Teacher as Constructor of Knowledge: An Analysis of Teachers' Contribution to the Hoshangabad Science Teaching Programme

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Teaching of science has been undergoing some major shifts in perspective and approaches over the last century. Each major shift has in turn reformulated the teacher's role calling upon her to acquire new skills, understanding of the subject matter and a different order of commitment to the emerging perspectives. How to create conditions that help teachers make these transitions has been a major challenge for innovating groups. The practical success of any new innovative approach crucially depends on how the task of teacher reorientation, involvement and motivation is approached.

In this paper we seek to share the framework evolved, the methods adopted and the experiences gained from the macro scale implementation of the Hoshangabad Science Teaching Programme in context of reorienting, reinforcing and motivating the teachers.

While mainstream science education in India continues to be afflicted by its phobia of the knowledge explosion and obsession with the 'empty vessel' vision of the learner, there have been interesting attempts to break away from the mainstream practice. The Hoshangabad Science Teaching Programme(HSTP) group's motivation was to evolve an effective approach to science teaching rooted in the social and economic challenges facing a developing country like India, particularly in its vast rural areas. Influenced by the new ideas and perspectives on Science Education emerging across the world, HSTP has been an attempt to reinterpret them in the Indian context and engage with the mainstream school system to evolve workable models of practice.

The major trends of Science Education that exerted their influence on the thinking and evolution of the HSTP approach have been:

- Bruner -'The curriculum of a subject should be determined by the most fundamental understanding that can be achieved of the underlying principles that give structure to the subject. (The Process of Education);
- Primacy to the Method of Science leading to the process-product balance debate;
- Science, Technology and Society linkages and issues emerging from that;
- Learner centred concerns- worldview, knowledge constructs, context and milieu, stages of learning;
- Behaviorism vs. Constructivism debate.

About learning and curriculum HSTP has highlighted

- Aim for developing higher order thinking skills;
- Greater emphasis on the social context of learning;
- Understanding of contextual influences on problem solving;
- Respect for learner's struggle to make sense of scientific phenomena;
- Learning less information in greater depth is preferable to covering a large number of facts and concepts with no understanding (less is more);
- Learning not a passive activity in which teachers disseminate knowledge to students in a one-way monologue using the textbook;
- Learners' construction of knowledge through a complex process of interaction with their own knowledge structures, engagements with materials and experiences, and a dialogue with peers and teacher through which meaning is developed;
- Learning by rote and information recall de-emphasized and seen as opposed to developing conceptual understanding and thinking and practical skills;
- Emphasis on development of learning and articulation skills.

Teachers, resource persons and the curriculum designers had to

- Make the transition from the image of a technical

expert to one of reflective practitioner;

- Prepare to address new views of content knowledge in a coherent and comprehensive manner;
- Evolve constructivist approaches to teaching and learning covering curriculum designing, text-cum work book and other teaching learning materials, experimentation using local materials and situations, class room architecture and interactions, different evaluation methods, etc.

An important implication of all this was for the teachers. An essential paradigm shift was to look upon the Teacher also as a constructor of knowledge, and no more as a mere transmitter of knowledge. This had important implications for the way the teachers were involved in various aspects of the programme and how their reorientation was attempted.

This paper attempts to share and analyse the essential ways in which this was carried out in the HSTP by

- Addressing teachers' existing knowledge and beliefs about teaching, learners, learning and subject matter;
- Providing teachers with sustained opportunities to deepen and expand their knowledge of subject matter;
- Treating teachers as learners in a manner consistent with the programme's vision of how teachers should treat students as learners;
- Grounding teachers' learning and reflection in classroom practice;
- Giving teachers a major role in developing curriculum and teaching-learning materials;
- Setting in place an elaborate system of regular peer and resource group-teacher interactions with organized feedback collection and equal participation;
- Giving teachers' a central role in devising and implementing an evaluation system in consonance with the larger educational goals of the program.

Major areas of teachers' contribution have been in

- Concept formulation;
- Concept learning and integration with methodology;
- Innovating with learning materials and experiments;
- Constructing a language of discourse with children;
- Evolving methods of classroom and kit management;
- Developing evaluation methods;
- Curricular choices and balance.

The paper and presentation elaborates all this through examples and concludes that an effective implementation of constructivist approach to teaching of science would crucially depend on enhancing and enriching the role of teachers.

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References

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