OF THE STUDY

The School Based activity was done only in five schools of Mokokchung Town, viz.

1. Mayangnokcha Government higher secondary school,
2. Government high school, Dilong,
3. Senayangba Government higher secondary school,
4. Government Middle School, Yimyu,
5. Children English School, Mokokchung.

III. OBJECTIVES

1. Focus on the process of children's thinking, not just its products.
2. Recognition of the crucial role of children's self-initiated active involvement in learning activities.
3. Emphasizes on practice, aimed at making children adult like in their thinking.
4. Acceptance of individual difference in developmental progress
5. To test the mental ability at respective stages as given in Piaget's theory.

ACTIVITIES CONDUCTED in Mayangnokcha Government Higher Secondary school.

Total number of students engaged in the activity-12
Stage-Formal Operational Stage (12 years and above)

IV. ACTIVITY 1: SELF INTRODUCTION ROUND

The first activity was an introductory round. The students were made to visualize an imaginary audience where individual imagines and believes that multitude of people are listening to or watching him/her.

From this activity, we found out that from the 12 students, only two (2) boys and one (1) girl among them introduced well. The student's feel awkward while introducing themselves.

Reflection:

Though the students were 12 years and above, i.e., formal operational stage, yet they were not able to introduce themselves with confidence. It was observed that they were still shy and felt awkward among themselves.

Thus, we assume that the students lacked confidence and poor communication skills, may be because of the way they have been brought up- classroom settings, environment, societal etc.

V. ACTIVITY 2: THE THIRD EYE

For this activity, the class was divided into three (3) groups, consisting of four (4) members each.

The students were given five minutes each to work together and discuss on the activity at hand. They were asked to imagine where they would want to place a 'third eye' if they had one or were given the privilege.

All the three groups suggested that they would place their eye at the back of their head. Their reason was, to be able to see what activities or events are happening behind which cannot be seen from the front.

PURPOSE

The purpose of this activity was to test their creativity, abstract reasoning, logical thinking, imagine the amount of outcome of a particular action, manipulation of ideas in their mental schema, because such skills emerge during this stage.

REFLECTION

Therefore, from this activity, we see that the students lacked imaginary skills, abstract thinking etc. If the students or any individual have mentally reached the Formal operational stage, any individual should be aware that the 3rd eye should be at the hand, so that it can move around in all possible direction and be able to see things which otherwise is not possible if placed at any position or part of the body.

VI. ACTIVITY 3: REASONING

According to Piaget, in Formal Operational Stage (12 years and above) any individual can understand abstract concepts and reasons logically. Thus, the third activity given was to logically reason the statement given-

The statement was: can a feather/hair break glass

All the students were of the view that, it is impossible for a feather or hair to break a glass.

REFLECTION

At the beginning of the activity, it was stated as, "the rule is that- a feather or a hair can break a glass". But, when the activity was carried out, all the students did not follow the rule that was given. They all depended on the given statement.

Thus, we concluded that they reasoned from their previous/prior knowledge and were unable to reason logically.

VII. ACTIVITY 4: TO TEST THE PROBLEM SOLVING ABILITY

At the Formal Operational Stage, the thinking becomes more advanced. Students can think about abstract and theoretical concepts and use logic to solve problems and give solutions. Skills such as deductive reasoning and systematic planning emerge during this stage.

To test this point in development, the students were given an activity to plot a graph from the given point (1-2), (-1, 3), (-1, 2).

REFLECTION

From this activity, it was found that the students lack problem solving skills, since only one student could solve abstract correctly. Thus, the students do not have the ability to solve abstract concept or maybe they could not apply their theoretical knowledge and concepts at that point or situation.

Problem solving activity needs prior knowledge to come up with solution which in this case, they might have lacked.

SUGGESTION

1. From the observation, we have come to learn that the students are not outspoken and are not open to interaction which makes the class a bit dull and less interesting. Therefore, activities in which students are interested in and are comfortable with should be included and practiced.
2. It was also observed the students lack problem solving during the activity. So it is advisable to make the students understand not only theoretical concepts but also practical knowledge and hands on experiences. Subjects like mathematics or science should not only be taught in theory but also accompanied with activities to make the lessons more interesting and joyful and to make them learn through hands on experiences as well, should be encouraged and practiced.
3. During the first activity, the students were asked to introduce themselves but they were unable to do that as they were shy and uncomfortable with the task. This may mean that there is less of interaction during their normal class hours. In order to overcome this, students and teachers need to have more friendly interaction instead of an authoritarian class session.
4. According to the observations, the students also lacked creative and imaginative thinking, so in order to enhance their imagination and creativity skills, making use of ICT like audio-visual aids in the teaching-learning process or classroom transactions, will aid to their prior existing knowledge and help them to link it with new contents taught.

5. Problems that required logical and analytical thinking, 'brain teasers' are a great way to incorporate in the teaching-learning process, which will help in enhancing their problem solving skills and ability.

VIII. ACTIVITIES CONDUCTED IN GOVERNMENT HIGH SCHOOL DILONG

Total number of students involved in the activity-16

Stage-Formal Operational Stage (12 years and above)

Day 1

Activity 1: Aptitude and reasoning questions

The students were asked a set of mental reasoning questions where they had to just think and answer without using pen/pencil and paper.

Activity 2: Third eye problem

The students were asked- "if you were granted a wish to have a third eye, where would you prefer to have the third eye?"

Activity 3: Two identical glasses were filled with the same amount of water and the student was asked which glass had more water. Now the water from one of the glass was poured into a taller glass and asked to compare the amount of water in the two glasses.

Activity 4: Two students at a time were called for this activity. Three paper cups with numbers 1, 2 & 3 written on the cups were placed inverted on the table. A sweet was placed inside one of the cups in front of the students. They were asked in which cup the sweet was. The student 1 was asked to go outside. The position of the sweet was changed in front of student 2 and asked where it was. Student 1 was called inside. Now student 2 was asked in which cup student 1 would think the sweet was.

Analysis and Reflection of the activity-

We had prepared some activities suited for all the four stages. Since the students were of ages 12-17, they were to be in the formal operational stage according to Piaget. So, we decided to conduct some activities which were appropriate for students of formal operational stage. Activities 1&2 were conducted. But the students failed to show signs of attainment as they even struggled with simple operations like addition, subtraction and multiplication.

So, activities 3&4 were conducted to check if they have achieved the attainment of the preceding stages though, initially we thought those activities might be too simple for students of age 12-17 years. It was quite surprising to hear the answers of the students. For activity 3, they replied that the taller glass had more water which indicated that they were not able to conserve quantity. And for activity 4, student 2 replied that student 1 would have the same answer as him/her which indicated egocentrism.

Though they had developed physically, they had not developed mentally according to their age. They had not even achieved some of the key attainments of pre-operational stage. The reason for such a slow intellectual development

might have been because of their upbringing and home environment. On being asked about their family background, most of the students belonged to families which were below poverty line. They were mostly domestic helpers staying in other people's homes or their parents earned through manual labour.

IX. ACTIVITY CONDUCTED IN SENAYANGBA HIGHER SECONDARY SCHOOL

Total number of students engaged in the activity-10

Stage-concrete operational stage (7 to 11 years)

Activity 1: Conservation of quantity

Same number of coins was spread in two lines over a sheet of paper and asked whether the amount were the same. Then, the coins were in one line were further spread apart and asked whether the amount were the same or different. The same activity was done using match sticks.

Activity 2: conservation of length

Two sketch pens of same length were held and shown to the students. They were asked if the sketch pens had the same length or not. Then, one sketch pen was pushed up a little further and asked again whether they had the same length or not.

Activity 3: Egocentrism

1. This activity was conducted with two students at a time using three cups and a coin. The coin was placed under the cup while both the students could see. Then, one student was told to close the eyes and coin is placed under a different cup. The one who had seen the coin being placed is asked about the friend's opinion (whose eyes were closed) on the position of the coin.

Analysis and Reflection

Since the students belonged to the age group of 7-12 years, they were expected to be in the concrete operational stage according to Piaget's theory. Three activities were conducted to determine their attainment.

On the activity conducted for the conservation of quantity i.e., activity 1, we found that the students could tell the right answer after spreading the coins and matchsticks. So we concluded that they have attained the conservation of quantity.

On the activity conducted for conservation of length, i.e., activity 2, some students failed to give right answer after pushing the sketch pen a little further even though they were of the same length. Therefore, it was observed that they were in the concrete operational stage, they were unable to conserve length.

On the activity conducted on egocentrism, i.e. activity 3, some students could come up with the right answer while the others were not able to answer correctly or give the justifications. Some students answered that their friends will say the same answer as them though they haven't seen where the coins were placed. So, some students were still egocentric.

Overall, the activities conducted and the students responses shows that even though the age of the students were in the concrete operational stage, some of their cognitive levels have not developed according to their age. This might be due to some factors like environment, the student's upbringing, learning opportunities, family and the society.

X. ACTIVITY CONDUCTED IN GMS YIMYU

Total number of students engaged in the activity-4

Stage-concrete operational stage (7 to 11 years)

Activity 1: Conservation of quality

Equal number of sweets were arranged in two lines identically and asked which line had more sweets. Then with same number of sweets, the sweets on one of the lines were spread so that the lines appeared longer.

Activity 2: Curiosity & Animism

For this activity, the students were asked to draw scenes from one's own perspective i.e., the students were asked to create/draw a family portrait based on a photograph which was provided.

Analysis and Reflection:

In activity 1, for the first question the students responded that I both the lines, the number of sweets were same. When the sweet were spread on the other line, except for one, the remaining students responded that the line which appeared had more sweets.

From the responses, we come to know that even though the students come under the concrete operational stage of Piaget's theory, most of the students were not able to conserve quantity. The reason for their slow mental development may be because of poor socio-economic conditions. Moreover, all the students were domestic helper from different locality and maybe because of thus, they never got the chance to think independently and to reason things/situations.

XI. ACTIVITY CONDUCTED IN CHILDREN ENGLISH SCHOOL.

Total number of students engaged in the activity- 10

Stage-Formal Operational stage (12 years and above)

Activity 1: Two glasses, half filled with orange juice that are identical in height were placed in front of the students and asked them which glass had more, less or same amount of juice. Then the teacher placed a short glass on the table and poured the juice from one of the glass into the glass and asked them again, which glass has more, less or the same amount of juice.

Activity 2:

- i. To test their logical reasoning ability, the question asked was- "a bird, a monkey, a cat and a squirrel climbed up a coconut tree. Who will get to eat the mango first?"
- ii. To test their inferential reasoning ability, the question asked was- "if Govin is taller than Andrew and Andrew is shorter than John, who is the shortest of the three?"

iii. to test the creative reasoning, Piaget's third eye test was used which is "if you had a third eye, where will you put it and why?"

Analysis and Reflection

The responses obtained from Activity-1 are

Student A- He said that the amount of juice were the same when they were in the identical glasses. When poured in one glass into the shorter glass, he said the one in the taller glass held more juice.

Student B- she decided that the juices in both the glasses held the same amount even if it is poured in different size of the glasses.

From the above result it is clear that the student B according to Jean Piaget who is in the formal operational stage can conserve liquid because she understands that when liquid is poured into a different shaped glass, the quantity of liquid remains the same, even though its appearance changed, which shows that she has the ability in doing conservational task,

But on the other hand, student A faces difficulty even though he is also in the formal operational stage, and could not complete the conservational task in accordance with his stage. so, from the above result, it can be concluded that, though both the students in the experiments were taken from the same class with the same age but differ in doing conservational task, may be due to difference in their socio-economic background.

For question (i) under activity 2, both the students were not able to answer correctly.

For question (ii) under activity 2, Donya answered correctly which shows that he can think logically, abstractly and can make inferences without using paper or real people or symbols. Whereas, Tiasenla was not able to answer correctly which shows that she still lacks abstract thinking and is not able to make inferences.

For question (ii) under activity 2, Donya answered that he would place the third eye at his back so that he would see both back and front at the same time. This indicates both abstract thinking and creativity.

But Tiasenla answered that she would place the third eye on her forehead which she would use if her other two eyes lose vision. Although her answer has some meaning, yet she lacks creativity because she could not think of anywhere else to put the third eye which shows the characteristics of children below 11 years (concrete operational stage).

If we examine their level of their performance and relate it with Piaget's cognitive theory, Donya's cognition has reached the formal operational stage and is still developing. But Tiasenla by the age is already in the formal operational stage but her mental ability is still immature as she is still not able to follow the logic and think abstractly.

XII. CONCLUSION

From all the school based activities conducted and after analyzing the responses of the students we can say that most of the students cognitive development is below the expected level. Though some of them have achieved the attainments of

their corresponding stage (as suggested by Piaget and are in the process of developing, many of them have not yet achieved the attainments of preceding stages.

The reasons for their under developed cognitive abilities could be because of their socio-economic background and upbringings most of the students were domestic helpers, they might not have got a chance to think critically or analyse situations according to their perspective. Their opinions might have always been oppressed. Also due to uneducated parents, they might have hardly been encouraged or taught about the importance of education.

The concrete operational stage is characterized by ability to reason logically, replaces intuitive thought but only in concrete situations, classification skills are present, but abstract problems present difficulties. Therefore, the school should organize task that involve children in operational tasks. These include adding, subtracting, multiplying, dividing, ordering, seriating and reversing. Use concrete materials for these tasks possibly introducing math symbols. Plan activities in which students practice the concept of ascending and descending classification hierarchies. Have students list the following in order of size such as (largest to smallest). Include activity that require conservation of areas, weight and displaced volume. Realize that there is considerable variation in children's attainment of conservation across different domains. The formal operational stage is characterized by the ability to formulate hypothesis and systematically test to arrive at a reasonable answer to any problem. At this stage, individuals move beyond reasoning only about concrete experiences and think in more abstract, idealistic and logical ways. So to develop the student's cognitive abilities, the schools, institutions, policy makers, curriculum framers should focus more on the activity based and collaborative learning. Students should be given or provide appropriate experiences, instructions, motivations by the teachers in all to develop a clear understanding of the concepts, lesson taught and improve their thinking and reasoning skills. Present a problem and suggest several ways it might be approached. Then ask students that stimulate students to evaluate the approaches. For example, describe several ways to investigate a robbery and ask students to evaluate which is best and why. Keeping in mind the developmental and cognitive ability of the students as according to Piaget's theory, the classroom transactions should be taken in ways that the overall teaching learning experiences will be interesting, joyful and meaningful and for a positive teaching- learning outcome.

XIII. REFERENCES

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