

S Y N O P S I S

Background

The Homi Bhabha Centre for Science Education (HBCSE) at the Tata Institute of Fundamental Research, undertakes action research projects aimed at improving science and mathematics education in the country. The primary thrust of these action research projects is to identify socio-cultural, pedagogic, and linguistic factors that hamper the scholastic progress of first generation learners and to design, implement and evaluate specific remedial measures.

The work described in this thesis arose out of one such project. This project aimed at identifying factors hampering the progress of scheduled caste students studying in the secondary schools of the Bombay Municipal Corporation, and at designing specific remedial measures to boost their scholastic achievement. This project has now been conducted for over six years, covering three batches of forty students each, whose scholastic achievements were improved substantially.

To ensure that remedial measures designed in such an action research project are eventually implementable over the

entire system, efforts were made to keep unit costs low, and to avoid measures which would depend critically on the availability of expensive resources (human and material). The interaction with the students was limited to weekly sessions of three hours, that is, to hundred hours in an academic year. The students received the remedial inputs at the HBCSE laboratories located in one of the secondary schools of the Corporation for three years, covering class VIII, IX and X.

The academic account of this project is presented in this thesis.

Introduction

Science and mathematics are being taught on a compulsory basis upto the school leaving stage in the state of Maharashtra. This move has brought about uniformity in syllabus in rural and metropolitan areas with a view to establishing equality of educational opportunities. It also served to eliminate the softer option which students from weaker sections were tempted or encouraged to choose. However, a substantial number of students, especially from the socially backward groups, are finding it difficult to benefit from this reform as seen by the high failure rate in the S.S.C. examination. It would be highly rewarding to study academic reasons for this failure and design, implement and evaluate remedial measures.

This thesis is concerned with three aspects :

- (1) To identify factors hindering scholastic progress of students from the socio-economically deprived sections of the society.
- (2) To design and implement appropriate and inexpensive (which could be easily implemented in the school system) remedial measures to overcome the identified difficulties.
- (3) To evaluate the effectiveness of remedial inputs.

All these aspects relate to concepts in science and mathematics for standards VIII, IX and X.

Organization of the thesis

The thesis is divided into five chapters. Chapter 1 deals with the problem, its scope and limitations, and its relevance in bringing about true equality in educational opportunities in various sections of the society.

Chapter 2 deals with the design and procedure adopted in this study. Choice of sample, selection of experimental and control groups, methods and tools for identifying factors that hinder scholastic progress, mode of providing remedial inputs and strategy for conducting formative and summative evaluation are described in detail.

Chapter 3 deals with various learning hurdles identified in the experiment. Hurdles arising out of lack of learning prerequisites, non availability of educational opportunities and underdevelopment of communication competence are discussed. The remedial measures undertaken to overcome learning hurdles are also described in this chapter. This description covers several aspects like, content enrichment, attempts to facilitate concept formation, design of a laboratory programme, use of question answer sessions, vacation assignments and developing familiarity with the examination system. Results of formative evaluation during the implementation of these measures are also described.

Chapter 4 presents the results of summative evaluation. Two different aspects of the effectiveness of remedial inputs are discussed. 1) Scholastic progress as seen in the final examination and 2) Changes in behaviours and attitudes of the project students.

Chapter 5 presents conclusions and some relevant observations. Major findings along with their implications for classroom teaching are discussed. A brief account of proposed large scale expansion is also given. Finally, a few relevant issues that need further exploration are enumerated.