CHAPTER - I

INTRODUCTION

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ORIGIN AND SELECTION OF THE PROBLEM

The individualization of learning has been and is still considered as one of the most important pedagogical problems. Learning effectiveness is not only a function of intellectual and personality characteristics of the learner but also of the instructional treatment mode to which the learner is exposed (Robins and Abrahamsen, 1971; Cronbach, 1967; Jensen, 1967). Individualization of learning would, therefore, consist in changing the instructional treatment modes in accordance with the intellectual and personality characteristics of the learner (Gagne, 1971; Jensen, 1967, 1968 and Glaser, 1967). Cronbach (1967) also suggests, "most adequate way open with individual differences in the schools might be to alter the instructional methods to fit the aptitude pattern of the learner". The implicit assumption is that learning results can not be explained by looking only at the intellectual and personality characteristics of the learner. The effect of learning must rather be interpreted as the results of interaction between intellectual and personality characteristics of the learner and specific features of instructional treatment modes (Heidt, 1976). Given a common set of objectives, a method may provide optimal achievement for learners with certain characteristics whereas the other may do so for learners with certain other characteristics. Consequently, a greater proportion of
learners would get optimal achievement when students with differing intellectual and personality characteristics will receive instructions with instructional treatment modes suited to them. Therefore, there is a need to study the interaction between intellectual and personality characteristics of the learner and specific features of the instructional treatment modes. Cronbach (1957) also writes,

Psychologists should combine their interests and methods to observe experimental effects for the subjects of different characteristics and to conduct investigations to find out the relationship between experimental treatment and individual difference variables, so that maximum profit can be gained in terms of achievement.

"Researches concerned with the interaction between instructional treatment modes and learner characteristics have been termed as Aptitude-Treatment Interaction (ATI) studies. Following, Cronbach and Snow (1969), aptitude can be defined as, "Any characteristics of the individual that increases (or impairs) his probability of success in a given treatment" and treatment as, "variations in the pace and style of instruction" (p.7). Tobias (1969), however, is of the view that there is a close identification between the term 'aptitude' and 'intellectual abilities' and the definition of the ATI construct is much wider than intellectual characteristics alone, a more accurate name for research in this area would be 'Attribute-treatment
Interaction' (ATT). More recently, Heidt (1976) and Berliner and Cohen (1973) have suggested the name as 'Trait-Treatment Interaction (T.T.I.)' for this type of research. The present investigator, however, believes that the term 'trait' is generally associated with personality characteristics and thus does not seem to be sufficiently comprehensive. Tobias (1976) also writes,

"The trait term in TTI has different connotations that may be equally disfunctional. Trait usually suggests a stable predispositions not infrequently in the personality domain, relatively unchanging over short periods of time."

Therefore, the term 'attribute' in ATI research seems to very appropriate because it includes all the characteristics of the learner—personality, intellectual, motivational which have long been established as influencing achievement through different instructional treatments. The term 'Attribute-Treatment Interaction' or simply ATI would, therefore, be used for this type of research in the present investigation.

The Attribute-Treatment Interaction (ATT) research is of relatively recent origin (Tobias, 1976) but has tremendous potential for improving educational practices. Quite a few well designed research have been conducted in the area. These researches have attempted to explore the relationship between variety of learner attributes and
instructional treatments.

The attributes that have, generally, been investigated are:


(b) Creativity or Divergent Thinking Ability - Stolurow, 1964; Doty and Doty, 1964; Tobias, 1969.


(f) Neuroticism - Socher, 1966; Crocker and others, 1976; Seddon, 1977.

(g) Achievement Motivation or Need Achievement - McKeachie, 1963; Kight and Sarsenrath, 1966, Doty and Doty, 1964.

Some attempts have also been made to study the relationship between attributes like study habit (Patel, 1978), independence (McCollough and Vanattai, 1958), sociability (Beach, 1960) and the instructional treatment modes.
The instructional treatments generally studied are: traditional method, demonstration method, group study methods, self-instructional methods like various styles of programming, individually prescribed instruction, and computer-assisted instruction.

A review of ATI researches conducted by Burton (1964), Bracht (1970), Kapadia (1972), Berliner and Cohen (1973) and the present investigators (Chapter II), reveals that the results of these studies are quite often contradictory and inconsistent. For example, Stolurov (1964) obtained a positive relationship between scores on creativity test and achievement through programmed instruction but Gortkin and Massa (1963) concluded that less creative students make significantly greater achievement using programmed instruction than do highly creative ones. Similarly Stolurov (1964) and Bhushan and Sharma (1975) found that scores on intelligence test do not correlate significantly with achievement scores based on programmed instruction, but others have concluded contrariwise (Shay, 1961; Keisler and Stern, 1970; Nagar, 1970; Kapadia, 1972). The contradictory and inconsistent findings of the ATI studies may in part be attributed to inappropriate selection of instructional treatment modes. The instructional treatment modes employed in these studies, differ in most cases, only in minor details and may not require very different attribute
patterns for learning effectiveness through them. After a review of ATI research, Tobias (1975) also writes,

In such studies both the attribute dimension and instructional treatments have not been as carefully thought out as they might be. For example, the alternative instructional treatments, the inputs have often differed from one another in only minor details and the input differences may not have engaged different abilities and hence are unlikely to interact with aptitude dimensions.

Therefore, for satisfactory results the ATI studies should employ instructional treatments which required widely different learner attributes for success through them. Sheehan and Hambleton (1977) also support this view. They write, "To substantiate interaction, future ATI studies will have to utilize treatments which are known to require different psychological processes".

Inconsistent results of some ATI researches may also be attributed to the subject matter variability. Different subject matter areas may require differing instructional treatments for learners possessing similar characteristics. Thus ATI results obtained for one subject matter area may not be equally applicable to another area (Suthall, 1968; Tallmadge and Shearer, 1969; Tobias, 1969). Tallmadge and Shearer (1969), for example, obtained a triple interaction between instructional treatments, subject matters and learner attributes. Thus learner for whom an inductive method was optimal for one subject matter achieved better
through a deductive approach in a different subject matter area. These results suggest that ATI's may be highly specific and may vary with subject matter areas.

The lack of consistent relationship may also be attributed to inadequate research design of these studies. Variables other than those under investigation may have affected achievement, which should have been controlled for dependable conclusion. Most of the ATI studies thus seem to suffer from improper selection of instructional treatment modes, unsuitable subject matter areas and inadequate controls. For dependable results, future ATI studies should, therefore, take care of these shortcomings. The present investigation is an attempt in this direction.

A variety of learner attributes, can be employed for ATI research. A review of related studies reveals that attributes such as intelligence or mental age (Keisler and Stern, 1970; Kapadia, 1972), creativity or divergent thinking ability (Rechard, Jason and Narwin, 1969; Tobias, 1969), anxiety (Leith, 1969; Tobias and Williamson, 1968) and introversion/extroversion (Leith, 1969; Leith and Wisdom, 1970; Greer, 1976) are important for achievement. The present study, therefore, proposes to employ mental ability variables like intelligence and creativity or divergent thinking ability and personality variables like anxiety and introversion/extroversion for studying interaction
effects. The achievement prior to instruction, which has come out as very important variable which influences achievement after instruction in most of the investigations (Tobias, 1976) is proposed to be employed as a control variable in the present study.

A review of researches also shows that significant interaction effect have not been revealed in number of studies because they have employed instructional treatment modes which may not require the learner attributes employed for success in them. The present study therefore, proposes to employ the treatment modes which seem to require different mental ability and personality variables - intelligence, creativity, anxiety and extroversion / introversion - employed in the present study. There is a strong rationale for interaction between these learner attributes and achievement via programmed instruction. A number of investigators such as Nigst and Sarsenrath (1966), O’neil and Ripple (1967) and Leith (1969) have presented strong arguments for expecting anxious and introvert subjects to profit more from programmed instruction as compared to less anxious and extrovert subjects. Programmed format removes personal evaluation from the learning situation, reduces the difficulty of the subject matter, and decreases the amount of uncertainty a pupil experiences making it eminently suitable for anxious and introvert subjects.
There is sufficient evidence to show that different programmed instructional styles require different intelligence and creativity levels for success through them (Reed and Hayman, 1962; Doty and Doty, 1964; Kapadia, 1972; Singh, 1977; Agarwal, 1978). The present study, therefore, proposes to employ programmed instruction - linear and branching styles and expository method for this purpose.

Tallmadge and Shearer's (1969) observation, that a particular attribute or pattern of attributes is not equally important in the instruction of different subject matter areas seems to be important. A variety of subject matter can be employed for investigating the ATI effects. In studies like the present one it may not be possible to employ more than one such subject matter areas because of limitations of time and resources. The subject matter areas selected for this purpose should suit the instructional treatment modes and the learner characteristics employed in the study. Statistics because of its well defined and sequential steps seems to be eminently suitable for programmed learning styles. Studies employing statistics and mathematics as the subject matter areas have shown sufficient interaction with learner attributes proposed to be employed in the present study. The present study therefore, proposes to employ statistics or more specifically
"measures of central tendencies" as the subject matter area.

In specific terms the present study proposes to investigate the relationship between personality variables like anxiety and extraversion/introversion and mental ability variables like intelligence and creativity and achievement through linear and branching styles of programming and expository method of teaching, "measures of central tendencies" a topic of high school statistics course has been employed as subject matter area. The achievement prior to instruction and intelligence is proposed to be employed as a control variables.

HYPOTHESES:

In order to investigate the relationship the study proposes to test the following hypotheses:

1. The achievement of high intelligence students will differ significantly from that of low intelligence students, employing either linear or branching style of programming or expository method of teaching.

2. The achievement of high creative students will differ significantly from that of low creative ones employing either linear or branching styles of programming or expository method of teaching.

3. The achievement of high anxiety students will differ significantly from that of low anxiety students.
employing either linear or branching styles of programming or expository method of teaching.

4. The achievement of extrovert students will differ significantly from that of introvert students employing either linear or branching style of programming or expository method of teaching.

PROCEDURE IN OUTLINE:

1. Two programmes - linear and branching on measures of central tendencies (statistics) suitable for high school students of the board of high school and intermediate education, U.P., were developed and validated. A pretest consisting of items for measuring entry level and terminal behaviours and a post test consisting of only items measuring terminal behaviours were also constructed.

2. Suitable measures of the personality and mental ability variables proposed to be employed in the present study were selected. These measures are:
   (a) Mixed Type Group Test of Intelligence by P.N. Mehrotra.
   (b) Verbal Test of Creative Thinking by Baqar Mehdi.
   (c) Hindi Version of Eshynok's Modaley Personality Inventory by S.D. Kapoor and S.Jalota for measurement of extraversion.
   (d) Sarason's General Anxiety Scale for Children.

3. Previous achievement in maths as measured by Junior
Highschool marks in mathematics and intelligence are proposed to be employed as control variables. The marks obtained by the students comprising the present study in mathematics at the Junior Highschool stage were collected.

4. The sample of the study consisted of 267 students studying in class IXth of three urban Intermediate Colleges of Uttar Pradesh. The different measures of personality and mental ability were administered to these students. Pretest was then administered to ensure that the subjects possessed the required entry level behaviours and do not possess any of the behaviours which are proposed to be taught.

5. Three groups of students from each of the above three schools were taught separately by linear and branching style of programming and expository methods of teaching. The post test was administered after the instructional programme. The post test scores served as criterion measure.

6. The personality and mental ability and the criterion scores of the students from three institutions taught through each of the treatment modes were pooled separately. Thus three groups were constituted. Each taught by one of the treatment modes. Each group was than divided into
high and low groups on the basis of personality and mental ability scores.

7. Comparisons were made between the high as well as low groups on any personality or mental ability variable taught by the three treatment modes to ensure that the groups were matched. Comparisons were also made between the groups high or low on each variable to find that significant differences existed.

8. Means of criterion scores obtained by students high and low on each personality and mental ability variable taught through three treatment modes were adjusted for previous achievement in mathematics and intelligence by means of analysis of covariance. Comparisons of these adjusted means were made for different pairs of treatment modes for assigning treatment modes for optimal achievement.

DELIMITATIONS:

In view of the paucity of time and resources, the study has been delimited as follows:

1. The study is confined to the male students studying in IXth class of three urban Intermediate colleges of western Uttar Pradesh. The extent to which the findings may be considered applicable to other situations will depend upon the similarity between the sample under study.
2. A variety of personality and mental ability variables may be employed for studying interaction effects. The present study has employed only two personality (anxiety and extraversion) and two mental ability variables (intelligence and creativity) for this purpose as they were considered suitable for the instructional treatment modes selected for the present study.

3. A variety of instructional treatment modes can be employed for studying interaction effects. The present study has employed only linear and branching styles of programming and expository method of teaching as instructional treatment modes because they seem to require different mental ability and personality variables - intelligence, creativity, anxiety and extraversion - for success through them.

4. The present study has attempted to investigate the interaction between some measures of mental ability and personality and three instructional treatment modes in only one subject matter area i.e. statistics. This area was selected because it was considered suitable for the instructional treatment modes and the learner attributes proposed to be investigated in the present study.

5. A variety of statistical treatments have been employed in related research. They includes - computation of
coefficient of correlation, partial correlation, analysis of variance and analysis of covariance. The present study has employed analysis of covariance for this purpose, specially because it helps to eliminate statistically the effects of extraneous variables which might influence interaction. This technique also allows the comparison of extreme groups on any personality or mental ability variable so that alternative instructional treatment modes may be assigned for optimal achievement.
REFERENCES:


