

EVOLVING SYSTEMS FOR INTRODUCING INNOVATIONS
IN SCHOOL EDUCATION

A proposal for District-level Testing
of the Hoshangabad Science Teaching Programme

Submitted by

Department of Science
Regional College of Education (NCERT)
Shyamla Hills, Bhopal
Madhya Pradesh

in consultation with

Friends Rural Centre Rasulia and Kishore Bharati
District Hoshangabad, Madhya Pradesh

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PRELIMINARY REMARKS

At a meeting convened at the Regional College of Education, Bhopal on October 26, 1977, the Friends Rural Centre Rasulia and Kishore Bharati made a proposal for testing the feasibility of the Hoshangabad Science Teaching Programme in all the middle schools of Hoshangabad District under the joint auspices of the Government of Madhya Pradesh and the NCERT. The meeting was attended by the following :

1. Dr Shib K Mitra, Director, NCERT
2. Shri B M Date, Secretary, Department of Education, Government of Madhya Pradesh
3. Shri Sewa Ram Chaturvedi, Joint Director, Directorate of Public Instruction, Bhopal
4. Prof. S N Saha, Principal, Regional College of Education, Bhopal
5. Smt Vijaya Mulay, Principal, Centre for Educational Technology, NCERT
6. Dr J S Rajput, Department of Science, Regional College of Education, Bhopal
7. Shri Sudarshan Kapur, Friends Rural Centre, Rasulia
8. Dr A P Gupte*, Friends Rural Centre, Rasulia
9. Shri Kamal Mahendroo, Kishore Bharati, Bankhedi
10. Dr Anil Sadgopal, Kishore Bharati, Bankhedi

The Secretary, Department of Education, Government of Madhya Pradesh, and the Director, NCERT, agreed to the proposal in principle and extended both administrative and financial support for its implementation by July, 1978 (1). The Regional College of Education was directed to submit a detailed Project proposal for consideration under the next Five Year Plan. Since then a number of meetings have been held amongst the representatives of the Directorate of Public Instruction, the Regional College of Education, the Friends Rural Centre Rasulia and Kishore Bharati. In particular, the Joint Director of Public Instruction, the Divisional Superintendent of Education (Narmada Division) and the District Education Officer, Hoshangabad, have been closely consulted in the planning of detailed implementation mechanisms. Basically, the following Proposal takes guidance from the broad outlines laid out at the meeting held last October and at the series of meetings convened since then. The Proposal is based upon the data provided by the District Education Office of Hoshangabad on the local educational institutions. Special surveys of the local Higher Secondary Schools were also undertaken to gain a realistic appreciation of their possible role in innovation at Middle School level.

* On deputation for three years from Government Degree College, Rampura, District Mandasaur, or a UGC Teaching Fellowship

1. INTRODUCTION

1.1 The stagnancy of the basic direction, content and the methodology of our education system is now an accepted reality. The end of the British Raj and the formation of a national government has made little fundamental difference to the educational structure. The only hope of breaking this stagnancy lies in continuous and open-ended innovation and experimentation. Such innovations, however, are normally introduced only at micro-level, namely a single class or school, or a group of schools. More often than not, innovations are permitted and encouraged in private school networks alone. The Government has tended to 'tolerate' innovative activities only in the domain of voluntary or private initiative. The fact that innovations are generally introduced by 'idealistic and dedicated men and women' has been the basis for euphemistically considering such improvements as 'novelties' and, thereby, untenable. The above characteristics of educational experimentation have resulted in a state in which innovations are generally allowed to die out and their lessons are forgotten. The status quo thus prevails. This is what happened to the great experiments at Shanti Niketan, Jamia Milia, Aurobindo Ashram, Sewa Gram and a host of other places. These experiments, though glorified, have remained essentially confined and were slowly lost in history. Their successful experience in ungraded classrooms, 'open schools', linking folk art with learning, integrating vocation with education, and relating learning to social action were all conveniently ignored. The established educational system continued unconcerned and unaffected.

The present proposal, therefore, is concerned with the problem of evolving systems for introducing innovations at macro-level in large Government school networks with the objective of initiating long-term changes. The Proposal is based on the premise that the traditional 'island' or 'oasis' view of innovation is socially irrelevant and elitist; innovation will be meaningful only when the process becomes integrated into the vast national educational apparatus for the benefit of the masses.

1.2 Given a stagnant system, it would be necessary to build special capabilities, both human and administrative, with the objective of creating effective channels for the spread of educational change. Development of these new strengths in the traditional system will demand a commitment from the Government to a style of functioning which is free of bureaucratic stranglehold and hierarchy in educational administration. It also demands a commitment to build fresh human resources and to reorient the existing ones for creating a self-learning and continuously evolving base in the school system. The building of such a base within the Department of Education, Madhya Pradesh, is the focus of the Hoshangabad Experiment proposed here. The large financial expenditure inherent in such resource development can be meaningful and justified only if the Government can view such resources as catalytic nuclei for further innovation at both regional and national levels. In line with the recommendations of the Kothari Commission, it is imperative that the human resources

available in the Universities, Colleges, Higher Secondary schools, and Teacher Training Institutes are utilized to their maximum potential in any programme of improvement in school education. Therefore, the present Proposal takes a conscious step in testing the concept of the University-College-School Complex as an integral part of the implementation mechanism for expanding an innovation. The utilization of this Complex will also necessitate fresh adjustments and modifications in the pattern of governing both higher and school education.

1.3 The Proposal emanates from the now widely known 'Hoshangabad Science Teaching Programme' which was introduced by the Friends Rural Centre Rasulia and Kishore Bharati in sixteen middle schools spread over two development blocks of Hoshangabad District. It is a unique instance of a State Government accepting the role of voluntary agencies in changing school education within its own framework. The Hoshangabad Programme undertook to investigate the feasibility of the 'discovery approach' and 'activity-based learning' of science under rural school conditions. In the course of time, the concept of environment-based learning was also included. The Department of Education played a special role by extending much-needed administrative backing and academic freedom to experiment with books, kit, curricula, teacher-training and examination methods. Both the Government of Madhya Pradesh and the NCERT have watched the unfolding of the Hoshangabad Experiment with keen interest during the past six years. It is now being proposed that the experience and insight gained by the two voluntary agencies be utilized by the Government and the NCERT by testing the feasibility of the environment-based discovery approach in about 165 middle schools (approximately 20,000 students) spread over ten development blocks of Hoshangabad District. The human resources to be developed within the Government system during the expansion of this innovation, it is hoped, would become the vehicle for widening educational change to other regions of Madhya Pradesh as well.

2.0 SPECIAL FEATURES

The experience gained and the methodology evolved during the Hoshangabad Science Teaching Experiment has been discussed elsewhere (2,3). The distinguishing features of the Hoshangabad Experiment are summarized below :

2.1 Learning Method : The children learn science primarily by arriving at conclusions through experiments, field trips, observation, data collection, interpretation of their results in the form of drawings and graphs, and finally, by analytical discussions under the guidance of the teacher. The teacher's role is transformed from being an imposing fountainhead of all knowledge to one acting as guide and helper in learning through experience and analysis. The programme has amply demonstrated that it is indeed possible for village children in Government schools to learn science through the environment-based discovery approach.

2.2 The Role of Environment : Special emphasis has been placed on the utilization of the environment as a rich source of learning. A system of field trips to agricultural fields, rivers, rocks, forests and the village has been evolved and tested. Biology is primarily learned through this method.

2.3 Workbooks (4) : A complete set of workbooks has been developed and subjected to extensive trials and revisions. The workbooks do not give facts, definitions or information but instead give only instructions for performing experiments and for conducting field trips followed by a set of questions. The curriculum (5) covered by these workbooks has been examined by the Madhya Pradesh Textbook Committee and found to be equivalent to the material covered in the traditional curriculum. Therefore, the M P Textbook Corporation has been authorized to publish these workbooks from this year onwards.

2.4 Kit (6) : A simple and versatile kit has been developed to enable the children to conduct experiments in groups of four each with their own hands. Approximately one third of the kit is constituted of items collected from the village. It should be emphasized that the kit is meant for activity and not merely demonstration. The kit is continuously subjected to revision to make it more suitable for rural conditions.

For an average size middle school from classes six to eight (40 children per class), the initial investment in the kit is about Rs.800/-. The cost of packing and transporting the kit is likely to be an additional Rs.200/-. The subsequent annual replacement cost works out to be Rs.1.25 per student. It is proposed that the children should be asked to pay for the annual replacement cost.

2.5 Teacher Training : An average Government teacher can be reoriented and trained in the discovery approach by building up the necessary motivational and attitudinal environment during the training schedules and follow-up work. Technical experience of the methodology of teacher training for this purpose is available with the Hoshangabad Science Teaching Group (HSTG)*.

2.6 Follow-up : A crucial realization is regarding the role of follow-up in teacher training programmes. The experience shows that a training programme without a substantial follow-up component is likely to be a wasteful exercise. Regular follow-up involving both school visits (an average of twice per month) and monthly meetings with teachers is necessary not only to assist the teachers but also to collect feedback from the classrooms. This feedback becomes the basis of all future planning and material development.

2.7 Examinations : Traditional examinations chiefly test the students' capacity to memorize and recall facts from books or dictated notes. In contrast, the Hoshangabad Experiment emphasizes the qualities of independent observation, data collection, free thinking, and logical deduction. It also seeks to test the extent of a child's readiness and ability to innovate through physical experimentation when faced with a new problem. The traditional testing procedures, including the so-called 'objective tests', are basically incompatible with the aims of learning science through the discovery approach. This contention has been accepted by the Government which gave the Hoshangabad Experiment freedom to evolve and execute its own examination system in science. Earlier attempts at educational change by voluntary agencies have failed precisely when the Government did not recognize the incompatibility of the traditional examinations with the new approach.

2.8 Methodology of Material Development : It is a contention of the programme that a meaningful teacher-training system, work-books, kit, and learning methodology can be evolved only through direct interaction with the teachers, students, school administration, and village environment. Any material prepared at urban headquarters, irrespective of the quality of scholarship behind it, will turn out to be not only impractical but also irrelevant. In the Hoshangabad Experiment, therefore, all of its material was evolved during the teacher training courses, and was further modified on the basis of feedback gathered through follow-up meetings and school visits. Despite this close interaction, the material finally proposed for district level expansion should be considered tentative and open to further modification.

2.9 Contradictions : It is now generally accepted that 60 to 70 per cent of the village children either do not enter the village schools or drop out at an early age. It is also known that a majority of the children who finish middle school in the villages do not proceed to higher secondary schools. These limitations arise mainly out of the conditions of poverty. The answers to this malady are not expected from the formal system. Despite these contradictions, schools continue to be the only available open channels for communicating with millions of village children who somehow manage, though briefly, to interact with the school. The schools, therefore, need to be made as relevant and effective as possible. The development of material and methodology in the Hoshangabad experiment has been consciously guided by the knowledge of the above disparities, and not by idealized and irrelevant formulations developed by and for urban elite groups. In addition, the attainment levels of the children at the time of entering the middle schools, their limited numerical and linguistic skills, the restraints placed by the teachers' cynical attitudes, and the bureaucratic school administration have also been taken into account while developing the programme. A detailed discussion of how these factors have a major bearing on the teaching methods and curriculum development is available (2,3).

2.10 University-College-School Complex : From the very beginning of the Hoshangabad Experiment, the significance of utilizing the human resources of the Universities, Colleges and the Higher Secondary Schools has been fully recognized. The initial impetus was given by groups from the All-India Science Teachers Association (Physics Study Group) and the Tata Institute of Fundamental Research, Bombay. This original combination was later joined by a group of faculty members and research students from the University of Delhi which has since taken upon itself the entire academic responsibility. The Delhi University Group has received the official support of the University Grants Commission to participate in the Hoshangabad Experiment. The Government of Madhya Pradesh has also permitted some of its post-graduate college teachers to participate in this Programme on a regular basis. An Assistant Professor of Zoology from a Madhya Pradesh Post-Graduate College has been recently deputed on a UGC Fellowship to work in the Hoshangabad Experiment. The supportive decision of the UGC, Delhi University, and the Madhya Pradesh Directorate of Collegiate Education has set a precedent in the country in recognizing the rôle which can be played by the University and College Community in the improvement of school education at village level. A positive and significant result of this University-College-School interaction is the gradual breaking down of the elitist character of the institutions of higher education, thus preparing conducive ground for

3.0 IMPLEMENTATION

As discussed earlier (cf. Introduction), it is proposed here that the Hoshangabad Experiment be multiplied from its present 16 middle schools to all the middle schools of Hoshangabad District by July, 1978 under the joint auspices of the Government of Madhya Pradesh and the NCERT. The chief features of the process of implementation are described below :

i) The administrative control and leadership will rest with the Directorate of Public Instruction, Bhopal.

ii) On behalf of the NCERT, the Regional College of Education, Bhopal will build up its capacity to assist the State Government in all academic aspects (cf. Academic Cell).

iii) In the first year, i.e. 1978-79, only class six will be taken up, followed by classes seven and eight in the second and third years respectively.

iv) The target will be to train about 400 teachers eventually, an average of two per school, with more than two teachers in schools which have more than one section per class. In the first year, however, in view of only class six being taken up, about 200 teachers will be trained, with the remaining entering the training programme in the following year.

v) Faculty members, research scholars and, possibly, post-graduate students from the various institutions of higher education and teacher training in Madhya Pradesh will be identified and oriented to act as long-term resource persons for educational innovation (cf. Resource Group).

vi) The Higher Secondary Schools and the Degree/Post Graduate Colleges of the Hoshangabad District will have the chief responsibility for school follow-up and collection of feed-back from class rooms (cf. Operational Group).

vii) Approximately one-third to one-half of the middle school teachers already trained and experienced under the Hoshangabad Experiment for the past 5-6 years should be utilized for assisting in teacher training and school follow-up (cf. Peer Teacher Group).

viii) The Scientists and educators who have been so far actively involved in the Hoshangabad Experiment will continue to be available for all academic consultation, if so desired, by the State Government and the NCERT (cf. Hoshangabad Science Teaching Group).

ix) Continuous and scientific evaluation of both the efficacy of implementation and the educational gains from discovery approach should be made an integral part of the Programme (cf. the role of the Centre for Educational Technology, NCERT).

x) The concept of decentralization proposed by the State Government earlier can be tested under this Programme by making the Block-level and Village-level Committees responsible for the implementation of the discovery approach and for the distribution and maintenance of the kit.

3.1 Operational Units :

a) Resource Group (RG) : A group of about 40 to 50 individuals will be carefully selected from state-sponsored institutions like the State Institute of Education, the State Institute of Science, Bhopal.

tutes, Government Colleges of Education and the Degree/ Post-Graduate Colleges, to constitute the Resource Group. These people will undergo an intensive Orientation Workshop to become familiar with the discovery approach under field conditions. While continuing to work at their respective institutions, these people will be called upon from time to time to guide and assist in activities such as teacher training, school follow-up, monthly meetings, material development and evaluation. Necessary funds to support their travel costs would be made available. An estimate of the time expected from an average resource person for this Programme is given in Appendix I(a).

b) Academic Cell (AC) * : An Academic Cell will be established at the Regional College of Education, Bhopal by involving staff members on both full-time and part-time basis. The Cell will consist of about five to six persons in the nucleus team supported by administrative and research assistants. The Cell will perform the crucial function of academic coordination, planning and liaison with the different levels of the Department of Education, ranging from the Director of Public Instruction to the participating teachers. The Cell will be responsible for the designing of the programmes of teacher training and school follow-up, collection and analysis of feed-back data, material development, evaluation, report writing and communication with other groups involved in educational innovations. In view of these responsibilities, it would be imperative to allocate at least two to three full time staff members. The question of providing additional posts for this purpose needs to be critically examined in the next Five Year Plan. An estimate of the budgetary requirements for the Academic Cell is given in 'Summary of the Budget' (C) on page 17

The village-level experience and insight expected to be thus gained by the Academic Cell in Hoshangabad District, it is hoped, should enable it to take up wider responsibilities for educational change on a long-term basis. The example of the emergence of the Hoshangabad Science Teaching Group is the basis of the contention that the Academic Cell will gradually become capable of initiating innovative changes even in different socio-cultural regions of Madhya Pradesh (eg. Jhabua/Bastar Districts). This enlarged vision of the role of the Academic Cell is the chief motivation for proposing the investment of such human and financial resources in the Regional College of Education.

c) Operational Group (OG) : This will be a field-based group of about 100 people drawn from the local Higher Secondary Schools and Degree/Post-Graduate Colleges. A small number of highly motivated Assistant District Inspectors of Schools (ADISS) may also be selected to participate in OG. The OG will be responsible for regular school follow-up and collection of feed-back data from the class-rooms. The feed-back data thus collected will be sent to the Academic Cell for analysis and utilization. An estimate of the time expected to be spent by an average Operational Group member is given in Appendix I (b).

d) Hoshangabad Science Teaching Group (HSTG) : It is defined as the group of people who have been involved in the Hoshangabad Experiment on a voluntary basis during the

past five years. These people will be drawn mainly from the Friends Rural Centre, Kishore Bharati, Delhi University, some of the Government Degree/Post-Graduate Colleges in Madhya Pradesh (viz. Khandwa, Dhar and Rampura), Tata Institute of Fundamental Research and the Indian Institutes of Technology. This group will be responsible for providing all the necessary academic material (e.g. workbooks, teacher's guides, unit-wise scheme and kit lists) as a basis for starting the programme in July, 1978. In addition, the group will assist the Regional College of Education in selection and the first Orientation Workshop of the Resource Group members. The academic initiative of this Group will be gradually taken over by the Academic Cell and the Resource Group.

e) Peer Teacher Group (PGT) : About 15 to 20 middle school teachers will be selected out of those who have received training and experience in discovery approach for the past 5-6 years under the Hoshangabad Experiment. These teachers, presently teaching in the middle schools of Hoshangabad and Bankhedi Blocks, will be utilized for assisting in teacher training, school follow-up, and monthly meetings in and around their respective blocks. The potential of such middle school teachers in these tasks has been amply demonstrated during the interaction which took place between them and the Lecturers from Basic Training Institutes in May, 1975 at the Regional College of Education. Necessary changes in the teaching schedules of teachers thus selected will have to be made in order to make their participation effective.

f) Block-level and Village-level Committees : The concept of decentralization in education has already received wide support from various circles, including the State Government. The importance of giving greater participation and responsibility to local committees has been long recognised as the means of improving administrative and academic performance of village schools. The Hoshangabad Experiment offers a unique opportunity to undertake a field-based testing of the concept of decentralization by constituting Block-level and Village-level Committees. Such Committees may consist of village representatives, participating science teachers, primary and middle school headmasters, ADIS', Principals and Lecturers of local Higher Secondary Schools and Colleges, Development Officers and representatives of local voluntary organisations or youth clubs. These committees should be made responsible for

- (i) ensuring that the trained teachers faithfully translate their training in discovery approach into practice in their schools and do not revert to traditional methods of teaching by rote,
- (ii) ensuring that the members of the Operational Group conduct regular school follow-up and collect feedback data for communication to the Academic Cell, and
- (iii) kit distribution and maintenance.

The Academic Cell and District Education Officer should be prepared for providing the necessary academic and administration consultation to the Block-level Committees to discharge their functions effectively. In view of their voluntary character and village-level experience the Friends Rural Centre and Kishore Bharati should be asked to play a specially active role in assisting and motivating these Committees.

3.2 Administration and Coordination : As stated above, the Directorate of Public Instruction will exercise complete administrative control and provide the necessary leadership for the Programme through the Divisional Superintendent of Education (Narmada Division) and the District Education Officer, Hoshangabad. In close liaison with the Directorate of Public Instruction, the Academic Cell will be responsible for the over-all academic coordination and planning as well as for proper functioning of the Resource Group, Operational Group and the Peer Teacher Group. At the local level, the District Education Officer should be vested with complete coordination responsibilities. It would be necessary to involve the ADISSs in organizing school follow-up, monthly meetings and kit distribution/maintenance in collaboration with the Principals of the local Higher Secondary Schools and Colleges. The administrative roles of the Principals and ADISSs, and their inter-relationships will need to be clearly defined. The implementation of the Programme will be critically dependent on the participation of the Block-level and Village-level Committees in providing feed-back on school performance and in ensuring the availability of kit. The Hoshangabad Science Teaching Group will be available for consultation and assistance at all stages of the Programme, whenever found necessary by the Academic Cell or the Director of Public Instruction.

3.3 Kit Development and Supply : The Regional College of Education has the necessary facilities in its workshops for the assembly and manufacture of the kit. The kit prepared at the Regional College of Education with funds from the NCERT will be distributed to the schools through Block-level and Village-level Committees. The Academic Cell located at the Regional College will thus be in a favourable position for continuous experimentation and modification of the kit.

3.4 Evaluation : The quality with which the teachers are able to put their training into practice as well as the educational and attitudinal changes will need to be evaluated in a systematic manner. It is proposed that the Centre for Educational Technology (NCERT) should be made responsible for this function. At a later stage, the responsibility may be passed on to the State Institute of Education or the State Institute of Science Education.

3.5 Supportive Inputs

a) Teaching Aids : The Department of Teaching Aids (NCERT) has recently shown a keen interest in developing low-cost teaching aids using the material available in the villages. A Workshop, jointly sponsored by the Directorate of Public Instruction and the NCERT, was held at Kishore Bharati in October, 1977 to test the feasibility of the school teacher and the rural artisan joining hands to prepare local teaching aids. The concrete results of the Workshop have provided sufficient basis for initiating a systematic programme of preparing teaching aids.

b) Communication : It is proposed that the District Education Officer, Hoshangabad, bring out a small monthly bulletin for circulation amongst the participating teachers, members of the various operational units and all other interested educators around the country. The bulletin will provide an open platform for the teachers to share their experiences and innovative ideas with each other. The Academic Cell may also use the bulletin to communicate any new suggestions or instructions to the teachers from time to time.

A suggestion has been made that the Centre for Educational Technology (NCERT) should be requested to evolve a brief and effective radio bulletin to exchange ideas amongst the teachers and educators. Such radio bulletins may have a special use in making weather-based timely suggestions for biology experiments and for astronomical observations of the night sky. The Centre has previous experience in such work when it broadcast during the free and unutilized time available after the completion of regular radio programmes.

c) Teacher Talent Search Scheme : The NCERT should undertake a scheme to select specially gifted and motivated teachers (may be two per Block) and give them an opportunity to develop their academic potential. The selected teachers may be given the opportunity to spend their vacations in institutions of higher education and research or at teacher training centres on the model of NCERT's Science Talent Search Scheme for students. Provision also needs to be made for a stipend/honorarium and additional funds for purchasing books to encourage the selected teachers to improve their capabilities. The introduction of a motivational programme of this kind in an otherwise hierarchical and stagnant system will inspire the teaching community to give its best under the new Programme. The significance of such a scheme should not be underestimated.

d) Research : It would be necessary for the Academic Cell to conduct research studies with the objective of understanding the nature of changes taking place within the new approach. Suitable research projects may be submitted to ERIC (NCERT) for financial support and for engaging research fellows.

4.0 BUDGET AND SOURCES OF FUNDS :

As already agreed at the meeting held on October 26, 1977, the State Government will meet the cost of training of its staff members including resource persons and teachers in the form of TA/DA (1). In addition, the State Government will be responsible for the expenditure for the school follow-up, monthly meetings, and examinations.

The NCERT will provide funds for the expenditure on kits through the Regional College of Education. It also agreed to bear the travel costs and related expenses to enable the participation of its faculty members. A proposal for the establishment of an Academic Cell at the Regional College of Education may also be considered under the next Five Year Plan.

The Friends Rural Centre and Kishore Bharati will be responsible for supporting their own staff members for participating in this Programme.

A complete budget with details is given in Appendix II*.

5.0 THE SCHEDULE OF ACTIVITIES FOR 1978

The following schedule is being proposed with the objective of starting the Programme in July, 1978 :

<u>S.No.</u>	<u>Month(s)</u>	<u>Activities</u>
1.	March	Selection of Resource Group Members
2.	March-April	Selection of Operational Group Members
3.	April	First Orientation Workshop of the Resource Group
4.	May-June	Orientation of the Operational Group and school teachers (Summer Course)
5.	July	Distribution of workbooks and kits
6.	July to December	Monthly meetings and school follow-up
7.	Winter Vacations	Orientation of the Operational Group and school teachers (Winter Course)

6.0 ADVANCE PREPARATION

The following advance steps are necessary to ensure time-bound and successful implementation :

6.1 Printing of Work-books and Related Material : Necessary instructions should be given to the Madhya Pradesh Pathya Pustak Nigam (Text Book Corporation) to print the work-books, kit booklets, and teachers' guides for classes six, seven and eight by the end of June, 1978 so that the material will be available in the market in time for the new academic year.

6.2 Selection of Resource Group Members : The respective Principals/Heads of the concerned institutions of higher education and teacher training should be instructed to help in the identification of the members of the Resource Group. Representatives of the Regional College of Education and the Hoshangabad Science Teaching Group will plan visits to all the concerned institutions in March and April, 1978 to familiarize their faculty members with the proposed Programme. Efforts should be made to bring the interested faculty members of these institutions to visit the 16 middle schools of Hoshangabad District as a part of the selection process.

6.3 Preparation of the Kit : The Regional College of Education should begin the assembly and manufacture of the kit in March, 1978. A prototype of the kit has already been made available to the Regional College by the Friends Rural Centre and Kishore Bharati. It would be also necessary to develop a transport-cum-storage system for the kit to suit the rough village conditions.

7.0 PRE-CONDITIONS FOR SUCCESSFUL IMPLEMENTATION

Both the State Government and the NCERT will have to make a number of commitments in order to ensure the success of the Programme. Some of these are listed below :

7.1 For the Department of Education (Government of Madhya Pradesh) :

a) Permission to RG Members : The members selected for the Resource Group should be given the necessary duty leave plus TA/DA to participate in the Hoshangabad Programme (cf. Appendix I(a)). The concerned institutions would also need to administratively and academically view the Hoshangabad Programme as an integral part of their own activities.

b) Permission to OG Members : The teachers and lecturers of the local Higher Secondary Schools and Colleges who have been selected for the Operational Group will need official permission plus TA/DA to go for school follow-up duties for at least three days per month. It would be necessary to make the Principals of the respective Higher Secondary Schools and Colleges responsible for this purpose.

c) New Role for the Peer Teachers : The middle school teachers selected for the Peer Teacher Group will need to be permitted by their respective Head Masters/Principals to go for school follow-up for at least three days per month. Necessary modifications in their teaching assignments should also be made.

d) Role of ADISs : The ADIS is a critical administrative link in the Programme. It would be necessary to ensure his participation in arranging teaching schedules to suit the needs of the Programme, kit distribution/maintenance, follow-up, monthly meetings and collection of feedback data. The OG will need the support of the ADIS for functioning properly.

e) Transfers : The teachers trained in discovery approach shall not be transferred outside the Hoshangabad District or to primary schools without making appropriate arrangements to fulfil the gap thus created. Strict adherence to this requirement is crucial to the success since the teachers not trained in discovery approach will be incapable of replacing the trained teachers.

f) Decentralization : The Block-level and Village-level Committees as proposed above should be given the necessary responsibility and authority in order to be effective.

g) Involvement of Private Middle/Higher Secondary Schools : Special financial and administrative arrangements will have to be made to ensure the participation of the private Middle/Higher Secondary Schools in this Programme.

7.2 For NCERT :

At a later stage, however, full-time staff would be necessary for undertaking the responsibilities as pointed out above. The faculty members of the Regional College will also need permission and funds to visit the middle schools of Hoshangabad District and to participate in other academic activities.

b) Centre for Education Technology : Necessary funds should be provided to the Centre for Educational Technology to undertake regular evaluation of the Programme.

c) Department of Teaching Aids : Adequate provision needs to be made to enable the Department of Teaching Aids to hold village-based workshops to gain experience in preparing low-cost teaching aids.

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2. Science Teaching in Rural India. Fulcrum, January, 1976.
3. The Hoshangabad Vigyan. Science Today, December, 1977.
4. (a) The workbook entitled 'Bal Vaigyanik' published in 1972.
(b) The workcards published between 1973 and 1976.
(c) The revised and newly written cyclostyled drafts tested in 1977-78.
5. The unit-wise curriculum for discovery approach (1976-77)
6. Kit list (1977-78)
7. A statistical comparison of the performance of students from 'discovery approach' and 'traditional' middle schools in the annual examinations of class nine.(Nov. 1977)

Appendix I (a)

An estimate of the time expected from the Resource Group Members for giving academic support in the Hoshangabad Experiment

(First Year)

S. No.	Activity	No. of days/participant			No. of Participants
		During vacation	During Academic Year	Total	
1.	Orientation (self)	10 [†]	--	10	50
2.	Orientation (Operational Group) ¹			8	
	a) Summer Course (15 days)	5	--		30* (5x3x2)
	b) Winter Course (7 days)	3	--		20** (5x2x2)
3.	Orientation (School Teachers) ²			22	
	a) Summer Course (15 days)	15	--		40*** (8x1x5)
	b) Winter Course (7 days)	7	--		40*** (8x1x5)
4.	Follow-up ³			10	
	a) School visits	--	3+3		40
	b) Teachers' meetings	--	1+1		40
	c) OG meetings	--	1+1		40
5.	Evaluation	--	4	4	40
6.	Material Development	According to interest & availability			
Total		40	14	54	--

¹In two batches of 50 OG Members each

²In five batches of 40 teachers each

³Teachers' meetings and OG meetings will be scheduled along with school visits so that RG members can participate in all these activities during the same trip.

[†]This course would not be necessary from the second year onwards

* Five RG Members to participate for 5 days each on rotation

** Five RG Members to participate for 3 days each on rotation

*** Eight RG Members to participate for full duration in 5 batches

Note : If accomodation is available, effort will be made to organize the Orientation Course for the teachers and OG simultaneously at a common site. This would mean that training will have to be imparted in 7 batches simultaneously. This arrangement will enable better utilization of the members of RG, AC and HSTG for giving training. It should also save at least 8 days and avoidable travel expenditure (i.e. item Nos.2a and b) of the RG members during vacations

(ii)

Appendix I (b)

An estimate of the time expected from the Operational Group Members for giving academic support in the Hoshangabad Experiment

S. No.	Activity	No. of days/participant			No. of Participants
		During Vacation	During Academic Year	Total	
1.	Orientation (self) ¹			22	100
	(a) Summer Course (15 days)	15	--		
	(b) Winter Course (7 days)	7	--		
2.	Follow-up			34	
	(a) School visits	--	24*		100
	(b) Teachers' meetings	--	7		25
	(c) OG meetings	--	3		100
3.	Evaluation	--	7	7	100
4.	Material Development	According to interest & availability			
	Total	22	41	63	--

¹In two batches of 50 OG Members each

* @ three days/month or 4 school visits/month

Summary of the Budget for the Hoshangabad Experiment
(b) Year-wise source of funds. *

1978-83

(Detailed Budget not attached here)

Year	Govt. of MP Rs.	NCERT Rs.	UGC Rs.	KB/FRC Rs.	Total Rs.
1. 1978-79	1,72,220/-	1,74,700/-	15,900/-	8,600/-	3,71,420/-
2. 1979-80	2,31,660/-	79,600/-	12,900/-	7,900/-	3,31,960/-
3. 1980-81	2,31,660/-	79,600/-	12,900/-	7,800/-	3,31,960/-
4. 1981-82	1,45,490/-	48,900/-	12,150/-	6,950/-	2,13,390/-
5. 1982-83 (and onward)	27,200/-	37,100/-	4,200/-	2,500/-	71,000/-
GRAND TOTAL					
Grand Total					8,08,230/-
					4,19,900/-
					58,050/-
					33,550/-
					13,19,730/-

* This does not include the Budget allocation for creating new posts for setting up an AC at RCE, Bhopal.

Abbreviations used:

KB- Kishore Bhatti; FRC- Friends Rural Center, Resulia.

RCE- Regional College of Education, Bhopal.

(c) Financial outlay for setting up the Academic Cell at
the RCP, Bhopal

DRAFT FIVE-YEAR PLAN (1978-83)
(not included in the Budget)

Name of the Scheme	Proposed outlay for AC (Figures in lakhs of Rs.)					Total
	1978-79	1979-80	1980-81	1981-82	1982-83	
Science Teaching Programme in Hoshe- ngabad District (M.P.)	0.24	0.24	0.24	0.24	0.24	1.20
Professors-1	0.36	0.36	0.36	0.36	0.36	1.80
Roaders-2	0.36	0.36	0.36	0.36	0.36	1.80
Lecturers-3	0.12	0.12	0.12	0.12	0.12	0.60
Research Assistants-2	0.06	0.06	0.06	0.06	0.06	0.30
Personal Assistant-1	0.06	0.06	0.06	0.06	0.06	0.30
Stenographer/LDC-1	0.60	-	-	-	-	0.60
Transport (Diesel Jeep)						
TOTAL	1.80	1.20	1.20	1.20	1.20	6.60

Summary of the Budget for the Hoshangabad Experiment
(a) Year-wise allocations *
1978-83
(Detailed Budget not attached here)

ITEM	1978-79	1979-80	1980-81	1981-82	1982-83 (on wards)	Total expenditure in five years.
1. Orientation Course-FG	21,650/-					21,650/-
2. Training course-OG	37,300/-	37,300/-	37,300/-			1,11,900/-
3. Training course-Teachers	89,250/-	1,45,820/-	1,45,820/-	89,250/-		4,70,140/-
4. Kit supply	1,15,500/-	24,700/-	24,700/-			1,64,900/-
5. School follow-up	37,500/-	37,500/-	37,500/-	37,500/-		1,87,500/-
6. Monthly follow-up Meetings	38,720/-	53,140/-	53,140/-	53,140/-		1,98,140/-
7. Evaluation expenses	5,000/-	7,000/-	7,000/-	7,000/-		33,000/-
8. Quality Improvement Programme	5,000/-	5,000/-	5,000/-	5,000/-		25,000/-
9. Reports, communication, meetings	5,000/-	5,000/-	5,000/-	5,000/-		25,000/-
10. Stationery for AC	2,500/-	2,500/-	2,500/-	2,500/-		12,500/-
11. Monthly Bulletin	5,000/-	5,000/-	5,000/-	5,000/-		25,000/-
12. Vehicle charges	9,000/-	9,000/-	9,000/-	9,000/-		45,000/-
Grand Total	3,71,420/-	3,31,960/-	3,31,960/-	2,13,390/-	71,000/-	13,19,730/-

* This does not include the Budget allocation for creating new posts for setting up an AC at RCE Bhopal, Abbreviations used:- RG- Resource Group; OG-Operational Group; AC-Academic Cell.