



National Educational Policy 2020 - Dimensions of Science Faculty

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Abstract

The Higher Educational Institutions need to be granted autonomy in core and associated dimensions to achieve the vision Envisaged in NEP 2020. The core dimensions are strategic direction, curriculum, multi-disciplinary and cross-disciplinary approach, value-based education, research, and publication.

The associated dimensions are innovation, collaboration, consultancy, contribution to national missions, continuing education programmes, and fund raising. The Higher Educational Institutions may work on these core and associated dimensions to harness the full potential of autonomy for achieving their vision.

Keywords: National Education Policy 2020, Science Faculty

Introduction

In the light of National Education Policy 2020 it is not merely factual knowledge of scientific matters that is important but the cultivation of scientific outlook and scientific temper –qualities which have significance beyond the domain of science literacy. If the science teacher does not consciously help to develop the scientific temper and the student has not even a suspicion of what it means, if they go on playing or toiling at physics and chemistry or biology but cultivate no objectivity of scientific outlook or scientific integrity to my way of thinking in the deeper educational sense they are just wasting their time. This cyclic implementation will increase quality of education, In science education, the main issue has been the large gap that separates the curricular objectives and their implementation through syllabus, textbooks, classroom practices and examinations. It is imperative to address these concerns and formulate broad strategies so that the curriculum reforms do not simply remain 'on paper' but actually benefit the school system. (Higher Educational Institutions) to become autonomous college or multidisciplinary university. There are various models and branches of science.

The researchers have attempted to develop core and associated dimensions of science for Higher Educational Institutions in the context of NEP 2020. The core dimensions comprise of strategic direction, curriculum, multi-disciplinary and cross-disciplinary approach, value-based education, research and publication. The associated dimensions comprise of innovation, collaboration, consultancy, contribution to national missions, offering continuing education programmer, and fund raising. The Higher

Educational Institutions may work on these core and associated dimensions To accomplish the aims and objectives of science education as envisioned by NEP 2020 we require certain minimum infrastructure. Currently the infrastructure facilities are grossly inadequate in a great majority of schools. The facilities need to be prominently more advanced for the secondary and senior secondary stages, with well-planned laboratories, preferably Internet and multimedia facilities and a well-stocked library containing professional development literature for teachers and career corner for students. If the required facilities are not immediately possible in all schools, they must be available at least at the science resource centers and in mobile laboratories at the cluster, block and district levels. Local talent like electricians, lab technicians should be used in science teaching for demonstration purposes.

The teachers had limited knowledge of Educational websites on science education. They were not given any practical training in constructing low cost improvised teaching aids on zero cost budget and level of willingness to the use of teaching aids was found low. Significant number of science teachers did not display that vigor, enthusiasm and seriousness in attending the short term orientation/ refresher courses on training science teachers. Baring some exceptions resource persons in these training programmes had nothing new to offer. Lack of electricity in schools is one big impediment in application of technology. Computers have been supplied to the schools without complete accessories. The investigator found that in some schools, they are being operated directly on the mains or low voltage which puts them on risk.

The limited computers which are available in schools are used for administrative activities. It is imperative that while preparing the curricular document, we should also prepare grounds for its translation into syllabi, textbooks and classroom processes. Within the broad guidelines of the curriculum design the syllabi and the textbooks must allow space for contextualizing and variations at the local level for all stages of school education. There is a general feeling that activity based teaching is costly, takes more time that could be otherwise 'fruitfully' used for 'text based' teaching, and does not prepare the child for examinations and competitive tests. The concern about expenditure involved in activities cannot be dismissed. The most important reflection while developing a science curriculum is to ensure a reduced stress on mere information and provide greater exposure to what it means to practice science. Science teachers need to be empowered and given autonomy to experiment with innovative pedagogical models of teaching. There is an urgent need to conduct workshops for science teachers regarding how to teach online in hybrid or blended mode using various online pedagogical tools and techniques. Science teachers need to qualify teacher eligibility tests as envisaged by NEP 2020.

The temptation for information overload stems from a concern with knowledge explosion and the need to put adequate information in a textbook. We should be wary of falling into this trap and should avoid ending up with a content-dominated curriculum that leaves insufficient time for discussion and reflection.

We have already stressed that scientific concepts introduced at any stage of the curriculum must be within the cognitive reach of the learner at that stage. We should avoid steep learning gradients, as currently existing between the secondary and higher secondary stage of education. Finally, pedagogy cannot be divorced from content—the two must be developed concurrently. In an ideal education system, a textbook is only one of the diverse tools for curricular transaction. A major problem today is the practice of rote learning, largely a result of the prevailing examination system. Textbooks should help counter this tendency by raising meaningful and interesting questions, and by emphasizing applications and problem-solving. Traditions of testing, research inputs and feedback mechanisms must be institutionalized as part of textbook development.

One serious problem has been that these tasks are often performed with unrealistic deadlines, leading to hasty production of books. Textbooks at different stages should be split into suitably small sizes based on programmed learning approach to

avoid the physical burden of the school bag. A major area of concern is the gradual decline of practical work and experimentation at secondary and senior secondary levels, even while the concept of activity-based teaching is yet to become a living reality in our primary schools.

The often repeated recommendation of integrating experimental work and theory teaching has not been realized because of perceived lack of facilities and trained teachers in most of the schools. Even well-reputed schools tend to give only cosmetic importance to laboratory work in the prevailing scheme of things. Ultimately, there is no alternative but to invest heavily in improving school laboratories and workshops while reducing the importance of external examinations and promoting experimental culture in our schools. The investigator made the following observation regarding science practical in our schools. Due to lack of proper planning no attempt has been made so far to establish a recognized training institute to train manpower for laboratory services in the state. There is a need for recognizing laboratory services as a professional career at 10+2, undergraduate and postgraduate level. The level of willingness to the use of teaching aids of our science teachers was found low. We do not want teachers say, 'I do not have test tube so I cannot teach science'.

Our focus should be on the development of low cost improvised teaching aids. Even currently the laboratory services comprise heterogeneous group of untrained and non-technical personnel mostly from the non-science stream. The observations are dictated to the students from the old practical science copies.

Without doing any experiments, observation are recorded in science practical copies and validated by the teachers. This exercise injures the scientific temper in the students, breeds an element of corruption in our future generation. We should record our experimental observations carefully and systematically and do not manipulate our results under any circumstances. Another point of concern as observed by NEP 2020 is the great decline in the reading habit among children. Children need to be encouraged to read not only good science textbooks but also a broad range of other materials to enrich their understanding. The school library should be adequately equipped to meet these requirements and schools should actively promote reading and referencing habits among children. NEP 2020 recommends that ICT as a tool should be used with care so that it serves to bridge the social divide and equalize opportunity. Given the growing reach of the technology, it is mandatory that efforts are initiated to utilize ICT at the school level to prepare

children to face the challenges of a society that is fast transforming into an information driven society.

The importance of community (FM) radio in science communication needs also to be stressed. One of the objectives of NEP 2020 is to develop inventiveness and creativity along with competence. Science education in India at its best develops competence, but does not encourage inventiveness and creativity.

This is evident from the fact that many Indian students perform very well in formal / scholastic tests, but relatively few make it to the grade of truly outstanding researchers or original thinkers. The investigator made the content analysis of the matriculation board papers for science of the last three years. The study revealed that the Board Question Papers are set in the crude manner; they do not test the comprehension, application and higher mental processes of the students. No item analysis of the question papers is done, nor is there discrimination index and difficulty index calculated. No proper standard procedures for vetting the question papers by the experts are being followed in setting the papers. So when there is failure at the matriculation level the poor teacher is a scapegoat. As envisaged by NEP 2020 radical and willful change in the examination system at the secondary school stage must be made.

The theoretical science paper for examinations including the Class X and Class XII Board examinations should have carefully designed experiment/technology-based questions, questions testing critical understanding and ability to solve problems. The system should display the courage of conviction to mobilize required resources to put in place support systems that will help disadvantaged children to overcome their inadequacies in learning science in a meaningful manner. The curriculum should strive to make the contribution of women to the field of science and technology 'visible'. Teachers should be sensitized to promote equitable classroom practices to ensure science experiences' of comparable quality to girls. NEP 2020 strongly recommends that research in science education should be promoted to develop the scientific temper. What are the basic ingredients of scientific temper? How can it be assessed accurately? Which strategies are most appropriate to inculcate the spirit of science in the students? Research in science education awaits answer to these questions.

Conclusion

At the conclusion some of the recommendations of New Education Policy 2020 if implemented in letter & spirit in our state will result in reorientation of Science Education in our state as per global standards. These recommendations are provision of

multiple exit and entry points; focus on learning outcomes ,pedagogical innovations; creation of quality digital resource bank in science education in open access mode to address the issue of equity; creating autonomous science institutions free from red-tapism, international collaboration; redesigning board exams to assess conceptual clarity; focus on formative assessment with feedback; inter-disciplinary approach; making science education value-based; ; science curriculum restructuring as per global standards, curriculum flexibility & focus on creativity & innovations.