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Reflection on Curriculum Review of Science at Upper Primary Level in CBSE Affiliated Private Schools of Delhi

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Abstract: ***Curriculum is best thought of as that set of planned activities which are designed to implement a particular educational aim. This research paper highlights the problems and issues faced by teachers while implementing Science curriculum for Class VI to Class XII in CBSE affiliated private schools in Delhi. This paper delves into various aspects such as View on science curriculum, text books, pedagogy and assessment in Science and then goes to give Recommendations on how to overcome some of these problems.***

Keywords: Curriculum, Science, Upper primary, Pedagogy, Teaching.

1. Introduction

Curriculum is, perhaps, best thought of as that set of planned activities which are designed to implement a particular educational aim- set of such aims - in terms of the content of what is to be taught and the knowledge, skills and attitudes which are to be deliberately fostered, together with statements of criteria for selection of content, and choices in methods, materials and e' evaluation". In reference to the framework above it would mean the 'curriculum core' and 'syllabus' put together. Syllabus: refers to the content of what is to be taught and the knowledge, skills and attitudes which are to be deliberately fostered; together with stage specific objectives.

The syllabus for Science – or Science and Technology – has been carried out with "Learning without burden" as a guiding light and the position papers of the National Focus Groups as points of reference. The aim is to make the syllabus an enabling document for the creation of textbooks that are interesting and challenging without being loaded with factual information. The experiment and activity – based approach led to the development of rich curricular material that guides children to explore various phenomena of life and physical sciences. Beginning with simple qualitative experiments, the curriculum allows a lot of time and opportunity to train children in a variety of quantitative measurements and analysis. By the end of class VIII it becomes possible for children to empirically derive some quantitative relationships and express them as formulae.

The position paper on the Teaching of Science – supported by a large body of research on Science Education – recommends a pedagogy that is hands-on and inquiry-based. While this is widely accepted at the idea level, practice in India has tended to be dominated by chalk and talk methods. To make in any progress in the desired direction, some changes have to be made at the level of the syllabus. In a hands-on way of learning science, the things that are directly related to the child's experience, and are therefore specific.
The 1975, 1988 and 2000 Curriculum Frameworks recommended integrated approach, whereas thematic and integrated approaches have been recommended in NCF-2005.

The following paper was undertaken as an action research and details of the same are highlighted in the table below.

S. No	*Steps of action research*	*Step undertaken as an action research in the current assignment*
1.	Identification of Problem Area	Curriculum and its problems
2.	Identification of Specific problem	Problems and issues faced by teachers while implementing science curriculum for classes VI to VIII
3.	Analysis of the problem	The problem was specifically analyzed under the following sub-headings : • Views on science curriculum, • Science textbooks, • Pedagogy in science, • Assessment in science
4.	Collection and Organization of Data	Interviews undertaken
5.	Interpretation of Data	Observations highlighted for each interview criterion
6.	Recommendation	Recommendations given under below headings
7.	Conclusion	Conclusion given under below headings

2. Analysis of the Problem

The problem was analyzed under the following sub-headings:
- Views on science curriculum,
- Science textbooks,
- Pedagogy in science,
- Assessment in science

Given below are the interviews undertaken and observation for each of the areas analyzed as part of the action research. Interviews were broadly divided into 4 criteria to understand the problems faced by the teachers in implementing science

curriculum for students of Classes VI to VIII.

Interview was conducted with ten science teachers teaching science in classes 6, 7 and 8 having minimum five years of experience of teaching science in a private CBSE affiliated schools to these classes. It was conducted to know their views on the teaching pedagogy currently being used.

2.1 Criteria 1: Views on science curriculum

Interview
Interview was conducted with science teaching teachers to classes 6, 7 and 8 in order to know their views on the science curriculum. The interviews were conducted in bilingual i.e. English and Hindi were used.

Quote by one the teacher contextualization of science should not be at the expense of concepts, laws and principles of science and quoted:

…let us say that I have some students of economically weaker sections….who do not use our language . . . then I have to teach science to them. When I say I want to teach them science I mean I want to teach them the concepts of science, the laws of science, I am not talking about the context of science. Science teaching should be linked with the daily experiences of students and teacher said that it should be relevant and meaningful. In the words of one teacher, "give less of science and give more of what is relevant"

My Observations
Participants expressed their views on the nature of science for school curriculum; the constraints on development of meaningful science curriculum materials; what methods and strategies they recommend for the treatment of subject matter; and the strengths and limitations of current textbooks. During interviews, teachers expressed some of their difficulties with developing integrated materials. They said that the need to extend themselves beyond their own specialties is very demanding. They recognized also that as subject specialists they have a tendency to emphasize without explanation the need for particular subject content as part of an interdisciplinary criteria. Specialist subject concerns are so strong that they end up negotiating the requirements of their respective disciplines within the curriculum. As one member of faculty put it "what we end up doing is that you have 30% and I will also have 30%, that kind of thing . . .". This suggests why science in the current textbooks is merely an assembly of concepts taken from physics, chemistry and biology.

2.2 Criteria 2: Science textbooks

Interview
Interview was conducted with science teaching teachers to know their views on science textbooks. As quoted by one of the teachers

In current science textbooks, it is difficult for the learners to identify themselves; students are not given a chance to think . . . The quality of NCERT textbooks can be improved by reframing a few sentences and activities.

The major finding reveals that the contents in the Science textbook fulfils the aim of the subject curriculum and the text material is helpful in developing reasoning curiosity and logical skill in the students which was one of the aim of the science education but academic aspects need some more improvement. Maximum of the teachers think that the present N.C.E.R.T textbook of science should be revised up to World class knowledge.

My Observations
In science classrooms, the textbooks function as a source of knowledge whose meaning is mediated by both the developers of instructional materials and teachers for students, who are expected to reconstruct or restate it. Teachers have to follow the textbooks from page one till the end page. There are no separate sets of instruction as to how to modify, how to use different methodologies for dealing with different type of children, for addressing the needs of areas from different socio-economic conditions.

The class VI Science textbook has a fair number of activities for children to do, but many are of the paper – pencil variety. However, its merits are marred by shortcomings in the language used, which is characterized by lack of precision, by many instances of Indian English, the inaccurate use of definite and indefinite articles, bad grammar and the occasional typo. Some diagrams in the chapters – 'Motion and Measurement of Distances' and 'Light, Shadow and Reflections'—are either in accurate or unclear and should be replaced also in class VII -chapter Light. In the chapter 'Fun with Magnets' (class VI) personally liked some discussion on the Earth's magnetic field because how else does one explain the direction – seeking properties of magnets with which the chapter has dealt at length? In the chapter 'Components of Food' there is talk of starch, fats, protein, vitamins and minerals but none at all of the calorific value of different food items. So, although the chapter mentions deficiency diseases like scurvy, beriberi and rickets, which are no longer so common in our country, there is no discussion at all about the low-calorie intake of many of our children and the consequent incidence of malnutrition which is still the problem in India

Abstract concepts in class 6 & 7 science textbooks
In class 6 and 7 when teachers taught the chapter on electricity and currents - children were actively involved in performing the activities and they made the circuits using simple bulb, connecting wire and switch. It was observed that the children enthusiastically made the models and the model talks about 'current flowing' when the path is fully connected promptly leads to conjectures like: 'If we cut the wire should not the current spill out like it would in the case of, say, a water – pipe?' Inevitably these questions and discussions have to be gone through to build an understanding that 'current flowing in a wire' used in their textbooks is only a limited metaphor with probably no concrete model to compare with and no set of abstractions to define it fully. As in class VIII many children enter puberty. They are curious about their own bodies and sexuality, while being subject to social restrictions and taboos. Thus, it is important that the

topic of human reproduction (chapter Reproduction) not be treated merely as a biological process. Thus, the syllabus provides space for addressing social taboos, and for making counselling on these matters part of the classroom process.

2.3 Criteria 3: Pedagogy in Science

Teachers are encouraged to use the constructivist approach to teaching science. Constructivism is an approach which focuses on the central role that learners' mental schemata play in cognitive growth. This is characterized by active engagement in learning, collaborative or cooperative learning and hands-on activities. Teachers must therefore structure lessons to challenge students' suppositions and let students work through the task collaboratively. They should plan lessons around big ideas use open-ended questions and make the curriculum relevant to their needs.

Interview
Teachers when interviewed on the use of constructive knowledge during their class one of them quoted:
….they find difficulty in constructing the knowledge of the some theoretical concepts and same cannot be constructed by the students.

My Observations
Difficulty for constructivism which is posed by teaching the content of science is a fundamental theoretical problem, not merely a practical one. If knowledge cannot be imparted, and knowledge must be a matter of personal construction based on one's experience, then how can children gain knowledge of complex conceptual schemes that have taken the best minds hundreds of years to build.

Teachers taught the concept using number of activities but students were actually not able to perform it due to the unavailability of the required equipment for 40 students for a classroom. Children of these classes usually have no access to equipment, even if the school has functional laboratories for higher classes. While many experiments can be performed with 'zero-cost' equipment, it is unfair to deny children the opportunities of handling, e.g., magnets, lenses and low-cost microscopes. In many of the cases it was observed that students of classes 6 – 8 are not taken to the laboratories.

2.4 Criteria 4: Assessment in Science

Teachers are encouraged to use a balanced approach to assessment. Both formative and summative strategies: that is assessment of learning and assessment for learning are used. Teachers assess what students know, understand, and are able to do. Assessment should be ongoing and target both the content and the skills that are taught in the curriculum.

Interview
The teachers when interviewed faced the problem that they need to asses on different activities as a part of their formative assessment (FA 1, FA 2, FA 3 and FA 4) as students take part in activities like the group activities, role play, experimentation and model making. They find it very difficult to complete the syllabus on time.

One of the teachers quoted
…..due to more of activity oriented classrooms student scores less in pen paper test. But they actually participate more in classroom discussions at the same time writing skills has got affected after the implementation of CCE.

My Observations
As emphasis on collaborative learning students take part in group activities but often teachers said they often get complain regarding the marks of group work. As all students in a group do not equally contribute but they are given same marks to all the group members. Planning and conducting of activities takes more time and effort and constraints the time for completion of the syllabus.

3. Recommendations

Some of the recommendations basis interviews conducted and also it takes into account my observations are as below:

3.1 Classroom experience

The learner also needs time to reflect on the classroom experience. This is possible only if the content load is reduced substantially, say by 20-25%. Children are naturally curious. Given the freedom, they often interact and experiment with things around them for extended periods. These are valuable learning experiences, which are essential for imbibing the spirit of scientific inquiry, but may not always conform to adult expectations. It is important that any program of study give children the needed space, and not tie them down with constraints of a long list of 'topics' waiting to be 'covered'. Denying them this opportunity may amount to killing their spirit of inquiry. To repeat an oft-quoted saying: "It is better to uncover a little than to cover a lot." Our ultimate aim is to help children learn to become autonomous learners.

3.2 Syllabus

There should be more than one approved syllabus and that each school should be permitted to adopt the syllabus best suited to its own condition.

3.3 Textbooks

No useful purpose it served by having only one textbook in a subject for a given class. In the light of this process, all textbooks, even those produced by private publishers would be reviewed and approved by the State bodies. Moreover, it is recommended that the regulatory mechanism must be professionally worked out to carefully avoid the attendant distortions and problems that may arise out of bureaucratic and political pressures, vested interests or even corrupt practices, within bodies established to approve the curricular packages. There should be a multiplicity of textbooks with a multiplicity of approaches so that teachers and school can choose the one they find most suited to their needs. It should also, in keeping with its mandate, promote quality research in education to guide it in its policy formulations and pedagogical recommendations.

Since development of textbooks requires a lot of effort and time, there should be lot of instructional materials i.e. analogies, situations, problems and illustrations. At present instructional materials, do not take into account local materials, resources and environment. So, that teacher can actually choose the instructional material according to the need of the environment in a particular situation.

3.4 Teaching pedagogy of science

Teachers should be trained to teach science in an integrated and holistic manner as the present teacher training component of the curriculum is not geared to address the deficiency where the science teachers tend to interpret science according to their own area of specialization and do not to view science holistically.

3.5 Tools for experimentation

The governments and other agencies make enough copies of such kits available to schools, assuming that children will perform the experiments themselves, in groups. Until a kit is designed and provided, specific items that are needed should be identified and procured. Glassware, common chemicals, lenses, slides etc. are items that will be in any such list.

3.6 Activities

There should be lot of books on activities, quizzes, puzzles and other hands on activities that can be easily performed and are meaningful for the student. Activities should be part of the curriculum not supplementary to the text as it is now at present

4. Conclusion

I believe that for teaching Science, particularly to younger children, what is actually taught is not as important as how it is taught, with experiments and investigations being used to ignite the imagination of young minds and make them aware of the importance of the empirical basis of the discipline, instead of stuffing information into unwilling minds and merely emphasizing its rationality.

References

[1] MHRD: Learning Without Burden: Report of the National Advisory. 1993
[2] Committee Appointed by Ministry of Human Resource Development, New Delhi, MHRD, Govt. of India.
[3] NCERT: National Curriculum Framework, New Delhi, NCERT. 2005
[4] NCERT: Position Paper: National Focus Group on Curriculum, Syllabus and Textbooks, New Delhi, NCERT. 2006
[5] S.K Yadav, "Ten Year School Curriculum in India-A Study Report." DTEE, NCERT, New Delhi. 2013
[6] G.L. Arora, "Reflections on Curriculum, New Delhi, NCERT." 1984
[7] G.L. Arora, "Curriculum and Quality in Education, New Delhi, NCERT." 1988
[8] R.C. Das & Others, "Curriculum and Evaluation, NCERT, New Delhi." 1984
[9] S.K. Yadav, "Implementation of Ten Year School Curriculum in Different" 2008
[10] States in India, Indian Education Review (NCERT, New Delhi), Vol.44,No.1, January, 2008.
[11] NCERT : Leading the change 50 YEARS OF NCERT. 2011

Author Profile

Chetna Arora received the M.Sc. and B.Sc. degrees in Home Science Government Home Science College Punjab University & Institute of Home Economics respectively in 2008 and 2006. Post that completed her B.Ed and M.Ed from Delhi University in 2009 and 2014. During 2009-2016, she taught in as PGT Home science (2 years) and TGT Science (5 years) in two of the prestigious schools in New Delhi. Since August 2016, she is teaching as Assistant Professor , Department of Education, Delhi University.