Applicability of Piaget's Conservation Concept to Sri Lankan Children

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Introduction

Cognitive Development is the study of how thought processes develop in children and young people, and how they become more efficient and effective in their understanding of the world and their mental process (Oakley 2004). Children's thinking is different from adults' thinking. As a child develops, his/her thinking changes and develops. Cognitive Development is a major area of study within Developmental Psychology. Many researchers (Beilin & Pufall 1992; Gruber & Voneche 1977; Holford 1989; Mogdil & Mogdil 1982) noted that, no theory has had a greater impact on developmental Psychology than that of Jean Piaget.

Piaget described how children develop intelligence in stages. It is important to examine these stages to understand children's conception of conservation and space. Therefore, this section provides an account of stages of development as Piaget has presented. Piaget's theory of cognitive development was based on three main principles namely assimilation, accommodation and equilibrium (Oakley, 2004).

Piaget's book titled "La Genese du nombre chez l'enfant" translated in to English (The child's conception of Number) was published in 1952. He organized the book in three main parts as: Conservation on quantities, through the notions of cardinal and ordinal correspondence and additive and multiplicative compositions. The present study deals with the conservation on quantities in Sri Lankan children. Jean Piaget conducted tests in the concept of conservation on quantities under the titles, conservation of continuous quantities and conservation of discontinuous quantities.

Research Problem

Teacher training programmes in Sri Lanka are greatly influenced by Piaget's Theory (Talagala 2004). The Open University of Sri Lanka conducts a certificate programme for Pre-School teachers and 'Development of mathematical Skills' is a compulsory course in this Programme. The content of this course is mainly based on Piaget's cognitive development theory. The content consists of concepts of conservation (Session 5) Likewise, the content of the subject Mathematical concepts in the pre-School teacher training programmes conducted by the National Institute of Education and Eastern University of Sri Lanka is also based on Piagetian concepts.

Sri Lankan Primary Mathematics syllabi consist of six main topics – Numbers, Mathematical Operations, Measurement, Money, Space and Shapes, and Data Handling .But other than these six concepts, the pre-number concept is also in the key stage1 (Grade 1 and 2) syllabi. These concepts are mainly based on Jean Piaget's concepts.

Considering the importance of these concepts in later learning of mathematics and the attempts of teachers to develop these concepts in young children, the researcher felt Sri Lankan teachers would benefit immensely by investigating into the applicability of children's conception of 'conservation' presented in Piaget's theory in the Context of Sri Lanka.

Piaget developed his theory of cognitive development in a cultural context which is dissimilar to the Sri Lankan context. Nevertheless, the influence of Piaget's Cognitive development theory is evident in early childhood education and primary education. Therefore, considering the impact of Piaget's Cognitive Development Theory in the education of our children and conclusions of studies conducted on the applicability of his theories to different cultural contexts, the researcher feels that the problem whether children's conception of 'conservation' are applicable to Sri Lankan children, should be investigated.

Objectives of the Study

- to examine the applicability of children's conception of 'conservation' in Piaget's Cognitive Development Theory to Sri Lankan children in relation to age.
- to examine the applicability of children's conception of 'conservation' in Piaget's Cognitive Development Theory to Sri

Lankan children in relation to the social sector they belong to urban, rural and estate.

Theoretical Considerations and Empirical Evidence

Many studies have been conducted to find out the universal applicability of Piaget's Theory (Santrock 2001; Chen and Menglan 1983). Greenfield (1966) carried out a series of research among Wolof children in Senegal, West Africa, to identify whether 'concrete operational thought' in Piaget's theory is universal. She found only 50% of the children between the ages of 10-13 years understood the principle of conservation. Another study was conducted in Australia to find out whether the child's ability to use the concept of conservation improves if he/she comes from a culture where conservation is not widely practiced (Dasen Ngini & Lavalee, 1979). The study found even with training aboriginal children they were far behind the white children in Canberra.

Methodology

The research methodology and the theoretical framework for this study is largely based on Piaget's Cognitive Development Theory. Jean Piaget's methods were followed as closely as possible. Following instrument was used for task Conservation of Continuous Quantities.

Child was first given two cylindrical containers of equal dimensions (A1 and A2) containing the same quantity of liquid (as indicated by the levels). The contents of A2 is then poured into two smaller containers of equal dimensions (B1 and B2) and the child was asked whether the quantity of liquid poured from A2 into (B1 and B_2) was equal to that in A1.

The same procedures as with continuous quantities described above were performed with green gram. The child's answers were noted by the researcher and these results compared with Piaget's results.

The sample of this study consisted 75 children from different age levels (5 years to 10 years) and different social sectors (urban, rural and estates).

Key Findings

Results of Sri Lankan children's ability to complete tasks related to conservation of quantities are presented in the following table. Results of Piaget's study are also converted into percentages and presented in the same table.

Table 1: Conservation of Quantities Number and Percentages of Who Completed Items

Age group	Test	Present Study					Piaget's Study
		Urban	Rural	Estate	Total	Percentage	Percentage
5-6	continuous	0	1	1	2	13.33	0.00
Years	discontinuous	0	0	1	1	6.67	100.00
6-7	continuous	3	3	4	10	66.67	50.00
Years	discontinuous	1	4	4	9	60.00	66.67
7-8	continuous	4	5	5	11	93.33	100.00
Years	discontinuous	3	5	4	12	80.00	100.00
8-9	continuous	5	5	4	14	93.33	-
Years	discontinuous	5	4	4	13	86.67	100.00
9-10	continuous	5	5	5	15	100	-
Years	discontinuous	5	5	5	15	100	100

Source: Author

As the table above shows all the subjects in Piaget's sample (100%) did not show the conception for the continuous quality and all children (100%) showed the conception for the discontinuous quantities in the age range 5-6 years. But a majority (87% and 93.33% respectively) in the Sri Lankan sample failed to complete these tasks. This shows that a majority of subjects do not possess the conception of quantity of liquid at the age of 5-6 years. The chi square test indicated that there is a significance difference between Piaget's findings and the present study ($P<0.05$).

The table reveals that, 66.67% of the children in the present study and 50% children of the Piaget's sample have the conception of liquid conservation in the 6-7 years age range. But 60%children in the present study and 66.67% children from the Piaget's study showed the conception for the task discontinuous quantity conservation. The chi square test indicated (P values are greater than 0.05) there is no difference between these two studies.

The table above shows 93.33% and 80% children from the present study showed the conception for the conservation for the continuous quantity and 100% children from the Piaget's study showed the

conception for both the continuous quality and discontinuous quantity in the age range 7-8 years.

The chi-square tests computed has also shown that there is no significant difference in the achievement levels of Sri Lankan sample and of Piaget's sample for the conservation of continuous quantity. But there is significance difference between the studies for the discontinuous quantities in this age range.

Piaget did not conduct the experiment of conservation of continuous quantity in the age range 8-9 years. All the children showed the conception for the discontinuous quantity for his study. There 93.33% and 86.67% children from the showed the conception for the conservation of continuous quantity and discontinuous quantities in the present study in the age range 8-9 years.

Conclusion

Therefore it can be concluded that, Jean Piaget's conservation task is applicable to Sri Lankan children aged 6-7 years. All the children showed the conception for the both experiment in the present study.

References

Oakley, L. (2004). Cognitive development. London: Routledge.

Piaget, J. (1952). The child's conception of number. London: Routledge.