PUPIL PARTICIPATION AND CURRICULUM RELEVANCE

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Abstract

Some results of formative research carried out in primary schools in rural India have been presented. The relationship between the lesson content and the participation of the pupils has been investigated. The spontaneous participation of pupils in teacher-directed classrooms is shown to be correlated with the time spent by the teacher in relating the content of the text-book to the natural experiences of the pupils. The use of an experiment or a teaching aid is also found to be useful in drawing participation from the pupils. The results of the study are relevant for teachers working in a traditional, teacher-dominated system of education.

Introduction

There has been a growing realization among science educators in developing countries that the curriculum in science must be made relevant to the life-styles of the pupils (Ministry of Education, 1966; Myrdal, 1968; Brown, Kedves, & Wenham, 1971). Curriculum development groups in several countries have taken up the task of relating science with pupils' experiences in daily life (Robson, 1970; Delhi University Science Teaching Group, Friends Rural Centre, Rasulia, and Kishore Bharati, 1977; Kulkarni, 1978).

Another matter of concern to educators has been the low level of pupil participation and pupil initiation in the classroom. Studies conducted in the United States have found that pupil initiation occurs in less than ten percent of classroom interaction time (Dunkin & Biddle, 1974) while in Indian classrooms pupil initiation has been found to occur in two percent of the classroom interaction time (Buch, 1975).

The Homi Bhabha Centre for Science Education undertook a curriculum development project in science in a cluster of 15 primary and middle schools in rural India. One of the main aims of this project was to increase the level of pupil participation and initiation in the class-room. The several aspects of the project and its evaluation have been documented elsewhere (Kulkarni, 1978; Kulkarni & Taskar, 1978 a,b). This paper presents some results of the formative part of the project evaluation, which was carried out mainly to test the practicability of the philosophy behind the curriculum development project.

Specifically, an attempt was made to test whether the level of pupil participation and initiation in the classroom was related to the relevance of the curriculum, and thus to measure the effectiveness of some of the operational instructions given to the project teachers.

Rationale

Pupil initiation has been defined by Flanders (1970) who has suggested several strategies, based on analysis of teacher-pupil interaction, for increasing pupil initiation in the classroom. There is some evidence to suggest that pupil initiation is related to the personal qualities of the teachers, like for example, the teacher's humanistic attitudes towards pupils and teacher expectations for pupil achievement. (Dunkin & Biddle, 1974; Mehta, 1974.)

The concept of pupil initiation, as it is generally used, includes initiation of a new topic for discussion in the classroom and the development of a line of thought by an individual pupil (Flanders, 1970). This part of the concept of pupil initiation is not applicable in an Indian classroom due to the nature of the classroom proceedings which tend to be highly teacher-centered. In this study, the pupils' participation in the classroom was measured in terms of (1) the frequency of occurrence of spontaneous responses and (2) the time during which there were no individual responses and most of the pupils were showing a lack of interest.

The qualities of the teacher which were found to be correlated with pupil participation were controlled for, so that previously unexplored curriculum-related variables could be studied. An attempt was made to isolate one dimension of the lesson, that is, relating of the content of the textbook to the experiences of the pupils, and to show that it had a positive effect on the pupils' interest in the lesson and on their spontaneous responses in the classroom.

Method

156 class-sessions were observed in 30 schools, all located within a radius of 10 miles in the Jalgaon District in the State of Maharashtra, India.

The teachers in 78 of these class-sessions belonged to the experimental group and had been trained to get pupil participation. The other 78 class-sessions were conducted by the teachers of the Project control schools.

The duration of the lessons ranged from 10 to 25 minutes with a mean duration of 18.6 minutes.

There were three observers in the classroom. These observers had been frequent visitors to the classrooms for a year before the actual collection of data started. Thus the pupils and teachers in both the experimental and control classrooms were quite accustomed to having the observers sitting at the back of the classroom during the class-sessions.

Instruments

New tools were developed (Kulkarni & Taskar, 1978a) for the evaluation of the science Teaching Program. The relevant features of the tools are described below.

The record of classroom events consisted of three parts. The first two parts were time sequence records, based on the categories shown in Tables I and II.

The term "focus of attention" in Table I may be understood in the following context. The atmosphere in the classroom varied from a total authoritarian one in which the teacher dictated everything to a more or less permissive one in which the pupils were allowed to think and respond freely and naturally to any situation. However, irrespective of the nature of the atmosphere in the classroom, the teacher was always in charge of the proceedings. It was the teacher who allowed or withdrew freedom, started or ended any discussion, decided which experiment or activity to conduct, and set the pace of instruction. In this sense, all session could be described as "teacher directed." Therefore, at any time during the session, the "focus

TABLE I
Foci of Attention in a Classroom

Category	Sub - categories
Natural life experiences	Facts
	Comparisons
	Patterns
Experiments	Apparatus
	Skill
	Innovations
	Meaning
Teaching aid	Hardware
	Effective use
Textbook	Terminology
	Facts

of attention in the class-room" (as described by the categories in Table I) was determined by the teacher and could be coded without ambiguity.

The categories listed in Table I are not mutually exclusive. For example, categories of (1)
Experiences or (4) Textbook, could overlap with categories of (2) Experiment or (3) Teaching-aid.

To remove this source of ambiguity categories (1) and (4) were recorded only in the absence of (2) and (3). Such a procedure introduced a hierarchy in the coding. However, this hierarchy did not affect adversely the procedure of the evaluation since the lessons with and without experiment and also those with and without the use of a teaching aid were analyzed separately. It may be pointed out that under the prevailing conditions a lavish use of teaching aids and demonstration experiments etc. is virtually ruled out. The hierarchy mentioned above, therefore, did not pose any problems.

The rater agreement of the coding was found to be very high, with no discrepancy in a sample of 200 instances in ten lessons coded by two observers at half minute intervals.

The second time-sequence record used categories of pupil behavior (Table II).

Again, the recording was done every half minute. The category of group activities was determined by what the majority of the pupils were doing at that time. The rater agreement for
the coding was again found to be very high, with only one discrepancy in a sample of 200 instances in ten lessons coded simultaneously by two observers.

The third observer in the classroom kept a record of the other essential details of the lesson, such as, order of presentation of concepts, factual and conceptual errors, details of the experiment etc. Table III shows the items which are relevant to this paper.

There was an inventory of 29 teacher qualities and other attributes of the lesson which the evaluators rated on a seven-point scale at the end of the lesson. A principal components analysis

TABLE II
Categories of Pupil Behavior in the Classroom

Individual Responses	Qualification
1. Providing innovations in handling initiative	a. on own
equipment prompted by	b. On being
	the teacher
2. Making a logical argument interruption of	c. by
(Irrespective of right or wrong) narration	teacher 's
3. Pointing out an error/showing occasional pause	d. during an
provided by	not deliberately

4. Suggesting a new pattern
   (Irrespective of right or wrong) deliberately

e. during time provided by the teacher

5. Seeking clarification

6. Narrating direct or indirect
   experiences

7 Pointing out any special feature
   (Including similarities/differences)

8 Handling equipment or blackboard

Group Behavior
1. Passive participation such as listening, watching, copying blackboard work
2. Group activities (experimental or otherwise)
3. Answering elliptical questions or cheap recalls
4. Showing lack of interest

Performed on these ratings showed that the 29 qualities could be reduced to five factors:

(1) Teacher's knowledge of the science content;
(2) Speed and development of the topic;
(3) Quality of the experiment performed during the lesson;
(4) Novelty of ideas; and
(5) Teacher-pupil interaction.

The items in the inventory which are relevant for this discussion are included in the factor of "Teacher-pupil interaction." These items are displayed in Table IV along with the inter observer agreement which is the Kendall rank-order correlation between ratings arrived at by two independent groups of observers.

Analysis of the Data

It is interesting to look for a relationship between the spontaneous responses of the pupils and the focus of attention in the classroom. The original plan was to carry out a time-sequence analysis of the lesson in order to find out whether the spontaneous responses of the pupils (coded in categories (a), (c), and (d) of Table II) were associated with any particular focus of attention or any pattern of foci which preceded the pupil's response. However, it was found that the spontaneous responses were quite infrequent and typically did not occur in more than half the lessons. In a Sample of 10,400

half-minute intervals, spontaneous responses of types (c) and (d) occurred during 234 intervals. Responses of type (a) were absent.

Thus, using a time-sequence analysis to look for a phenomenon which is very rare in a
Teacher-directed classroom was found to be inappropriate.

As an alternative, a class-session was taken as the unit of analysis and relationship between

TABLE III
Some Relevant Items in the Classroom Observation Pro forma

1. Distribution of opportunities (questions, participation in observations, experiments etc.
   To selected few/To those seated near the teacher/Random
2. Responses obtained from
   a. Selected few/Those seated near the teacher/Random
   b. Quite frequently the class answered in a chorus
3. Did the teacher rely entirely on elliptical questions?
   a. Yes/ No
   Were questions designed to obtain only expected answers?
   b. Give approximate number
   Were the pupils helped in their thinking by guide questions?
   c. Often/Sometimes/Rarely
4. How were the responses treated?
   a. Only expected answers were accepted
   b. All responses were treated on equal footing
   c. Wrong or irrelevant responses were handled/ignored/pupils penalised for wrong answers
Were the responses analysed and used to bring out patterns?
   Often/Once/Never

TABLE IV
Qualities Included in the Factor of "Teacher-Pupil Interaction"

No.	Quality	Scoring considerations	Scoring Reliability
1	Opportunities for pupil participation	Quality of opportunities Frequency Distribution of opportunities	O. 67
2	Questioning technique	Refraining from elliptical questions and very simple recalls Planning a series of questions to point out a pattern Seeking expensive recalls	0· 55

	Asking supplementary questions to aid thinking	
3 Treatment of pupils' responses	Accepting all responses instead of only preconceived expected answers . Attempts to generate patterns out of the responses Quality of the patterns so generated	0. 56
4 Friendliness of the teacher	Permissiveness of atmosphere in the classroom Treatment of unexpected or wrong responses Language of expression and the tone of voice of the teacher	0. 44
5 Teacher's concern for the pupils	Paying special attention to disadvantaged pupils Ensuring that all pupils understand Showing consideration to the Non-academic and psychological needs of the pupils	0. 56

the frequency of occurrence of spontaneous responses and that of the foci of attention during the lesson was looked for. The rationale for this choice of the unit of analysis was that the pupils' participation in the lesson is likely to be the cumulative effect of their previous experiences with the teacher.   The frequencies of the foci of attention during any lesson could be expected, therefore, to indicate a trend that was common to that teacher's lessons.

With this premise, it was possible to test the hypothesis that the frequency of occurrences of spontaneous responses is correlated with the time spent during the class in relating the course content to the experiences of the pupils.

The teachers' scores on the qualities of questionning technique, treatment of pupils' responses, friendliness and concern for the pupils, were found to be positively correlated with both the frequencies mentioned above. To avoid complicating factors, these qualities had to be controlled. The length of the lesson was also controlled, because the probability of any event occurring during a lesson increases with the duration of the lesson.

The hierarchy inherent in the recording of the "focus of attention" ("Experiences" and "Textbook" were recorded only if "Experiment" or "Teaching-aid" were absent) made it necessary to analyze lessons with/without "experiments" and with/without "teaching-aid" separately. For the lessons in which a teaching-aid or an experiment was used, it is reasonable to assume that the distribution of the frequencies of "Experiences" and "Textbook" within the "Experiment" or "Teaching-aid" time, is the same as it is outside that time. Thus the co-efficients of correlation are still valid indicators of association between frequencies.

The partial correlation coefficients between frequencies of the main categories of the focus of attention and frequencies of (i) spontaneous responses and (ii) instances when most pupils were showing disinterest in the class, are displayed in Table V. The variables controlled for are teachers' scores on the qualities in Table IV and duration of the lesson.

TABLE V
Partial Correlation Coefficients Controlling for the Teachers' Scores on Teacher-Pupil Interaction Qualities and Duration of the Lesson

Variable - pairs	Lessons with experiment		Lessons without experiment	
	With teaching aid	Without teaching aid	With teaching aid	Without teaching aid
	N = 17 df = 9	N = 58 df = 50	N = 36 df = 28	N = 44 df = 36
Relating to experiences with spontaneous responses	.83*	.21 ns	.08 ns	.32*
Relating to experiences with lack of interest	.07 ns	-.22 ns	.21 ns	-.36*
Teaching-aid with a spontaneous responses	-.37 ns	-	.35*	-
Teaching-aid with lack of interest	.27 ns	-	-.36*	-
Textbook with a spontaneous responses	-.48 ns	.15 ns	-.37*	-.32*
Textbook with lack of interest	-.14 ns	.02 ns	.08 ns	.36*
Experiment with a spontaneous responses	.07 ns	.01 ns	-	-
Experiment with lack of interest	.09 ns	.10 ns	-	-

*significant at Υ = .05 (two-tailed)

TABLE VI
Significant Differences Across Rows in Table V

	Lessons with experiment	Lessons without experiment	P

	With teaching aids	Without teaching aids	With teaching aids	Without teaching aids	s
	N = 17 df = 9	N = 58 df = 50	N = 36 df = 28	N = 44 df = 36	
Relating to experiences with a spontaneous responses	.83			.32*	.015
	.83	.21			.006
	.83	ns	.08 ns		.003
Relating to experiences with lack of interest			.21 ns	-.36*	.011
		-.22 ns	.21 ns		.034
Teaching-aid with a spontaneous responses	-.37 ns	-	.35	-	.031

Results

The partial correlation coefficients suggest a systematic relationship between the focus of attention and the pupils' participation in a teacher-directed classroom. The correlation coefficients are slightly inflated due to the fact that the data from both the experimental and the control groups of the project were included in the analysis. However, the significance of the correlations is genuine. Differences between correlation coefficients for the experimental and control groups were not found to be significant.

The analysis indicates that spontaneous responses are obtained from children if the teacher spends more time relating the content of the lesson to the experiences of the children. This relating to experiences was more effective in drawing responses when a teaching aid and an experiment were used. However, since the time spent on the experiment is not correlated with the number of spontaneous responses, the effectiveness of the experiment must be nonlinear with time. This might mean that there is an optimum duration of the experiment which is effective in getting the children to respond spontaneously. The same thing does not seem to be true of the use of teaching aid, at least for the normal range of duration of the lesson.

In lessons where the teacher spent more time relating the content of the textbook to the experiences of the pupils, there were fewer occassions when most of the pupils were showing disinterest in the lesson. The same was true of the use of a teaching aid, although in this respect and in drawing spontaneous responses, the teaching aid was more effective when no experiment was performed. Similarly, the effectiveness of relating the content to the pupils' experiences showed up when no teaching aids were used.

Conclusion and Implications

The results of this study are relevant for a teacher in a traditional, teacher-directed science class. In Western countries there is a long history of liberal, pupil-centered styles of teaching and in these countries the preoccupation now is with discipline problems in the classroom. However, in Indian classrooms the teaching practice has been authoritarian and teacher-centered for many years and the problem for teacher educators is to shift the emphasis in the classroom to the learners.

In this paper we have shown that the content of the curriculum and the method of presentation are important factors in the spontaneous participation of pupils during the lesson. From the point of view of teacher-training and in-service education, these factors are easier to change than the attitudes of the teachers. We hope that our findings will stimulate further research in this direction.

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