C H A P T E R I

INTRODUCTION

1.00 RATIONALE OF THE STUDY

The present study entitled "Relationship Between Patterns of Teacher Classroom Behaviour and Pupils' Attainment in terms of Instructional Objectives" has its genesis and rationale in terms of main three reasons.

Firstly, the important area of research on teacher effectiveness has not been given due place in the past, may be on account of methodological difficulties of quantifying teacher behaviour in experimental conditions or because of conceptual difficulties.

Flanders and Simon (1969) have defined teacher effectiveness as "..... an area of research which is concerned with relationships between the characteristics of teachers, teaching acts, and their effects on the educational outcomes of classroom teaching". This definition of teacher effectiveness implies two sets of variables for study. One set of variables relates to 'teacher', the other to 'pupils'. The main concern of

researchers in this area has been to find out the correlates of good teaching in terms of characteristics of teachers - their personality, qualifications, experience, and the way they teach-effective methods of teaching behaviour in terms of amount of teacher-pupil participation etc. The criterion of good teaching has been the gain in pupil achievement as a result of these characteristics or teaching acts.

Morsh and Wilder (1954) reviewed the research in this area for the years 1900 to 1952 and came to a conclusion that no single, specific, observable teacher act has yet been found whose frequency or per cent of occurrence is invariably and significantly correlated with student achievement. However, the scene is changing from a pessimistic to an optimistic one. Flanders and Simon (1969) comment on this change of scene as follows:

> In the past decade, however, research has began to relate certain teacher behaviours to specific consequences in the climate of the classroom and in the academic achievement of pupils. The shift has been from subjective evaluation to a more objective counting of teacher-pupil interaction, using more sophisticated observational systems.(Flanders and Simon, 1969, p. 1423)

Here, Flanders and Simon (1969) have spotlighted the use of systematic observation as a means to study variables of teacher effectiveness. Though, the basic variables involved in the study have been the same - the teacher

variables and pupil variables, and still today it is a question of studying the same relationship. The change has come in terms of the way this relationship is to be studied.

Recently, a number of research reviews of such studies as using observational systems to study classroom interaction and teaching effectiveness are being published. They are an evidence of the growing consciousness towards studying classroom teaching systematically and establishing a rationale for the teacher education programmes. The times are gone when a teacher educator or a researcher was satisfied with the theories of learning as a basis for teaching. At present, it is a question of developing a theory of teaching to describe and analyze teaching. Gage (1964) comments, "Farmers need to know more than how plants grow. Mechanics need to know more than how a machine works. Physicians need to know more than how body functions. Teachers need to know more than how a pupil learns". He has expressed a dissatisfaction with the learning theories as a sole basis for training in teaching. The educational psychology courses are full of learning theories, psychology of individual differences and such other themes. But they hardly say a word about psychology of teaching. There are courses on teaching methods but how can a teacher use them to facilitate learning, no rationale is forwarded. This may be the reason for the

failure of research on teaching methods. Bloom (1966) wrote that research on teaching methods has shown most of the methods to be almost equally effective. One implication of this view point is that the correlates of teacher effectiveness cannot be studied by studying teaching methods or one should change the approach through which this variable has been studied so far. One reason for failure in this direction might be traced to the assumption underlying the study of teaching in the last few decades. Highet (1955) wrote,

> ..... because I believe that teaching is an art, not a science, it seems to me very dangerous to apply the aims and methods of science to human beings as individuals, although a statistical principle can often be used to explain their behaviour in large groups and a scientific diagnosis of their physical structure is valuable..... Of course, it is necessary for any teacher to be orderly in planning his work and precise in his dealing with facts. But that does not make teaching 'scientific'. (Highet, 1955,pp.vii-viii)

For those researchers who based their researches on this assumption, knowledge about the learners and learning process was sufficient and they did not attempt to study teaching systematically. But it has not resulted into any fruitful results. Bruner (1964) describes the nature of learning theories and also the nature of would be theories of instruction. He says,

> ..... theories of learning and development are descriptive rather than prescriptive. They tell us what happened after the fact: for example, that most children of six do not yet possess the notion of reversibility. A theory of instruction, on the other hand, might attempt to set forth the best means of leading the child towards the notion of reversibility. A theory of instruction, in short, is concerned with how best to learn, what one wishes to teach, with improving rather than describing learning. (Bruner, 1964, p. 307)

The improvement of learning requires not only the knowledge about learners, learning process but also about teachers and teaching process.

The present study is an offshoot of such thinking. It is based on the assumption that teaching can be studied scientifically. The basic thesis involved is, as Morrison and Mcintyre (1969) put it, "..... given adequate theoretical models and techniques of assessment, many aspects of teaching can be described in ways which lead to a better appreciation of current practice, and of how, in some respects, it might be improved".

The second reason is that the study has another important and novel characteristic of exploring the criterion variable of achievement in terms of instructional objectives. Bloom et al. (1956, 1964) have given a new turn to study the domain of achievement by publishing their monumental work, 'Taxonomy of Educational Objectives" in two parts - cognitive domain and affective

domain. So far the research studies, in general, dealt with achievement as a global construct or at the most subjectwise analytic outlook (treatment) of achievement. Bloom (1956) has given a lead to treat achievement in school subjects in a systematic and analytic way. The cognitive domain has been classified, mainly, into two parts - knowledge, and intellectual abilities and skills. The intellectual abilities and skills have further been divided into five sub-parts, namely, comprehension, application, analysis, synthesis and evaluation. Similarly, Bloom et al. (1964) have analysed the affective domain. The affective domain implies such objectives which are concerned with interests, appreciation, values and emotional tendencies. The school curriculum envisages both types of objectives. The development of interests, appreciation and values are long term in nature as compared to objectives in the cognitive domain. For experimental purposes it is difficult to measure objectives in affective domain with great accuracy as it is difficult to ascribe them to the effect of a fifteen or twenty minute lesson. Moreover, it is the cognitive objectives that are more explicit in school curriculum. Seeing to practical difficulties involved and on the priority basis for immediate need, the present study is delimited to only cognitive domain of educational objectives. It is in this domain that the present work

would take a lead to explore achievement in terms of Bloom's Taxonomy of Educational Objectives and to attempt to fill in the gaps in the enlisting knowledge in this area.

Thirdly, the study has its own innovation and importance from the methodological point of view. If a survey of all the researches in teacher education is made, then it is just possible that the readers would come across a negligible number of studies having employed experimental approach. The latest study undertaken by Buch (1972) indicates that out of about 325 approved Ph.D. theses in Education in India upto 1972, there are less than 3 per cent of the studies which can be classified as experimental research. And when it comes to the research studies in area of teacher effectiveness, the number of experimental work is still less. Thus, one of the major characteristics of the present investigation is its likely capacity to generate new approaches in research designs for the future studies in this area.

The review of related literature as given in this chapter (vide captions 1.10 to 1.40) would further help the readers to provide the justification and frame-work of the study in terms of (i) what has been explored and what is yet to be explored in the area of teacher effectiveness, (ii) priorities and strategies of new

explorations in this area, (iii) establishing the objectives of the study and (iv) genesis and formulation of the workable hypotheses of the study.

1.10 APPROACHES TO THE STUDY OF TEACHER EFFECTIVENESS

As mentioned in caption 1.00, the present study aims at studying teaching in relation to instructional objectives in cognitive domain by undertaking an experimental research. This is a broader overview of the work to be done. The next question in conducting the study is of specifying what aspects of teaching are to be studied, why and how. It requires to define and analyse teaching. The following discussion helps to answer this question.

Flanders and Simon (1969) have analysed the study of teacher effectiveness into study of teacher characteristics and teaching acts. They have specified teacher characteristics as presage variables as they exist before teaching starts. Ultimately, the presage variables are not important in themselves; it is their manifestation in the teaching process that is more important. Hence, the present study is limited to the study of teaching acts. The following caption gives an account of the views of a few researchers for defining teaching acts or teaching.

1.11 Defining Teaching

According to Houghes (1963), "..... a description of teaching as it was in progress in the classroom could be secured by defining 'teaching as interaction'. Interaction is used in its dictionary sense of mutual or reciprocal action or influence". For Amidon and Hunter (1967) teaching is,

> "..... an interactive process,primarily involving classroom talk, which takes place between teacher and pupils and occurs during certain definable activities. The teaching activities recognized here are: motivating, planning, informing, leading discussion, disciplining, counselling and evaluating. (Amidon and Hunter, 1967, p. I)

For Flanders (1970), "Teaching behaviour by its very nature, exists in a context of social interaction. The acts of teaching lead to reciprocal contacts between the teacher and the pupil, and the interchange itself is called teaching".

A new view point for defining teaching acts is of Smith (1963). According to him,

> ..... teaching is a system of actions, involving an agent, a situation, an end-in-view, and two sets of factors in the situation - one set over which the agent has no control (for example, size of classroom and physical characteristics of pupils) and one set which the agent can modify with respect to end-in-view (for example, assignments and ways of asking questions). (Smith, 1963, p. 4)

An analysis of the above mentioned definitions of teaching shows two clear cut approaches to defining and analysing teaching acts, viz. (i) analysing in terms of 'influence', and (ii) analysing in terms of 'system of actions'. Smith (1964) classified teacher verbal behaviour into three types. One type involves intellectual operations like explaining and defining, the second type involves procedural operations like telling a student how to perform some operation, and the third type consists of utterances in which the teacher praises and commends, disapproves and reprimands. This classification practically covers almost all the definitions of teacher acts. Recently, many systems have been developed to analyse and study teaching acts in the classroom. They are based on either of these three types of behaviours. For example, Flanders' Interaction Analysis Category System (FIACS) is an observational tool to study teacher's classroom verbal behaviour referring to the third type and is usually used to study 'affective' dimension of teaching acts leading to the study of classroom climate. On the other hand, Smith's system is meant for studying the logical operations in the classroom and is used for studying 'cognitive dimensions' of the classroom. Procedural categories are embodied in one way or the other in all the systems. Simon and Boyer (1967) have given a description of such tools. However, the present investigation based its

definition of teaching acts on Flanders' (1970) opinions and affective acts of teaching and the need to consider both of these acts for research purpose. He expressed his views as under:

> Even though we may continue to theorize about the cognitive and affective components of classroom interaction separately, either one alone is incomplete so that considering both results in theories that apply more realistically to what goes on in the classroom. Teachers and pupils think about their feelings and often feel strongly about their thoughts. Researchers and those who would help others improve teaching will have to learn how to take both into consideration. (Flanders, 1970, p. 269)

To summarise, the study of teacher effectiveness in the context of this investigation implies a study of such teaching acts as being exhibited in the classroom situations. Teaching acts comprise both, the cognitive and affective actions of a teacher.

This solves the question of what is to be studied and why. The next question is how to study these teaching behaviours. The next caption attempts to clarify the 'how' part of this investigation.

1.12 Identifying the Approaches for Studying Teacher Behaviour

The issue is to develop an approach to study the teacher behaviour. A few researchers have reviewed past

researches and spotlighted their shortcomings as well as suggested improvements for further research. Some have been concerned with identifying problem areas in teacher effectiveness (Anderson and Hunka, 1963), while others have tried to study predictor variables (Fattu,1962 and Howsam, 1960), improving methods of conducting research (Gage, 1965), interpreting and understanding results (Biddle, 1964 and Soar, 1964). Still a few others made efforts for developing a conceptual framework to study it (Ryans, 1963 and Smith, 1962).

Anderson and Hunka (1963) made an attempt to bring forth problem areas in research on teacher effectiveness. They came to a conclusion that "attempts to build a theory of teaching from a statistical description of what is happening fail to prescribe what should be happening. Even examples of best of teaching may not provide the theoretical basis for the most effective teaching". Stolurow (1965) also pointed the same approach as suggested by the above mentioned two researchers when he stressed the need for 'mastering a teaching model' as opposed to 'model the master teacher'. All such studies which search for correlates of effective teaching in the classroom are trying for defining and prescribing the acts of a master teacher. Thus, the main problem is of finding out the actions of such a teacher

or components of teaching model, which may help in preparing master teachers.

Another approach to study teacher effectiveness is to find out the predictors for a 'master teacher'. Fattu (1962) and Howsam (1960) reviewed researches on predictor criteria of teacher effectiveness. They studied such characteristics as intelligence, age, experience, cultural background, sex, marital status, scores on aptitude tests, job interest, voice quality and some special aptitudes as the predictors. Only professional knowledge was found to be a good predictor of teacher effectiveness.

Though, Morsh and Wilder (1954) concluded the failure of researches in this area and Fattu (1962) and Howsam (1960) too could not find satisfactory predictors of teacher effectiveness from past researches, the search for 'master teacher' is still on. Gage (1965) justified these attempts in terms of the pressing need for it. He, however, argues that modern methods of research are qualitative. Improvement therein might be rendering the past researches obsolete. He identified five global characteristics - (i) warmth, (ii) cognitive organization, (iii) orderliness, (iv) indirectness, and (v) problem solving ability as the components of effective teaching. Medley and Mitzel (1963) also expressed an

opinion that powerful* statistical methods will help to identify relationship between teaching behaviours and their effects.

Another aspect spotlighted by the reviewers is how to interpret the results of teacher effectiveness. Both Biddle (1964) and Soar (1964) pointed the need for agreement about the effects that the teacher is to produce in order to determine the components of teacher effectiveness. Flanders and Simon (1969) summarised their view points thus:

> They distinguish between the research components of teacher effectiveness (in which the relationships between teacher characteristics and behaviours and pupil outcome measures are determined) and the criteria component (which is a question of selecting the pupil outcome components) considered to be desirable. (Flanders and Simon, 1969, p. 1424)

Biddle (1960) and Soar (1964) both expressed a view in favour of using observation data as the direct method of learning about teaching.

Ryans (1963) and Smith (1962) discussed the need for a conceptual framework for understanding the research findings on teacher effectiveness. The conceptual framework used in a study of teacher behaviour, according to Smith (1964) is dependent on the aims of the study.

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* Emphasis by the present author

The above discussion can be summarized to suggest that (i) there is a need to experiment and find out what best teaching is (Anderson and Hunka, 1963); (ii) systematic direct observation of teaching is more helpful in drawing conclusions about teaching (Biddle, 1964; Soar, 1964); and (iii) every research needs to be explained within its conceptual framework (Smith, 1964).

The present investigation envisages to find out (i) certain patterns of teaching behaviour (the term pattern is defined in caption 2.10)which are effective in pupils' attainment of certain instructional objectives, (ii) to describe these patterns in a manner as can be described in terms of an observational system -(Flanders' Interaction Analysis Category System); and (iii) to interpret the findings in terms of the specified patterns and objectives only in the context of included pupil sample.

It may be noticed here that the approaches for the study of teacher effectiveness discussed so far have implied an analyse of the global domain of teacher behaviour into microscopic units. In the following captions, efforts have been made to discuss such research studies relating to affective and cognitive dimensions of teaching behaviour which served to generate the hypotheses for the present study.

1.20 AFFECTIVE DIMENSIONS OF TEACHER CLASSROOM BEHAVIOUR

An act is classified as 'affective' if its focus is on the emotional component of communication such as accepting, rejecting or encouraging expressions of teacher talk. This section gives an account of the studies undertaken with a view to studying the effect of teacher behaviour specified as 'affective' in terms of rejecting, or accepting pupils' responses, criticising or appraising them or using pupils' ideas in teacher talk.

1.21 Using Pupil Ideas

In these studies, different natural styles of teaching specified with the help of some observational tools have been taken as treatment variables and changes in attitude and/or achievement scores represented criterion measure. The sample varies for grades from elementary to high school classes. The number of teachers ranges between ten to thirty. The findings of each study has been discussed along with the name of the researcher in the following paragraphs.

Nelson (1964) tried to find out relationship between learning of linguistic skills and teacher behaviour. He found positive relationship between teachers' use of pupil ideas and learning of linguistic

skills. Flanders (1965) conducted four studies to find out process (teacher behaviour) product (pupil achievement or attitude) relationship. He concluded that,

> .... the percentage of teacher statements that make use of ideas and opinions previously expressed by pupils is directly related to average class scores on attitude scales of teacher attractiveness, liking the class etc., as well as to average achievement scores adjusted for initial ability. (Flanders and Simon, 1969, p. 1426)

These results were further supported by Dodl (1966), Johns (1966), and Pankratz (1967). Besides finding the above mentioned relationship, Johns (1966) also found that pupils of such teachers are more likely to ask thought provoking questions during classroom discussions. But Dodl (1966) found the incidence of such pupil questions very low. The additional finding by Pankratz (1967) was that the teachers who were judged more effective on the basis of principal's ratings, class average of pupil attitude inventory and a 'teacher situation - reaction test' made more use of pupils' ideas and opinion than the teachers judged as less effective.

LaShier (1967) also confirmed the findings of Flanders (1965). Powell (1968) attempted to show relationships between teacher 'indirectness' and pupil growth on standardized measures of achievement. He selected out those pupils who had been with the same

'indirect' and 'direct' teachers during their first three years of school and had either 'indirect' or 'direct' teachers during their fourth-grade year. The results indicated that arithmetic achievement was strongly related to 'indirectness' of the teacher during first three years of school, but that reading achievement was not similarly affected. Whether the pupils had a 'direct' or 'indirect' teacher in their fourth-grade class appeared to have no effect. The author concluded that it seems clear that, when looking at the results of this study, by themselves, no clear cut overall benefit has been shown to accrue from indirect teaching.

While these studies took natural styles as the treatment variables, a few other studies involved 'role playing' by teachers. Here, the teachers were trained to produce certain styles or patterns of behaviour. In one treatment the ideas and opinions expressed by pupils were acknowledged and integrated into classroom discourse while in the other treatment, these behaviours were minimised. For showing the fidelity of the treatments, some systematic coding system was used. The differences in pupil activity were controlled either by random assignment or using the analysis of covariance.

Flanders (1961), found that not all the pupils

but only those who were dependence prone as shown by a special test, learned more principles of geometry when their ideas were made use of. Schantz (1963) selected verbal recall as the criterion variable and studied students of high and low ability. He found significant results for both the groups.

Filson (1967) studied the effect of teacher making use of pupil ideas in terms of 'dependence on teachers'. He came to the conclusion that more the teacher makes use of pupils' ideas, the lesser is the degree of dependence on teachers. Flanders et al. (1963) supported Filson's finding. In this study, adult pupils developed perceptions of greater independence and self-direction during the first week of a nine-week inservice programme, indicating these perceptions development to be cumulative in nature.

All the above mentioned studies have supported the positive relationship between teacher's use of pupil ideas, and pupil attitude and achievement except the studies by Guggenheim (1961), Hoover (1963), Powell (1968), and Snider (1966).

However, the present investigation aimed at focusing upon teacher's use of pupil's ideas as a part of positive feedback to explore its implications with respect to different instructional objectives.

1.22 Using Criticism

Here, criticism refers to such statements of teacher, intended to change student/pupil behaviour from unacceptable to acceptable, extreme self-reference by the teacher, justification of teacher's authority, scolding or giving negative personal remarks to pupils. However, a special reference for the interpretation of 'criticism' has been made for such studies where this investigator could get the definition of criticism by the respective researcher. Otherwise, this interpretation is mainly based on the seventh category, namely, criticism of FIACS (Appendix 1.1).

Spaulding (1963), Perkins (1965), Fortune(1966), Harris and Serwer (1966), Morrison (1966) and Soar(1966), concluded that teachers' use of criticism of pupil has a negative relationship with achievement but Wallen (grade 3, 1966) and Harris et al. (1968) did not support these findings. A few studies further distinguished between mild form of criticism and strong criticism. Mild form of criticism has been defined as teachers not accepting student answers.

Spaulding (1963) did not find that disapproval by negative evaluation loaded on a significant factor. Perkins (1965) too did not find that giving directions

loaded on any of his findings. Similarly, Soar (1966) also did not find significant results for the vicious circle (that is behaviours in the 6-6, 6-7, 7-6 and 7-7 cells of FIACS Matrix). These findings are further supported by Wallen (1966) who did not find significant correlations between academic control and achievement. However, Spaulding (1963) found as a result of factor analysis that disapproval both by commanding conformance and by eliciting clarification in a non-threatening way loaded on a factor positively related to achievement in reading. Perkins (1965) also supported this finding (Spaulding, 1963) that mild criticism was positively related to achievement. In this study the behaviour "teacher does not accept student's answer" loaded on the same factor as the total class gain in arithmetic. According to Rosenshine (1969), these findings about the use of mild criticism implies that,

> ....there is no evidence to support a claim that a teacher should avoid telling a pupil that he is wrong, or should avoid giving him academic directions; however, teachers who use a good deal of criticism appear consistently to have classes which achieve less in most subject areas. (Rosenshine, 1969, p.6)

Spaulding (1963), Perkins (1965), Soar (1966) and Wallen (1966) found that strong criticism had significant negative relationships with achievement. The

variables studied under 'strong criticism' were (i) personal control (Wallen, 1966), (ii) total disapproval and disapproval by shaming or threat (Spaulding, 1963), and (iii) frequencies in cell 7-7 of FIACS Matrix (Soar, 1966).

In view of the conclusions drawn by Rosenshine (1969) about the use of criticism and its effect on achievement, the present investigation aimed at including only corrective and positive feedback measurements in the teacher behaviour patterns.

1.23 Using Approval

The term 'approval', here, refers to both verbal and non-verbal approval by teacher. It also includes specific types of praise in terms of reinforcement and i/d ratio (FIACS Matrix).

Wallen (1966) did not find any significant results for the non-verbal approval such as smiling and nods in Grades I and III. Similarly, Perkins (1965), Spaulding (1965), Harris and Serwer (1966), Wallen (1966, Grade I), and Harris, et al. (1968) could not find significant results even for verbal positive feedback. But positive results were found when the variable under study was limited to minimum positive reinforcement, such as saying 'right', 'okay' or when it follows such actions

as showing pupil independence or teacher's use of teacher-centred 'I', use of a warm voice and selection of topics related to pupils' interests, the use of i/d ratio as a variable has shown inconsistent results (La-Shier, 1965, Snider, 1966; Soar, 1966, and Furst, 1967).

1.24 Overall Comments for Affective Dimension of Teacher Classroom Behaviour

The overview of the above reported studies on affective dimension helps to draw certain trends which would help a researcher in deciding the treatment variables.

(i) The majority of the studies reported are field studies. They do help in identifying certain behaviours or patterns which discriminate between high achieving and low achieving teachers. They are important for understanding teaching behaviours as they exist. But those people who are involved in the programmes of the teacher education or inservice education need to know more than this. They raise a question whether training teachers to produce certain behaviour will result in better achievement of pupils. The field studies cannot answer such questions as they are

correlational in nature. Moreover, in such studies many other extraneous variables play role to contaminate criterion variables. Experimental studies are required to establish cause and effect relationship.

(ii) The studies reporting the use of approval and criticism draw attention to the fact that it still needs to be established to which degree and how a teacher should use these strategies in the classroom.

> It does not seem reasonable to assert that the more a teacher responds to pupil behaviour, the more pupils will learn, unless some limits are established for the generalization..... . A different point may exist for other measures of pupil growth such as positive attitudes, creativity, memory tasks and other kinds of educational outcomes. (Flanders, 1970, p. 403).

(iii) A few researchers have already tried to establish these points as mentioned by Flanders (1970). Furst (1967) and Soar (1967) found curvilinear relationship between the achievement measure and the percentage of recorded teacher and pupil behaviour. Soar (1967) found that the measures of the amount of time a teacher was talking and the degree of freedom that

pupils were having in initiating discussion are not related to measures of pupil achievement. But 'extended discourse versus rapid teacher-pupil interchange was the most closely related factor. To summarise, the use of criticism and approval needs further research as its relationship to achievement is yet to be explained in terms of curvilinear relationship (Furst, 1967; Soar, 1967). The present study purports to vary the use of reinforcement and approval experimentally through treatments to fill in some of the gaps in the past research.

1.30 COGNITIVE DIMENSIONS OF TEACHER CLASSROOM BEHAVIOUR

Gage (1972) remarked,

> .... by research on cognitive aspects of teaching, I mean something fairly restricted. Research, of course, is the quest for relationships between variables, preferably causal relationships, or functional relationships, but if not these, then mere correlations of any kind. Research on teaching, as I have stated earlier is that in which at least one of the variables consists of a behaviour or characteristic of teachers - something that the teacher does or is. It might be the teachers' way of explaining something or his characteristic of being warm or logical. Gage, 1972, p. 126)

The affective dimension of teaching refers to the latter part of Gage's statement. A teacher approves or disapproves a pupil's response, criticises it or uses it, but why and how a teacher gives the stimulus for such responses, in which context, all such variables need further explorations. Such variables have been referred to as cognitive dimensions of teacher behaviour. As has already been mentioned in caption 1.11, it is difficult to isolate affective and cognitive dimensions from each other in practice; nevertheless, a few researchers have studied, the cognitive dimensions in isolation (Gage, et al. 1966; Smith and Meux, 1967). The following discussion reviews a few attempts in this direction.

1.31 Explaining Ability

Gage (1968) has defined explaining as ".....the skill of engendering comprehension - usually orally, verbally and extemporaneously - of some process, concept, or generalization". It is in this context that all the studies presented hereafter have been reviewed.

Fortune, Gage and Shuts (1966) reported a study in which the 'explaining ability' of forty student teachers was compared. They all were asked to explain a topic to small groups of high school pupils under similar conditions. The design provided for a comparison across different topics with different groups of pupils. They

concluded that a teacher's ability to explain a topic is likely to change with different topics, but remains relatively constant across different groups of pupils. It implies that there is a possibility to generalize the ability of explaining for a particular teacher irrespective of groups of pupils but not in case of topics to be taught.

Gage et al. (1968) have reported a few more studies in this connection. They obtained the post teaching comprehension scores for two units taught in fifteen minutes lessons by forty three social studies teachers. A tape-recorded lesson presentation on a third unit served to measure the initial ability. Besides, comprehension scores, data for pupil's appraisal of each experimental lesson, and pupils' degree of attentiveness were also collected on standard questionnaire forms. They found a correlation of .41 across the two units, suggesting that sixteen to twenty per cent of the variance in class performance could be attributed to a teacher ability factor. Pupils' attentiveness scores were correlated with their achievement significantly while their appraisal showed the pupils' ability to estimate with some accuracy the teachers' ability to explain. Using the same data, Hiller, Fisher and Kaess (1968) and Dell and Hiller (1968) tried to identify the important components of 'explaining ability' of teachers. They found that 'verbal fluency' and 'vagueness'to be reliably related to teachers'

effectiveness across the lessons.

Rosenshine (1968) investigated a large number of variables selected on the basis of twenty seven categories derived from the research in the areas of linguistics, instructional set, experimental studies of instruction and multivariate studies of behaviour and correlates of teaching effectiveness. The significant variables were - (i) gesture and movement, (ii) rule and example pattern, and (iii) explaining links. The more able teachers showed a greater frequency of the use of these three variables. According to Nuthall (1970), the significant variables as identified by Rosenshine (1968) appeared to be those which relate to the organization of the teacher communication. But sequences of ideas and their supporting details need further research.

If FIACS is studied, then 'explaining' is category five representing the 'lecture'. But category four 'questioning' is also a cognitive dimension. A few research studies have also been conducted on the use of questioning and probing, pupil participation, feedback and strategies to deal with wrong answers in response to questions by teacher. The later factors are a synthesis of cognitive and affective dimensions. The studies are being reported and discussed in the following captions.

1.32 Frequency of Questions

Rosenshine (1969) reported five studies - Conners and Eisenberg (1966); Wallen, Grade I and Grade III (1966); Harris and Serwer (1966); and Harris et al. (1968). These studies have been conducted in preschool or the primary grades. Except for the study by Harris et al. (1968), all other studies found a significant positive relationship between the frequency of asking questions and achievement.

Recently, a study by Church (1971) has been made available. The investigator identified two types of questions - primary and secondary, differentiated on the basis of former's inviting new or different answers and latter's use in modifying or extending the former questions. It was found that primary questions play a critical role in the development of pupil learning. A reduction in the ratio of primary questions results in reduced pupil learning. Thus, the study emphasises the need to ask primary questions more frequently. Church (1971) has proposed a few hypotheses for further research, viz., (i) the superiority of questions is due to the fact that the question-answer-comment unit carries more information than a simple statement; (ii) the superiority of questions lies in catching the attention of the pupils resulting from the likelihood to be called upon to answer; and (iii) the superiority of questions is due to the greater

'mental activity' which they produce. The present investigation is aimed at trying to test the first hypothesis to some extent.

A few more researchers have also investigated into types of questions as reported in the following caption.

1.33 Types of Questions

Solomon et al. (1963) found relationship between higher frequency of any types of questions with pupil achievement. But, Spaulding (1965), Perkins (1965), Conners and Eisenberg (1966), Harris and Serwer (1966), Soar (1966), Harris et al. (1966) and Thompson and Bowers (1968) did not find any significant relationship between types of questions asked and pupil achievement. Rosenshine (1969) commented that may be the restrictive way of classifying questions is the reason for not finding any significant results. The classification of questions into two broad categories like open and narrow, recall and interpretation, did not yield any linear relationship. Spaulding (1965) found negative relationship between such questions as 'eliciting a response in an open-ended way' with achievement.

Church (1971) tried to study the effect of the proportion of closed questions (sixty five per cent) on

pupils' understanding and retention following the lesson. The analysis was done in terms of pupil achievement, pupil ability, answers accepted by teacher and time taken to complete the lessons. It was found that the increase in the proportion of open questions addressed to pupils of similar ability results in decrease in the proportion of pupils' answers accepted by the teacher. But it does not necessarily result in less learning. The pupil achievement remains identical when double the time is given to open questions, but equalising the time of open questions and closed questions, the increase in the proportion of open questions results in decrease in achievement. It implies that open questions require more time ~~in and~~ to be positively related to pupil achievement.

Francis (1971) conducted an experiment to study the effects of 'thinking' and 'learning' lessons in Grade II and Grade III. 'Thinking' was defined as relating ideas and events in mind while 'learning' implied the factual knowledge. The analysis showed more teacher talk in 'learning' lessons and more pupil talk in 'thinking' lessons. The questions in 'thinking' lessons were more concerned with pupil ideas than the topic. The study has implications for different types of objectives specified for a topic.

Another difference in questions has been studied

by proportionating the two types of questions - convergent and divergent. Thompson and Bowers (1968) found that teachers using an equal mixture of divergent and convergent questions are more successful. Furst (1967) found that the most successful teachers had a higher ratio of analytic and evaluative type of interchanges which is rather infrequent otherwise. According to Soar (1966) though inquiry itself is not a correlative of effective teaching, the effective teacher did have a higher ratio of inquiry as compared to drill.

No categorical stand can be taken either in favour of closed or open questions in the light of these studies. They stress a need for finding out the optimum levels as well as their use in terms of the educational objectives. According to Church (1971),

> .... open questions may be viewed both as 'more challenging' and as 'more vague', when the objective is pupil understanding and retention. The virtues of the challenge posed by open questions are outweighed by the detrimental effects of their vagueness, at least at the fourth grade level. As far as future studies are concerned, what would appear to be most needed are studies aimed at identifying optimum levels of open and closed questions for pupils at various levels and for lessons with various objectives. (Church, 1971, p. 21)

1.34 Probing

The 'probing' as interpreted by the studies to

be reported here means a teacher statement encouraging a pupil to answer or eliciting classification in a non-threatening manner.

Soar (1966) found significant positive correlations for instances of teachers encouraging elaborations and interpretations. Similarly, Spaulding (1965) and Fortune (1967) too found significant results for teacher eliciting classification in non-threatening manner and teacher responding to pupil answers with further classifying questions.

1.35 Amount of Pupil Participation and Feedback

The amount of pupil participation refers here to the probability of a pupil's being called upon to answer a question and the frequency with which he may be called upon to answer. The term 'feedback' is used to designate the ways in which a teacher reacts to a pupil's response, such as giving summary course comments, or telling him why he is wrong.

Houghes (1971) conducted a study in which the effect of 'predictability' of being called to answer questions, the degree to which they are required to answer and the frequency with which they are called to answer was studied on pupils' achievement. The results showed that the amount of pupil participation has no

effect at all on the learning of eleventh grade pupils who were the sample for this study. Even Church (1971) too could not find significant results for pupil's opportunity to answer with the achievement. According to him "it may be possible that though questions are important in promoting pupil learning, the actual answering of those questions may not matter much".

Church (1971) programmed his teachers to use combinations of feedback types such as no comment, repetitions of all or part of pupil's answer, simple comments, complex comments and summary comments, but analysed the 'feedback as a whole'. He found it to be a significant factor related to pupil achievement. He further suggested guidelines for future research,

> What is needed now are further studies to determine just what it is about the comments following pupil answers which is so important. Is it the feedback regarding correctness which plays the crucial role? Or is it the extra information provided by the discussion of wrong answers? Alternatively, if many of the pupils are evaluating their own answers, then it might be the extra redundancy provided by answer repetitions which is important. (Church, 1971, p. 25)

Here, Church (1971) has referred to the strategies following wrong answers. It is worthwhile to refer to his findings regarding these strategies. He suggested three strategies, namely, answer moves,

prompting moves and extension moves. The answer moves refer to teacher's answering himself the question; the prompting moves imply a hint for further information; and extension moves are called for further or better answers without prompting. The results showed that prompting moves are related to highest level of achievement as compared to other two moves. But, he says that results should be interpreted keeping in view the fact that answer moves took the least time and it can be a factor affecting the relative affects of the three moves.

1.36 Overall Comments for Cognitive Dimensions of Teacher Classroom Behaviour

The review of the reported researches as mentioned above would help a researcher to have an idea of the needed work in his area.

1. Gage (1968) has defined 'explaining ability' as a skill to engender comprehension. It raises the question for further research to find out whether 'explaining ability' has any other role to play as far as the other intellectual abilities and skills are concerned in the hierarchy of cognitive objectives as propounded by Bloom (1956).

2. The second issue raised for future research is about the role of questioning.

What is more important about them - (i) are they important as a carrier of information or stimulator of mental activity (Church, 1971); (ii) which type of questions are more important, at what grade level and for which topics (Church, 1971).

3. The third important feature of cognitive dimension is the role of probing and feedback. Should a teaching strategy be based only on isolated types of questions such as either open or narrow, or these two types of questions should be used in a way as to serve at certain places as probing moves? In the light of the studies about reinforcement and 'criticism,' should a teacher always use positive feedback or even corrective feedback which shows better results? In what proportion should the corrective or a positive feedback be used?

These are some of the questions that need to be answered, before research on teaching behaviour can take one step further towards giving theoretical basis for teacher education programmes. As mentioned at the end of caption 1.00 the review has helped the present investigator to formulate a framework for the present

study. The next caption enlists some implications of the reviewed research for the present study.

1.40 IMPLICATIONS FOR PRESENT STUDY

The reviewed studies have helped to specify the aspects of teacher behaviour for this study on a priority basis as well as in formulating the hypotheses. The findings and view points that helped or are to serve as a basis for formulating the hypotheses are as under:

1. 'Explaining ability' of a teacher may have some relationship with other objectives besides comprehension only (Gage, 1968).

2. When types of questions and varied forms of teacher responding behaviours to pupil responses are embodied in the main stream of 'explaining' by teacher, it may result in better achievement with certain types of instructional objectives.

These two considerations have resulted into the selection of four teacher behaviour patterns and three criteria of pupils' attainment to judge the effectiveness of selected teacher behaviour pattern.

The next chapter describes the objectives of the

study, certain assumptions for designing the study and hypotheses formulated. It also includes a description of treatment and criterion variables.