CHAPTER VI

SUMMARY, CONCLUSIONS, EDUCATIONAL IMPLICATIONS AND FURTHER RESEARCH POSSIBILITIES
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Instructional strategies determine the approach a teacher uses to educate students and help them achieve their learning objectives. Instructional strategies are techniques teachers use to help students become independent, strategic learners. These strategies become learning strategies when students independently select the appropriate ones and use them effectively to accomplish tasks or meet goals.

The present investigation was an attempt to study the Effect of Modular and Multimedia Instructional Strategies on Achievement in relation to Cognitive Styles and Achievement Motivation at the Secondary Stage.

This chapter contains a summary of total investigation, the statement of the problem, objectives, hypotheses, sample, as well as design and tools used in the study. This chapter also includes the main findings of the present study, educational implications and suggestions for the further researches in this area.

6.1 STATEMENT OF THE PROBLEM
The proposed study may be precisely stated as under:

EFFECT OF MODULAR AND MULTIMEDIA INSTRUCTIONAL STRATEGIES ON ACHIEVEMENT IN RELATION TO COGNITIVE STYLES AND ACHIEVEMENT MOTIVATION AT THE SECONDARY STAGE

6.2 OBJECTIVES OF THE STUDY
The study was undertaken keeping in view the following objectives:
1. To find out the differences on Achievement of Field Independent and Field Dependent groups of students at the Secondary Stage.
2. To study the differences on Achievement of High and Low Achievement Motivation groups of students at the Secondary Stage.
3. To work out differences on Achievement of students taught through Modular and Multimedia Instructional Strategies and that of the Control group of students at the Secondary Stage.
4. To work out the interaction effect of the variables of Cognitive Styles and Achievement Motivation on Achievement of students at the Secondary Stage.
5. To study the interaction effect of the variables of Cognitive Styles and Instructional Strategies on Achievement of students at the Secondary Stage.
6. To find out the interaction effect of Achievement Motivation and Instructional Strategies on Achievement of students at the Secondary Stage.
7. To study the interaction effect of the variables of Cognitive Styles, Achievement Motivation, and Instructional Strategies on Achievement of students at the Secondary Stage.
8. To work out the intercorrelations among the variables of Cognitive Styles, Achievement Motivation, Instructional Strategies and Achievement of the Secondary Stage students.

6.3 HYPOTHESES OF THE STUDY

The study was conducted on the basis of following Hypotheses:

1. The Field Independent group of students will be significantly higher than that of the Field Dependent group of students in Achievement.
2. The students with High Achievement Motivation will be significantly higher in Achievement than that of the students with Low Achievement Motivation.
3. There will be no significant differences in the Achievement of students taught through Modular and Multimedia Instructional Strategies and that of the Control Group of students.
4. The interaction effect of the variables of Cognitive Styles and Achievement Motivation will yield significant results on Achievement.
5. The interaction effect of Cognitive Styles and Instructional Strategies on Achievement will be significant.
6. The interaction effect of Achievement Motivation and Instructional Strategies on Achievement will be significant.
7. There will be no significant interaction effect of the variables of Cognitive Styles, Achievement Motivation and Instructional Strategies on Achievement.

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8. The intercorrelations among the variables of Cognitive Styles, Achievement Motivation, Instructional Strategies and Achievement will be positive and significant.

6.4 DESIGN OF THE STUDY

For carrying out any kind of research, it is important to chalk out a design. According to Best (1963), all research involves the elements of observation, description and the analysis of what happens under certain circumstances. A systematic procedure is a must to collect the necessary data, which helps to attain the objectives and to test the hypotheses formulated for the study.

The present research was designed to study the effect of Modular and Multimedia Instructional Strategies on Achievement of students in relation to Cognitive Styles and Achievement Motivation. For the purpose of investigation, experimental method was employed in the form of pre-test and post-test factorial design by involving two experimental groups and one control group.

The study was experimental in nature in which (3 x 2 x 2) factorial design was used to find out the effect of independent variables (Instructional Strategies, Cognitive Styles and Achievement Motivation) on the dependent variable of Achievement. The three levels of Instructional Strategies and two levels of each of the variables of Cognitive Styles and Achievement Motivation given below:

a) Instructional Strategies (I)
   i.) Modular Instructional Strategies (I1)
   ii.) Multimedia Instructional Strategies (I2)
   iii.) Control Group - (No Teaching Io)

b) Cognitive Styles (C)
   i.) Field Independent (C1)
   ii.) Field Dependent (C2)

c) Achievement Motivation (A)
   i.) High Achievement Motivation (A1)
   ii.) Low Achievement Motivation (A2)
In the study Instructional Strategies remained the treatment variable. Cognitive Styles and Achievement Motivation were used as classifying variables and Achievement in English acted as dependent variable.

6.4.1 TREATMENT COMBINATIONS

The total number of different combinations came out to be $3 \times 2 \times 2 = 12$ as shown in Table:-6.1 below

<table>
<thead>
<tr>
<th>Groups I</th>
<th>Cognitive Styles C</th>
<th>Achievement Motivation A</th>
<th>Treatment Combination</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Experimental Group -I I1</strong></td>
<td>C1</td>
<td>A1</td>
<td>I1 C1 A1</td>
</tr>
<tr>
<td></td>
<td>C1</td>
<td>A2</td>
<td>I1 C1 A2</td>
</tr>
<tr>
<td></td>
<td>C2</td>
<td>A1</td>
<td>I1 C2 A1</td>
</tr>
<tr>
<td></td>
<td>C2</td>
<td>A2</td>
<td>I1 C2 A2</td>
</tr>
<tr>
<td><strong>Experimental Group -II I2</strong></td>
<td>C1</td>
<td>A1</td>
<td>I2 C1 A1</td>
</tr>
<tr>
<td></td>
<td>C1</td>
<td>A2</td>
<td>I2 C1 A2</td>
</tr>
<tr>
<td></td>
<td>C2</td>
<td>A1</td>
<td>I2 C2 A1</td>
</tr>
<tr>
<td></td>
<td>C2</td>
<td>A2</td>
<td>I2 C2 A2</td>
</tr>
<tr>
<td><strong>Control Group -III I0</strong></td>
<td>C1</td>
<td>A1</td>
<td>I0 C1 A1</td>
</tr>
<tr>
<td></td>
<td>C1</td>
<td>A2</td>
<td>I0 C1 A2</td>
</tr>
<tr>
<td></td>
<td>C2</td>
<td>A1</td>
<td>I0 C2 A1</td>
</tr>
<tr>
<td></td>
<td>C2</td>
<td>A2</td>
<td>I0 C2 A2</td>
</tr>
<tr>
<td><strong>Total Combinations</strong></td>
<td></td>
<td></td>
<td><strong>12</strong></td>
</tr>
</tbody>
</table>

The Treatment combinations are detailed below:-

1.) **I1 C1 A1** Modular Instructional Strategy with Field Independent and High Achievement Motivation.

2.) **I1 C1 A2** Modular Instructional Strategy with Field Independent and Low Achievement Motivation.
3.) I1 C2 A1 Modular Instructional Strategy with Field Dependent and High Achievement Motivation.
4.) I1 C2 A2 Modular Instructional Strategy with Field Dependent and Low Achievement Motivation.
5.) I2 C1 A1 Multimedia Instructional Strategy with Field Independent and High Achievement Motivation.
6.) I2 C1 A2 Multimedia Instructional Strategy with Field Independent and Low Achievement Motivation.
7.) I2 C2 A1 Multimedia Instructional Strategy with Field Dependent and High Achievement Motivation.
8.) I2 C2 A2 Multimedia Instructional Strategy with Field Dependent and Low Achievement Motivation.
9.) I6 C1 A1 Control Group with Field Independent and High Achievement Motivation.
10.) I6 C1 A2 Control Group with Field Independent and Low Achievement Motivation.
11.) I6 C2 A1 Control Group with Field Dependent and High Achievement Motivation.
12.) I6 C2 A2 Control Group with Field Dependent and Low Achievement Motivation.

6.5 SAMPLE OF THE STUDY

A sample pool of 500 students was drawn from the students of class IX of C.B.S.E. affiliated schools of Chandigarh. It consisted of both male and female students. The sample was random in nature and the technique of multistage sampling was employed to carve out the treatment combinations as per requirements of 3 x 2 x 2 factorial design described under the caption 6.1.

The sample was selected with an assumption that the "other things being equal, the larger the sample, the greater the precision and accuracy of the data" (Mouly, 1964).
In the first stage, 5 schools were randomly selected out of the total number of Secondary and Senior Secondary Schools of Chandigarh.

In the second stage, the tool of Cognitive Styles was administered to the students and two groups belonging to field independent and field dependent categories were formulated in accordance with Kelly’s (1939) consideration of taking up Top and Bottom 27% groups.

In the third stage, the tool of Achievement Motivation was administered and two groups (High and Low Achievement Motivation) were formulated on the basis Kelly’s (1939) consideration given above.

Thus four treatment groups were formed. Each of the four groups mentioned in the stage three above was further distributed into three equal groups (Two Experimental Groups and One control Group).

The sample size consisted of 12 students in each group. Thus in twelve groups of the sample for application of ANOVA will be 144 (12*12) cases were selected.

For Intercorrelation, the entire sample of 500 students was taken into consideration for computing relationship among the variables of Cognitive Styles, Achievement Motivation, Instructional Strategies and Achievement.

6.6 TOOLS USED

Selection of tools was done keeping in mind the relevance of tools in accordance with the objectives of the study, the reliability, validity and norms of tools. The following tools were used to conduct the present study:

1. Group Embedded Figure Test (GEFT) by Philip, I., K. Ottman, Evelyn R. and Herman, A. Witkin (1971) was used to identify the Cognitive Style of the students.
2. Achievement Motivation (n-Ach) Scale by Deo, P. and Mohan, A. (1985) to test the Achievement Motivation.
3. Modular and Multimedia Instructional Strategies (Developed by the Investigator)
4. Achievement Test (Developed by the Investigator)
6.7 PROCEDURE OF THE STUDY

The Study was conducted in four phases. The following procedure was adopted for each topic to conduct the experiment.

Phase: I
- Cognitive Styles and Achievement Motivation Scale were administered to the sample strictly in accordance to the instructions given in the respective manuals.
- Achievement Test as Pre Test was administered to the students to explore their entering behaviour.

Phase: II
- The students were randomly distributed into two Experimental Groups and one Control Group for treatment on the basis of Instructional Strategies in the respective groups as given below:
  i) Experimental Group: - I Taught through Modular Instructional Strategy (I1)
  ii) Experimental Group: - II Taught through Multimedia Instructional Strategy (I2)
  iii) Control Group: - III No Teaching (Mo)
- The teaching was carried out for a period of 4 weeks (5 periods per week, 2 periods per day). Teaching for one period for each of the two Experimental Groups was done in each of the sampling schools.

Phase: III
After the Teaching Programme of 4-weeks, again same Achievement Test (as Post Test) was administered to the students of two treatment groups and one control group to get a measure of their final Achievement. The answer sheets were scored with the help of scoring key. The time limit for test was 1 Hour and 30 Minutes.

Phase: IV
The data were statistically analysed, interpreted and discussed in the context of the hypotheses of the study and the prior fund of research work.
6.8 STATISTICAL ANALYSIS OF THE DATA

The data were subjected to statistical analysis through descriptive and inferential statistics by using SPSS software. Keeping in view the objectives, design and nature of data following statistical techniques were employed to analyse the data.

- Descriptive statistics such as measures of mean, median, mode, standard deviation and dispersion were used to study the nature and distribution of data. Kurtosis and skewness were computed to find out the normality of distribution.
- Three way analysis of variance on gain scores was computed to find out main effects and interaction effects of the independent variables on the dependent variable. Wherever F-ratios were found to be significant, t-ratios were computed to find out the significance of difference between means of pre test scores and post test scores.
- Pearson’s r was computed to find out the intercorrelation among the variables.

6.9 CONCLUSIONS

On the basis of analysis of data and discussion of results, the hypotheses were tested and verified. Efforts were made to draw useful conclusions. The results already arrived by the various studies directly or indirectly related to the present study were also compared with the results of the present study to make it more meaningful. The conclusions of the study are as follows:

- The Field Independent group of students has higher Achievement than that of the Field Dependent group of students.
- High Achievement Motivation group of students exhibits higher Achievement than that of the Low Achievement Motivation group of students.
- The Achievement of the group taught through Multimedia Instructional Strategy (I2) is better than that of the group taught through Modular Instructional Strategy (I1) and also that of the Control Group (I0).
- The Achievement of the group taught through Modular Instructional Strategy (I1) is higher than that of that of the Control Group (I0).
- The interaction effect of Cognitive Styles and Achievement Motivation (C x A) was significant on the Achievement of Students. This reveals the results detailed below:

* Field Independent Group of students with High Achievement Motivation (C1 A1) exhibits higher Achievement than that of Field Independent Group of Students with Low Achievement Motivation (C1 A2).

* Field Independent Group of students with High Achievement Motivation (C1 A1) reveals higher Achievement than that of Field Dependent Group of Students with High Achievement Motivation (C2 A1).

* Field Independent Group with High Achievement Motivation (C1 A1) exhibits higher Achievement than that of Field Dependent Group with Low Achievement Motivation (C2 A2).

* Field Dependent Group of students with High Achievement Motivation (C2 A1) and Field Independent Group of Students with Low Achievement Motivation (C1 Io) show no significant differences on Achievement.

* Field Independent Group of students with Low Achievement Motivation (C1 A2) reveals higher Achievement than that of Field Dependent Group of Students with Low Achievement Motivation (C2 A2).

* Field Dependent Group of students with High Achievement Motivation (C2 A1) shows higher Achievement than that of Field Dependent Group of Students with Low Achievement Motivation (C2 A2).

- The interaction effect of Cognitive Styles and Instructional Strategies (C x I) was significant on the Achievement of students. This shows the following results:

* Field Independent Group of students with Modular Instructional Strategy (C1 I1) reveals higher Achievement than that Field Independent Group of students with Multimedia Instructional Strategy (C1 I2).

* Field Independent Group of students with Modular Instructional Strategy (C1 I1) exhibits higher Achievement than that of Field Independent Group of students with Control Group (C1 Io).
* Field Independent Group of students with Modular Instructional Strategy (C1 Ii) and Field Dependent Group of students with Modular Instructional Strategy (C2 Ii) reveal no significant differences on Achievement.

* Field Independent Group of students with Modular Instructional Strategy (C1 Ii) shows higher Achievement than that of Field Dependent Group of students with Multimedia Instructional Strategy (C2 I2).

* Field Independent Group of students with Modular Instructional Strategy (C1 Ii) exhibits higher Achievement than that of Field Dependent Group of students with Control Group (C2 I0).

* Field Independent Group of students with Multimedia Instructional Strategy (C1 I2) reveals higher Achievement than that of Field Independent Group of students with Control Group (C1 I0).

* Field Independent Group of students with Multimedia Instructional Strategy (C1 I2) and Field Dependent Group of students with Modular Instructional Strategy (C2 Ii) show no significant differences on Achievement.

* Field Independent Group of students with Multimedia Instructional Strategy (C1 I2) exhibits higher Achievement than that of Field Dependent Group of students with Multimedia Instructional Strategy (C2 I2).

* Field Independent Group of students with Multimedia Instructional Strategy (C1 I2) exhibits higher Achievement than that of Field Dependent Group of students with Control Group (C2 I0).

* Field Dependent Group of students with Modular Instructional Strategy (C2 Ii) reveals higher Achievement than that of Field Independent Group of students with Control Group (C1 I0).

* Field Dependent Group of students with Multimedia Instructional Strategy (C2 I2) exhibits higher Achievement than that of Field Independent Group of students with Control Group (C1 I0).

* Field Dependent Group of students with Control Group (C1 I0) shows higher Achievement than that of Field Dependent Group of students with Control Group (C2 I0).

* Field Dependent Group of students with Modular Instructional Strategy (C2 Ii) exhibits higher Achievement than that of Field Dependent Group of students with Multimedia Instructional Strategy (C2 I2).
* Field Dependent Group of students with Modular Instructional Strategy (C2 Ii) reveals higher Achievement than that of Field Dependent Group of students with Control Group (C2 Io).

* Field Dependent Group of students with Multimedia Instructional Strategy (C2 I2) exhibits higher Achievement than that of Field Dependent Group of students with Control Group (C2 Io).

* The interaction effect of Achievement Motivation and Instructional Strategies (A x I) was significant on the Achievement of students. This reveals the results detailed below:

* High Achievement Motivation Group of students with Multimedia Instructional Strategy (Ai I2) exhibits higher Achievement than that of High Achievement Motivation Group of students with Modular Instructional Strategy Group (Ai Ii).

* High Achievement Motivation Group of students with Modular Instructional Strategy (Ai Ii) reveals higher Achievement than that of High Achievement Motivation Group of students with Control Group (Ai Io).

* High Achievement Motivation Group of students with Modular Instructional Strategy (Ai Ii) and Low Achievement Motivation Group of students with Modular Instructional Strategy (A2 Ii) show no significant differences on Achievement.

* Low Achievement Motivation Group of students with Multimedia Instructional Strategy (A2 I2) exhibits higher Achievement than that of High Achievement Motivation Group of students with Modular Instructional Strategy (A1 Ii).

* High Achievement Motivation Group of students with Modular Instructional Strategy (A1 Ii) reveals higher Achievement than that of Low Achievement Motivation Group of students with Control Group (A2 Io).

* High Achievement Motivation Group of students with Multimedia Instructional Strategy (A1 I2) exhibits higher Achievement than that of High Achievement Motivation Group of students with Control Group (A1 Io).
* High Achievement Motivation Group of students with Multimedia Instructional Strategy (A1 I2) shows higher Achievement than that of Low Achievement Motivation of students with Modular Instructional Strategy (A2 I1).

* High Achievement Motivation Group of students with Multimedia Instructional Strategy (A1 I2) and Low Achievement Motivation Group of students with Multimedia Instructional Strategy (A2 I2) reveal no significant differences on Achievement.

* High Achievement Motivation Group of students with Multimedia Instructional Strategy (A1 I2) shows higher Achievement than that of Low Achievement Motivation Group of students with Control Group (A2 I0).

* Low Achievement Motivation Group of students with Modular Instructional Strategy (A2 I1) exhibits higher Achievement than that of High Achievement Motivation Group of students with Control Group (A1 I0).

* Low Achievement Motivation Group of students with Multimedia Instructional Strategy (A2 I2) reveals higher Achievement than that of High Achievement Motivation Group of students with Control Group (A1 I0).

* Low Achievement Motivation Group of students with Control Group (A1 I0) and Low Achievement Motivation Group of students with Control Group (A2 I0) show no significant differences on Achievement.

* Low Achievement Motivation Group of students with Multimedia Instructional Strategy (A2 I2) exhibits higher Achievement than that of Low Achievement Motivation Group of students with Modular Instructional Strategy (A2 I1).

* Low Achievement Motivation Group of students with Modular Instructional Strategy (A2 I1) exhibits higher Achievement than that of Low Achievement Motivation Group of students with Control Group (A2 I0).

* Low Achievement Motivation Group of students with Multimedia Instructional Strategy (A2 I2) reveals higher Achievement than that of Low Achievement Motivation Group of students with Control Group (A2 I0).

- The Triple interaction effect of Cognitive Styles, Achievement Motivation and Instructional Strategies (C x A x I) was not significant on the Achievement of students.
- There was a positive and significant correlation between:
  * Cognitive Styles and Achievement Motivation
  * Cognitive Styles and Instructional Strategies
  * Cognitive Styles and Achievement
  * Achievement Motivation and Instructional Strategies
  * Achievement Motivation and Achievement
  * Instructional Strategies and Achievement

6.10 EDUCATIONAL IMPLICATIONS

The findings of the present study are not only useful to researchers in terms of further research but they will also have application to the classroom practices and organizational management of schools. The conclusions of this study may also help the teachers, parents, guidance workers to identify the low achievers, diagnose their problems and provide guidance to improve their performance.

The findings of this study have wide implications of applying Modular and Multimedia Instructional Strategies in quick and better Achievement of the concepts of English Grammar, and other school subjects. With the rapid advancement in the field of both educational and instructional technology in recent years, Modular and Multimedia Instructional Strategies based teaching along with the usual classroom instruction has opened new possibilities for meeting the new educational needs of the contemporary society. Modular and Multimedia Instructional Strategies have an enormous prospective to be used as alternative instructional strategies for Indian classrooms.

Thoughtfully designed Instructional Strategies have immense potential of motivating learners by gaining their attention, increasing their perception, enhancing their comprehension skills and eventually resulting into greater achievement as compared to that of traditional method of teaching not only in English Grammar but also in other School Subjects viz. Social Studies, Mathematics, Science, and Information Technology etc.
Modular and Multimedia Instructional Strategies have an edge over Traditional Methods of Teaching in view of the fact that they have equipped the teachers with the tools, the integration of which can help them gain and hold attention of students, make points clearer, inspire discussion, and in general, enhance the learning process.

These Instructional Strategies allow the educators to present more information, more examples, Illustrations, and problems for students to solve than through the conventional instructional method, thus facilitating their conceptual understanding of the school subjects.

The results of the present study can benefit educators, administrators and instructional designers who can incorporate Modular and Multimedia Instructional Strategies in school curriculum that can prove to be effective teaching and learning strategies in the in diverse subject areas.

It is also suggested that while developing Modular and Multimedia Instructional Strategies in English Grammar or other school subjects, levels of Cognitive Style and Achievement Motivation of students should be kept in mind so that the needs of both Field Independent and Field Dependent and High and Low Achievement Motivation of students must be fulfilled.

The teachers’ will be benefited by the results of the study since there is a positive and significant relationship among the variables of Cognitive Styles, Achievement Motivation and Achievement.

The implications of these results will encourage the teacher to turn the Achievement of the students in the context of their Cognitive Styles and Achievement Motivation in various school subjects.

6.11 SUGGESTIONS FOR FURTHER STUDY

Having completed the present study, the investigator has put up the following suggestions for further study:

- The present study is limited to preparation and validation of two Instructional Strategies (Modular and Multimedia) for secondary school students. A Study may be conducted with some other types of Teaching
Strategies, like C.A.I, digital and smart class rooms learning, e. content and mobile learning etc.

* Studies may be conducted on the technological competencies of teachers who handle different gadgets such as OHP, C.A.I Slides, Film Projectors etc., and how the teachers teach with the amount and specification of technologies available in different schools.

* The present study may be replicated by involving different school subjects at the secondary level.

* The present study may be replicated on a large sample even from other States of India to ensure wider application in order to get better understanding of the relationships of these variables.

* The study may be replicated on the learners of different streams from the schools, colleges and the universities.

* The present study was confined only to two levels of each of the independent variables of Cognitive Styles and Achievement Motivation and three levels of Instructional Strategies. It may be conducted with other independent variables like, Creative Thinking, Self Concept, Problem Solving Ability and Locus of Control etc.

* The study may be replicated in the field of special education to enrich the learning of special students.