

CHAPTER EIGHT

REVIEW. MAJOR FINDINGS AND SUGGESTIONS

- 8.1 REVIEW
- 8.2 MAJOR FINDINGS
- 8.3 SUGGESTIONS .

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8.1 REVIEW :

In the present study an attempt was made to obtain inference about whether or not certain selected verbal teaching behaviour patterns affected students' achievement.

The study envisaged not only a direct approach to the process of teaching but also experimental manipulation of these selected process variables with a view to achieving systematic variations in them so as to draw an inference about their differential effect, if any, on students achievement measured in terms of knowledge, understanding and application levels of cognitive growth.

The process of teaching can be looked in a number of ways but, essentially, it may be considered as an inter-personal interactive process that occurs in a formalised instructional situation of the classroom where the teacher carries on an organised series of acts and the pupils learn. It is a highly complex and intriguing process and can be

described as a 'polymorphous' activity. It is obvious, therefore, that systematic research on teaching is an extremely delicate and difficult endeavour.

Of late, a forceful plea for making frontal research attack on the process of teaching has come from a group of educational researchers who feel concerned about teaching and teacher effectiveness. For them it is teaching not the teacher that is key to the learning of students. "It is not what teachers are like but what they do in interacting with their students in classrooms that determines what students learn and how they feel about learning and about themselves." This plea for process-product approach has been put forward atleast for two reasons : (i) research efforts using presage-product approach have so far failed to yield dependable answer to the problem and (ii) whatever little has been achieved using process--product approach-- and, in fact, very little has been achieved so far--appears to hold promise to these researchers.

In the process-product approach the independent variables are the classroom interactive behaviours which are guided mostly by teaching behaviours and are recorded using either category systems or rating systems. The dependent variables are student change measures. In the present study, the concept of process-product approach includes both correlational as well as experimental studies. The focus of earlier researchers was mainly either on survey or correlational studies. However, in recent years, a case for classroom experimental studies is being made. In such studies the experimental teachers are trained to exhibit specific teaching behaviours such as

accepting student feelings, using student ideas, praising and encouraging student, asking different types of questions etc., which represent the process variables. The control teachers generally follow their usual teaching behaviours. Product variables, on the other hand, may be more of cognitive growth, attitude change, motivational change etc., in the student which are measured with the help of suitable criterion measures.

The verbal teaching behaviour patterns considered as process variables in this study were (i) providing confirmatory and corrective feedback (ii) asking cognitive memory, convergent, divergent and evaluative questions and (iii) general indirectedness in teaching attributable to more of such teaching behaviours as accepting student feelings, encouraging and praising student and providing confirmatory and corrective feedback. In fact, general indirectedness was considered in this study because providing confirmatory and corrective feedback also contribute to its nature in classroom interaction. In comparative analysis of teaching of three groups of teachers emphasis was placed on these variables. Student achievement, considered as product variable, was measured in terms of knowledge, understanding and application reflecting three hierarchical levels of cognitive complexity and difficulty.

The volume of earlier related research efforts, that have often varied in terms of theoretical framework and procedural aspects, has been meager and the results have generally been contradictory--except, perhaps, with regard to general indirectedness in teaching and student achievement. For example, nine studies reviewed by Rosenshine (1971) did not

report significant linear correlation between the use of student ideas (or, in the present study, providing confirmatory feedback) and student achievement although a positive trend in relationship was observed in eight out of the nine studies. In another study, Rosenshine (1971) found small degree of positive relationship ($r = .18$) between these two variables. As against this, studies by Morrison (1966) and Fortune (1967) indicated high degree of relationship between these two variables. Spaulding (1965) reported that disapproval both by commanding conformity and by eliciting clarification in a non-threatening manner (a concept very close to teacher providing corrective feedback) was loaded on a factor that was positively related to achievement in reading. Studies on relationship between questioning and achievement have also given contradictory results. For example, studies conducted by Perkins (1965), Hutchinson (1963), Miller (1966) and Beseda (1972) reported not significant relationship whereas those conducted by Wright and Nuthall (1970), Sharma (1972), Kleinman (1964), Solomon (1963) and Chasas reported significant relationship between types of questioning investigated by them and student achievement. In most of the above studies student achievement was considered as a global concept. However, despite not significant relationship reported in the above studies between selected verbal teaching behaviours and student achievement, the trend in some of these studies was positive.

Taking some support from the results of earlier researches that reported positive and significant relationship or gave an indication of a positive trend in the relationship

between different verbal teaching behaviours and student achievement, these teaching behaviours were considered collectively as process variables in the present study. As product variable achievement was considered in terms of knowledge, understanding and application representing hierarchical levels of cognitive complexity and difficulty. The assumption made was that variation in selected verbal teaching behaviour patterns may affect not only the quantity of cognitive growth but also its quality reflected in students performance on achievement test items requiring complex and difficult cognitive operations. Null hypotheses asserting no real difference in mean achievement at three levels between comparative groups of students exposed to different verbal teaching behaviour patterns were formulated with the "express purpose of being rejected."

Broadly speaking, the methodological approach in the present study required (i) obtaining three different sets of verbal teaching behaviour patterns representing three treatments and then (ii) exposing three groups of students to the above three treatments for the purpose of comparing their end-of-course achievement at knowledge, understanding and application levels.

The three different sets of verbal teaching behaviours patterns were obtained by observing and recording classroom interaction of Control (C), Experimental No.1 (E_1) and Experimental No.2 (E_2) groups of teachers. E_1 group of teachers had been given limited training in the theory and practice of interaction analysis. E_2 group of teachers who started training along with E_1 group of teachers were given additional training

in the use of the selected verbal teaching behaviour patterns. Observational Category System (OCS), which is a modified version of FIACS, was used for recording classroom interaction. C group of teachers were not given training and thus served as control. The data on verbal teaching behaviour patterns with respect to C and E₁, C and E₂ and E₁ and E₂ groups of teachers were analysed for comparison purposes.

Achievement scores that represented cognitive gain in students at the end of 8 sequential lessons were obtained by administering the achievement test specifically constructed for this purpose. This 50 items test measured achievement at knowledge, understanding and application levels. Achievement scores were adjusted for initial differences in previous related knowledge (measured by previous knowledge test, PKT) and intelligence (measured by an intelligence test) and the mean achievement at three levels for C and E₁, C and E₂ and E₁ and E₂ groups of students were compared for significant difference using the technique of covariance analysis.

Major findings obtained in the present study are given in the next section that now follows.

8.2 MAJOR FINDINGS :

On the basis of the discussion of the results presented in the three preceding chapters, some major findings seem warranted and are, therefore, given below :

1. Training, characterised by explanation of theory and practice in interaction analysis and a few feed-

back sessions, given to teachers for 12-13 hours to obtain significant variations in 9-10 teaching behaviours did not result in significant "programme effectiveness" except with respect to one category, viz., providing confirmatory feedback(3a). Even this teaching behaviour was not significant (at .05 level) when considered as a part of indirect teaching behaviour (TRR) or as an index of the tendency to provide confirmatory feedback (TIFbR89-confirmatory). Limited training imparted for 12-13 hours may not result in significant difference when a number of verbal teaching behaviours are to be changed.

2. When the limited training specified above was supplemented by additional training for about 11-12 hours spread over 5 more days and was characterised by (i) practice in developing questions to be asked in the lessons, discussing possible situations where different types of questions could be asked as well as different types of verbal feedback that could be provided and (ii) teaching in simulated and actual small classes followed by feedback of one's verbal teaching behaviour patterns, significant differences (at .05 level of significance), when compared with C Group of teachers, were observed in favour of additional training with respect to asking divergent questions, praising and encouraging, providing confirmatory feedback, lecturing and student response. Asking divergent questions was again significant in favour of E₂ group of teachers when considered in

terms of ratio (TQR-4c) indicating tendency of the teacher to ask divergent questions. Difference was also observed in favour of additional training with respect to asking evaluative questions. However, significant differences were not observed in favour of additional training with respect to asking cognitive memory and convergent questions, giving direction and command and student initiation. It appears intensive training of the type organised in the present study may be needed for a longer duration when a number of teaching behaviours are sought to be changed significantly.

3. Comparison between limited and additional training (E_1 and E_2 groups of teachers) indicated significant differences (at .05 level) in favour of additional training in such interactive behaviour patterns as asking divergent questions, lecturing and student response. About evaluative questions only 1 of the 3 E_1 group of teachers asked such questions and that, too, very rarely (0.14%) whereas all the E_2 group of teachers asked evaluative questions, the minimum occurrence being 0.37%. Similar trend with regard to asking divergent and evaluative questions were observed in E_2 groups of teachers when only 11 teacher-talk categories were analysed or when analysis was done in terms of ratios. This indicates that variations in these two teaching behaviours were consistent amongst different comparisons.

4. When not significant, directional difference in favour of training, even if limited, was found almost for all the teaching behaviours included in the study as treatment variables except providing corrective feedback (Cat. 3b).
5. Except in 11 teacher-talk category comparison for E_2 group of teachers, more number of teachers who were not trained or less trained provided more of corrective feedback, though this occurrence was not significant. Direction of difference of this teaching behaviour in favour of teachers not trained (C group) or less trained (E_1 group) appears unusual and needs further probing.
6. Occurrence of such teaching behaviours as accepting student's feelings (Cat. 1) and criticising and justifying authority (Cat. 7) were generally rare in all the three groups of teachers.
7. Some verbal teaching behaviours such as praising and encouraging (Cat. 2) and providing confirmatory feedback (Cat. 3a) were found significant when 14-category or 11 teacher-talk category comparisons were made but these behaviours were not significant when index of indirect teaching (TRR) was considered or tendency to provide confirmatory feedback at the time pupils stop talking (TIFbR-confirmatory) was considered. This is because these ratios take into account the occurrence of other related teaching behaviours and

thus affect the arithmetical values of isolated categories either way.

8. Significant difference at .05 level of significance was found between C and E₁ groups of teachers for such teaching behaviour as providing confirmatory feedback (Cat. 3a) when 14-category and 11-category comparisons were made without corresponding significant difference in mean achievement between C and E₁ groups of students. This means that, when considered as a category separately, providing confirmatory feedback (or accepting and using ideas of students as in FIACS) did not affect student mean achievement significantly at any of the three levels of cognitive growth. Alternatively, no true difference in mean achievement may be attributed to not significant difference obtained between C and E₁ groups of teachers when providing confirmatory feedback (TIFbR89-Con.) was considered as a ratio and not separately. Teacher instantaneous confirmatory feedback ratio (TIFbR89-Con.) is an index of the tendency of the teacher to provide confirmatory feedback at the moment pupils stop talking.
9. In the above comparison, directional differences were found in favour of E₁ group of teachers in almost all the selected teaching behaviour patterns that served as treatment variables. These directional differences did not affect students' mean achievement significantly at K, U and A levels as

illustrated by no true difference in mean achievement obtained between C and E_1 groups of students. If this holds true in the case of those comparisons where significant mean achievement at U and A levels (e.g. C and E_2 and E_1 and E_2 groups) were attributed to obtained significant differences in some of the treatment variables, then, it may be safe to conclude that directional differences ^{alone} ~~alone~~ in treatment variables may not be sufficient to promote significant student achievement. In other words, training will have to be geared to produce significant difference in those verbal teaching behaviours that are empirically related to achievement in order to obtain significant cognitive growth in students.

10. Even when significant difference (at .05 level) between C and E_2 groups of teachers was found in favour of E_2 group with respect to such teaching behaviours as asking divergent questions, category 4c (in all the three comparisons), praising and encouraging, category 2, and providing confirmatory feedback, category 3a (in 14-category and 11-category comparisons) and also when all the E_2 group of teachers asked evaluative questions (Cat. 4d) as against none in C group, no corresponding significant difference was observed in mean achievement at knowledge level between these two groups of students. It appears these verbal teaching behaviour patterns did not differentially affect cognitive growth

characterized by such operations as recall and recognition. However, mean achievement at understanding and application levels representing higher cognitive operations appears to have been significantly affected by significant difference in the above verbal teaching behaviour patterns as illustrated by obtained significant difference (at .05 level) in mean achievement at U and A levels between C and E₂ groups of students.

11. Despite significant difference (at .05 level) in asking divergent questions (Cat. 4c) in favour of E₂ group of teachers and asking evaluative questions by all of these teachers as against rare use of this teaching behaviour (0.14%) by 1 out of 3 E₁ group teachers in E₁ and E₂ group comparisons, no corresponding significant difference was observed in mean achievement at knowledge level indicating thereby that these questioning behaviours did not affect differentially cognitive growth of simple recall and recognition level. However, significant difference (at .05 level) in mean achievement at understanding and application levels was found in favour of E₂ group of students. If we take into consideration the comparison of verbal teaching behaviour patterns between C and E₂ groups of teachers in terms of ratios only, the above results related to mean achievement at knowledge, understanding and application levels obtained for E₁ and E₂ groups of students

are similar to those obtained for C and E₂ groups of students.

12. The present study gives an indication that asking significantly more of divergent and more of evaluative questions did not result in significant difference in mean achievement at knowledge level but resulted in significant difference (at .05 level) in mean achievement at understanding and application levels.

If comparison of this study is allowed on conceptual and methodological grounds, the results obtained here are somewhat different from those reported by Miller (1966), Beseda (1972) and Sharma (1972) and similar to those reported by Miller (1966) and Chasas (1973); Miller (1966) reported no significant treatment effect as measured by the criterion test of higher understanding between "directive questioning" and "responsive questioning" characterised by more high-level questions and elaboration of student responses. Beseda (1972) found increased use of divergent questions by experimental teachers without corresponding increment in student achievement taken as a global concept. Sharma (1972) found that narrow questions were comparatively more effective than open questions in the realization of knowledge and comprehension objectives and, that, the hypothesis that there ^{would} ~~will~~ be comparatively high achievement for application objective when taught through the use of open questions was not supported. On the other hand, Miller (1966) reported no significant treatment effect as measured by the criterion test of "mastery of facts" in favour of "responsive questioning." This result appears to be similar

to those found in the present study with respect to achievement at knowledge level in the case of C and E₂ and E₁ and E₂ groups comparison. Again Chasas(1973) reported that discussion stimulated by narrow questions were less effective for achievement (taken in a global sense) than discussion stimulated by broad question. This finding comes close to the results obtained in the present study in which significant achievement at understanding and application levels resulted from asking significantly more of divergent questions and also more of evaluative questions.

8.3 SUGGESTIONS :

AS a logical outcome of the findings of this study a few suggestions are offered that may be of interest to those engaged in search of effective teaching styles. These suggestions are not prescriptive. Rather, they may be considered as certain research problems that need further investigation.

1. Further replications of this kind of study are desirable. This may not only help in validating the results obtained in the present study but may also generate certain hypotheses. In any further replication including more number of teachers and more number of lessons may be desirable.
2. In the present study a number of selected verbal teaching behaviour patterns (e.g. two types of feedback, four types of questioning and those behaviours that contributed to general indirectness) were considered for each teacher assuming

that a teacher in his normal classroom teaching exhibits a set of behaviour patterns. Some further controlled studies may be planned in which one or two teaching behaviours are taken at a time for investigation. This will help in drawing an inference about the effect of specific verbal teaching behaviours on pupil achievement.

3. It may be of interest to find the nature and duration of training necessary for bringing about significant "programme effectiveness" in relation to a set of teaching behaviours sought to be changed.
4. Besides previous related knowledge and intelligence other concomitant variables such as student achievement motivation, student perception of instructional setting etc., may be considered while adjusting for initial differences among them.
5. Studies can be conceived where student sample can be dictomized on the basis of certain criteria such as general mental ability, previous related knowledge etc., to find out in what way student gain in these groups is affected by a particular teaching behaviour pattern/patterns.
6. Besides achievement other product variables such as student attitude change, motivational change may be of research interest.

7. Non-verbal teaching behaviours as process variables also need research attention.
8. It may be of interest to study how cognitive growth of students exposed to different teaching behaviour patterns are retained over a period of time.
9. The possibility of non-linear relationship between teaching behaviours and student gain needs investigation.
10. It is felt that besides correlational and experimental studies, case study approach emphasizing intensive analysis of classroom interaction patterns of a few "effective" teachers may be helpful in generating hypotheses for experimental verification. No doubt, locating "effective" teachers will pose great problems with regard to both the criteria and criteria measures but some modest start can be made.
11. The present study gave an indication that asking significantly more of divergent questions and more of evaluative questions affected students mean achievement at understanding and application levels of cognitive growth. Should an attempt be made to incorporate these teaching behaviours into a teachers repertoire of teaching behaviour patterns? It is suggested that such an attempt with inservice or preservice teachers should be in the form of a research investigation.

12. Different conceptual approaches can be adopted for research in classroom teaching. One such approach is that suggested by Alschuler and his associates (1970) in which the emphasis is on improving student performance by training teachers in motivational development. These researchers, who are working primarily in the field of education, have demonstrated student improvement in performance as a result of training teachers in motivational development. This approach also needs further research attention. In India some attempt using this research approach in teaching has been reported by Desai (1970).

Whatever further research attempt is made in the area of teaching behaviours and student change, the aim should be towards contributing to an adequate psychological theory which may be used to explain and predict relationship between these process and product variables.