HOMI BHABHA CENTRE FOR SCIENCE EDUCATION (TIFR)

Report of a Workshop to Review a Course on Science Education

HBCSE, RVEC, SCERT, Karnataka, 12-14 August 2104

Objective

The objective of the workshop was to review a course on Science Education and provide feedback on the units on *Nature of Science, Food, Matter*, as part of the 2 year D.Ed. syllabus, developed by RVEC, Bangalore, SCERT Karnataka. The workshop was held at HBCSE during 12-14 August 2014.

Participants

RVEC, Bangalore: Mythili Ramchand

SCERT, Karnataka: Nirmala Arun, Ashwin KB

HBCSE: Chitra Natarajan, Sugra Chunawala, Narendra Deshmukh, Meena Kharatmal

Context

The RVEC and SCERT, Karnataka have developed material for teacher educators suggesting strategies for transacting and assessing student teachers for the pedagogy of science course in the D.Ed. program. The focus of the material is seen as a shift in perspective from previous curriculum for teacher education. It is claimed that the present course utilizies an integrated pedagogical content knowledge approach to facilitating learning of science. It is expected from the present course that the student-teachers are actively engaged in inquiry based learning. The material has laid down various modes of transaction of the course – readings, group discussion, classroom activities, assessment techniques. The HBCSE's role was to provide feedback and suggestions on the material. The workshop mode comprised of deliberation on the material in the form of presentations, discussions.

Material

Prior to the workshop, one of the materials was sent to HBCSE members for understanding the context.

- Draft of Syllabus
- Facilitating Learning of Science – Nature of Science (Unit 1)
- Modules – Food, Matter, Diversity

The workshop began with introduction of the 3 day meeting. In the beginning of the workshop, we shared the HBCSE's teacher education program. HBCSE has conducted state level teacher education programs for teacher educators of Bihar, West Bengal, Gujarat, Uttarakhand, and teachers of Kendriya Vidyalaya. The mode of workshops was explained in detail. The focus on learning through inquiry, sessions on science through investigation were highlighted. The workshop material, such as worksheets, slides, modules, resource materials were shared. It was mentioned by the RVEC that they would plan sessions based on the worksheets. This was followed by sharing of materials from a workshop of Australia India Council. The books, and materials were reviewed for its significance.

Review of Unit on Nature of Science

The unit on the Nature of Science was presented for discussion. The specific objectives laid for this unit are – to introduce the elements of scientific knowledge, interface among the science, technology and society. The unit discusses the following:

- Introduction
- Objectives
- Topics of study
    - Elements of scientific knowledge
    - Scientific world view
    - Scientific inquiry
    - Scientific enterprise
    - Values and attitudes in the context of science education
    - Science, technology and society
- Summary
- Self assessment
- Practice activities
- Suggestions for more reading

The unit emphasizes the science as human endeavor, make learners appreciate critically values of science, analyze the interface among science, technology and society. In the scientific inquiry topic, the scientific approach to conduct experiments was presented. It was followed by a discussion activity in box.

The science as human endeavor is showcased in the form of people doing science from different times and countries with different backgrounds. This topic contains well thought examples and are appropriate to the topic. However, a classic experiment by van Helmont about measuring the soil before and after the tree grows was discussed and considered to be added. In addition, it was also pointed to highlight women scientists from history, and an example of Kamala Sohonie was emphasized in the context of gender differences in sciences.

McComass' work on myths about scientific inquiry and enterprise is highlighted. Some discrepancy regarding law, theory was resolved by discussion and updated in the text. A discussion revolved around a point whether scientists are objective.

In the topic on values of science, it was observed that only the positive values of science are portrayed in the unit. It was suggested to also add and discuss about the negative values of science in this unit. In this context, Allchin's work on values of science was suggested.

The science, technology and society topic depicts national education standards recommended by the USA. Although these are considered to be important, it would be helpful if these are contextualized from the point of view of our nation. With regard to the policy paper, it was suggested that the unit can incorporate the national policy documents related to science and technology of DST, DBT, CSIR, etc. and need not just rely on the AAAS for considering as benchmark for Indian context.

The unit ends with Sundar Sarrukai's work on “what is science”, and NCF's position paper on teaching of science.

It may be noted that HBCSE suggested more examples for classroom activities. It was also suggested to show the video documentary of young historian and in this connection, conduct

a field study with neighbors and local people on a topic of their interest.

Review of Modules on Food, Matter, Diversity

Of the three modules developed only two modules on *Food, Matter* were presented and discussed. The module included the varieties of food, components of food (protein, carbohydrates, fats, sugar, etc.), with activities. It was suggested that the unit should include the social aspects of food, culture differences with regard to food, etc. With regard to module of matter, classroom activities were suggested.

Resource Materials Suggested by HBCSE

- Collins and Pinch: The Golem – What everyone should know about science
- Chalmers: What is this thing called science
- Allchin: Values in science and in science education
- HBCSE: Worksheets, modules of Science through investigation – HBCSE's TPD programs
- NIOS: Units on Nature of Science, Scientific Inquiry, Different Approaches to Teaching of Science, Hands on Experiences of the 2 year D.Ed. program of National Institute of Open Schooling.
- SCERT, Karnataka: Position Paper on ICT mediation in teaching-learning, D.Ed. Syllabus Review 2012, Department of State Education Research and Training, Karnataka,
- SCERT, Karnataka: Young historians – Video documentary

Summary

To summarize, it must be pointed that the prior work of developing the draft of syllabus and unit on nature of science was very well done by the RVEC, SCERT, Karnataka. The discussion of the 3-day workshop progressed smoothly because of the well thought material. In addition, it has been a learning experience for the HBCSE members as well.

Meena Kharatmal, HBCSE, August 2014.