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**In-service Teacher Professional Development (TPD) in Elementary Education in Collaboration
with MHRD and SCERTs/DIETs (Bihar & West Bengal)**

“Building Capacity in Teacher Education”

Interim Project Report (November 2011 -- October 2012)

(K. Subramaniam, Meena Kharatmal, Minakshi Bhattacharya, Jayashree Ramadas)

1. Background

1. Following a discussion with MHRD, HBCSE submitted in November 2011, a proposal for capacity building in science and mathematics teacher education at the elementary school level in the two States of Bihar and West Bengal. The proposal envisaged working with science and mathematics faculty members of DIETs in order to enhance their appreciation and understanding of the new vision of education written in National policy documents. The intervention would aim at developing among the target group a deep understanding of the main ideas of this vision interpreted in the context of science and mathematics education. An additional goal was to strengthen the resources available in DIETs especially in the form of laboratories and library material.
2. The project was proposed to be initiated with a field visit to the DIETs in the two States and an introductory workshop with the target group. This would be followed by an intensive, residential course to be held at HBCSE. The project was proposed to also be informed by discussions in a working group meeting with key experts who have made significant contributions in the field of elementary teacher education.
3. At the time of writing of this report, the initial field visits, introductory workshops, the working group meeting and the two intensive residential courses have been completed.

2. Document study

1. During November 2011 – January 2012, prior to the field visit, a detailed study of available documents was undertaken by the HBCSE team to build an understanding of the local context related to teacher education, State policy documents, DIET curricula, etc.
2. The documents of NCF 2005, its position papers on teaching of science, mathematics, teacher education and curriculum renewal, curriculum, syllabus and textbooks formed the background of the study. The NCFTE 2010, reports of three international conferences on teacher education organized by MHRD, NCERT and Vidya Bhawan Society, Model curriculum of two year D.El.Ed. course, provided us with in-depth perspective in teacher education. The Pratiche documents of studies in Bihar and West Bengal and the common school system commission report facilitated in creating awareness of the local context and ground level situation in both the States. The reports on DIET restructuring and strengthening, its two possible models, potentials and possibilities provided direction in working with DIETs. In addition to these documents, report of comparative study of DIETs in three States, and the UNICEF detailed profiling of all the DIETs in Bihar were studied. The complete list of documents is given in the list of references.
3. An initial understanding of the condition of the DIETs, the infrastructure available, etc., was developed on the basis of these documents which helped the team to prepare a more meaningful field visit.

3. Assessing the ground situation

1. A team of about ten HBCSE members visited 7 DIETs each in Bihar and West Bengal in February – March 2012 to assess the ground situation (see maps). The composition of the team was as follows:
 - Four senior faculty members
 - Three scientific officers and Post-doctoral fellows
 - Three Research scholars
 - One Project staff
2. A team of two to three members visited each DIET, collected information on the basis of a questionnaire and prior discussions about the needs and requirements, as well as the facilities available. The team members interacted with the principals, faculty and student

teachers in the DIETs and wrote detailed discussion reports (internal reports).

3. These visits provided critical inputs in planning the sessions of the workshop and in developing the intensive course at HBCSE.

4. *Introductory workshop*

1. The DIET visits in each of the two States were followed by two-day workshops. In Bihar the workshop was organized in SCERT, Patna from 28-29 February, 2012. In West Bengal the workshop was organized in DIET, Hoogly from 3-4 March, 2012. The workshop included components such as analysing classroom teaching, students' thinking, activity based learning in science, connecting science learning with the local environment, learning from problems and hands-on mathematics activities. The aim was to obtain feedback about whether these components addressed the teacher educators' needs, and created sufficient interest and learning opportunities for them. The workshops helped to break the ice and to shape expectations with regard to the intensive course to be held later in HBCSE.

5. *Working group meeting*

1. A working group meeting was held in HBCSE on 23rd and 24th June, 2012 to review interventions in teacher education and development in different parts of the country. HBCSE identified various organizations (Central Institute of Education, University of Delhi, Tata Institute of Social Sciences, Eklavya, Vidya Bhavan Society, Digantar, NCERT, RIE, Science Communication Forum, SCERT- Bihar, DIETs-West Bengal, DIETs-Maharashtra) who have been working in this area and invited about 15 persons from the community for a collaborative discussion.
2. The themes discussed were, restructuring and strengthening of DIETs, experiences of working with DIETs in diverse States including Bihar and West Bengal, teacher professional development in science and mathematics, developing needs based resources, and developing local resource centres in Bihar and WB through linkages with education and research institutions. Experiences from interventions with DIETs and teacher education institutions in Chamarajnagar district of Karnataka, several districts in Rajasthan, Orissa, Delhi, Bihar, West Bengal, Maharashtra and Chattisgarh, were shared by the experts. The list of participants is attached as appendix.
3. Key changes and interventions needed with regard to DIETs and teacher training institutions

were discussed such as innovation in pre-service education, creating an interface between school education and teacher education. The need to strengthen faculty expertise in science and mathematics education was emphasised by several expert members. The importance of involving DIET faculty in curriculum and textbook development, developing deeper understanding of the link between activities in science and mathematics and core learning outcomes and continuous assessment were discussed.

6. *Intensive 12-day course*

1. As proposed, HBCSE conducted a 12-day intensive residential course at its campus on "*Building capacity for teacher development*" for the DIET science and mathematics faculty of both Bihar (23 August to 3 September) and West Bengal (24 September to 6 October). There were 39 participants from Bihar (3 SCERT, 13 DIETs, 20 PTECs, 3 Middle School), and 25 participants from West Bengal (11 DIETs, 14 PTTIs). The resource persons for the course comprised of senior faculty, scientific officers, post-doctoral fellows, research scholars and project staff of HBCSE. The list of participants with the represented districts is provided with the maps.
2. The aim of the course was to develop among the participants a deep understanding of the main ideas of the new vision of education in policy documents such as the NCF 2005, interpreted in the context of science and mathematics education. Further it was important to relate this broad aim to the concrete work of teacher education. Hence several strands of the course were planned keeping in view the D.El.Ed. Curriculum, that would illustrate how the principles and ideas articulated in the NCF could be implemented in teacher education and in school education. To create a strong interface between school education and teacher education, the course was built on materials drawn from school teaching, such as textbooks, examples of students' thinking, student misconceptions, video excerpts of classroom teaching, etc.
3. The main strands of the course were:
 - Learning and constructivism, NCF 2005 perspectives
 - Nature of science, Nature of mathematics
 - Analyzing classroom teaching using video excerpts
 - Analysis of textbook and curriculum material

- Understanding students' thinking
 - Assessment
 - Learning science through inquiry by carrying out investigatory projects
 - Reading research articles
 - Miscellaneous topics: action research, learning from problems in mathematics
 - Visit to science centres such as Nehru Science Centre and TIFR
4. The workshop was entirely conducted in participatory mode with discussion-based and activity based sessions. The participants got a hands-on feel of how to manage learning through these modes. Tasks were assigned to the participants in groups on which they had to work and make a presentation to the whole group.
 5. A newly introduced component for the West Bengal course was setting up and using on an online e-learning platform called Moodle for holding discussion and uploading of presentations, resource materials, assignments, project work, etc. This online platform has potential for implementation in teacher education and needs further development and trial.
 6. Detailed, written feedback for each session was collected from the participants. The participants felt that this was a unique course in science and mathematics education and teacher education. The teacher educators particularly appreciated learning by an investigative approach as all of them got the opportunity to investigate and conduct science projects in the HBCSE labs for two weeks. Almost all the participants mentioned that the sessions were enriching and they would certainly use the experience in their teaching program.

7. *Future course*

1. The intervention so far has been successful and has been received positively by the participants. The DIET and PTTI/ PTEC faculty are ready and primed to not only introduce innovations in teaching at the D.El.Ed. Level, but also in developing curricula and teacher education material, and in translating high quality material from English into Hindi or Bengali. To take the project concretely forward, the SCERT and other decision making agencies in the two States need to be brought on board to plan how the expertise of this group could be utilized in core projects in the State. A meeting of SCERT and other leaders in the State together with MHRD and HBCSE members is important in facilitating this step.

2. In the next phase of the project, it is envisaged that the resources of the DIETs, specifically library material and laboratory equipment will be strengthened. During the intensive workshop, participants learned how to design and implement activities in science for learning by inquiry. This will give them the confidence to design and implement new activities. Accordingly the laboratory equipment will largely be generic, which can be used for a variety of experiments, rather than “kits” developed for specific experiments. HBCSE will be preparing a list of such equipment, with inputs from the DIET and PTTI/ PTEC faculty. HBCSE will forward the list to MHRD. Based on this, MHRD will release funds (Rs. 1 lakh per DIET) to the DIETs and PTTI/ PTEC in Bihar and West Bengal for procuring the materials.
3. Print materials for teacher education are scarce in Hindi and Bengali. Hence it is proposed that translation of powerful print material available in English be taken up systematically with the help and involvement of the DIET and PTTI/ PTEC faculty.
4. Local resource centres: It is being proposed to develop local resource centre for collaboration with DIETs. in Bihar and West Bengal. Some of the organizations that we would like to seek collaboration are Patna Science College, Patna Women's College, Agricultural College, IIT Kanpur's initiative of Shiksha Sopan in Bihar, and Saha Institute of Nuclear Physics, IISER Kolkata, S. N. Bose Institute and NCSM in West Bengal.
5. In the course of the field study and interaction with DIETs, we became aware of several critical factors that need urgent attention if teacher education is to improve.

We mention some of the most critical of these below:

- i. Filling up vacant positions for DIET faculty: The number of vacancies in most DIETs, including in science and mathematics education are critically low, making it almost impossible to impart meaningful teacher education. These vacancies need to be filled urgently.
- ii. Salaries of primary school teachers: The salaries of primary school teachers continue to be low. Not only does this compromise the quality of school education, but it also affects the morale of the teacher students and negatively affects the ambience in the DIETs. Similarly, the salaries of teacher educators should be brought on par with University teachers. This will go a long way in enhancing the status of elementary education as envisaged in the National policy documents.
- iii. Infrastructure of the DIETs: The infrastructure in many of the DIETs that we visited

needs to be urgently improved even to meet minimum acceptable levels. The issues that must be attended to immediately are building renovation, expansion of in-campus accommodation for lecturers and students, toilet maintenance, provision for year round safe drinking water, generators, safe wiring, furniture and computers (in Bihar). In addition, computers, projectors, speakers and internet must be made available to faculty and student teachers.

- iv. Empowering teacher educators: Many of the DIET principals and faculty that we met were enthusiastic and full of ideas on how to improve the DIETs. Many had made innovative interventions in their own institutions. Such attitudes as well as the contributions made by principals and faculty in difficult circumstances must be acknowledged and rewarded to build a sense of empowerment and to motivate the community as a whole. Also, DIET principals need to be given more say in how to spend funds to attend to urgent improvements in the DIETs.

As a major component of the project, HBCSE will be working on documentation and reports of DIET visits and workshops. Booklets on course material for teacher education with worksheets, articles related to sessions and activities conducted during the workshops would be produced. HBCSE will oversee the resource enhancement in libraries and laboratories of the DIETs. It is also planned to create local resource centres with initiatives from the education and research institutes in both the States.

In the second phase of the project, HBCSE plans to conduct follow-up visits to DIETs with in-field workshops in Bihar and West Bengal. It will also organize a working group meeting with experts to communicate the project outcomes based on the intervention and in-field visits.

8. Acknowledgements

- MHRD, Government of India
- Secretariat, DPE, SCERT, DIETs, Bihar
- WBBPE, DPSC, SCERT, DIETs, West Bengal
- HBCSE Team Members for Field Visits (*Minakshi Bhattacharya, Arindam Bose, N. D. Deshmukh, Karen Haydock, Meena Kharatmal, Arunachal Kumar, Prajakt Pande, Jayashree Ramadas, Vijay Singh, K. Subramaniam, Shikha Takker*)
- HBCSE Participants in Working Group Meeting (*Arindam Bose, Sugra Chunawala, N. D.*

Deshmukh, Rajkumar Diwakar, Tuba Khan, Arunachal Kumar, Ruchi Kumar, Chitra Natarajan, Jeenat Rahman, Saurav Shome, Vijay Singh, Anveshna Srivastava)

- HBCSE Resource Persons for Contact Sessions (*S. C. Agarkar, Minakshi Bhattacharya, Pooja Birwatkar, Arindam Bose, Indrani Das, N. D. Deshmukh, Rajkumar Diwakar, Vikrant Ghanekar, Akshay Gole, K. T. Hambhir, Karen Haydock, P. K. Joshi, Rakesh Joshi, Rajendra Kadam, Aaloka Kanhere, Tuba Khan, Rajesh Khaparde, Meena Kharatmal, Arunachal Kumar, Ruchi Kumar, A. T. Mavalankar, K. K. Mishra, Adithi Muralidhar, Manoj Nair, Swapna Narvekar, Chitra Natarajan, Shirish Pathare, Prajakt Pande, Praveen Pathak, Jeenath Rahaman, Jayashree Ramadas, D. P. Roy, Riyazzudin Shaikh, Saurav Shome, Gurinder Singh, Vijay Singh, Himanshu Srivastava, V. C. Sonawane, K. Subramaniam, Shikha Takker, Arsheya Taskeen*)

9. List of resource persons, organizations for the working group meeting

- Poonam Batra (CIE, University of Delhi, New Delhi)
- Abhijeet Bardhan (Science Communicators Forum, West Bengal)
- Pratibha Bhalerao (DIET, Phaltan, Maharashtra)
- Minakshi Bhattacharya (HBCSE, Mumbai)
- Satya Bhushan (NCERT, New Delhi)
- Vinod Deogaonkar (DIET, Osmanabad, Maharashtra)
- Karen Haydock (HBCSE, Mumbai)
- Meena Kharatmal (HBCSE, Mumbai)
- Rajesh Kumar (Digantar, Udaipur)
- Kamal Mahendroo (Vidya Bhavan Society, Jaipur)
- Gopal Midha (TISS, Mumbai)
- S A Moin (SCERT, Patna)
- S C Panda (RIE, Bhubaneswar)
- Jayashree Ramadas (HBCSE, Mumbai)
- Somenath Roy (DIET, Nadia, West Bengal)
- K A Sadat (DIET, Hoogly, West Bengal)
- Atanu Sain (Vikram Sheela, West Bengal)
- Padma Sarangapani (TISS, Hyderabad – through video conferencing)
- Vandana Singh (Digantar, Udaipur)
- K. Subramaniam (HBCSE, Mumbai)

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11. Maps showing no. of districts represented in visits and workshops.

- Bihar

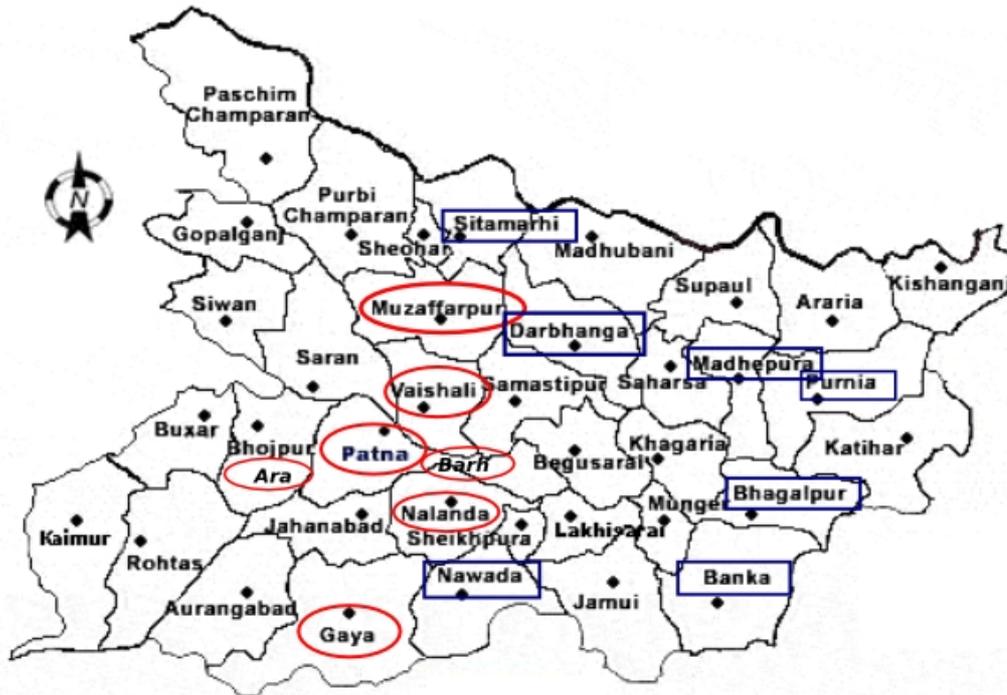


Figure 1: A map showing number of DIETs visited and number of districts represented in workshop in Bihar. (Source: <http://gov.bih.nic.in>)

No. of DIETs visited	7 (marked in ovals) <i>Ara, Barh, Gaya, Muzaffarpur, Nalanda, Patna, Vaishali</i>
No. of Districts (DIETs) represented in the workshop	7 (marked in boxes) <i>Banka, Bhagalpur, Darbhanga, Madhepura, Nawada, Purnia, Sitamarh</i>
No. of Districts (DIETs) not represented in the workshop	31 <i>Araria, Aurangabad, Begusarai, Bhojpur, Buxar, Gaya, Gopalganj, Jamui, Jehanabad, Kaimur (Bhabua), Katihar, Khagaria, Kishanganj, Lakhisarai, Madhubani, Munger, Muzaffarpur, Nalanda, Pashchim Champaran, Patna, Purba Champaran (Motihari), Rohtas, Saharsa, Samastipur, Saran, Sheikhpura, Sheohar, Siwan, Supaul, Vaishali</i>
No. of Districts (DIETs) common for field visits and workshop	0 (No district was common)

- West Bengal

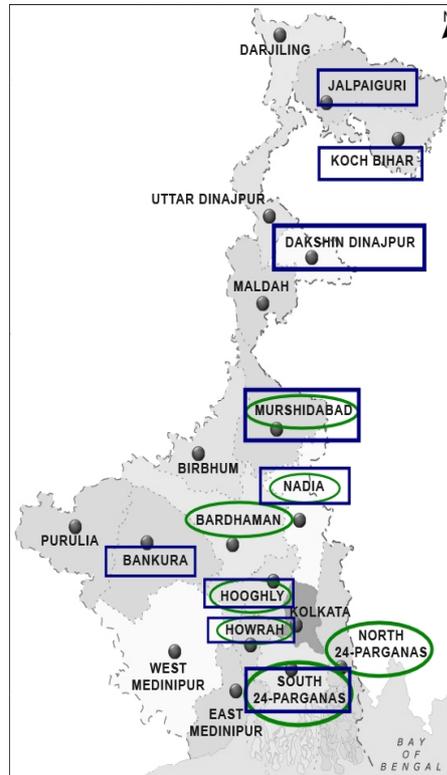


Figure 2: A map showing number of DIETs visited and number of districts represented in workshop in West Bengal.

(Source: http://www.msmedikolkata.gov.in/maps/wbdistri_new1.jpg)

No. of DIETs visited	7 (marked in ovals) Bardhaman, Hoogly, Howrah, Murshidabad, Nadia, North 24 Parganas, South 24 Paraganas
No. of Districts (DIETs) represented at the workshop	9 (marked in boxes) Bankura, Cooch Behar, Dakshin Dinajpur, Hoogly, Howrah, Jalpaiguri, Murshidabad, Nadia, South 24 Paraganas
No. of Districts (DIETs) not represented in the workshop	10 Bardhaman, Birbhum, Darjeeling, East Medinapur, Kolkata, Maldah, North 24 Paraganas, Puralia, Uttar Dinajpur, West Medinapur
No. of Districts (DIETs) common for field visits and workshop	5 (marked both in ovals and boxes) Hoogly, Howrah, Murshidabad, Nadia, South 24 Paraganas

12. Websites and Email

- MHRD-HBCSE Teacher Education Project Website: <http://teacher-ed.hbcse.tifr.res.in>
- TPD Moodle Website: <https://tpd.hbcse.tifr.res.in>
- HBCSE Website: <http://www.hbcse.tifr.res.in>
- Email: tpd@hbcse.tifr.res.in