CHAPTER V

THE RESUME

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CHAPTER V

THE RESUME

The present Chapter deals with summary, conclusions, suggestions and follow-up studies. They have been sequentially presented as under.

5.0 The Summary

Nothing is more denounced than the emphasis on rote memorization by pupils existing in the present educational system. Learning theories or predominantly designing the course contents and learning experiences of the text books meant for class room training in teaching. Consequently the present educational system designs 'A learning child' as end product of the educational system. The Piaget's S School of Thought brought about a revolutionary change and shifted the emphasis from the 'learning child' to 'the thinking child'. It was felt more essential on the part of the learner to have developed the skill for 'learning to learn' and 'learning to think'. Piaget and Inhelder (1957, 1958) and other neo-Piagetians like Elkind (1961), Lovell and Ogilvia (1961) and many others contributed significantly to the concept of conservation. Amount all the variables affecting conservation of substances that a child acquires. Perhaps, age, locale, socio-economic status

The social learning processes accompanied with rearing techniques and socialization practices prevalent at homes with the interactions of family members largely determine the mode of behaviour, cognitive attributes and social skills that the child assimilates during childhood. This is further promoted by social interactions, social learning and schooling. Perhaps, schooling and cultural patterns in which the child is nurtured, nourished and developed, play a vital role in the development of his cognitive abilities, affective attributes and other psychosocial potentialities.

Narayan Rao (1977) and Shukla, J.P. (1980) conducted significant researches on conservation development of Indian children. However, they concentrated on
school children with a view to know the effect of schooling on conservation. No study in India has yet been undertaken in which the conservation abilities of non-school going children has been explored and investigated.

The present study, therefore, aims at investigating largely the effects of schooling on conservation properties of the Indian children by replicating Piagetian concept of conservation on school going and non-school going children.

The objectives of the study can be more explicitly presented as under:

5.10 Objectives:

1. To study the differences in conservation in mass, weight and volume of solid and liquid of school going and non-school going children.

2. To examine the effect of schooling and non-schooling on conservation in mass, weight and volume of the solid and liquid.

3. To test the relative effect of age, sex, socio-economic status on conservation in mass, weight and volume of solid and liquid.

4. To study the effect of socio-economic status and locale on conservation in mass, weight and volume of solid and liquid.
5. To examine whether pupils differ significantly in their conservation performance in mass, weight and volume of solid and liquid when they are stratified in terms of their sex, schooling, age, grade, locale and socio-economic status.

6. To identify the relative effects of certain sources of variance on conservation of mass, weight and volume of solid and liquid.

These objectives of the study have been translated into the following hypotheses:

5.20: **Correlational studies:**

- **H$_1$:** "There exists a significant positive linear relationship between the scores on the conservation in mass, weight and volume of solid".

- **H$_2$:** "A significant positive linear relationship would be observed between the scores on conservation in mass, weight and volume of liquid".

5.21: **Interactional studies:**

- **H$_3$(a):** "All three main variances, namely, sex (2) x Age (3) x Schooling (2) would have significant effects on conservation of mass of solid substances, when separate ANOVA for each of the three dependent variables are computed; however, schooling would display the highest significant main effect whereas sex the lowest".
H₃(b): "All the three main variances, namely, SES (2), x Grade (3) x Locale (2) would have significant effects on conservation of mass of solid substances, when separate ANOVA for each of the three dependent variables are computed, however, the main effect of grade would display the highest significant effect whereas locale the lowest".

H₄(a): "All the three variances, namely, Sex (2), x Age (3) x Schooling (2) would have significant effects on conservation of weight of solid substances when separate ANOVA for each of the three dependent variables are computed, however, schooling would display the highest significant main effect whereas sex the lowest".

H₄(b): "All the three variances, namely, SES (2) x Grade (3) x Locale (2) would have significant effects on conservation of weight of solid substances, when separate ANOVA for each of the three dependent variables are computed; however, the main effect of grade would display the highest significant effect whereas locale the lowest".

H₅(a): "All the three variances, namely Sex (2), x Age (3) x Schooling (2) would have significant effects on conservation of volume of solid substances when separate ANOVA for each of the three dependent variables are computed, however, schooling would display the highest significant main effect, whereas sex the lowest".
H_5(b): "All the three main variances, namely, SES (2) x Grade (3) x Locale (2) would have significant effects on conservation of volume of solid substances, when separate ANOVA for each of the three dependent variables are computed, however, the main effect of grade would display the highest significant effect whereas locale the lowest.

H_6(a): "All the three main variances namely Sex (2) x Age (3) x Schooling (2) would have significant effects on conservation of mass of liquid substances when separate ANOVA for each of the three dependent variables are computed, however, schooling would display the highest significant main effect whereas sex the lowest".

H_6(b): "All the three main variances, namely, SES (2) x Grade (3) x Locale (2) would have significant effect on conservation of mass of liquid substances, when separate ANOVA for each of the three dependent variables are computed, however, the main effect of grade would display the highest significant effect whereas locale the lowest".

H_7(a): "All the three main variance, namely, Sex (2) x Age (3) x Schooling (2) would have significant effect on conservation of weight of liquid, when separate ANOVA for each of the three dependent variables are computed, however, schooling would display the highest significant main effect, whereas Sex, the lowest".
$H_7(b)$: "All the three main variance, namely, $\text{SES} \times \text{Grade} \times \text{Locale}$ would have significant effect on conservation of weight of liquid substances, when separate ANOVA for each of the three dependent variables are computed, however, the main effect of grade would display the highest significant effect whereas locale the lowest.

$H_8(a)$: "All the three main variance namely, $\text{Sex} \times \text{Age} \times \text{Schooling}$ would have significant effects on conservation of volume of liquid substances when separate ANOVA for each of the three dependent variables are computed, however, schooling would display the highest significant main effect whereas sex, the lowest.

$H_8(b)$: "All the three main variance, namely $\text{SES} \times \text{Grade} \times \text{Locale}$ would have significant effects on conservation of volume of liquid, substances when separate ANOVA for each of the three dependent variables are computed, however, the main effect of grade would display the highest significant effect whereas locale the lowest."
5.211: Differential Studies:

H₉: Schooling Differences

H₉(a): "The conservation scores in mass, weight and volume of solid substances of school going children would be significantly higher than those who are non-school going".

H₉(b): "The conservation scores in mass, weight and volume of liquid substances of school going children would be significantly higher than those who are non-school going".

H₁₀: Age Differences:

H₁₀(a): "Children of higher age group would conserve significantly higher in mass, weight and volume of solid substances than those at lower age group, thereby observing sequential decalag in the conservation of various substances".

H₁₀(b): "Children of higher age group would conserve significantly higher in mass, weight and volume of liquid substances than those at lower age group thereby observing sequential decalag in the conservation of various substances".

H₁₁: Grade Differences:

H₁₁(a): "The conservation responses in mass, weight and volume of solid substances of pupils of the upper grade would be significantly higher than those at the lower grades".
H_{11}(b): "The conservation responses in mass, weight and volume of liquid substances of pupils of the upper grade would be significantly higher than those at the lower grades".

H_{12}: **Sex Differences**:

H_{12}(a): "Girls regardless of age would conserve significantly higher in mass, weight and volume of solid substances".

H_{12}(b): "Girls regardless of age would conserve significantly higher in mass, weight and volume of liquid substances".

H_{13}: **Sex-cum-Grade Differences**:

H_{13}(a): "Girls regardless of age, grade differences would conserve significantly higher in mass, weight and volume of solid substances".

H_{13}(b): "Girls of higher grade would conserve significantly higher in mass, weight and volume of liquid substances than those of boys of higher grade".

H_{14}: **SES Differences**:

H_{14}(a): "Pupils belonging to upper SES group would conserve significantly higher in mass, weight and volume of solid substances than those belonging to lower SES groups".
H14(b): "Pupils belonging to upper SES group would conserve significantly higher in mass, weight and volume of liquid substances than those belonging to lower SES groups".

H15: Locale Differences:

H15(a): "Regardless of sex, age, grade and SES differences, children coming from urban locale would conserve significantly higher in mass, weight and volume of solid substances than those in rural locale".

H15(b): "Regardless of sex, age, grade and SES differences, children coming from urban locals would conserve significantly higher in mass, weight and volume of liquid substances than those in rural locale".

5.30: Delimitations:

1. The study would focus only on the concrete operational period, covering ages 7+, 8+ and 9+ years which admits children in grades 2nd, 3rd and 4th of primary schools.

2. The present study deals only with mass, weight and volume of solid and liquid. The study has not been extended beyond these parameters of conservation.

3. The present study has been designed for school going and non-school going children of ages 7+, 8+ and 9+ years.
4. Children belonging to both the locales, i.e. urban and rural have been included in the present study.

5. The representative sample of pupils have been drawn from grades II, III and IV of primary schools located in rural and urban areas.

6. The study will cover correlational, interactional and differential aspects.

7. The present study has been designed to test the effect of Sex (2), Age (3), Schooling (2), SES (2), Grade (3) and locale (2) on conservation performance in mass, weight and volume of solid and liquid.

8. The study has been designed for the children of the concrete operational period (age group 7 to 9) enrolled in the primary schools. The urban locale would be represented by pupils studying in the primary schools of Baloda Bazar city whereas rural locale by children enrolled in rural primary schools of Baloda Bazar Block.

9. By and large, the present study is a replication of Piagetian tradition, but is extended to non-school going primary school children. The experimental apparatus in the conduct of the study and control of variables as operated by Piaget has been carefully replicated.
5.40 Methodology:

5.41 Sampling Technique:

From the universe of pupil population at grade II, III and IV of rural and urban primary schools of Balodabazar city and block in Raipur district of Madhya Pradesh, representing the concrete operation period between ages 7+ to 9+, 378 boys and 353 girls constituting respectively 20% and 19.29% of universe as mentioned above have been drawn out for the present study employing systematic representative random quota sampling technique. The size of the school going sample was found to be 331 against the non-school going children 400 the total being 731 Ss. As many as 320 urban and 411 rural children participated in the experimentation. The samples stratified in accordance with the ages 7+, 8+ and 9+ were 239, 248 and 244, respectively.

5.42 Instruments

In the present study, solid and liquid as the substances have been studied for conservation of mass, weight and volume. The apparatuses employed by Piagetians have been replicated in the present study. Thus, the instruments do not differ from the standard apparatuses employed for measuring conservation in mass, weight and volume of solid and liquid by Piagetian schools. However, in addition to the standard instruments and procedures of
Piagetian schools, grains (paddy seeds and grams) were employed in the present study for measuring conservation of weight of solid with which the rural pupils were more familiar.

5.43: Design of the Study:

The present investigation consists of three types of studies -

(i) the correlational studies - Hypotheses H₁ and H₂
(ii) the interactional studies - Hypotheses H₃ to H₈
(iii) the differential studies - Hypotheses H₉ to H₁₅

In the present study, conservation of mass, weight and volume of solid and liquid functioned as Dependent variables whereas (i) schooling (2) age, (iii) sex, (iv) grade, (v) SES and (vi) locale operated as independent variables.

The entire procedure of experimentation of conservation properties was operated in individual setting by the investigator herself which took about 2 hours for each of the subjects.

5.44: Treatment of Data:

The responses collected from the pupils were treated statistically in accordance with the purpose of the study mentioned earlier. The main statistical techniques employed in the study proper are as under:
Correlational studies - application of Pearson Product Moment coefficient of correlation.

Interactional study - application of Analysis of Variance for (a) 2x3x2 and (b) 2x3x2 factorial designs.

Differential study - application of mean, SD and t values.

The results obtained on the studies have been discussed and interpreted in the light of the findings arrived at by earlier investigators! Conclusions drawn from these findings have been presented as under:

6.50: The Conclusions

5.51: Correlational studies

All the indices of correlation between scores in conservation in mass, weight and volume of solid and liquid have been found significant.

Highest positive coefficient of conservation scores in conservation of weight and volume of liquid. The coefficients of conservation between mass and volume of liquid have been found relatively lower.

On the strength of these results, hypotheses $H_1$ and $H_2$ have been completely retained with minor reversals.
5.52: Interactional studies

On the strength of results it is concluded that age, schooling, grade and locale have shown highly significant main effects on conservation of mass, weight and volume of solid and liquid substances whereas sex and SES did not occur affecting conservation phenomenon under study significantly.

Hypotheses $H_3$ to $H_8$ have been partially retained.

5.53: Differential studies

(a) Schooling Differences:

"The conservation scores in mass, weight and volume of solid substances of school going children has been found significantly higher than those who are non-school going ones".

Hypothesis $H_9(a)$ has been retained completely except in case of conservation in mass of solid.

$H_9(b)$: "The conservation scores in mass, weight and volume of liquid substances of school going children has been significantly higher than those who are non-school going ones".

Hypothesis $H_9(a)$ has been retained completely except in case of conservation in volume of liquid.

(b) Age Differences:

$H_{10}(a)$: "Pupils of higher age group have shown significantly higher conservation in mass, weight and volume of
solid substances than those at lower age group, thereby observing sequential decalag in the conservation of various substances".

Hypothesis $H_{10}(a)$ has been completely retained.

$H_{10}(b)$: Pupils of higher age group have conserved significantly higher in mass, weight and volume of liquid than those at lower age group.

Hypothesis $H_{10}(b)$ has been retained completely.

(c) Grade Differences:

$H_{11}(a)$: The conservation responses in mass, weight and volume of solid substances of pupil of IVth grade has been found significantly higher than those at the lower grades, i.e. IInd and III; however, a sequential decalag has been observed in their conservation responses.

Hypothesis $H_{11}(a)$ has been partially retained.

$H_{11}(b)$: The conservation responses in mass, weight and volume of liquid substances of pupils at upper grade has been significantly higher than those at the lower grades.

Hypothesis $H_{11}(b)$ has been partially retained.

(d) Sex Differences:

$H_{12}(a)$: Girls regardless of age have conserved significantly higher in mass, weight and volume of solid substances.

Hypothesis $H_{12}(a)$ has been retained with minor reversals.
$H_{12}(b)$: Girls regardless of age have conserved significantly higher in mass, weight and volume of liquid substance. Hypothesis $H_{12}(b)$ has been partially retained.

(e) **Sex-cum-Grade Differences:**

$H_{13}(a)$: Girls regardless of age, grade differences have conserved significantly higher in mass, weight and volume of solid substances.

Hypothesis $H_{13}(a)$ has been retained completely except in case of conservation of weight of solid.

$H_{13}(b)$: Girls of higher grade i.e. IVth grade have conserved significantly higher in mass, weight and volume of liquid than those of boys of IVth grade.

Hypothesis has been completely retained.

(f) **SES Differences:**

$H_{14}(a)$: Pupils belonging to upper SES group have conserved significantly higher in mass, weight and volume of solid substances than those belonging to lower SES groups.

Hypothesis $H_{14}(a)$ has been partially retained.

$H_{14}(b)$: Pupils belonging to upper SES group have conserved significantly higher in mass, weight and volume of liquid substances than those belonging to lower SES groups.
(g) **Locale Differences:**

**H\textsubscript{15}(a):** Regardless of sex, age, grade and SES differences pupils coming from urban locale have conserved significantly higher in mass, weight and volume of solid, than those in rural locale.

Hypothesis **H\textsubscript{15}(a)** has been retained completely except in case of volume of solid.

**H\textsubscript{15}(b):** Regardless of sex, age, grade and SES differences pupils coming from urban locale have conserved significantly higher in mass, weight and volume of liquid substances than those in rural locale.

Hypothesis **H\textsubscript{15}(b)** has been retained completely except in case of mass of liquid.

5.60: **The suggestions:**

On the strength of findings obtained in the present study as well as of those pointed out by Piagetian school of thought and others, the following suggestions have been offered with a view to bring an improvement in the status and standard of the child who should be accepted as the "thinking child" and who should be trained in the skill of "learning to learn" and "learning to think".

1. In view of the fact that rich socio-economic status availables to the privileged urban children in their homes and neighbourhood as well as the enriched instructions made possible to them through better
schooling, effective guidance and stimulating socio-economical climate at home and in the school in comparison to their counterpart rural students who have rather deprived of such facilitative factors, it is suggested that compensatory instructional programmes be effectively organized for the rural and they should be encouraged to participate in the social deliberations.

(ii) Following Piagetian school of thought pertaining to horizontal decalage, it is essential to introduce course-content in accordance with the local needs and resources. Such learning experiences should emerge from the socio-economic status in which they are brought up and to which they should contribute. The school curricula in concept formation and acquisition of conservation should develop strictly in accordance with the horizontal decalage following the age norms on one hand and taking into consideration the locale variation as the potential source of variation on the other. Rather, this suggests for a separate curricula in science and humanity with a view to meet the locale variations as well as with the aim of utilizing the locale potentiality acquired from the locale richness inherent in a particular locale.

(iii) Enough opportunities should be made available to the pupils and sufficient freedom should be granted to them so that the sense of self direction should be included to its maximum.
In this regard, in Indian schools and homes where a critical comments negative approaches and convergent values and norms had to be radically changed by bringing about a behavioural modification in attitude change among the parents and teachers as well as among the school authorities and other concerned persons.

(iv) Since training has one failed probability serious attempts should be made to inculcate a sense for acquiring richer conservation.

5.70: The Follow-up Studies:

The following studies have been suggested with a view to enrich the status of literature on conservation of substances.

1. A study on conservation of number of solid among schooled and non-schooled adolescents in different locale.


3. Effect of training on conservation and scientific creativity.

4. Relationship between logical thought development and scientific creativity.

5. Personality correlates of the conservers and non-conservers.
6. A study of parental acceptance in relation with conservation of substance.

7. A study of creative talent among the criminals of different cultural groups.


9. Effect of geometrical concepts on scientific creativity.

10. Personality correlates of Indian scientists disciplined in various physical, social, biological, medical and other applied disciplines.