CHAPTER - VI
SUMMARY AND GENERALIZATIONS

In the preceding chapters, introduction of the problem, development of the tools, method of the study and interpretation of the results were discussed. The present chapter has been devoted to the summary of results. For providing the background to the findings, a brief description of purpose, design of the study and procedure, along with conclusions and suggestions for further research have also been presented.

6.1 INTRODUCTION

Success of an educational process, to a large extent is determined by the mode of instruction. A planned instruction has the purpose of helping each individual to develop optimally in the direction of instructional objectives.

An instructional system may be viewed as composed of various interrelated components, functioning together to achieve a purpose (Briggs and Hannum, 1982). It is an important sub-system of the educational supra-system. Educational technologists have frequently discussed system and systems approach to the design of instruction. Generally, it is accepted as ".......... a rational problem solving method of analyzing the educational process taken as a whole, incorporating all of its parts and aspects, including the students and teachers, the curriculum content, the instructional materials, the instructional strategy, the physical environment and the evaluation of instructional objectives" (Cyrs and Lowenthal, 1970). The instructional systems approach rejects the idea that there is one best medium or strategy for instruction (Jamison, Suppes and Wells, 1974; Schramm, 1977).

What is unique about the systems approach is that, it enables the analysis of not isolated components, but, of the whole and helps one to think in a gestalt way rather than in a fragmented manner. Application of this methodology is likely to produce a "Learning Environment" which arranges human and non-human resources in an efficient manner to bring about effective student learning.

In Indian situations, majority of the studies have been conducted on the effectiveness of isolated components of an instructional system, such as, use of
objectives, different modes of instruction, media, evaluation devices, but, very
little work has been reported on the effectiveness of the integrated system. In
order to convince the field workers to co-ordinate all components of an instru-
cctional system via systems approach and enhance the output of a program, well
designed experimental studies are needed.

Although, instruction through systems approach surpasses the same through
conventional ways, this system is not independent of student characteristics, especially,
intelligence. In better and better designed instructional systems, relationship between
performance and intelligence is progressively diminishing.

After the dawn of political independence, India focussed firstly on
expansion of educational opportunities and democratization of class-room management
However, certain totalitarian tendencies still persist in some schools in the form of
pseudo-democratic tendencies. A portion of research evidence stresses the superiority
of the democratic school climate. The interaction of school climate with an Integra-
ted system of Instruction is yet to be explored.

Most of the classroom learning is comprised of concepts and principles,
that may be taught under a wide range of conditions and circumstances. Learning
hierarchy is supported by a number of studies that indicate it as an important tool
in the hands of teachers. Further, the knowledge received by a pupil through a
teacher is not of much use unless it can be transferred to real life situations.
Retention is a prerequisite for transfer. A number of studies indicate the inter-
relationship between retention, intelligence and achievement, but, very few of them
explore the relationship of retention with instructional systems and school climate.

All through the ages, the society at large showed a keen interest in the
non cognitive aspects of human personality. Manners and Initiative are two personality
traits that are required for becoming a good democratic citizen at a later stage.
Hence, the question arises that what type of school climate will foster initiative
and inculcate desirable manners.

So, the present study entitled, "EFFECTIVENESS OF AN INTEGRATED
SYSTEM OF INSTRUCTION FOR CONCEPT AND PRINCIPLE LEARNING IN
DIFFERENT SCHOOL CLIMATES AT SECONDARY LEVEL", was undertaken with
a view to investigate the efficacy of the model of an Integrated System of
Instruction in relation to performance, school climate, types of learning and retention. The personality variables were studied in relation to intelligence and school climate at the secondary level.

6.2 OBJECTIVES

The present study was designed to realize the following objectives:

(1) **To develop an Integrated System of Instruction (ISI) for a segment of science at the secondary level.**

(2) **To study the effect of instructional treatments against the performance criteria of 90-90.**

(3) **To make the qualitative analysis of the students' responses on the criterion test.**

(4) **To study the sequence progression on the basis of the criterion scores.**

(5) **To study the relative effectiveness of ISI and Traditional Instruction (TI) for different school climates.**

(6) **To study the relative effectiveness of the two instructional designs in the two school climates for high and low intelligence levels.**

(7) **To study the relative effectiveness of ISI and TI in relation to the two school climates for high and low intelligence levels at Knowledge and Comprehension level of objectives.**

(8) **To study the relative effectiveness of the ISI and TI with respect to achievement scores for Concept learning as a function of:**
   (a) school climate,
   (b) intelligence and
   (c) levels of objectives (Knowledge and Comprehension levels and their different combinations).

(9) **To study the relative effectiveness of ISI and TI with respect to achievement scores for Principle learning as a function of:**
   (a) school climate,
   (b) Intelligence and
   (c) levels of objectives (Knowledge and Comprehension levels and their different combinations).

(10) **To study the association of forgetting and reminiscence separately with instructional treatments, school climates, intelligence levels and levels of objectives.**

(11) **To study the effect of school climate on the traits associated with Manners in relation to intelligence levels.**

(12) **To study the effect of school climates on the traits associated with initiative in relation to intelligence levels.**
6.3  **HYPOTHESES**

The study was designed to test the following hypotheses:

A]  
**Hypotheses for analysis of Total Scores**

1) ISI and TI yield equal level of achievement scores.
   
   (a) ISI yields better achievement scores than TI.

2) Democratic and authoritarian school climates produce equal level of achievement scores in secondary school science.
   
   (a) Democratic school climate yields better achievement scores than authoritarian school climate.

3) Difference in the scores through ISI and TI is not qualified by the school climates.
   
   (a) The ISI yields better achievement in democratic school climate than in authoritarian school climate.
   
   (a₂) The TI yields equal achievement in democratic and authoritarian school climates.

4) The two instructional designs yield equal results in democratic and authoritarian school climates with both the levels of intelligence.
   
   (a₁) ISI in democratic school climate shows better results with high intelligence group than with the low intelligence group.
   
   (a₂) ISI in authoritarian school climate shows comparable results with high and low levels of intelligence.
   
   (a₃) TI in democratic school climate exhibits better results with high intelligence group than with low intelligence group.
   
   (a₄) TI in authoritarian school climate shows equal results with both the levels of intelligence.

5) Democratic school yields results equal to that of authoritarian school climate for the two levels of intelligence and objectives.
   
   (a₁) Democratic school climate with high intelligence group produces equal achievement scores for knowledge and comprehension levels of objectives.
   
   (a₂) Democratic school climate with low level of intelligence produces better achievement scores for knowledge than for comprehension level of objectives.
   
   (a₃) Authoritarian school climate with high intelligence group produces higher achievement scores for knowledge than for comprehension levels of objectives.
Authoritarian school climate with low level of intelligence produces better achievement scores for knowledge than for comprehension level of objectives. The two instructional groups yield comparable results in democratic and authoritarian school climates with both the levels of intelligence at knowledge and comprehension level of objectives. Through ISI in democratic school climate, the high intelligence group performed equally well at knowledge and comprehension level of objectives. Through ISI in democratic school climate, low intelligence group performed at knowledge level higher than the same at comprehension level. Through ISI in authoritarian school climate, high and low intelligence groups performed equally well at knowledge and comprehension level of objectives. Through ISI, the high intelligence group performed higher in the democratic school climate than the high intelligence group in the authoritarian school climate for both the knowledge and comprehension level of objectives.

Hypotheses for analysis of Concept scores

ISI and TI yield equal level of concept attainment scores. ISI yields better results than TI. Democratic and authoritarian school climates produce equal level of concept achievement scores in science at secondary level. Democratic school climate yields better achievement scores in concept learning than authoritarian school climate. Difference in the scores through ISI and TI is not qualified by school climate. The achievement in concept learning through ISI is better in democratic school climate than in authoritarian school climate. The achievement in concept learning through TI is equal in democratic and in authoritarian school climates. The two instructional designs yield equal results in democratic and authoritarian school climate with both the levels of intelligence. ISI in democratic school climate shows better results with high intelligence group than with low intelligence group. ISI in authoritarian school climate shows comparable results with high and low levels of intelligence.
(a_3) TI in democratic school climate exhibits better results with high intelligence group than with low intelligence group.

(a_4) TI in authoritarian school climate shows equal results in both the levels of intelligence.

11) Democratic school climate yields results equal to that of authoritarian school climate for the two levels of intelligence and objectives.

(a_1) Democratic school climate with high intelligence group produces equal scores in concept learning for knowledge and comprehension level of objectives.

(a_2) Democratic school climate with low level of intelligence produces better achievement scores for knowledge than for comprehension level of objectives.

(a_3) Authoritarian school climate with high intelligence group produces higher achievement scores for knowledge and comprehension level of objectives.

(a_4) Authoritarian school climate with low level of intelligence produces better achievement scores for knowledge than for comprehension level of objectives.

12) The two instructional groups yield comparable results in democratic and authoritarian school climates with the two intelligence groups at knowledge and comprehension levels of objectives.

(a_1) Through ISI in democratic school climate, the high intelligence group performed equally well at knowledge and comprehension levels of objectives.

(a_2) Through ISI in democratic school climate, low intelligence group performed higher at knowledge level than the same at comprehension level.

(a_3) Through ISI in authoritarian school climate, high and low intelligence groups performed equally well at knowledge and comprehension levels of objectives.

(a_4) Through ISI, the high intelligence group performed higher in the democratic school climate than the high intelligence group in the authoritarian school climate for both the knowledge and comprehension levels of objectives.

Hypotheses for analysis of Principle scores

13) ISI yields achievement scores equal to that of TI.

(a_1) ISI yields better results than TI.

14) Democratic and authoritarian school climates produce equal level of achievement scores in principle learning science at secondary level.
Democratic school climate yields better achievement scores than authoritarian school climate.

Difference in the scores through ISI and TI is not qualified by school climate.

The achievement in principle learning through ISI is better in democratic school climate than in authoritarian school climate.

The achievement in principle learning through TI is equal in democratic and authoritarian school climates.

For principle learning in science the two instructional designs yield equal results in democratic and authoritarian school climates with both the levels of intelligence.

The ISI in democratic school climate shows better results with high intelligence group than with the low intelligence group.

The ISI in authoritarian school climate shows comparable results with high and low levels of intelligence.

The TI in democratic school climate exhibits better results with high intelligence group than with low intelligence group.

The TI in authoritarian school climate shows equal results with both the levels of intelligence.

Democratic school climate yields results equal to that of authoritarian school climate for the two levels of intelligence and objectives.

Democratic school climate with high intelligence group produces equal achievement scores in principle learning for knowledge and comprehension levels of objectives.

Democratic school climate with low intelligence group produces better achievement scores for knowledge than for comprehension levels of objectives.

Authoritarian school climate with high intelligence group produces higher achievement scores in principle learning knowledge than comprehension levels of objectives.

Authoritarian school climate with low level of intelligence produces better achievement scores for knowledge than for comprehension level of objectives.

The two instructional designs yield comparable results in democratic and authoritarian school climates with both the levels of intelligence at knowledge and comprehension levels of objectives.
Through the ISI in democratic school climate, the high intelligence group performed equally well at knowledge and comprehension levels of objectives.

Through the ISI in democratic school climate, low intelligence group performed at knowledge level higher than the same at comprehension level.

Through the ISI in authoritarian school climate, high and low intelligence groups performed equally well at knowledge and comprehension levels of objectives.

Through the ISI, high intelligence group performed higher in the democratic school climate than the high intelligence group in the authoritarian school climate for both the knowledge and comprehension levels of objectives.

Hypotheses for analysis of Retention scores

Retention is independent of the instructional treatment.
Retention is independent of school climates.
Retention is not associated with levels of objectives.
Retention is independent of intelligence levels.

Hypotheses for analysis of Rating scores

The two school climates promote equal level of Manners in high and low intelligence groups.
The high intelligence group was rated higher than their low intelligence counterparts on different traits associated with Manners.
The two school climates promote equal level of Initiative in high and low intelligence groups.
The high intelligence group was rated higher than their low intelligence counterparts on different traits associated with Initiative.

Sample

The research investigation was carried out on the students of class VII from two representative English medium schools of Chandigarh. The age of students ranged between 11 and 13 years. Fifty five percent of the subjects were boys and the others girls. The final sample comprised of 166 students with 84 students from a democratic and 82 from an authoritarian school. The selected students with high and low intelligence levels were randomly allocated to the Integrated System of Instruction and Traditional Instruction in equal proportion.
6.5 DESIGN OF THE STUDY
The present study employed three replications of the 2x2x2x2 - factorial designs combined with ANCOVA with four fixed variables of which the measures on one of them were repeated. One 2x2x2x2 - factorial design was computed by ANCOVA for the total scores. Here, instructional design (Integrated System of Instruction or Traditional Instruction) school climate (authoritarian or democratic), intelligence (high and low levels) and the levels of objectives (Knowledge and Comprehension levels) were the independent variables. Each one of these variables were studied at two levels. Attainment scores on total learning was the dependent variable.

The second 2x2x2x2 - factorial design was analyzed with help of ANCOVA for the scores on concept attainment. Here, the four independent variables were studied, viz., instructional design, school climate, intelligence (at levels mentioned above) and concept learning at two levels of objectives, viz., knowledge and comprehension levels. Attainment scores on concept learning was the dependent variable.

The third 2x2x2x2 - factorial design was computed with the help of ANCOVA on the scores in principle learning. This design comprised of the four independent variables viz., instructional design, school climate, intelligence (at levels specified above) and principle learning at the two levels of objectives, viz., knowledge and comprehension levels. The attainment scores on principle learning was the dependent variable.

6.6 TOOLS
The following tools were used for the purpose of data collection:

(i) Integrated System of Instruction.
(ii) Achievement Test.
(iii) Jalota's Group Test of General Mental Ability (GTGMA).
(iv) Halpin and Croft's Organizational Climate Description Questionnaire (OCDQ).
(v) Rating scales.

6.7 PROCEDURE
The experiment comprised of the two main stages:

(i) Selecting the experimental sample.
(ii) Conducting the experiment.
(i) **Selecting the experimental sample**

During this stage, the schools of the Union Territory of Chandigarh were identified on the basis of their organizational climates. Halpin and Croft’s OCDQ was administered to ten teachers during mid-September, 1984 in each of the fourteen English medium secondary schools of Chandigarh. The responses on the OCDQ were scored on the eight dimensions. The profiles were constructed for the fourteen schools on the basis of the standard scores on the eight dimensions of OCDQ. Thus, Government Model High School - Sector - 22 and Shivalik Public School - Chandigarh were identified as democratic and authoritarian schools respectively.

In order to select the experimental sample, Jalota's GTGMA was administered to 307 students of Class VII in November, 1984 from the two selected schools. One sub-group from the high scorers of the intelligence test and another from the low scorers was allotted to the ISI treatment and the similar matching group to the TI treatment. This plan of allocation was uniformly followed for the other school also.

(ii) **Conducting the experiment**

The experiment was conducted in the following five phases:

- Phase 1: Instructions for classroom climate.
- Phase 2: Administration of the Pre-Test.
- Phase 3: Instructional Program.
- Phase 4: Administration of the Post-Test.
- Phase 5: Administration of the Retention Test.

6.8 **RESULTS**

The results of the study have been given in the following paragraphs and all the findings pertain to a segment of science at the secondary level:

**Total Learning** (Sum total of scores at all levels of learning)

- The two instructional designs, Integrated System of Instruction and Traditional Instruction, differed in their effectiveness with respect to achievement scores, the Integrated System of Instruction group yielding better scores than the Traditional Instruction group.
- Authoritarian and democratic school climates do not differ with respect to the total achievement scores.
The high intelligence group performs much better than the low intelligence group on the achievement test.

Integrated System of Instruction and Traditional Instruction yield equal results with high and low intelligence groups.

Authoritarian and democratic school climates produce equal results for both high and low intelligence groups.

Integrated System of Instruction yields better results than Traditional Instruction with both the high and low intelligence groups in both the authoritarian and democratic school climates.

High and low intelligence groups performed better on items at knowledge than at comprehension level of objectives.

High intelligence group performed better than the corresponding low intelligence group at knowledge level than at comprehension level of objectives.

Through Integrated System of Instruction, high intelligence group performed equally well in authoritarian and democratic school climates.

Low intelligence group attained equal achievement scores in democratic and authoritarian school climate through Integrated System of Instruction.

Low intelligence group performed comparably with high intelligence group through Integrated System of Instruction in democratic school climate.

Students attained more scores at knowledge than at comprehension level of objectives.

The Integrated System of Instruction and Traditional Instruction yield equal scores at knowledge and at comprehension level of objectives.

High intelligence group attained more scores in authoritarian than in democratic school climate at both the knowledge and comprehension level of objectives.

Low intelligence group performed equally well in authoritarian as well as in democratic school climate at both knowledge and comprehension levels.

In democratic school climate, high intelligence group performed equally well at knowledge and comprehension levels.

In authoritarian school climate, high intelligence group exhibited better performance at comprehension level than low intelligence group at knowledge level.
The Integrated System of Instruction and Traditional Instruction yield comparable results in authoritarian and democratic school climates with high and low intelligence groups at knowledge and comprehension levels of objectives.

Concept Learning
- The Integrated System of Instruction yields better results than Traditional Instruction.
- The authoritarian and democratic school climates lead to comparable achievement scores for concept learning.
- For concept learning, the Integrated System of Instruction and Traditional Instruction yield equal achievement scores in democratic and authoritarian school climates with both high and low intelligence groups.
- Students attained concepts more at knowledge than at comprehension level.
- The Integrated System of Instruction and Traditional Instruction yielded equal scores on concept learning both at knowledge and comprehension levels.
- High and low intelligence groups achieved better at knowledge than at comprehension level on concept learning.
- On concept learning, the Integrated System of Instruction and Traditional Instruction yield comparable results in authoritarian and democratic school climates both for high and low intelligence groups.
- On concept learning at knowledge and comprehension levels, authoritarian and democratic school climates produce comparable results both for high and low intelligence groups separately.
- On concept learning, high and low intelligence groups attain equal scores through the Integrated System of Instruction at knowledge as well as comprehension levels.
- On concept learning at knowledge and comprehension levels, the Integrated System of Instruction and Traditional Instruction yield comparable results in democratic and authoritarian school climates with both high and low intelligence groups.
- High intelligence group attained concepts more than low intelligence group both at knowledge and comprehension levels.
Principle Learning

- The Integrated System of Instruction yielded better scores than Traditional Instruction on principle learning.

- Authoritarian and democratic school climates yield comparable results as measured by achievement scores on principle learning.

- The principle learning at knowledge level was superior to that at comprehension level.

- The Integrated System of Instruction both in democratic and authoritarian school climates yield equal scores for principle learning.

- In both the authoritarian and democratic school climates, groups taught through the Integrated System of Instruction attained more scores than those taught through Traditional Instruction.

- In principle learning, the Integrated System of Instruction yielded equal scores at knowledge and comprehension levels.

- The system's group attained more scores than Traditional Instruction group at knowledge and comprehension levels.

- Both in the democratic and authoritarian school climates, high intelligence group performed more than low intelligence group on principle learning at knowledge as well as comprehension levels.

- High intelligence group performed equally well on items of principle learning at knowledge and comprehension levels both in democratic and authoritarian school climates.

- Low intelligence group performed equally well on items of principle learning at knowledge and comprehension levels in both democratic and authoritarian school climates.

- On principle learning, high intelligence group attained more scores in authoritarian than in democratic school climate, whereas low intelligence group attained equal scores in the two climates at knowledge level.

- At comprehension level, both high and low intelligence groups attained on principle learning more in authoritarian than in democratic school climate.

- At comprehension level, high intelligence group learned principles better than low intelligence group in authoritarian school climate.

- Low intelligence group attained comparable scores in authoritarian and democratic school climates at the knowledge level on principle learning.

- Through the Integrated System of Instruction, high and low intelligence
groups learned principles equally well in authoritarian and democratic school climates.

- High intelligence group achieved more than the corresponding low intelligence group on principle learning through the Integrated System of Instruction in authoritarian school climate.

- Through the Integrated System of Instruction, high and low intelligence groups attained comparable scores on principle learning in democratic school climate.

- In authoritarian school climate, high intelligence group learned principles more through the Integrated System of Instruction than through Traditional Instruction.

- In authoritarian school climate, the low intelligence group learned principles better when taught through the Integrated System of Instruction than through Traditional Instruction.

- In democratic school climate, the Integrated System of Instruction yielded better results than Traditional Instruction with high as well as low intelligence groups on learning of principles.

- In principle learning, high and low intelligence groups exhibited comparable attainments in principle learning in democratic school climate.

- The Integrated System of Instruction and Traditional Instruction yielded comparable results in democratic and authoritarian school climates in principle learning at the knowledge and comprehension levels.

- High as well as low intelligence groups achieved equal scores through the Integrated System of Instruction and the Traditional Instruction at the knowledge and the comprehension levels.

Retention

- Retention is dependent upon intelligence. Both reminiscence and forgetting were exhibited more by the low intelligence group.

- Retention is exhibited more in the democratic than in the authoritarian school climate.

- Forgetting is exhibited more in authoritarian school climate.

- Retention is equally effective for learning at knowledge as well as at the comprehension level of objectives.

- Forgetting was exhibited more by the Integrated System of Instruction group.

- Reminiscence was exhibited more by the Traditional Instruction group.
Manners

- The traits associated with Manners, viz., Cheerful, Friendly, Frank, Altruist, Modest, Obedient, Responsible, Attentive and Tolerant were found to be unaffected by school climate. The trait, Disciplined was promoted better in authoritarian school climate and the trait sportsmanship spirit in democratic school climate as compared to their counter-climates.
- High intelligence group exhibited better Manners i.e., more Cheerful, Friendly, Frank, Altruist, Modest, Obedient, Responsible, Attentive, Tolerant, Disciplined and Sportsman spirit than low intelligence group.
- Authoritarian school climate promotes the differences between high and low intelligence groups whereas democratic school climate tends to reduce the same in respect of learning of Manners.
- Democratic school climate helps low intelligence group more than the corresponding high intelligence group for learning Manners.

Initiative

- The traits associated with Initiative, viz., Self-confident, Expressive, Active, Alert, Persistent, Integrity were found to be unaffected by the type of school climate.
- High intelligence group exhibits better Initiative, i.e., is more self-confident, Expressive, Active, Alert, Persistent and possess greater Integrity than low intelligence group.
- Authoritarian school climate promotes differences between high and low intelligence groups on traits of Initiative whereas democratic school climate helps the low intelligence group more than the corresponding high intelligence group for the development of Initiative.

6.9 EDUCATIONAL IMPLICATIONS OF THE FINDINGS:

The results of the study suggested that the systems approach to instructional design may be used to improve the performance of students in science at the secondary level. A special attention to the instructional designing for the low intelligence group should be paid to content sequence and arrangement of instructional activities. This may enable the low intelligence group to attain scores comparable to high intelligence group.

A democratically managed learning environment was found suitable for the basic learning of concepts and principles. But, as the content complexity increases,
authoritarian components, like, strict discipline are needed in order to produce a good level of performance both in high and low intelligence groups. Democracy in school management helps to create an environment of mutual faith and co-operation, but does not appear to exert any pressure for higher attainments in the learning of complex concepts or principles. Therefore, a blend of guided democratic ways with a tradition of discipline and hard work may help learners in advanced and complex learning.

As students in an authoritarian school climate exhibit greater forgetting, these schools may provide for sequential, cumulative learning and provide students with opportunities for application of newly learned content matter to enable greater retention. As Manners are learned and Initiative is developed more in democratic school climate than in authoritarian, teachers in their relationships with the students should allow some components of democratic environment to creep in.

6.10 SUGGESTIONS FOR FURTHER STUDY

1) The present study has been conducted only on a segment of science syllabus of N.C.E.R.T., more studies may be conducted on larger and larger portions of the total curriculum, in order to cross-validate the present findings.

2) Models of Integrated System of Instruction should be developed for other disciplines, like, Languages, Social Studies, etc. and the effect of different instructional materials on different types of learning should be studied.

3) More studies should cross-validate the interaction between school climate and non-intellectual personality variables, like, Manners and Initiative.

4) Transfer of learning from one situation to another is of utmost importance. Therefore, it may be studied in relationship with intelligence, different types of instructional systems and school climates.

5) Effect of other variables like, age, sex, personality type, may be studied on the model of Integrated System of Instruction.