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INTRODUCTION

In Chapter III the preparation of self-instructional material, its tryout and final product development are discussed. The present chapter deals with installation and field testing of product, so also its effect on decision making behaviour of the student teachers.

For the field testing of the self-instructional material, the experimental strategy was used mainly because of, it provides a systematic and logical method of doing so. As defined by Sukhia, Mehrotra and Mehrotra (1982), "Experimental research is the description and analysis of what will be, or what will occur, under carefully controlled condition". In case of the present study, the objective was to find out what would happen after use of the material under carefully controlled condition. There is

a larger number of experimental designs available for this purpose. They are broadly categorized as pre-experimental, true experimental and quasi-experimental designs. The selection of a particular design is based upon the purposes of the experiment, the types of variable to be manipulated, and the conditions or limiting factors under which it is conducted. The design deals with such practical problems as how the subjects are to be selected for experimental and control groups, the way variables are to be manipulated and controlled, the way extraneous variables are to be controlled, how observations are to be made, and the type of statistical analysis to be employed in interpreting data relationships.

The adequacy of experimental designs is judged by the degree to which they eliminate or minimize threats to experimental validity, i.e. the influence or effect of intervening, extraneous variables.

For the present study pre-test post-test single group design was used.

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The independent variable was the use of self-instructional material in microteaching setting and dependent variable was general teaching skill, viz: Questioning for Feedback. The extraneous variables operating were, of course, many.

Although these variables or threats to the internal validity of experiment are inadequately controlled in pre-test post-test single group design, it was used for many reasons and practical difficulties in the study. Such use of single group experimental design is advisable only under certain conditions. They are listed by Sukhia, Mehrotra and Mehrotra (1982).

In single-group design -

- (1) A group of subjects is measured with regard to few factors under study.
- (2) All factors are kept constant except one, which is the experimental factor or the independent variable.
- (3) The experimental factor is applied for some definite and short period of time.

- (4) The group is again measured to determine the changes produced by the experimental factor in the dependent variable.
- (5) The single group design is easy to plan and operate and easily adaptable to class-room situation.

The threats of experimental validity, viz: maturation, history, differential selection, experimental mortality, etc. cannot be controlled in this design. However, in the case of the present study, some of these factors have little influence. The reasons for this are discussed below:

1. Maturation:

It connotes the changes in subjects in many ways over a period of time as a result of normal development and maturity. In the present study the span of treatment was of just seven days. Therefore, the effects of maturation could be assumed to be very little.

2. History:

History means occurrence of specific

external events beyond the control of researchers which affect the dependent variable.

In case of the present study teaching competency was the main dependent variable and this variable is influenced predominantly by observation of models and practice. These two major events were non-existent at the time of treatment.

3. Selection:

Selection bias was controlled to some extent by taking a random sample.

4. Mortality:

There was no mortality, that is, loss of subjects in the experiment.

The other threats to internal validity were, however, not taken care of and it was the main limitation of this study.

In spite of these limitations, the researcher had to select the pre-test post-test single group design for the following reasons:

- (1) Feasibility and convenience
- (2) Busy schedule of teacher education programme

(3) Co-operation from the subjects and administrators.

(4) Administrative difficulties.

1. Feasibility and convenience:

(a) Being a single group experimental design, there was no need for an additional assistant for conducting the experiment.

Getting such co-operation from the colleges was difficult due to their busy schedule.

(b) There was a problem of provision of space for conducting double group (control and experimental) experimentation which was not available in the institution.

(c) The use of single group experimental design has also reduced the time of testing.

2. Busy Schedule of Teacher Education

Programme:

In teacher education programme, the student-teachers are always busy with practical work and assignments and they are time bound. So, the

students were fully busy with them. In such busy schedule it was very difficult to expect many student teachers to spare time of seven days for experiment.

3. Co-operation from the subjects and administrators:

Generally, microteaching is conducted in B.A.B.Ed. and B.Ed. colleges in the beginning of the academic year but the material was not ready in the beginning of the academic year i.e. June. Fortunately, the unaided colleges started late. Hence, the experiment was organized in the closing period of the first term in the academic year of 1992. Naturally there were time restrictions.

In the light of all these difficulties and problems, pre-test post-test single group design was selected.

SAMPLE

For the purpose of drawing the sample, the universe was defined as all the students admitted in the colleges of education affiliated

to Shivaji University, Kolhapur in the year 1992-93. The students who constituted the universe had at least the following common features:

- (1) They were at least graduates in their qualifications.
- (2) They had opted for teacher training course.
- (3) They did not have any (or very marginal) experience prior to their training.
- (4) They had opted for teaching practice to be conducted through Marathi medium.

The students enrolled in each affiliated college were treated as the population of the universe. The population selected for the study was all student-teachers enrolled in Vasant Rao Naik College of Education, Kolhapur in the year 1992-93.

There was a division consisting of eighty students. The researcher selected nearly fifteen per cent random sample of the students, i.e. (twelve students) for this study. For doing so,

a list of eighty students was first prepared alphabetically. The number given to the first student was 00, for the second one 01 and so on and twelve students were selected using random number tables. The sample thus selected was composed of twelve gents students. The students were kept free from microteaching training. The list of names of students is enclosed in Appendix No.III.

TOOLS:

The tools used for the present study were as follows:

- (a) Process-Process-Appraising Scale of Teacher Effectiveness (PASTE).
- (b) Stimulated recall system (SRS).
- (c) The category system.

(a) PROCESS-PROCESS APPRAISING SCALE
OF TEACHER EFFECTIVENESS (PASTE)

PASTE was developed by Bhalwankar A.G. and Joshi A.N. (1981), for the appraising teaching performance of teachers and student-teachers as well.

The salient features of PASTE are as follows:

- (1) In PASTE unique combination of high and low inference variables are achieved.
- (2) It takes into account both teacher as well as pupil behaviours (i.e. the immediate product variables) so that it becomes a tool of measuring teacher effectiveness.
- (3) The combination of rating and counting makes the tool more objective than the rating scale and more feasible than category system.
- (4) It focusses on both qualitative as well as quantitative aspects of teaching.

The PASTE could be used in different ways for the purpose of research on teaching and teacher education as given below:

- (1) As an objective tool to measure and evaluate teaching, teaching competency and teacher effectiveness.
- (2) As a source of feedback in teacher education.
- (3) For the improvement of perception and performance of the teachers and student teachers.
- (4) For diagnosing the teachers.

The scale was extensively used in an exploratory study on teacher effectiveness and in a few colleges of education in Maharashtra. It was found to be very useful instrument and the results are encouraging and promising.

The PASTE consists of fourteen components. Each one has one or more sub-components. Each sub-component includes many teacher behaviours. In all, there are one hundred and thirteen teacher behaviours. Each teacher behaviour is to be rated on five points scale. Similarly, there are students' behaviours listed as the consequent behaviours of teachers' activities. The total number of students' behaviours is seventynine. Each student's behaviour is to be rated on three points scale. The final rating of each sub-component is done on the basis of teaching behaviour and consequent student behaviour. This is done on six points scale. There are eighteen sub-components. Therefore, the score will be out of ninety and ten marks are assigned for general impression. So, the total score will become hundred.

RELIABILITY

The PASTE is highly reliable and valid tool. The co-efficient of stability is 0.62, the content

validity is high, the co-efficient of equivalence is 0.69, and the validity of co-efficient is 0.68. The index of decision making accuracy is 0.91. Inter-observe reliability was established before its use, using Scotts which was above 0.80. The PASTE is enclosed in Appendix VI.

By using the abovementioned tool, the scores were obtained. For the achievement of the scores, the scoring system was applied as below:

The scoring system:

1. PASTE

In the present study, during the pre-test, the teachers' behaviour and consequent students' behaviours were observed by using PASTE. According to the observation of both behaviours, the final rating of each such component was done on six point scale. There were eighteen sub-components. Therefore, the pre-test scores were obtained out of ninety and for the general impression, the scores were given out of ten. So, each teacher's total pre-test scores became out of hundred.

The same procedure was used to obtain the scores of post-test. The scores are enclosed in Appendix VIII.

(b) STIMULATED RECALL SYSTEM:

The stimulated recall system was used originally by Bloom (1954). Such system consists of replaying a videotape or audiotape of a teaching episode to enable the viewer (usually the teacher of the episode) to recollect and report on his or her thoughts and decisions during the teaching episode. Variations in the use of stimulated recall include replaying only researcher-selected portions of the recording versus replaying the complete tape; researchers asking prespecified questions each time the tape is stopped versus soliciting open-ended commentary from the teacher; and researcher control of when to stop the tape versus teacher control or shared control.

The teacher's reports and comments about thoughts and decisions while teaching are audiotaped, transcribed, and subjected to content analysis, using appropriate category system. This category system will be also developed by the researcher. Connors (1978a) and Tuckwell (1980a, 1980b) provide a summary, analysis and

recommendations regarding techniques for conducting stimulated recall sessions and analysis of the resulting protocols. Calderhead (1981) offers a more theoretical and philosophical analysis of the limits and possibilities of stimulated recall in the study of teaching. (Clark and Peterson, 1978).

(c) THE CATEGORY SYSTEM:

For the interpretation of content of the thoughts, the category system was developed by the researcher. The category system is mainly useful for the analysis and interpretation of the nature of antecedent thoughts, types of decisions and actions of the teacher trainees in the class-room.

The category system is composed of four major folds. They are:

- (1) Category 1 : Antecedent
- (2) Category 2 : Thinking Process
- (3) Category 3 : Content
- (4) Category 4 : Instructional moves.

The details of each major category are as follows:

(1) Category 1 : Antecedent

The dictionary meaning of the word itself

is, 'Going before', 'Previous to'. It means that teachers think about preceding events or circumstances while teaching session.

This category is again divided into four sub-categories for better interpretation.

1.1 Preactive

1.2 Internal factor

1.3 Learner

1.4 Material

Each sub-category has been defined in detail as:

1.1 Preactive

According to Jackson's (1968) distinction, the teacher's preactive thoughts occur before or after class-room interaction. Such kind of thinking teachers do when they are not interacting with students in the class-room.

Preactive thinking sub-category has subsumed under the teacher planning category. Teacher Planning includes the thought process that teachers engage in prior to the class-room

interaction and also includes the thought processes or reflections that they engage in before or after class-room interaction.

For example, teacher plans the previous evening the reflections about his teaching the next day in the class-room.

The examples are given below:

1. त्याने चंद्रगुलाला कसा राजा बनविले, हे सांगायचे होते.
2. कारण त्याच्यावरून आपल्याला परस्पर संबंध शिकवायचा होता.
3. कारण मला Gampat likes to ask questions हे शिकवायचे होते.

1.2 Internal factor

During the interaction with the students, some part of the content would remain to be presented although the teacher wanted to present it or some times a teacher would not explain the matter (i.e. poor teaching) thoroughly. This is due to internal factor like, 'failure to retrieve', 'confusion', 'anxiety', etc. All these activities of teachers come under this sub-category. This sub-category can be measured after the class-room teaching.

Some examples are:

- (1) 'I forgot to explain the structure of Igloo.'
- (2) 'I felt that it is necessary to show the map of rice distribution in India but I didn't.'
- (3) मग माझ्या लक्षात झाले की शिकविण्याच्या ओघामध्ये माझा हा मुद्दा सरोवराचा राहून गेला.

1.3 Learner

This sub-category consists of students' learning behaviours. Teachers' reports of their interactive thoughts were concerned with the learner.

Examples include as follows:

- (1) 'I was thinking that they do not understand what they are doing.'
- (2) '..... and nobody was listening at all.'
- (3) त्या मुलीने माझ्या अपेक्षेप्रमाणे उत्तर दिले. टीकीचा धटक असून सुद्धा उत्तर दिले.
- (4) तो प्रश्न मी विचारला पण विद्यार्थी उत्तरे देत नाहीत म्हणून मला वाटले की त्रिशूजप्रदेश त्यांना समजून सांगायचा.

1.4 Material

While interacting some times, teachers use the black-board, teaching aids, scientific equipments, etc. Such activities come under the material sub-category.

Following examples make clear the sub-category:

- (1) The teacher writes some new words on the black-board while interacting.
- (2) Teacher uses teaching aids while teaching.

(2) Category 2 : Thinking Process

The teachers' reports of their interactive thoughts are categorized in this category. Teachers' statements about the learner including perceptions about the learner, interpretation about the learner, expectations about the learner, self-awareness about the learner, information and mediation about the learner, fall under this category. Therefore, this category is again sub-divided as follows:

2.1 Retrieval

2.2 Perception



2.3 Interpretation

2.4 Reflection

The explanations about each sub-category are as follows:

2.1 Retrieval

The dictionary meaning of retrieval is 'Recall'. The teacher's thinking related to the preactive phase or retrieval of the content is categorized as 'Retrieval'.

Some examples are as follows:

- (1) --- मला परत तांबड्या पेशींचे कार्य विचारलेले आहे, असे सांगणे लाडाले म्हणजे पुढीलज्ञानाची थोडीशी उजवणी घेतली.
- (2) --- म्हणून मी गुणोत्तर कसे काढायचे हे त्यांना परत सांगितले.

2.2 Perception

In perception category, the teacher reports a sensory experience (i.e. one that was seen or heard).

The examples are:

- (1) I found that her pronunciation of the word 'whether' was not correct.

(2) I observed that all students are paying attention.

(3) प्रत्येक विद्यार्थी उत्तरातील एकेक भाग सांगत होता.

2.3 Interpretation

The teacher attached subjective meaning to this perception in the units. This category comes closer to describe the thoughts - interactive thoughts.

Examples are as follows:

(1) I asked questions because I thought they might not have understood. So, I wanted to ensure about students' understanding.

(2) --- त्या प्रश्नाला योग्य प्रतिसाद मिळाना म्हणून मी त्यांना 'पाऊस पडला नसता तर' हा प्रश्न विचारला.

2.4 Reflection

Units in which the teacher was thinking about past aspects of, or events in, the lesson and its implications while interacting

Examples are as follows:

- (1) त्या आधी त्यांना कोष्टकावरून समजावून सांगितले.
- (2) त्यानंतर मूल्यमापनात्मक प्रश्न विचारला होता कारण मुलांना मुंबईला कापड गिरव्या जास्त आहेत हे सांगितले होते.
- (3) **Category 3 : Content**

In this category, the teachers' statements about their interactive thoughts dealing with the content or the subject matter, are included.

The examples of such a statement are:

- (1) "At this point here I wanted to focus in on the idea of Japan being to-day an industrial nation, rather than an agricultural nation."

(4) **Category 4 : Instructional moves**

The teacher reports of their interactive thoughts deal with the instructional process including instructional procedures and instructional strategies, and these go under this category.

Examples are as follows:

- (1) "I was trying to guide her into the sounding without actually having to do it."

(2) I thought after I explained it to her,

"I didn't make that very clear."

(3) विद्यार्थीना समजले असे समजून मी पुढे गेलो.

(4) --- आणि परत पुढेविकाणी आलो.

(5) --- तसे थोडेसे बाहेर (नियोजनापेक्षा) जावे लागले मला.

For the interpretation of the content of thoughts of student-teachers, Stimulated Recall System was used. The prespecified questions were asked on the selected portions of the recorded taught matter of pre-test and post-test. These student-teachers' answer statements were transcribed. The transcript of pre-test and post-test is enclosed in Appendix VII. Each statement of student-teachers was categorized according to the coding number of category earlier mentioned.

Category 1 : Antecedent

1.1 Preactive

1.2 Internal factor

1.3 Learner

1.4 Material

Category 2 : Thinking process:

2.1 Retrieval

2.2 Perception

2.3 Interpretation

2.4 Reflection

Category 3 : ContentCategory 4 : Instructional moves

As the statements made by the student-teachers were complex in nature, each statement was related to more than one category. The number of statements in each category statement and the statement related to each category were counted and the statements of all the four categories were added and then percentage of each category statements was found out. Percentage scores are enclosed in Appendix VIII.

OBSERVATION MATRICESOBSERVATION MATRIX FOR QUESTIONING
FOR FEEDBACK

The observation matrix of questioning for feedback consists of five desired behaviours as well as five undesired behaviours. They are as follows:

Desired behaviours:

- (1) Testing assumption of previous knowledge.
- (2) General feedback question.

(3) Specific feedback questions

(a) Comprehension

(b) Application

(c) Open

Undesired behaviours:

(1) Uneven distribution

(2) Evaluative reaction

(3) Lack of attention to pupil response.

(4) Inadequate feedback question

(5) Non-use of feedback.

The main purpose of observation matrix is to observe a five/seven minutes micro-lesson. Therefore, there are ten/fourteen columns, each one indicating an interval of thirty seconds. Whenever the behaviour mentioned in the matrix occurs in the specified time interval, it is to be noted down.

STRATEGY

After the selection of the sample and tools the experiment was started on Eighth of October, 1992. The programme of experiment is given in

figure No.5 and is briefly described below

The first day : All the students selected for the study were invited. They were explained the purpose and performance of the experiment and also were instructed about the testing.

The second day : Six student-teachers gave a
and : lesson of fifteen minutes and

The third day : it was observed using PASTE by the researcher herself. Each lesson was audiotaped. No guidance regarding the selection of unit and planning was given to the trainees. For the lesson, the primary school pupils of VII Standard from school were brought.

After completing the teaching session, immediately each lesson of the student-teachers was analysed by stimulated recall system for their thought processes.

The fourth day : The self-instructional material of skill Questioning for Feedback was distributed to the students for reading. It was more or less a supervised study. After the reading was over, their doubts and difficulties were discussed.

The fifth day : The students prepared lesson plan at home and came with preparation for teach session. Each student-teacher taught a lesson of five minutes. This was followed by critique session.

The sixth day : The students prepared lesson plan for reteach at home and came with preparation for reteach session. Each student-teacher taught a lesson of five minutes. This was followed by recritique session.

The seventh day : The students prepared their lesson plans at home which were

on the line of pre-test. Each student-teacher taught a lesson of fifteen minutes. Each teaching of the student-teachers was audiotaped.

After teaching, immediately the thought processes of the student-teachers were analyzed by using stimulated recall system.

The photographs of supervised study and teaching session are given in figure number 6 and 7 respectively.



Fig 6. Supervise study.



Fig. 7. Teaching session.

Sr. No.	Activity	Time	Date
1.	Introduction and Orientation	10.00 To 12.00	8.10.1992
2.	Pre-test		9.10.1992
	(A) Teach (only six students)		
	(1) Teaching performance of 15 minutes lesson	10.00 To 12.00	
	(2) Recording on audiotape		
	(3) Student-teacher was observed using PASTE		
	(4) Each lesson was analyzed by SRS	12.30 To 3.30	
	(B) Teach (only six students)		10.10.1992
	(1) Teaching performance of 15 minutes lesson	10.00 To 12.00	
	(2) Recording on audiotape		
	(3) Student-teacher was observed using PASTE		
	(4) Each lesson was analyzed by SRS	12.30 To 3.30	

Sr. No.	Activity	Time	Date
3.	Training for Questioning for Feedback in microteaching setting		11.10.1992
	(1) Reading and administration of self-instructional material prepared on skill, viz: Questioning for Feedback	10.00 To 12.30	
	(2) Doubts and difficulties were discussed	1.00 To 3.30	
4.	Post-test		12.10.1992
	(A) Teach		
	(1) Teaching of five minutes micro-lesson	10.00 To 12.00	
	(2) Critique session	12.30 To 3.30	
	(B) Reteach		13.10.1992
	(1) Reteaching of five minutes micro-lesson	10.00 To 12.00	
	(2) Critique session	12.30 To 3.30	

Sr. No.	Activity	Time	Date
5.	Post-test on the line of pre-test		14.10.1992
	(1) Teaching programme of 15 minutes	10.00 To 1.00	
	(2) Recording on audiotape		
	(3) Each lesson was analyzed by SRS	1.30 To 3.30	

Fig. No. 5 : Programme of conduct of the experiment.

The following types of data were available at the end of the experiment.

- (1) 12 Pre-test teaching performance scores.
- (2) 12 pre-test Thought processes
- (3) 12 Pre-test scores of analysis of thought process.
- (4) 12 Post-test teaching scores
- (5) 12 Post-test teaching thought processes
- (6) 12 Post-test scores of analysis of thought processes.
- (7) Student-teachers responses about the programme.

- (8) Interaction indices based activities included in the material and performed by the student-teachers as well as teacher-educators. They were indicative of their interaction with the material.

The analysis of the data and interpretation is presented in the next Chapter.