

THE CURRICULUM
FOR
THE TEN-YEAR SCHOOL

A Framework

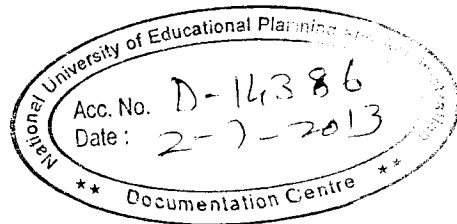
NUEPA DC



D14386



National Council of Educational Research and Training



विद्यया ऽ मृतमश्नुते
सर्वं विद्यायाः शक्तिः विद्यायाः
सर्वं विद्यायाः शक्तिः विद्यायाः
सर्वं विद्यायाः शक्तिः विद्यायाः
सर्वं विद्यायाः शक्तिः विद्यायाः
सर्वं विद्यायाः शक्तिः विद्यायाः
सर्वं विद्यायाः शक्तिः विद्यायाः
सर्वं विद्यायाः शक्तिः विद्यायाः
सर्वं विद्यायाः शक्तिः विद्यायाः
सर्वं विद्यायाः शक्तिः विद्यायाः

Foreword

The nascent Indian society is replacing old ideals by new. The Report of the Education Commission (1964-66) underlines national development as one of the most important concerns of education and, in fact, visualizes it as the only instrument of peaceful social "change on a grand scale". The Commission's report was discussed in the Parliament and a Policy Resolution was adopted by the Government of India in 1968 in which the main recommendations of the Commission were accepted.

Admittedly the task of developing a corresponding curriculum which by way of its objectives, content and methodology serves the current and emerging needs of the Indian society and the citizen is complex. In a large country, with diverse languages, cultures and traditions, where education is a State subject, the necessity of evolving a national consensus on the curricular framework makes the task even more difficult. However, during the last few years, as a result of many discussions at different levels involving experts from various fields, a framework has emerged which is being presented in this document. In spite of the fact that perfection or finality can never be achieved in the curriculum, since it is associated with everything that is dynamic, the moment has come to make the present framework the starting point of a serious effort to implement the ideas and the consequential tasks. The thrill of a continuing academic discussion has to be replaced by the excitement of action; otherwise, the object of the discussion will be lost.

The National Council of Educational Research and Training expresses its gratitude to the numerous educationists who have contributed to the making of this document. A special mention has to be made of the interest taken by the President of the Council, Prof. Nurul Hasan, and of the guidance which he gave to the work from its inception to its completion. His speeches at the first meeting of the expert group and at the conference at which these ideas were finalized were both invaluable contributions to the crystallization of ideas. It is hoped that this document will serve as a useful guide in remoulding education for national development in the years to come.

New Delhi
14 November 1975

Rais Ahmed
Director
National Council of Educational Research
and Training

November 1975

P D 15 T

© *National Council of Educational Research and Training, 1975*

Published at the Publication Department by Smt. J. Anjani Dayanand, Secretary, National Council of Educational Research and Training, NIE Campus, Sri Aurobindo Marg, New Delhi 110016, and printed at Rajendra Ravindra Printers (Pvt.) Ltd., Ram Nagar, New Delhi 110055

The Curriculum Committee

The Ministry of Education and Social Welfare constituted an expert group in 1973 to develop the curriculum for the 10+2 pattern. This group was expanded in 1974 to include the experts from within the NCERT which had drafted a version of the curriculum in 1972 and revised it in 1973. A number of sub-committees were appointed for different subject areas, and in the course of this work many other educationists were consulted. An Approach Paper was then drafted and circulated for comments to all the States and to many other teachers, educational administrators, and individual educationists in March-April 1975. Finally, a national conference on the curriculum was convened in Delhi in August 1975 to discuss the draft. It was attended by about 200 educationists from all over the country. The present document is the result of all these endeavours to have as wide a consultation as possible and perhaps represents the largest measure of common understanding which is possible in such a matter. It is not possible to name all the people who have contributed very significantly to this framework of the curriculum and to whom we are indebted but a list of members of the enlarged committee is given below.

1. PROF. RAIS AHMED (Chairman)
2. PROF. RAMESH MOHAN
3. PROF. J.N. KAPOOR
4. DR. D.P. PATTANAYAK
5. PROF. SIVATOSH MUKERJEE
6. PROF. ROMILA THAPAR
7. PROF. R.C. MEHROTRA
8. DR. D.G. WAKHARKAR
9. DR. S.K. MITRA
10. PROF. MOONIS RAZA
11. PROF. RASHEED-UD-DIN KHAN
12. DR. (SMT.) CHITRA NAIK
13. SHRI V.G. KULKARNI
14. SMT. VIBHA PARTHASARTHI
15. PROF. NAMWAR SINGH
16. SHRI C. ULAGALANDAN
17. SHRI KRISHNA KANT DIKSHIT
18. DR. (SMT.) KAPILA VATSYAYAN
19. SHRI J.P. NAIK
20. SMT. J. ANJANI DAYANAND
21. PROF. P.K. ROY
22. DR. R.G. MISRA
23. SHRI A. VIDYALANKAR
24. KM. S.K. RAM
25. PROF. B.S. PAREKH
26. SMT. A. KHANNA
27. PROF. A.N. BOSE
28. PROF. B. SARAN
29. PROF. MANMOHAN SINGH ARORA
30. SHRI G.S. BADERIA
31. SHRI S.C. CHAUDHRI
32. SHRI A.K. SEN
33. SHRI J.D. VIRMANI
34. PROF. D.S. RAWAT
35. SHRI R.K. CHOPRA
36. SMT. C. DHAR
37. DR. (SMT.) P.P. SINGH
38. SHRI SURENDRA NATH
39. PROF. C.V. GOVINDA RAO
40. PROF. P.D. SHARMA (Member Secretary) and later
PROF. R.C. DAS (Member Secretary)

Contents

FOREWORD	..	iii
THE CURRICULUM COMMITTEE	..	v
I. Introduction	..	1
II. Salient Recommendations	..	3
III. Stage-wise Objectives of General Education	..	10
IV. Subject-wise Instructional Objectives and Content	..	14
V. Some Aspects of the Methodology of Education and the Teaching of Subjects	..	32
VI. Instructional Aids and Materials	..	40
VII. Evaluation and Feedback	..	42
VIII. Implications for Implementation	..	45
A. Machinery for Implementation	..	45
B. Areas of Work	..	46
C. Implications for Schools	..	50
D. The Involvement of the Community	..	52

I

Introduction

1.1 The school curriculum of a country, like its Constitution, reflects the ethos of that country as also its chief concerns. Time and again it has been pointed out by our national leaders that the vestigial remains of a colonial-feudal system of education historically meant for the production of clerks should be thrown out of the system and the system revamped to respond to the growing needs, aspirations and demands of a modernizing egalitarian society. In his system of Basic Education, Mahatma Gandhi gave an alternative approach which could help the development of a system in tune with the Indian society. The Report of the Education Commission (1964-66) incorporates the best that Basic Education has to offer, and lays emphasis on the "internal transformation" of education so as to relate it to the life, needs and aspirations of the nation. The values enshrined in our Constitution point towards the development of a pluralist open society and a state which is secular, democratic and socialist in nature. The school curriculum should reflect these aims and values in its structure, content, implied methodology—in fact, in its entire design.

1.2 It is not, however, easy to bring about a change in the existing system of school education so as to meet the requirements of national development implied by the statements made in the paragraph above. It is going to be increasingly difficult to provide good education in the country's schools under the mounting pressure of the growing number of children. But the task is made even more difficult by rigid postures and orthodox attitudes. It is necessary to understand that new ways have to be found of teaching and learning, that non-formal education in our society is a rich source of learning and should be utilized, and that an all-round flexibility in the school will have to be introduced—in the courses of studies, methods and materials of teaching and learning, evaluation, the time-table, admission policies and practices, the administration of the school system as well as of individual schools, the preparation and in-service education of teachers, the utilization of resources in the community, and such

other things. Thus, multiple entry into the school, part-time education in the school, non-formal education outside the school, and teaching by the experienced worker, artisan, artist and writer in the school should be all tried out. Nothing short of a total learning system involving the optimum use of resources in both men and materials, inside the school as well as in the community outside the school, can meet the growing demands of education today.

Here, however, we shall pay attention to only the important aspects of the development of the curriculum for the first ten years in school, from Classes I to X.

II

Salient Recommendations

2.1 Flexibility within a Framework of Acceptable Principles and Values. In order to develop a curriculum which is socially and personally relevant, it is necessary to have flexibility and dynamism in it for, otherwise, with the rapidly expanding frontiers of knowledge in science and technology and the changing socio-economic conditions of our society, the relevance of any curriculum is likely to be short-lived. For a vast country like ours with its diversity of languages, social customs, manners, mores and uneven economic development, the needs and demands of the individuals and the society will have differential pulls on the school curriculum, varying from one region to the other. For the sake of uniformity of standards and of national identity, therefore, it is necessary to develop a common curriculum within a broad framework of acceptable principles and values. Unless this is accepted, there is a likelihood of the "hidden" curriculum being different from the one prescribed, from one part of the country to the other. While the "hidden" curriculum of a school cannot be totally done away with, the discrepancy between the "hidden" and the "prescribed" can be reduced by allowing some freedom to teachers and other curriculum workers to adapt the curriculum to the needs of the individuals and the community, provided the basic values and the national goals are not sacrificed. Besides, a curriculum, in order to remain living and modern, has of necessity to be always in the process of development and change. Curriculum renewal should not be a sporadic and periodic effort. It has to be a necessary component of any curriculum development at any stage. This means that the educational system of a State (as well as at the Centre) has to have a built-in mechanism for curriculum renewal.

2.2 Curriculum Related to the Life, Needs and Aspirations of the People. As the Education Commission had noted, there is a need today to transform education so as to relate it to the life, needs and aspirations of the people, and

to make it an instrument of social change. For this purpose, the school curriculum should be related to national integration, social justice, productivity, modernization of the society and cultivation of normal and spiritual values.

2.3 Science and Mathematics for Productivity and a Rational Outlook.

In order to reach this aim, the curriculum should have science and mathematics as an integral part of school education up to Class X. The teaching of science and mathematics will have to be upgraded and the curriculum continually renewed in order to give our children modern knowledge, develop their curiosity, teach them the scientific method of inquiry and prepare them for competent participation in a changing society and culture, increasingly dependent on a rational outlook leading to better utilization of science and technology.

2.4.1 Work Experience as a Source of Learning. Work experience should be a central feature of school education at all levels. It should be oriented to the application of science and technology and to productive processes in agriculture and industry. Work experience should provide an opportunity to learn from the use of the hands, give insight into the material phenomena and human relationships involved in any organized productive work, create the attitudes necessary for cooperative accomplishment of tasks and discharging of social responsibility within a framework of equality as well as of the freedom of the human spirit.

2.4.2 The report of the International Commission on Education (UNESCO), entitled *Learning To Be*, shows that for too long a period in human history, education has remained cloistered and segregated from life and work. When one goes to school one does not work. One begins to work *after* one finishes school and *thereafter* rarely goes to school or has an opportunity for further education. This dichotomy between work and education is unnatural and should be broken. The school time-table, courses of study, methods of instruction, examination, certification—as a matter of fact, all aspects of the school—need to be flexible so as to bring the school closer to the community. Only thus will the school be able to promote equalization of educational opportunities and bridge the gulf between education for the elite and that for the masses.

2.5 Concern for Social Justice, Democratic Values and National Integration.

The awakening of social consciousness, the development of democratic values and of a feeling for social justice and national integration are extremely important. The promotion of national consciousness and the development of international understanding should be one simultaneous process. Tolerance, friendship, cooperation and peace between nations are possible only through a proper appreciation of each country's contribution to the world. National integration can be achieved only through a proper understanding and appreciation of the different sub-cultures of India and the common bonds that hold them together. Discrimination of any kind based on sex, caste, religion, language or region is to be looked at with aversion because it is irrational, unnatural and harmful to the growth of modern India. All subjects should be taught in such a manner

as to foster the spirit of scientific humanism.

2.6 The Three Language Formula. The three language formula should be implemented with sincerity, and, so far as possible, primary education should be in the mother tongue. The aim of language education should not be only the mastery of the language. Language is one of the most powerful tools to develop a catholicity of outlook and an appreciation of the basic values of the composite culture of India.

2.7 Artistic Experience and Expression. An area of personal expression is aesthetic activity. Interest in beauty and the ability to discern it and integrate it into one's personality, together with other components of artistic experience, should be woven into the entire texture of educational activity. Ample opportunity must be provided to each one to preserve and develop his originality and creative talents and make use of his gifts, aptitudes and personal forms of expression.

2.8 Physical Education. The promotion of aesthetic values includes a natural esteem for physical well-being. The mastery of the body, its powers and qualities, requires knowledge, methodical training and exercise. The body must be strengthened and its skills and capacities developed, the muscles and nerves trained, the senses cultivated, and hygienic and proper dietary habits inculcated.

2.9.1 Character Building and Human Values. The school curriculum should have a core centering round the objective of character building. The best way to do this is to help the child find the right road for his self-actualization and encourage him to follow it, watching, suggesting, helping, but not interfering. Self-actualization is a strong need in human beings; but the conditions in which the child lives—its social, mental and moral environment—may not be always conducive for the fulfilment of this need. Hence, attempts have to be made to nurture the child to discover its potentialities. Educational activity should be organized in such a way that, always and ever, in each and every task, the child is encouraged to express itself and find its best fulfilment.

2.9.2 Linked with this process of character building is the cultivation of such basic qualities as compassion, endurance, courage, decision-making, resourcefulness, respect for others, the team spirit, truthfulness, faithfulness, loyalty to duty and the common good. These can be encouraged by all curricular activity and particularly cultivated through a programme of physical education, co-curricular activity and work experience. Activities such as social service, scouting and guiding, NCC, and the like may be considered as well as physical education, sports, games, etc.

2.10 Implications of the Process of Learning. The UNESCO report *Learning To Be* emphasizes the process of learning, and particularly self-learning. The methods of teaching should change in the direction of helping individuals to learn better and on their own, not only in the school but also outside the school. The teacher will have to provide the resources for learning to the young child so that the child may discover knowledge and not just cram infor-

mation doled out to it. In this matter it is necessary, particularly, to emphasize the first five years in school. This is the period when the rate of learning is fast and we should take advantage of it. But this is the time when by not teaching the child how to learn and giving it the joy of curiosity, creativity and discovery, we may de-motivate the child so that it may not wish to learn in school. Children should be involved in the learning process. But children develop through ordered and sequential stages in the physical, intellectual and emotional areas of growth. Although social intervention during such growth may help, children are not infinitely malleable. In cognitive development, the mastery of subject matter is not as important as the modalities of the learning process. The teaching-learning situation, therefore, should be so arranged as to give the child the experience of actively solving problems. Care should be taken to see that the individual child can proceed at his own rate of learning and development. This does not mean that the curriculum should not be structured at all; it only means that the structure should take note of these facts of development. Education, specially in the primary stage, should not lead to an overloading of the child with too many books and too much of subject matter. School education costs can be minimized in this process by changing over from a passive rote learning and cramming of knowledge to more active methods of self-learning which take care of the child's diversity of interest and allow him to develop and learn at his own pace.

2.12 Drop-out and Multiple Entry. There are some other aspects of the curriculum which require attention. We have to think specially of the children from the backward sections of the community and the girls. Their numbers are not small and they either do not attend school, or, after attending for some time, drop out of school. While attempts are being made to develop part-time education and non-formal education, it is necessary to make suitable improvements in the organization of school education like changing the admission requirements and school hours (to fit into the pattern of harvesting or other productive work) so as to facilitate entry at different stages for those who come from non-formal programmes, and to reduce the number of those who cannot keep up with the school.

2.13 The Semester System. Likewise it would be desirable to change the present courses of studies, which tend to be uniform for everybody and by their duration of a full academic year tend to contribute towards inflexibility of the disciplines and channels of progress for individuals. Instead, semester-length courses would improve the teaching-learning situation and also reduce the burden of the end-of-course evaluation.

2.14 Units within Semester Courses. Reduction of inflexibility as well as improvement in learning and evaluation would also be promoted by dividing the entire course of studies for a given class over various "subjects" into smaller units. A proper sequence of units in the teaching-learning process could be established for the most meaningful, logical and, therefore, economical approach

to the concerned subjects. By this approach the many-sided nature of knowledge will become self-evident to the learner, which is something that he completely misses while examining problems and situations from the narrow angle of a single "discipline". In fact, even an examination of problems in depth in later years often turns out to be an exercise in interdisciplinary study. Another advantage is that areas such as health, sanitation, nutrition, population studies, pollution, water resources, elements of psychology and culture, which have to find a place in the modern curriculum and which are multi-disciplinary, would be dealt with more easily through a unit approach.

2.15 The Core Curriculum and Beyond. It is visualized that the details of a core curriculum based on these objectives and ideas will be drawn up and offered by all secondary schools in their programme of general studies. However, the special needs of the talented, the backward and those coming from non-formal channels have to be looked into. Where possible, schools should provide additional units for those who are keenly interested in, say, mathematics, or home science, or painting, etc., or those who offer to study one or another advanced unit. Students coming from the less fortunate schools or from non-formal education may also need remedial units or bridging units which particular schools would have to provide.

2.16 Evaluation. Whereas in the present system either there is promotion for all students without examination, or there is an annual examination covering all the courses inducing the child to cram a large mass of half-digested information in a short time and thereafter forget it conveniently, what is necessary is to bring out clearly the specific goals of education in the form of expected outcomes of learning at each stage, and then, in relation to these outcomes, offer courses of studies in the form of sequences of units. Each unit could then be evaluated separately thereby reducing the burden of the examination at the end. The necessary variety of tools and techniques should be employed to evaluate not only the performance of the learner but of the process itself. The deficiencies discovered must be removed as far as possible by remedial courses, if necessary, rather than "failing" students by way of punishment. Gradually, as the system of internal assessment takes root, and personal biases leading to the lowering of standards are brought under check, the external public examination even at the end of Class X will become redundant and should be abolished. It would be necessary for each Board/State to evolve a phased programme of accomplishing this.

2.17.1 Textbooks and Supplementary Material. Textbooks have to be considered in the light of the suggestions in this document that, particularly for primary classes, it is far more important to prepare teachers' guides and supplementary materials, and that the broad aims and objects of education have to be covered by each subject area in its own specific way. The questions pertaining to social justice or national integration, for example, have to be dealt with imaginatively but not only in books in social studies or history and civics.

The question of attitudes, such as attitude towards equality of sexes, or towards untouchability, for example, is capable of being dealt with with equal force in the social sciences and the natural sciences. The textbooks must not only inform the reader but also rouse his curiosity to learn and investigate; this curiosity, in turn, should be satisfied by suitable supplementary readers. Therefore the new approach to the curriculum will have to be explained to authors and publishers so that both textbooks and other materials can play their expected part in the educational process.

2.17.2 The idea of units explained here lends itself to two very useful possibilities. One is that the units for a particular class or year of study could be put together in one volume, to serve as a book or textbook, thereby reducing the load and number of books for a student to a minimum. The other is that with the unit approach it may be possible to establish a set of commonly accepted units for the whole country. The shortage of paper, and of funds in general, on the one hand, and the necessity of printing books in several languages within each State, on the other, has already led educationists to explore the possibilities of a common core curriculum. A commonly accepted framework of ideals and educational aims may reinforce this desire. The books may thus have some common units and some units specifically meant for and produced by a State. There may also be units which generally do not change rapidly with time, such as those in physics, or in history up to the achieving of independence, and units which change with time, dealing with such items as man's progress in exploring the universe, or the Constitution of India. Obviously, these problems require new thinking.

2.18.1 **Need for Coordination and Collaboration.** If the ten-year school curriculum has to develop along the lines noted above, it will be necessary to utilize and coordinate the institutions and their resources at all levels from the district upwards to the Centre. Universities, State Institutes of Education and NCERT, in particular, will have to work together. Suitable changes in educational administration, and particularly in the inspection and supervision of schools in the States, will have to be introduced so that the curriculum practised in the schools in a State may have the characteristics we have discussed earlier in this paper.

2.18.2 The harmonious and judicious blending of a certain amount of uniformity and a fair amount of flexibility in the curriculum should be based on careful thought since there are different levels of development, sub-cultures, regional differences and the like. Within a broad common framework, an attempt should be made to promote flexibility in approach by giving more freedom to the teacher to bring to bear his individuality and by encouraging individualization of instruction. It is in this context that the proposals regarding environmental education, providing guidelines to the teacher on evaluation and assessment, teacher participation in curriculum development, encouraging a spirit of innovation and experimentation on the part of the teachers and local

school systems under the school complexes scheme, greater use of local resources, involvement of the local community and the revision of curricula of teacher training institutions must be viewed.

2.18.3 A curriculum may be regarded as the sum total of all the deliberately planned set of educational experiences provided to the child by the school. As such it is concerned with

- (i) the general objectives of education at a particular stage or class
- (ii) subject-wise instructional objectives and content
- (iii) courses of studies and time allocation
- (iv) teaching-learning experiences
- (v) instructional aids and materials
- (vi) evaluation of learning outcomes and feedback to pupils, teachers and parents.

2.19 **Development and Research.** Developing a curriculum reflecting all the above components in an integrated, well coordinated and properly articulated form requires systematic and sustained effort over a period of time. In order to be practicable and functional, it has to be based on actual try-out and research. A well thought out and phased programme for the development of a ten-year curriculum should be worked out carefully, considering all the aspects of implementation in the school system of a State or Union Territory.

III

Stage-wise Objectives of General Education

3.1 The broad objectives of general education have a limited utility unless they are spelt out in terms of stage-wise and subject-wise objectives for the guidance of educational planners, administrators, supervisors and teachers.

Objectives of Primary Education

3.2 This stage of education covers, roughly, the children of age 6+ to 11+ studying in Classes I to V. In some parts the age may be 5+ to 10+. In some cases the classes may be I to IV and age in years may be 5 to 9 or 6 to 10. But the generalization which follows will hold. This is a very crucial stage in the life of a child. The child's spontaneity, curiosity, creativity and activity, in general, should not be restricted by a rigid and unattractive method of teaching and environment for learning. The curriculum should take into consideration the social, intellectual, emotional and physical maturity of the child as well as the socio-economic needs of the community. It will be helpful to identify realistically the basic minimum to be achieved in respect of each and every child and leave enough scope for individual schools to go as far beyond this basic minimum as their circumstances permit. There should be enough scope for flexibility and local adjustments. It should be pointed out here that for a number of children the primary stage is terminal. It should, therefore, be necessary to provide an education to them which prepares them for life and for self-learning. The objectives of education at this stage may be stated as follows:

- 3.2.1 The first objective is *literacy*. The child should learn the first language, which would generally be his mother tongue, to a level where he can communicate easily with others through properly articulated speech and in writing.
- 3.2.2 The second objective is attainment of *numeracy*. The child should develop facility in the four fundamental numerical opera-

tions and be able to apply these in the life of the community to solve practical problems.

- 3.2.3 The third objective is *techniracy*. The child should learn the method of inquiry in science and should begin to appreciate science and technology in the life and world around it.
- 3.2.4 The child should develop a respect for national symbols, like the flag and the anthem, and for the democratic processes and institutions of the country. He should know about the composite and plural culture of India and learn to denigrate untouchability, casteism and communalism.
- 3.2.5 The child should acquire healthy attitudes towards human labour and its dignity.
- 3.2.6 The child should develop habits of cleanliness and healthful living and an understanding of the proper sanitation and hygiene of its neighbourhood.
- 3.2.7 The child should acquire a taste for the good and the beautiful and should take care of its surroundings.
- 3.2.8 The child should learn to cooperate with others and appreciate the usefulness of working together for the common good. Other desirable qualities of character and personality such as initiative, leadership, kindness, honesty, should also be developed as well as an understanding of its role as an individual in the home, the school and the neighbourhood.
- 3.2.9 The child should be able to express itself freely in creative activities and should acquire habits of self-learning.

Objectives of Education at the Middle Stage

3.3.1 The classes VI to VIII cover the middle stage when the normal age-groups should be from 11+ to 14+. During these years, the children become adolescent and this period can become difficult for many children. Problems of adjustment in the family, the school and the society begin to appear. The child, however, becomes a boy or a girl with greater intellectual, emotional, social and physical maturity than the primary school child. Social demands and responsibilities begin to appear. For many boys and girls, this stage is terminal after which they enter life and work. They should, therefore, be prepared adequately to face life and develop capacities and attitudes for productive work in which they have to participate.

3.3.2 Thus, in the matter of national integration, the children should now develop an understanding based on knowledge, through a proper study of history, geography and other subjects. They should know our Constitution and the values enshrined in it. They should have a sound knowledge of the democratic processes, structures and institutions in our country. Their understanding should be deepened and widened by their knowledge of world culture and

civilization.

3.3.3 This is the stage when a second language should be learnt so that the child is prepared for wider participation in society and the nation. The child should begin to comprehend ordinary speech in that language as well as simple pieces of writing in prose and poetry. Its mastery of the first language, however, should now be greater and the child should begin to appreciate its literature.

3.3.4 In the sciences, physical and life sciences should be introduced. At the same time, environmental education, nutrition, health and population education should receive adequate attention so that science is related meaningfully to life. This is the age when work experience should emphasize agricultural and technological processes and tools to help the integration of science, mathematics and technology with production and with the life of the community.

Objectives of Lower Secondary Education

3.4.1 The lower secondary stage covers only the two classes, IX and X, and the age-range usually of 14+ to 16+. These two classes complete the ten years of general education. After this, there are three possible courses open to students: (a) they can enter the working force, (b) they can take up vocational courses, and (c) they can take up higher level academic courses of study to prepare for entrance to the first degree class in the college or university. The ninth and tenth years in the ten-year school should, thus, be terminal for a large majority of students who are likely to choose alternative (a) above. It is, therefore, necessary to bring their education beyond the middle stage up to a standard which will give them the competence to enter life. This means that the process of acquiring useful knowledge and skill, proper work habits, attitudes and character which contribute to productivity and national integration that should have started from the middle stage should be accelerated and brought to a satisfactory level of development. The Education Commission had thought of a minimum national standard of attainment in this context so that those areas of the country and those sections of the society which are backward could come up and compete fairly with the rest of the people. Hence, while maintaining a continuity of the objectives of education from the previous years, it is necessary to pay attention to the academic subjects as well as to the knowledge and skill required for doing socially productive work. These two years, however, are crucial from the point of view of the development of personality. While from the onset of puberty in the middle stage there are problems of adjustment which the young child has to cope with, it is in this stage that these become acute and the additional preparation for a transition from the life of a school student to that of a productive person in society has to be undertaken. It is, therefore, necessary to give the child some psychological insight into his problems and the knowledge that may help him to understand his own behaviour as well as that of others around

him.

3.4.2 In science and mathematics, the student should have developed the competence to apply his knowledge to the solution of the problems around him. He should have an understanding of the technological processes in agriculture and industry in use in his surroundings. He should be able to contribute meaningfully to environmental conservation, the reduction of pollution, the development of proper nutrition and health and hygiene in the community. He should be able to help in the development of proper habits and attitudes in child care and in the improvement of the home.

3.4.3 The student should have acquired by now the knowledge and skills required for entry into an area of work. He should have learnt one or two useful trades. But it is equally important to give him enough knowledge of the materials, tools, techniques and processes of a job family so that he can enter life with some confidence.

3.4.4 The first language should be learnt up to a point where some of the best specimens of literature in that language can be appreciated and a beginning made in creative writing. The second language should be learnt up to a level where one can adequately express oneself in that language. A third language should be learnt up to a point where the student can have reading comprehension of ordinary passages, and expression.

3.4.5 Apart from learning the other subjects like history and geography, the student should develop an understanding of the social and cultural phenomena, not only in India but in other countries of the world, and particularly of our neighbours. Through curricular and co-curricular activities, physical education, games and sports he should develop desirable social attitudes and values like those of kindness, cooperation, the team spirit, fellow feeling, leadership, courage, truthfulness, honesty and sincerity. He should be able to understand the value of national and civic property and be able to take care of them. He should have a clear grasp of the principles of democracy, secularism and socialism.

IV

Subject-wise Instructional Objectives and Content

4.1 Having broadly defined the objectives of education at different stages, the next step is to plan learning experiences for their realization. Learning experiences in school arise out of subject teaching as well as other activities. Therefore, what subjects are to be taught, what objectives are to be realized through each subject, what methods and materials are to be used so as to provide the best possible experience to pupils within the resources available to the schools, the allocation of time to curricular and co-curricular activities and the distribution of time over the various curricular areas need to be thought out. What should be evaluated, how often, by whom, and by what method also needs thinking over. Here we shall discuss the objectives and content of different curricular areas, and only some indications will be given for the guidance of curriculum workers.

4.2 As has already been pointed out earlier, the first ten years of school education should be spent in providing a broad base of general education to all pupils. The curricular areas proposed for this purpose are as follows:

- (i) The sciences
- (ii) Mathematics
- (iii) Work experience
- (iv) The social sciences
- (v) Languages
- (vi) Art, music and other aesthetic activities
- (vii) Health and physical education

4.3 The above list should not be taken to be exhaustive of all that can or should be given in a school. Other experiences should be available to students through co-curricular programmes and supplementary reading. By developing a system of semesters in each of which there will be several units of courses for instruction and evaluation, much flexibility can be introduced into the school system and opportunities can be provided for expression of diverse

interests and abilities. Especially for the children from the backward sections of the society, as also for the talented, such a flexible system would allow for provision of special types of courses. Multiple-entry and part-time education would also be easier in this system. The emphasis, however, should be on the process of learning rather than on a routine drill of textbook materials and exercises. It is important to involve the teachers in the preparation of instructional materials for particular units. There should be few textbooks during the primary stage. The possibility of having only one textbook per semester may be explored. This can be done if there is an integrated curriculum for Classes I–V, instead of the usual variety of subjects. This will require an interdisciplinary approach in the development of units. Language learning, for example, should not be considered to be taking place only in language classes. Much of it goes on while learning other subjects also. An attempt should be made to develop Pioneer Palace type of activities for children; these activities will be self-selected and will help in the development of their personality.

The Sciences

4.4 There is hardly any need today to justify the place of science in a scheme of general education for school children. Science is all pervasive. Modern societies exist on the basis of science; science is intimately related to the means of production and means of communication, including transport. Even economics and politics have to depend on scientific factors such as productivity from the land or from industry, the power of modern weapons or the speed of transportation of ground and air forces. In the present situation, therefore, anyone, in any walk of life, must be aware of a certain quantum of science and technology. Secondly, the scientific method extends far beyond science. All disciplines are becoming scientific. The method of observation, of making symbolic, graphical or linguistic models, of designing experiments, of applying reason as well as imagination to draw conclusions from data to formulate theories, the method of keeping an objective view while theories are tested is a method which pervades every discipline. The facts of today may not be the facts of tomorrow, and theories may also undergo change, but there can be no going away from the method of science.

4.5 Science should help in reducing obscurantism and all sorts of prejudices based on sex, caste, religion, language or region. By emphasizing a rational approach science should help the development of a democratic, secular and socialist state.

4.6 In the primary classes, the sciences should be taught as environmental studies; in Classes I and II as a composite course including both the natural and the social environment, and later on as two subjects, viz., environmental stu-

dies I (natural science) and environmental studies II (social science). One need not lay down how much of this should be covered in a particular class. The purpose should be not to stuff the minds of children with facts and information, but to sharpen their senses, to enable them to observe their environment and to enrich their experience.

4.7 It may be pointed out that since the environment and the experiences of the children outside the school vary from place to place, the activities provided in the school should also vary so that the edifice of knowledge is built not on abstract concepts alone but also on the solid foundations of experience drawn from the environment of the child. In such a programme an inflexible syllabus cannot be drawn up for all the schools. In fact, there is some point in the criticism that our science textbooks have, generally, an urban bias. The textbook may not be given so much importance in the learning of science. What is really important at this stage is to provide teachers with guides and allow them to develop their own instructional material. However, reading materials for children should be very thoughtfully prepared so as to motivate them to learn.

4.8 In the age-group 11+ to 14+ (Classes VI to VIII) a number of States have already gone ahead with the introduction of physics, chemistry and biology as disciplines. Some other States could develop integrated courses up to Class VIII. Some of the States could also try with groups, e.g., physical sciences, including physics and chemistry, and life sciences, including botany, zoology and human physiology. The unit approach, which does not violate the disciplines, and actually brings them closer and provides a more logical and economical procedure, has a great potential and should be adopted. This holds good for Classes IX and X as well. In these classes laws and theories should be gradually introduced, taking care that they are not introduced as dogmas. Pupils should be made to understand that many models are available and one of them is the one they are learning. Open-mindedness and scepticism should be encouraged.

Mathematics

4.9 Mathematics has helped man to quantify ideas, to be precise and to utilize spatial concepts in his day-to-day living. Its place in the sciences and in the practical arts, from the informational and computational standpoints, as well as its cultural significance, make it indispensable in our life. In a society which is rapidly transforming itself into an industrial and technological society, mathematical literacy is essential for every citizen. The objectives of mathematics education at the school stage should be :

4.9.1 To enable the students to cultivate a mathematical way of thinking, i.e., in terms of carrying out experiments with numbers and geometric forms, making hypotheses, verifying them with further observations and experiments, generalizing them, trying to find

proofs and making abstractions, etc.

4.9.2 To enable the students to quantify their experience of the world around them and to understand the process of applying mathematics to real life problems.

4.9.3 To enable the students to learn the basic structures of mathematics through unifying concepts and to motivate the learning of structures through applications and concrete situations.

4.9.4 To stimulate the students to study mathematics on their own and to develop a taste and feeling for mathematics.

4.10 The first ten years of schooling are to provide general education to all the pupils. No diversification of courses is envisaged in Classes IX and X. Therefore, mathematics should be compulsory for all students up to Class X.

4.11 The level of the general course should be high enough to provide the base for advanced study in later years and also to equip the individual with the necessary competence to be able to tackle day-to-day problems. But this does not rule out the possibility of offering some units at higher level for talented students.

4.12 At the primary stage, the child should be introduced to numbers, the fundamental operations on them and their elementary properties. Concepts of length, which, time, area and capacity should be developed along with the units of measuring these. The child should gain familiarity with geometrical forms and figures and also with an elementary notion of algebraic symbols. Simple applications of the fundamental operations and arithmetical processes to everyday problems should find an important place at this stage.

4.13 At the middle stage, the number system will be extended to real numbers as also the operations. The student should be made familiar with the language of algebra and linear equations, and inequalities in one or two variables introduced. The concept of sets and their notations, as also the elementary concepts of statistics, should be developed. The application of arithmetical processes to problems of daily life will be further extended, and properties of triangles, quadrilaterals and circles and area of regular figures and solids will be developed on practical lines.

4.14 In Classes IX and X, real-life problems should be handled by the students. The knowledge of algebraic processes should be systematized and extended. The idea of proof should be developed and elementary theorems on triangles, parallelograms and circles taken up. The introduction of trigonometric ratios and the use of descriptive statistics along with measures of central tendency and dispersion should be made at this stage. The history of mathematics with special reference to India and the nature of mathematical thinking should permeate the entire course.

Work Experience

4.15 For harmonious development of the child's personality, it is necessary

not only to expose him to scholastic areas for intellectual development but also to put him in situations where he may get opportunities to work with his hands and develop proper attitudes towards manual labour. In addition, there is an urgent need to bridge the gap between the world of school and the world of work. This gap will widen further, if not controlled early, due to the modern technological developments and the increasingly technology-based society of the future. Processes and skills of work are changing. An early initiation of children into these is possible only through work experience. That is why the Education Commission (1964-66) made a strong case for introducing work experience as an essential component of general education at all stages of school education. As a matter of fact, the work-experience approach should permeate the entire curriculum.

4.16 Work experience provides the basis for the development of knowledge, skills and attitudes useful for later participation in productive work. Work experience should cover production, maintenance and the technological processes, as well as human relations, organization and management and marketing. The areas of work chosen should have local significance and should be such as to develop the competence of the students. It is not just learning to do work, it is work education.

4.17 Work experience programmes can serve the following objectives. Their main purpose should be to develop proper attitudes towards work, to inculcate dignity of labour, banish status and class distinctions, and to stress the principle of productivity. Wherever possible, work experience should help to appreciate the need for and usefulness of labour-saving devices, gadgets, tools, that are so much a part of modern life, and the techniques involved in their use and the underlying scientific principles. Various activities of work experience must necessarily be related to the community needs and its services. A carefully directed work experience programme would also help to discover the aptitude of a student for gainful vocations which demand certain types of skills, physical ability, attitudes towards others with whom they have to work and responsibility in performing their jobs and discharging their duties.

4.18 At the primary stage, work experience should begin with simple, creative, self-expressional activities performed with locally available material and simple tools. It is desirable to avoid any activity with an element of monotony in it. In the upper primary (or middle) and secondary classes, the use of tools should be introduced in a scientific manner.

4.19 Work experience areas should be identified through community surveys and, wherever necessary, the expertise of artisans and mechanics should be utilized for the programme. In technologically oriented work experiences, the desired level of skill and precision should be attempted.

4.20 In order to give the students some experience in a number of areas of work, it is suggested that one area of work may be offered in one semester, another area in another semester, and so on.

4.21 Students may be given the chance of specializing in a particular area of work by following it successively at different levels. Such specialization could help in doing a regular job, either after Class VIII or after Class X. It would be desirable to provide some experience in Classes IX and X of working in a farm, a factory or such other establishment of work which may be available in the community.

4.22 The actual areas of work which should be included in the curriculum would be governed by local needs but the areas of work should cover the various processes, techniques and tools of work, as far as possible.

4.23 Work experience should be aimed at providing experiences which are not otherwise provided in the curriculum. It has implications for the teaching and learning of school subjects and provides a basis for integrating knowledge. Well organized work experience may, from the higher primary stage, result in some earning for the student, either in cash or in kind, and this potentiality should be exploited where possible.

The Social Sciences

4.24 The major objective of the study of the social sciences is to acquaint the child with his past and present geographical and social environment. An effective programme of teaching of the social sciences in schools should help the pupils to take a keen interest in the ways people live and function through various socio-economic and political institutions. It should also help children to develop an insight into human relationships, social values and attitudes. These are essential to enable the growing citizen of tomorrow to participate effectively in the affairs of the community, the state, the country, and the world at large.

4.25 The teaching of the social sciences should enable children to appreciate India's rich cultural heritage as also to recognize and get rid of what is undesirable and antiquated, especially in the context of social change. The schools should see that narrow parochial, chauvinistic and obscurantist tendencies are not allowed to grow in our pupils. The schools should endeavour to develop a will and ability in every pupil to participate in the most important task of the reconstruction of our society and economy with a sense of social commitment. Children should also develop a faith in the destiny of our nation in terms of promoting a spirit of tolerance and assimilation, and peace and harmony among the peoples of the world. Thus instruction in the social sciences should promote the values and ideals of humanism, secularism, socialism and democracy. It should inculcate attitudes and impart the knowledge necessary for the achievement of the principal values of a just world order, maximization of economic and social welfare, minimization of violence and maximization of ecological stability.

4.26 The study of the social sciences in Classes I-X should include the study of history, geography, civics and economics. In view of the limited time that

will be available for each of these branches, it would be desirable to integrate their teaching in a way that the pupils develop a proper understanding of the facts and problems in the right perspective without causing any damage to the totality of the individual disciplines. This would require identifying the essential units in each of the subjects and then unifying them into an integrated syllabus for the social sciences.

4.27 Since Classes V, VIII and X are the terminal classes for a large number of students, it is necessary to develop self-contained courses of study for each stage, and at the same time the courses should be such as to lay the foundations for the subsequent stage. While following this principle, it is also necessary to avoid repetition and waste of time and energy as far as possible.

4.28 **The Primary Stage.** The social sciences should be taught as a part of the study of the environment in Classes I and II and as the independent subject of social studies in subsequent classes. Environmental studies will include both natural and social environment in Classes I and II. It would be more appropriate to use the term social studies rather than social sciences at the primary school stage since it represents a broad and composite instructional area. It draws its information from different social sciences such as history, geography, civics and economics, in order to unfold gradually the total environment of the child with special reference to the physical, social and cultural elements. While presenting facts from all these areas, the primary concern of the school at this stage should be to develop the necessary social skills values and attitudes that would enable the child to contribute his mite, as he grows, towards the development of the society to which he belongs.

4.29 During the five years of primary school the child's mental horizon would be gradually widened from the home, the school and the local community to the world. In the process, the child would begin to appreciate the geographical elements of his environment. Various human activities, which help him to understand how the gifts of nature are processed to produce goods for serving the various needs of man, would also be studied. He would also get an idea of the social and cultural life in different parts of the country as well as of some different ways of living in certain parts of the world. Stories and narratives about personages and events that have contributed to our national heritage and human heritage will also be studied. In addition to these, the child would get ample opportunities to develop socially desirable habits, attitudes and values, besides becoming broadly acquainted with the functioning of political and social institutions.

4.30 **The Middle and Lower Secondary Stages.** For the organization of content in social sciences, comprising history, geography, civics and economics, in the next two stages of school education, three different approaches can be visualized:

4.30.1 History, geography and civics may be introduced as separate disciplines in the middle classes and carried over as such to high school classes, while economics may be introduced at the high

school stage as a separate discipline.

4.30.2 History and civics may form one group and geography and economics another group, and these two groups may be introduced right in Class VI and carried up to Class X.

4.30.3 The content of history, geography, civics and economics may be identified in an integrated manner for all the five years taken together.

While the first two approaches are common today and do not need any elaboration, except that they contribute to the isolation of the disciplines amongst themselves and of disciplines from problems or situations, in the third approach it would be necessary to identify essential units in each subject in two cycles of three years and two years. The units thus identified for the first cycle of three years may be integrated and arranged sequentially between and within subjects in the form of a common syllabus for social science. For the next two years of education, a similar exercise may be done treating the earlier cycle as the base. Some old units may be taken at a greater depth while new ones may be introduced in each subject so as to lead to a slightly more advanced integrated syllabus in these subjects. While selecting units from individual subjects care may be taken to preserve the general structure of the discipline and include those facts and principles which are useful to a growing adolescent and serve as a base for a systematic study of the subject subsequently. The scope of different subject areas as visualized at the middle and lower secondary stages is given below.

4.31 History at the middle stage should acquaint the pupils with the growth of Indian society from prehistoric times to the present. It is necessary to change the emphasis from dynastic history and political details to social and economic conditions and the growth of various aspects of culture in different parts of the country. At the same time a broad perspective of the history of mankind as a whole should also be provided.

4.32 The organization of the syllabus and the selection of the content may be based on what is known as the 'patch' approach. In the light of the requirements of general education it is not necessary to give a continuous chronological account of the history of India in the sense that every decade or century of Indian history is covered. Representative periods or 'patches' in chronological order, dealt with in all their important aspects may be given. This may be combined with the 'topical' approach in that in a particular 'patch', a few aspects would be selected to be studied in greater detail than other aspects.

4.33 It is suggested that the class-wise distribution of the Indian history syllabus may be as follows: Class VI—Ancient India; Class VII—Medieval India; Class VIII—Modern India. Along with this, with each of these major periods of Indian history, a broad perspective of the contemporary history of mankind as a whole should be provided.

4.34 Civics should aim mainly at imparting training in civic life rather than mere scholarship. The civics programme should contain such socially imperative knowledge as would not only impart an understanding of the civic processes but also provide training in the development of the civic competencies and civic abilities.

4.35 The course envisages the study of local government and the Indian Constitution in Classes VI and VII, respectively; and in the last year, i.e., in Class VIII, the students would study the actual problems that are facing India today. In the course some practical aspects of citizenship education and the elements of economics should also be incorporated to adopt a functional and integrated approach.

4.36 Though many of the activities and topics of study included under this scheme may be organized by the teacher in the class or school, it is suggested that the training would be more fruitful if the students are taken out of the classroom and involved in real life situations.

4.37 Geography at the middle school stage has to perform two distinct functions: (i) introduction of the students to geography as a school subject so as to develop their interest in the same, and (ii) reinforcement of values, attitudes and general understanding that would promote the objectives of citizenship education. Although these two functions have been listed separately, in practice they are not exclusive of each other.

4.38 At the middle school stage, the course would necessarily be more descriptive and, within the broad framework, would concentrate on imparting knowledge about India in the context of the world, which we have to share with other peoples, characterized by their diverse ways of living. It should bring home to the pupils the interdependence of the various regions of the country and the world. They should begin to appreciate that it is only through sharing with others that the peoples of the world can really enjoy the blessings of the mother earth.

4.39 For successful living in a developing society where socio-economic changes are occurring rapidly, it will be helpful if some rudimentary understanding of the economic forces that influence the citizens' daily life is given even at the middle stage. From this point of view, it appears desirable to introduce some elementary knowledge of consumer economics, such as earning and spending, controls, price rise and the effects of increasing population, in a very simplified form.

4.40 A systematic course in the history of mankind from prehistoric times to the present day should be introduced for Classes IX and X. This does not mean a chronologically continuous narrative but the selection of 'patches' that have a certain unity and distinctiveness along with many diversities. The main basis of the selection of these 'patches' may be the successive stages of distinct social formations that existed in different parts of the world in specific chronological periods. The main focus of this course should be on the study of social

systems in their rise and growth and their replacement by new forms, and on scientific and cultural development. The historical development of all the major areas of the world, including pre-colonial Africa and the Americas, should be covered. The selection of the content should be based on the specific histories of individual countries only where these histories have a significant bearing on the general history of mankind and represent new trends which became relevant to the history of mankind as a whole.

4.41 Along with the above, there should be a course in depth on certain aspects of Indian history, particularly the social, economic and cultural development and the factors that have a close bearing on the understanding of contemporary India.

4.42 In Classes IX and X, the two major objectives of teaching civics should be: (i) to promote an active and intelligent citizenship, and (ii) to develop an intelligent understanding of the structure and working of the social and political institutions. In addition to this, an understanding that the UNO is playing a significant role in strengthening world peace and cooperation should also be promoted.

4.43 From this point of view the course in Class IX should include the meaning and scope of civics, community life, forms of government, rights and duties and democracy in action. In Class X, the students would study the structure and functions of political and social institutions in India and the role of the UNO in maintaining world peace. Some basic elements of sociology should also be introduced.

4.44 At the terminal stage of general education the subject of geography should shift its emphasis from the mere descriptive to the somewhat analytical and conceptual in its presentation. This should bring it closer to the philosophy and spirit of general education. A few selected detailed studies from world geography and the economic geography of India should also be undertaken, besides a brief analytical study of all the different aspects of the same.

4.45 The approach to the teaching of economics at the lower secondary stage should emphasize not so much the principles of economics as the current problems and issues that affect the everyday life of the common man. While doing so, some light should, of course, be thrown on the principles of economics as well. Such an introductory course would, it is hoped, lay down the necessary foundations for a more systematic and rigorous course in Classes XI and XII.

4.46 The course should include a brief review of the economic conditions of India at the start of British Rule. This should prepare the ground to understand the need for the economic development of India through the National Plans and help to appreciate their objectives. As a part of his introduction to economic institutions, the child should be introduced to the role of money and financial institutions. The current economic problems such as poverty, rising prices, agricultural stagnation, etc. would be discussed. The course

would throw some light on the future economic prospects of the country on the basis of its potential resources and the performance shown so far.

4.47 In the middle and the lower secondary stages, curriculum units based on psychology should be developed so as to help the adolescents to cultivate an insight into their problems of growth, development, social relations, personality and adjustment to life and work.

Languages

4.48 The three language formula has been accepted as the national policy. A child at the completion of ten years of school should be competent in the first language, be able to understand and express himself in the second language and be able to comprehend the third language in its ordinary printed form. The first language should usually be the mother tongue. The second language should be Hindi where it is not the mother tongue. The third language should usually be English, but could also be any other foreign language. Sanskrit or Persian could be introduced as a part of the first or second language, or introduced separately as a fourth subject.

4.49 By the end of the primary stage, the pupil should have acquired the competence to express orally, as also in writing, through the standard form of the mother tongue, correctly, within the limits of the structures and vocabulary normally expected at this level of development. The pupil should be able to read loudly with correct pronunciation, modulation of voice, posture, proper speed and comprehension. The pupil should acquire the right habit of silent reading with comprehension. He should be able to listen with comprehension simple narrations at his level. At the middle and secondary stages a greater enrichment of all the above skills through more advanced linguistic and ideational content is expected.

4.50 The objectives of teaching the second and third languages are also on similar lines, except for the fact that their teaching is planned keeping in view that the exposure of the pupil to these languages is very much restricted, and there is hardly any chance for the child to enrich its command of these languages except through reading. Therefore, the teacher of these languages should be satisfied if the pupil learns to operate satisfactorily within the limits of a controlled vocabulary and graded structures. In addition to aiming at the development of the above skills, language courses should be so designed as to contribute to the inculcation of right attitudes and interests, the basic human values like compassion, honesty, tolerance, truthfulness, national consciousness, a sense of discrimination and the spirit of enquiry.

4.51 The second language may be introduced in the primary stage or in the middle stage. The third language could be introduced in Class VI. All the three languages should, however, be continued up to the end of Class X. The selection of content in language books must be such as to inculcate desirable attitudes and values and a general appreciation of the life and cul-

ture of the people concerned. Oral-aural techniques of language teaching should be introduced.

4.52 No language should be treated as an optional and non-examinable subject during the school stage. Provision, however, may be made for the study of other Indian and foreign languages at the middle and secondary stages as additional subjects. It should be kept in mind that language learning is helped considerably by the learning of the subjects. It should, therefore, be possible to keep the load of language teaching within reasonable limits, and to include a good portion of selections from other disciplines (curricular or co-curricular) as material for language teaching.

Art, Music and Other Aesthetic Activity

4.53 Art education begins with creative aesthetic activities. To this should be added the cultivation of discrimination and the aesthetic sense, the capacity to choose and take up what is beautiful and harmonious, simple, healthy and pure. As the child grows in capacity and understanding, he should be taught in the course of his education to add aesthetic taste and refinement to power and precision. He must be shown, made to appreciate, and taught to love the beautiful, lofty, healthy and noble things, whether in nature or in human creation. A methodical and enlightened culture of the senses can, little by little, remove from the child whatever has been vulgar, commonplace and crude in him; for one who has developed a truly refined taste, because of this very refinement, will feel incapable of acting in a crude, brutal or vulgar manner. This refinement will also give his character a nobility and generosity which will spontaneously find expression in his behaviour.

4.54 The teaching of the different arts—dance, music, painting, etc.,—should be based on the same fundamental principle of giving to the student an opportunity for perfecting his own capacities and of helping and encouraging him in the process.

4.55 Art education is a neglected area in the school curriculum. Whatever little art education is imparted, the emphasis is on the learning of skills, whereas the goal of art education should be to develop the aesthetic attitude which permeates all activities and not only the learning of the skills of the arts.

4.56 The attitude to the arts in the educational system is full of prejudice: the arts are supposed to be intended for the drop-outs or the slow learners only. Such attitude needs to be changed. Anything which becomes a vehicle for self-expression and for creativity should be taught to all students, rather than to the handful who may be extraordinary in either singing or painting.

4.57 The purpose of art as a teaching subject has to be re-defined. The old concept of teaching the skill of drawing should be dispensed with. The child should be considered as the centre of all creativity, and artistic expression (so natural to his instincts) should be encouraged.

4.58 The principle of "learning by doing" which forms the basis of the liberal

methods of teaching art, implies also, self-discovery through self-expression for the child. Art, therefore, is a training in seeing, sensing, feeling and, finally, in doing.

4.59 At the lower primary stage, the teaching of art should not be fragmented into different disciplines. Art instruction should be an integrated total experience. The subjects to be included are the fine arts, music, dance and drama. The instruction should revolve around the relationship of the child with his environment, both within and without. The teaching approach should be such as to provide to the child the maximum enrichment materials for developing his liking and understanding about them.

4.60 At the middle school stage, the art teacher, however, should avoid any direct instruction and should induce and motivate the pupil enough to let him mobilize his own resources to find out appropriate means for self-expression. Guidance in techniques should be indirect and inductive, although the child should be exposed to evaluate and appreciate works of art in his sphere of interest. More and more media should be introduced for his exploration and use in self-expression. The individual style of the child should be encouraged and respected. The topics suggested should be related to his experience.

4.61 The secondary stage is a transitional period between the creative expression of childhood and the vocation-based training of the later period. Here again, as before, direct instruction in techniques should be avoided. The adolescent should be induced to acquire them as far as possible through exploration and discovery.

Health and Physical Education

4.62 The national plan of physical education which was formulated by the Government of India for the first time in 1956 states that "physical education should aim at making the child physically, mentally and emotionally fit and developing his personal and social qualities which will help him to live happily with others and build him into a good citizen". It further emphasizes that the development of the total personality and achievement of worthy citizenship motivated for service should be the outcomes of physical education.

4.63 A wholesome and methodical programme of physical education may be expected to bring about the following results:

- (i) A sound and healthy body. This is a vast subject on which a good amount of knowledge has already been accumulated. It includes the acquisition of good habits in food, sleep, hygiene, and the use of physical exercises to regulate the various functions of the body.
- (ii) Strength and fitness. Not only muscular strength and physical stamina should be developed but the skill, dexterity and endurance, which sports and games develop, and which are an excellent preparation for many occupations, should also be encouraged.
- (iii) Training of the senses. It should be the aim to develop a quick per-

ception of the eye and ear and a quick response of all the parts of the body to any call made upon them and a coordination and mastery over the reflexes, as for instance in gymnastics and balancing.

- (iv) Not only strength, but also grace, beauty and harmony should be pursued. Beauty is not a superfluity but the very spirit of the physical world.
- (v) Self-mastery and discipline, and courage and confidence should be cultivated. To control one's impulses, reactions and weaknesses is a very important gain brought about by the practice of athletics, games and yoga.
- (vi) Cooperation, impartiality and fair dealings with others. These are especially developed by team games.

4.64 A well planned programme of physical education, scouting, guiding, NCC, etc., can be of help for the cultivation of such basic qualities as endurance, courage, decision-making, resourcefulness, respect for others, truthfulness, faithfulness, loyalty to duty, and the common good. Some of these activities may be in addition to the compulsory programme of physical education.

4.65 Mere emphasis on physical training, drill or formal activities will have to be replaced by a broad-based programme of physical education. The curriculum in physical education should be so designed as to ensure participation of the entire student population, from the primary to the lower secondary school stage of education, to spot out talent in sports and games and provide opportunities for nurturing this talent.

4.66 Since physical education is an integral part of general education, it should be incumbent upon every child to participate in the programme as provided in the time-table. Activities such as social service, scouting and guiding, NCC, and the like may be in addition to the core and compulsory programme of physical education.

4.67 The warmer hours of the day should be avoided for physical activities programmes. The morning and evening hours are the most suitable. The hours would differ from season to season. Local climatic conditions should also be taken into account while providing periods in the time-table and preparing programmes for tournaments, competitions, etc., under physical education.

4.68 Medical inspection should be compulsory at each of the primary, middle and lower secondary school stages of education with follow-up in cases in which medical/physical defects are noticed.

Areas of School Work and Time Allocation

4.69 It has been pointed out earlier that in order to bring education closer to life, it is necessary to introduce flexibility in the organization of

school work and school hours. However, a scheme of the areas of school work and the allocation of time is given below. This scheme is notional and not prescriptive.

Areas of School Work

Classes I and II

1. First language
2. Mathematics
3. Environmental studies (social studies and general science)
4. Work experience and the arts
5. Health education and games

Classes III, IV and V

1. First language
2. Mathematics
3. Environmental studies I (social studies)
4. Environmental studies II (general science)
5. Work experience and the arts
6. Health education and games

Classes VI, VII and VIII

1. The first language continues and a second is added (Hindi or English)
2. Mathematics (including algebra and geometry)
3. Social science (elements of history, geography, civics, economics)
4. Science (elements of the physical sciences and the life sciences)
5. The arts
6. Work experience
7. Physical education, health education and games

Classes IX and X

1. The first and second language continue and a third is added (English or any other Indian language).
2. Mathematics (including algebra and geometry)
3. Social sciences (history, geography, civics, economics, psychology)
4. Science (the physical sciences and the life sciences)
5. The arts
6. Work experience
7. Physical education, health education and games.

4.70 A word of explanation should be added here. The above scheme is illustrative of school work. But one may get an impression that there are too many subjects, if one counts each area of the curriculum mentioned as a sub-

ject. Actually, the arts, work experience, physical education, health education and games should not be considered as subjects.

Instruction Time in School

4.71 There should be a minimum of 240 working days in a year, out of which 220 days are for instruction and 20 days for school camps and community services, etc. Instructional time in the lower primary classes may be 3 to 4 hours a day. In the upper primary or middle classes and the lower secondary classes, instructional time should not be less than five hours. In addition to the instructional time, each school day is expected to devote one hour more in the primary classes for the daily assembly, routine activities and one or two recesses. In the upper primary and lower secondary classes, 50 minutes may be devoted to the morning assembly and one recess.

Allocation of Time in Classes I—V

4.72 There should not be a rigid allocation of time in these classes because projects and group activities which cut across subject boundaries need flexible scheduling. However, a broad indication of the time allotment may be given here. This is indicated below in terms of the percentage of total time to be allotted to each area of school work.

<i>Classes</i>	First language	25
<i>I-II</i>	Mathematics	10
	Environmental studies (social studies and general science)	15
	Work experience and the arts	25
	Health education and games	25
	Total	100
<i>Classes</i>	First language	25
<i>III-V</i>	Mathematics	15
	Environmental studies I (social studies)	10
	Environmental studies II (general science)	10
	Work experience and the arts	20
	Health education and games	20
	Total	100

4.73 It should be noted that the first language will also be learned through environmental studies and games. Mathematics also will be learned through

mains the same in the secondary stage, although the number of languages increases to three. But language will be learnt through the sciences and the social sciences, and as the medium of instruction is usually the first language, the proportion of time for the first language in the secondary classes goes down further. The effective time for language learning is much more because it will continue to be learnt through the sciences and the social sciences. The proportion of time for work experience, the arts and physical education is slightly less than a third. As against earlier years it goes down. This is because the sciences, the social sciences and mathematics take a larger share of the time—a little less than half, as a matter of fact.

V

Some Aspects of the Methodology of Education and the Teaching of Subjects

5.1 Teacher-pupil activities and their organization are crucial in the educational process. The achievement of curricular objectives is contingent upon their proper visualization and effective manipulation. Keeping in view the nature and background of the learner and the local conditions and resources available, learning situations have to be prepared in a manner that the desired learning outcomes are obtained. These situations may be both within and outside the classroom.

5.2 The teacher is the guide, the helper, and, above all, the wise friend whom the children look to gladly and confidently in case of difficulty, when they do not see the way or when they need some information. The teacher's role should be to suggest and to present, rather than command. He must show the child how to learn the subject, and how to devise his own methods of learning and organizing the knowledge which he gathers or discovers. The teacher should remember that the child learns better by doing, by discovering and not by merely listening submissively to a display of factual knowledge. It is only in this active, creative process leading to discovery that the child finds interest and joy, and that attention becomes spontaneous.

5.3 Normally, a child has love and admiration for his teacher. Truly, he must be an example, but not set himself up as such. He must be aware of the disastrous influence his defects and weaknesses have on the children. When a child asks a question, he should not be rebuked, or a derogatory remark be made to the effect that the child cannot understand. A teacher, if he takes pains, can always make himself understood.

5.4 There are certain basic requirements of the learning process which the teacher has to take into consideration to evolve the right approach and method. Proceeding from the concrete to the abstract, the simple to the complex, the known to the unknown, the whole to the parts and the easy to the difficult

are some of the basic tenets of teaching, too well known to be dilated upon. Some other factors of learning, however, may be discussed.

5.5 Experience is the Key to Learning. Experience in an actual situation gives first-hand knowledge of physical phenomena. Such experiences, if coherent, integrated and consistent, reinforce each other, while unconnected or compartmentalized learning experiences take more time and interfere with each other. Moreover, experiences utilizing many aspects of the child's psychological life in an integrated form have better chances of producing effective learning.

5.6 Motivation is Basic to Learning. The primary task in instruction is to manipulate the environment in such a way that children are stimulated to learn. It happens best when goals for learning are established in terms of the child's needs to know, to master, to create, to express, to relate oneself to the world and others, etc. Incentives such as praise and recognition promote learning. The pupil should be presented with problems and situations, where it can use what has been learnt, and get the satisfaction of success, and thereby ensure further gain in knowledge and skills. The thrill of acquiring new knowledge, and getting satisfaction out of it, is in itself a strong motivating force for the higher forms of learning.

5.7 Readiness is the Foundation of Learning. Readiness to learn depends upon the growth and developmental levels of the child. The physical, intellectual and emotional levels of the child's growth provide both the limiting conditions as also the foundations of learning. A child is capable of acquiring much more than the adults think it does, provided it is exposed to the right type of experiences. This requires a very judicious planning and a keen eye to identify the pupil's potentialities and inclinations in order to provide suitable experiences in line with his motivation and level of development.

5.8 Readiness to learn acquires special significance in the context of the growing numbers in our schools. Many children come from homes where parents are not educated (and this number is fairly large, especially in the rural areas). They do not have the necessary background to be able to participate in the teaching-learning process with the same level of motivation and readiness as children from the educationally advanced homes. These first generation learners need to be exposed to special preparatory classes in order to profit from the regular schooling. These preparatory classes are necessary not only at the beginning of the primary classes but even later on.

5.9 The above principles of learning are basic to the methods of teaching young children, and cut across all subjects. In the following paragraphs an attempt has been made to outline briefly subject-wise methods and approaches at different stages of school education. It is followed by a brief discussion of co-curricular and independent activities.

5.10 The Primary Stage. Language, the most commonly used medium of communication, is best acquired through actual use. Learning to speak satisfactorily forms the first step of language learning during the early years. Then comes

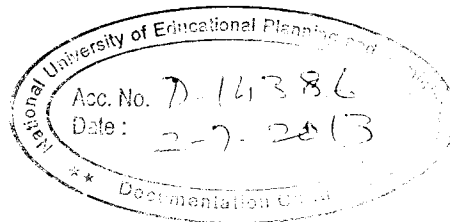
reading and writing. The readiness for reading, the introduction of a graded vocabulary content at successive stages and the use of a proper sequence of structures are important ingredients of a successful method of language teaching.

5.11 In Classes I and II, children should be given the opportunity to listen carefully to stories, narrations, recitations and formal talks. They should develop their powers of oral expression through story telling, recitation and singing of group songs, etc. The approach to teaching reading in a particular language will depend on the nature of the script of the mother tongue, its spelling system, the vocabulary interests of the children and the environment. Readers for Classes I and II should have material which is interesting to the children; it should be developed around their daily experience. The contents of the readers should be coordinated with the topics of environmental study for these classes and should also help to develop desirable attitudes in the children.

5.12 For the development of mathematical concepts the child should be helped through his experience with concrete situations in life. The discovery approach, guided by the teacher, should be adopted in almost all the situations. The teacher must carefully select material that stimulates children to be discovery-minded and to seek patterns and generalizations. The inductive method, which is based on concrete examples, is very helpful in bringing home to children certain characteristics and relationships of numbers, forms and shapes.

5.13 Careful and well directed observation is the primary means of acquiring knowledge and cuts across several subjects. At the primary stage this has an added significance. Children should observe the vegetation and animal life around them. They should observe nature in all its aspects, they should sense and feel objects, study their shapes and sizes and obtain a notion of their heaviness. They should observe objects using simple aids, things in motion, and things in the process of growth like plants, animals or the human hair or nails. For the teaching of environmental studies as a composite course in Classes I and II and for the teaching of the natural and social sciences in Classes III to V, this method is the most important, the purpose being to sharpen the senses and to enrich the children's experience to the maximum possible extent. In Classes I and II, children should be encouraged to describe their observations and experiences orally without drawing inferences; later they can be made to write accounts of the experiences they have had, or express themselves through drawing a picture or writing a poem.

5.14 An integrated approach to teaching environmental studies is based on topics and themes rather than on the subject, and children are provided opportunities to learn from situations. The teacher enjoys greater autonomy in organizing such experiences. The curriculum should indicate the kind of knowledge, understanding, interests, values and attitudes that should be developed in the children. It should also give suggestions about textual material, teaching aids, etc., to help achieve the objectives. The learning experiences



should be planned in terms of activities and programmes for the children. Helping children to prepare simple things from clay, taking them to the school garden and talking about flowers, organizing visits to nearby localities, measuring things available in the classroom or outside, discussing different seasons with reference to food, clothing and shelter, and organizing festivals and exposing children to situations where they may begin to appreciate the broad elements of civic and social life are just a few examples to denote the nature of activities which can form the basis of giving knowledge and skill in different areas. It may be stressed here that the activities and methods employed at this stage will help to develop appreciation among children of the values of self-sacrifice, patriotism, human brotherhood, etc. Inculcation of values, though emphasized in the statement of objectives, is generally paid lip service in the matter of providing learning experiences. It is necessary to emphasize that much of the learning in the primary stage should be through work experience, aesthetic activities and games. Attempts should be made to use the resources in the community, particularly the human resources, to enrich the experiences of the children and bring the community closer to the school. Evaluation of learning outcomes should be made frequently with a view to give the teacher an indication of the usefulness of the methods of teaching used as well as for feedback to the learner and his parents. Careful records of evaluation should be mentioned.

5.15 The Middle Stage. The study of the first language will aim at developing the abilities of listening, oral expression, reading comprehension and expression in writing. Instruction at this stage should help children develop their aesthetic ability, originality and creativity, and a feeling of pride in the nation. Supplementary reading material to read independently for knowledge and recreation should be introduced, and interest in reading developed. Recitation, drama, competitive writing, the wall newspaper, etc., should be encouraged. As a second language will also be there, it is necessary to make the learning of the second language interesting. Motivation is crucial, and for this it is necessary to reinforce every little step made by the child. Also, exhibition of pictorial materials and books should be arranged and speaking encouraged.

5.16 In mathematics, while the discovery approach to teaching should still be used, the question-answer method can supplement direct presentation to maintain a reasonable rate of progress. While the inductive approach based on concrete situations will continue to be useful, a gradual transition from the inductive to the deductive is to be effected as the student reaches higher classes. This method of analysis can be introduced very usefully in training students in the skill of independent thinking and problem-solving.

5.17 A spiral approach may be used to extend the boundaries of the subject from stage to stage, and the applications of mathematics and science have to be integrated throughout the curriculum in a natural way. Correlation with the life around and with other subjects of study should prove to be very use-

ful and motivating to students for the study of the subject. Graphs and statistics find a natural place here.

5.18 For the teaching of science, there should be a gradual introduction of contrived situations. The student should handle scientific apparatus and perform experiments. Demonstrations by the teacher interspersed with questions and answers should help to establish the properties of substances or cause-effect relationships. Concrete experiences gained through demonstration or through experimentation by the pupils will help the understanding of theory.

5.19 The student will be introduced to elements of history, geography and civics at this stage. The effort should be made to teach these subjects from the composite social studies point of view, keeping man in the focus all along.

5.20 It should be profitable to organize the contents in terms of broad topics in Indian history, geography or civics and identify major ideas and understandings under a topic to give a proper focus. The values that can accrue from the study of the social sciences need to be ensured by the use of special devices, activities, discussions and excursions. Children should, as a result of these experiences, develop a love for their country and an appreciation of the achievement of a cultural synthesis from the contributions of people belonging to different regions, religions and linguistic groups. Participation in camps and projects with "One India" as the focus will develop a feeling of tolerance and national integration. A critical look at the past and at cultural and social institutions should be encouraged through discussion of issues of national development.

5.21 It is necessary to emphasize that work experience, play and games should form an important means of organizing meaningful learning experiences cutting across language, mathematics, sciences and social sciences. There should be a continuous assessment of progress through frequent evaluation of learning outcomes, and the community and the school should come closer through the use of the resources of the community in learning and by the school's helping in the improvement of the life and environment of the community.

5.22 **The Lower Secondary Stage.** In the matter of the first language, the student should now be able to follow lectures or talks from the radio. He should be able to express his ideas effectively in speech and in writing. He should be able to read with comprehension various forms of literary prose and to enjoy poetry. A more analytical approach and the use of exercises will be necessary. Those aspects of language analysis which are conducive to better comprehension and expression should be emphasized in the teaching of grammar. Supplementary reading of short stories, biographies, etc., should be suggested and the thinking abilities in language helped through well directed exercises or assignments as well as through the dramatic arts, essay competitions, recitation, the school journal, club debates, etc.

5.23 In the teaching of mathematics, there should be a shift of emphasis from the inductive to the deductive. The student should develop the analytic ap-

proach and apply it to solve problems or prove theorems. The use of independent thinking and a novel approach to solve problems or derivation of proof should be encouraged. A course on probability, graphs and statistics should permeate the whole curriculum on the spiral approach and should be integrated with sets, mapping, function and other applications. The concept of flow charts should also be introduced in mathematical situations.

5.24 The basic principles of chemistry, physics or biology should be taken up. The investigatory or experimental approach is suited to this stage of learning. However open-mindedness and scepticism should be encouraged so that laws and principles are not taken for granted. Inquiry, prediction and experimentation to verify or contradict and to discover new relationships should be the key approach to teaching science. Science club activities can be introduced to encourage innovation and improvisation.

5.25 The approach to the teaching of history should be objective and comparative, stressing the social, economic and cultural aspects against the background of political developments. While teaching the various aspects of life and society in different periods of history, it is desirable to link the past with the present. Without suppressing historical facts, the trends towards synthesis and reconciliation should be emphasized. Conflicts and tensions need to be understood in a proper historical setting. The methods of presentation should help develop an appreciation of the national and cultural heritage.

5.26 More independent work should be attempted by pupils through challenging assignments, group projects, debates, dramatization and history club activities. A variety of devices, charts, models, time-lines, dialogues, etc., can be used to make history teaching lively and to stimulate the imagination of pupils. The student should be introduced to the method of history through practical work.

5.27 The study of geography should develop a sympathetic understanding of the people all over the world and their problems in the light of their varying environments. At the same time interdependence of various geographical regions and nations of the world should be brought out. The relation of the growing population to the natural resources and the need for conservation are also to be stressed. The student should be introduced to the method of geography through practical work.

5.28 Creating intelligent and mature citizens is the prime function of teaching civics. Methods which encourage student participation, such as seminars and group discussions, should be increasingly used. Children should be given opportunities for social living in camps, so as to learn how to share responsibility, to be considerate to others and to participate in decision-making.

5.29 Economics should be introduced through the study of economic activities. As a matter of fact, all the social sciences should be learnt through carefully planned activities and observation. The students should begin to understand what are relevant data and how these are recorded and analysed. Through

social science, work experience and the school activities of organizing functions, week celebrations, debates, etc., learning should be made realistic.

5.30 Elements of psychology should be taught through observation of behaviour in groups as well as through self-observation. An understanding of adjustment problems and human relations should come from group discussions and individual counselling. Students should know how learning takes place and abilities are developed.

5.31 Work experience, physical education, aesthetic activities and games should contribute in large measure in developing the knowledge, skill and attitudes required for the mastery of the languages, the sciences, mathematics, the social sciences and the arts.

5.32. There should be frequent evaluation, and self-evaluation should be also introduced. Every evaluation should be discussed individually with each student. Results should be discussed periodically with parents.

5.33 The role of co-curricular activities in the development of attitudes, interests and values has been already emphasized. It is not possible to realize all the objectives of education without giving sufficient weightage to co-curricular activities in the total school programmes. A well-balanced individual is one who is physically sound, mentally alert, emotionally well adjusted and socially useful. Classroom instructional programmes alone cannot bring about an integrated growth. Co-curricular activities can be utilized for supplementing what goes on in the classroom in the area of abilities, skills and social and personal traits, and also to provide a good ground for nurturing desirable attitudes, interests and values and to help the child to actualize its potentialities.

5.34 The nature and content of co-curricular activities has to be conceived in terms of the maturity levels of the pupils. At the primary stage these activities may be more in the nature of play, free expression of fantasy and unstructured situations so as to provide enough room for spontaneity. These activities should be interesting to the children. In higher classes, the situations may become more structured and organized, leaving, of course, enough scope for creativity and spontaneity. They should also be varied enough to cater to individual needs, interests and aptitudes. Another point which has to be borne in mind is to ensure that each and every child participates in some activity or the other. As far as possible the choice of activities should be left to the pupils and the teacher should only be an adviser in the planning and execution of such activities. His control of the situation should be remote and not immediate.

5.35 Pupils' personalities blossom forth in an atmosphere where they enjoy enough freedom to initiate and execute some activities on their own. The school should encourage children to go beyond the requirements of the syllabus and undertake projects and activities for the development of their special talents and interests. These are very necessary to generate self-confidence, initiative, leadership, and for the blossoming forth of the potentialities of indi-

vidual pupils.

5.36 Independent activities provide an excellent opportunity to students to acquire new knowledge as well. In projects such as those undertaken by talented students of science, pupils do acquire new knowledge, learn new methods and consult references and write out systematic reports. Such activities are also a valuable means of fostering creativity.

VI

Instructional Aids and Materials

6.1 A teacher should explore a wide variety of materials to find suitable aids for instruction to supplement what the textbook provides, to add to information, to broaden concepts and to arouse interest.

6.2 All these sources, materials and resources that he uses are **instructional aids**. They may be of various types as follows :

- (i) Textbooks used in the class
- (ii) General reference materials, like encyclopaedias, dictionaries, gazeteers, atlases, pamphlets and government publications
- (iii) Advanced books on the subjects taught in the class
- (iv) Teachers' handbooks, teachers' editions of textbooks, curriculum guides and similar materials where available
- (v) Pupils' workbooks, programmed instructional materials
- (vi) Audio-visual aids.

6.3 The textbook, though very important among the instruction aids, is not adequate in itself to help the child to acquire the expected learnings in terms of knowledge, understandings, skills of learning, behavioural skills and attitudes. It needs to be supplemented by other aids like the workbook, test items, charts, films, etc., to further explain and concretize the various concepts. It may therefore be desirable to conceive of, and develop instructional kits consisting of a textbook and accompanying materials. The various component elements of an instructional kit, being closely interrelated and interdependent, will have to be planned and developed in terms of the over-all objectives of teaching a subject in a particular class.

6.4 The selection, improvisation and use of proper instructional aids play an important part in the realization of the instructional objectives in different subjects. A multi-media approach in the instructional process should lead to better learning. In view of the financial constraints, it is not possible to provide all schools with the benefits of the latest developments in educational technology.

However, in spite of this obvious limitation a good teacher should make instruction more effective by making a good use of the available aids and materials and also by improvising some with the help of locally available raw materials.

6.5 No uniform policy or method can be recommended in the use of aids in the classroom. Every good teacher knows that different topics and lessons require particular types of aid and also that the teaching aids and materials vary according to the developmental needs of the particular group of children. Sometimes, verbal illustrations are the best aid to be used; in some cases a picture is all that is needed; in others, a chart or a model or a blackboard diagram or a film or a film-strip. Aids should reflect the purpose in using them. The purpose may be the concretization of an idea or the inculcation of an attitude. We may use concrete objects, models, pictures and charts for the former, and dramatization, role-playing and simulation for the latter.

6.6 A point to which adequate attention is not always paid relates to the collection of such materials in the school. Very often, a school may feel interested in any one variety or in any one area, and consequently, other varieties or areas get neglected. It is, therefore, necessary to plan carefully the collection of aids. Materials of different varieties are to be collected so that no area or branch of the school curriculum may be neglected. Only thus can there be a balanced collection within the available resources.

VII

Evaluation and Feedback

7.1 The main purpose of evaluation is to see how far the objectives set forth to be achieved through the curriculum have been realized. This process is naturally related to the learning experiences and methods of teaching that have been used in the process of instruction/learning. Evaluation, in order to be useful, should have the following characteristics:

7.1.1 It should give reliable and concrete evidence of the attainment of specific objectives.

7.1.2 It should gradually cover a number of objectives and the entire course of studies.

7.1.3 Evaluation should be done with a variety of tools and techniques:—written tests, practical and oral tests, observation, rating scales, etc.,—to measure different objectives and content.

7.1.4 Evaluation should be at several points in time. It should not be a one-shot affair at the end of six months or one year, because its purpose is to give immediate feedback to pupils and teachers. The pupils should have a knowledge of the results of their learning as immediately after learning as possible. They should know clearly what they have learnt, how much they have learnt and how well they have learnt it. The teacher should know from evaluation, what his instruction has done, where his instruction has failed and where his instruction needs change, so that all the pupils are able to master the subject he teaches, or develop the qualities intended to be developed by the learning experiences. Hence, evaluation should be done by the teacher himself.

7.2 It is important that students do not develop wrong attitudes to evaluation, but take it in the right spirit as a means of improving their own achievement. Insistence on passing in all the subjects of a course at one time, and the consequent fear of failure, drives many a student out of gear with studies and im-

pedes further growth. Such a situation has to be changed. There should be flexibility. The mode of evaluation has to be such that students are discouraged from memorization and become competent to apply their knowledge in handling new situations and problems. Children will not work for higher types of learning like critical thinking, creativity and evaluative judgment, unless such learning is attempted to be developed through suitable experiences and is followed by proper evaluation. Where the only learning experiences provided in school are of the drill type and where the mode of evaluation encourages cramming, all that we have discussed so far about education becomes useless.

7.3 At the primary stage, children are young and tender. No rigid system of evaluation should be imposed on them at this stage. Evaluation should be integrated with the process of learning, and a system of continuous recording of the progress and development of each child, on the basis of observation and oral tests, should be prepared. Promotion should not be based on the annual examination at the end of each year, but on the record of progress as registered over the session, and, normally, all the children should be promoted. However, special attention should be given to those children who do not show adequate progress, and particularly to the children from backward sections of the society.

7.4 Continuous evaluation of the development of the pupils in all aspects should be a regular procedure. From the middle stage onwards, the written examination should have a place in evaluating the achievement of students in subject areas. But there should be a variety of ways of testing and not just essay tests. Practical tests should be introduced. Observation, check lists, oral examination and evaluation of pupil products should be used in addition as tools and techniques of evaluation. Annual examinations may also be held, if considered necessary, but these should not have an unduly greater weightage than the other assessments made during the year. The emphasis should not be on formal tests for pass or fail in the aggregate; it should be on the assessment of pupil growth for the guidance of all concerned. There should not be any pass or fail in any examination, as a matter of fact. Letter grading on a five-point scale (A, B, C, D, E) may be conveniently used. What is important is to utilize this evaluation for the furtherance of learning. This can be done by giving back the corrected answer-books to the students and discussing with them the mistakes committed by them and showing them how they could do better. If any student wishes to improve his grade in any one evaluation, he should be given another chance by way of giving him another examination in that subject only.

7.5 The school's cumulative assessment in each subject/unit should be placed on record and given to each student. A record of such assessment should cover both scholastic and non-scholastic areas, and be without any aggregate. Thus, there should be no pass or fail in the final school-leaving certificate. This certificate should give only the letter grades (A, B, C, D, E) of each student in the school. Gradually, as the system of internal assessment takes root and a system of checking biases which lower standards is evolved, the external public exa-

mination at the end of Class X will become redundant and should be abolished. It would be necessary for each Board|State to evolve a phased programme of accomplishing this.

7.6 School complexes may be established throughout a state. The teachers of the school in any one complex may form a committee which may, from time to time, call for answer-scripts and question papers from the schools in their jurisdiction and re-examine samples to check biases and then discuss the matter openly with the teachers concerned. District education officers and inspectors and senior teachers in a district may set up a committee to do such sample checking and discuss results with the school complexes concerned. At the State level, there may be similar committees. This will be one way of ensuring that evaluation is properly done and standards maintained. Every school should hold community meetings from time to time not only to involve the community in the school programme, but also to let the community know how evaluation is done and used for the improvement of pupil growth and learning as well as for the improvement of instruction by the teachers.

VIII

Implications for Implementation

8.1 The implications for the implementation of above proposal have been discussed under the following four major heads:

- A. Machinery for implementation
 - At the national level
 - At the State level
- B. Areas of work
 - Research and development
 - Training and extension
 - Coordination
 - Clearing-house activities
- C. Implications for schools
 - The school atmosphere
 - Provision of facilities
- D. Involvement of the community

A. Machinery for Implementation

8.2 The infrastructure for curriculum renewal already exists both at the national and the State levels. It may also be found in good institutions. However, it is desirable to define its scope and functions more explicitly.

At the National Level

8.3.1 The National Council of Educational Research and Training is expected to develop innovative ideas in the field of curriculum and extend them to the field. With the NCERT's National Institute of Education at the Centre, four Regional Colleges of Education and Field Units in different States, it should be possible for it to coordinate the work in this area and also to promote and support various research and development activities related to the

curriculum. Further details about its specific responsibilities vis-a-vis the present proposals are being discussed under various areas of work. Universities should also be brought into the picture and a network of curriculum development centres established.

At the State Level

8.3.2 At the State level, a number of agencies are directly or indirectly concerned with the curriculum. The State Institutes of Education, State Institutes of Science Education, the Boards of Secondary Education, the Textbook Bureaus, Guidance Bureaus and similar other specialized institutions are all involved in curriculum work in some form or the other. It is very necessary to coordinate their work and define their specific roles in so far as curriculum renewal is concerned. Some States have already set up State Councils of Educational Research and Training. Others may also do this so as to provide an apex body at the State level, one of whose aims would be to look after curriculum renewal in a well-integrated fashion.

B. Areas of Work

8.4 Any proposal for curriculum renewal has far-reaching implications touching upon different aspects of the educational process. They have to be identified for simultaneous action on various fronts so as to make possible the achievement of the desired ends.

Research and Development

8.5 Curriculum renewal is a continuous activity. Once a curriculum is developed and implemented, it is necessary to study the process of implementation, the materials and methods used and the outcomes. Work will have to be undertaken in the following areas:

- (i) Development of detailed syllabi for a common core curriculum of a minimum number of units followed by the development of materials, such as textbooks, teachers' guides, workbooks, teaching aids and kits, etc., based on actual field try-out. This will have to be done by NCERT in collaboration with State Boards of Secondary Education, SCERTs, SIEs, etc.
- (ii) Instructional techniques and methods to ensure maximum effectiveness will have to be developed.
- (iii) Evaluative studies to ascertain how far the objectives of general education as a whole and of the various components of the process are being realized have to be periodically carried out by NCERT and State-level agencies.
- (iv) Studies concerning motivation, learning, development and behaviour characteristics of children will have to be encouraged.
- (v) Studies concerning school climate and the roles of different func-

tionaries in the school to ensure effective learning conditions will have to be made at the State level by the State-level agencies.

- (vi) Studies on the socio-psychological implications of the proposed curricular changes with specific reference to determining ways and means to ensure the effective participation of the community will have to be done by teachers colleges, universities, etc.
- (vii) Studies will have to be conducted to find out the efficacy of the measures adopted to change the examination system.

8.6 The National Council of Educational Research and Training should provide the necessary leadership in this field to initiate, promote and undertake scientific studies in the various areas stated above. It should not only coordinate research work going on in the States, but should also offer expert advice and guidance for specific studies. It should identify specific institutions capable of undertaking scientific studies on the curriculum and support them. It should develop syllabi, specimen textbooks, teachers' guides, workbooks, instructional aids, kits, etc., and make them available to the States for their guidance.

8.7 Every State Government should set up a strong Curriculum Cell in the State Institute of Education which should be responsible for coordinating, promoting and undertaking research and developmental studies at the State level. Selected teachers colleges and other colleges and institutions could be fruitfully involved in this activity. The Boards of Secondary Education, SIEs, SCERTs and some selected colleges and universities should be involved in developing the syllabi, textbooks, workbooks, teachers' guides, instructional aids, kits, etc., in collaboration with NCERT.

Training and Extension

8.8 The new emphasis given in the objectives and purposes of general education makes the teacher's role crucial in their realization. The teacher has to develop a new outlook and equip himself with the necessary knowledge, methods, and techniques. A thorough preparation of the teacher has, therefore, to be planned systematically. This has to be done both for the in-service and the pre-service education of teachers.

In-service Teacher Preparation

8.9 Short-term and long-term orientation courses for teachers will have to be planned to acquaint them with proposed changes in various subject areas and other school programmes, to orient them to the new content and methods as also materials in different curricular areas. They may also be made acquainted with the various strategies which they could try for implementing the maximum changes at the minimum cost by exploiting the available community resources. Areas like science and work-experience will need special planning and effort. It will be necessary to train teachers for the task of continuous internal assessment. Question banks will have to be developed at the Board level for

all classes of the school. Teachers will have to be helped in learning the letter grading in place of marks in examinations. Suitable checks will have to be developed for controlling the biases of an internal evaluation system. This will require setting up school complexes and training all the persons in such complexes to supervise the work of evaluation. The NCERT and the State agencies should chalk out a time bound programme.

8.10 The NCERT has to discharge the following important functions in this area:

- (i) Preparation of courses and materials for the in-service education of teachers in different curricular areas. The materials may be in the form of resource materials, teachers' handbooks, audio-visual aids, etc.
- (ii) Training of key personnel drawn from the States.
- (iii) Helping the States in the development and implementation of their extension programmes of direct relevance to the proposed curricular changes.
- (iv) Creating the necessary climate for change in the States by organizing teachers' meets, seminars, conferences, etc. Most of this should be done in collaboration with the State agencies.

8.11 The State agencies, on their part, will have to develop comprehensive programmes for the orientation of teachers. They will have to tap various local resources for developing expertise and materials. They may undertake intensive sample surveys to ascertain local training and extension needs, and provide for them. Since this programme will involve substantial financial and manpower resources, as also time, it will be desirable for the State-level agencies to fix priorities and phase out the programmes. Obviously, in the proposed programme of curriculum renewal top priority will have to be given to work experience and the orientation of teachers in science and mathematics.

8.12 Every State should prepare a three-tier plan of in-service teacher education. The first tier will consist of teacher educators and selected college and university teachers who should be oriented at the Regional College of Education. The second tier will be of the head teachers and secondary school teachers, organized area-wise within a State, who will be trained by the key persons trained in the first tier. The third tier will consist of primary school teachers and should be organised district-wise. The training will have to be given by both the first and second tier trainers. Self-learning materials should be produced on a large scale. A national and State-level machinery will have to be set up for this.

Pre-service Teacher Preparation

8.13 This is necessary to meet the future needs of teachers. It is also essential to reduce pressure on in-service teacher education programmes. The needs as identified on the basis of the proposed curricular renewal are as follows:

Revising the curricula of elementary and secondary teacher education so as to reflect the new demands of the school curriculum, such as relating the school to work, developing proper attitudes and values, the integrated approach to teaching, improvisation of aids, enlisting community help, exploitation of available resources to the best advantage, continuous evaluation etc.

Preparation of teacher educators to face this new challenge.

8.14 The NCERT, as also the Regional Colleges of Education under it, will have to play a key role in this area. They will have to undertake intensive teacher education programmes with individual States and universities and assist them in restructuring their programmes. They will also have to orient teacher educators for discharging their responsibilities more effectively. Conceptual literature and other materials on various aspects of the teacher education programmes will have to be developed to make good the deficiency of such literature and materials in the field. Serious thought will have to be given to the off-repeated charge against teacher education programmes of being unrealistic and unable to meet the demands of the school situation. Consideration of this issue has become urgent in view of the fact that the school curricula themselves are going to be geared to the needs of the community and the cleavage between the school and work has to be bridged.

8.15 The State Departments of Education and the universities will also have to take immediate action to revise the curricula for teachers colleges on the above lines in collaboration with the NCERT, wherever needed.

Coordination

8.16 Curriculum renewal being a multipronged activity involving different agencies and a variety of programmes, it is very necessary to have good coordination among all the agencies and programmes for an effective implementation of the curriculum proposed. This coordination has to be both vertical and horizontal, in respect of agencies as well as programmes.

8.17 The NCERT will have to coordinate the effort of its constituent units with that of the State-level agencies. This may be done through periodical conferences and meetings, developing materials and aids for adaptation or adoption by different States, training key personnel for various purposes through short-term and long-term orientation and internship programmes. The services of the Field Advisers and the Regional Colleges of Education may also be utilized for this purpose.

8.18 At the State level itself, there is a need for coordination. There are various agencies like the Directorates of Education, Boards of Secondary Education, State Institutes of Education and Textbook Bureaus dealing with curricula for different sub-stages and with different curriculum components. There may be even some overlap of functions and in certain matters so much of interdependence that in the absence of proper coordination it may even lead

to wastage of time and effort. It would, therefore, be desirable to identify the functions of these various agencies in respect of this curriculum and assign the function of coordination to one of them. This will become easier if an agency on the lines of the NCERT is set up in each State, as has already been done in a few States.

Clearing-house Functions

8.19 These functions are to be discharged mainly by the NCERT at the national level. It has to collect information from various States and feed it to other States and keep the States informed about the latest developments in the area of curriculum, both inside and outside the country. The States on their part will have to maintain a close liaison with the NCERT in this respect, on the one hand, and discharge clearing-house functions for the schools and the training institutes within the States, on the other. Ultimately all worthwhile innovations and research findings acquire meaning only when these are transmitted to the user.

C. Implications for Schools

8.20 The implications of the new approach are far-reaching for the schools. If properly implemented a complete transformation of the schools is likely to come about. There are two components to be considered from the point of view of the school.

The School Atmosphere

8.21 Operationally, a curriculum is not what is stated on paper, but what actually happens in a school. Ideally, each school should have the freedom to develop its own curriculum within the framework of the national objectives. Availability of resources at the local level, teachers, community needs and aspirations, support from the community, physical facilities, local, cultural and social background, job opportunities at the local level, etc., are some significant considerations for developing the school curriculum. Even within the existing social and economic constraints there is considerable scope for local initiative and involvement. The school has to create the necessary atmosphere and also make adjustments in the State-prescribed curricula to suit local conditions. Unless the school atmosphere is attractive enough to hold the pupils, wastage and stagnation will continue to remain.

8.22 The headmaster is the key person in this business of creating an attractive school atmosphere. There are two components of this atmosphere, viz., physical and psychological. The school building may be simple, yet it can be made attractive. If the headmaster is able to enlist the cooperation of the teachers, students and parents, it is not difficult to provide the minimum essential facilities without incurring huge expenditure. Keeping the premises neat and tidy does not involve much cost. In this area a conscious effort on the part of the headmaster can certainly bring about considerable changes.

8.23 The social and cultural atmosphere of the school is important. It should be attractive to the child and the parents. It should lead to the development of a sense of belonging among all concerned. There should be proper rapport among the head, the teachers, the pupils and the guardians. Good work should be appreciated. Decision-making should be democratic. There should be flexibility in the time-table. Each child should be recognized as an individual. The staff should work as a team and should not be distant from the students. Identifying pupils' personal problems and offering assistance in solving them, showing interest in their physical well-being, having direct contact with guardians and keeping them informed about the progress of the child, not only through correspondence but through personal contact, encouraging and allowing pupils to take decisions collectively on matters of common interest and in keeping with the over-all objectives of the school, honouring such decisions, nipping in the bud all undesirable elements by adopting an understanding approach and, above all, treating the school programme as something alive, are some of the basic requirements for providing a healthy atmosphere for learning.

Provision of Facilities

8.24 The next important requirement is the provision of the minimum essential facilities in schools in terms of instructional aids and equipment. In subjects like science and work experience where each and every child is to be put through the experience of "doing", no such experience is possible unless the children get an opportunity to handle, personally, apparatus and tools. Ingenious teachers can with the help of available resources make good the deficiency of certain types of aids and equipment through improvisation and help from the community. In spite of the existing financial constraints it should be possible to provide some minimum aids and equipment to the schools which may be supplemented by the above effort.

8.25 The provision of guidance facilities in school is also very necessary for the satisfactory development of the pupils. Students have to be helped in the selection of courses and in making a vocational choice at the end of the period of general education. They are to be provided with information about the various vocational possibilities through career conferences and occupational corners in schools. They are to be helped in developing a realistic self-concept through individual and group counselling. Students with special talents have to be identified and provided opportunities to develop them to the maximum possible extent. For such students enrichment programmes have to be provided. The educational needs of children coming from the weaker sections of the society have to be located and suitable provisions made to satisfy them. Diagnostic testing and remedial instruction has to be provided for slow learners. In addition to problems related to achievement in various subjects, personal adjustment problems have to be identified and suitable remedial measures taken to overcome them. All this is possible if adequate guidance services are pro-

vided and school counsellors for individual or groups of schools are available, and teachers are oriented to guidance activities, and, with the cooperation of parents, cumulative records of the individual pupil's growth and development are maintained.

8.26 Another important facility needed in schools is the school health services. Although health education is provided for in the curriculum, the introduction of a regular health service is very necessary for the harmonious development of the pupils. In their training programmes teachers should be acquainted with the principles of health education. With a little alertness on their part, they can easily detect physical deviations from the norms, such as defective vision, deficient hearing, postural oddities and speech defects, and bring them to the notice of the guardians and the school health officer for corrective measures. Teachers should be trained in rendering first aid. This knowledge comes handy in times of emergency. Teachers should maintain records of height, weight, etc., and this record in the case of every individual child has to be interpreted to provide necessary guidance in deviant cases. But that is almost all that a teacher can do. In addition, the provision of medical services for schools is essential for a satisfactory implementation of a school health programme.

8.27 There is another aspect of health services which is no less important. It is the provision of a neat and healthy school environment. The school building and compound should be clean. There should be provision for safe drinking water, disposal of refuse and clean toilet facilities. Students may also be provided with a wholesome yet inexpensive midday meal.

D. The Involvement of the Community

8.28 The community should realize that the school is to serve their needs and that the education of their children is necessary for the prosperity of the community. The existing distance between the school and the educational administrators as well as the community has to be reduced. For this purpose the attitude of the teacher has to change. A sincere teacher can surely make the school a centre of community activities. The community, in turn, can provide facilities in men and material through its own effort for nurturing the school.

8.29 With the change of attitudes and active participation of the community in the welfare of the school, it may be possible to utilize the locally available talent for various aspects of the curriculum, specially in the area of work experience and the arts. The community could also be helpful in providing other physical facilities for the school. Once the community accepts an institution as its own and realizes the value of education, many of the problems being faced at the moment, particularly at the primary level, will automatically vanish. It should be possible to utilize the artisan, the carpenter, the blacksmith, the experienced farmer, the artist, the musician and such other persons in the

community; they could be brought to participate in the work experience and other curricular areas in the school. One need not always have a trained teacher. Students and teachers on their part should participate in community life, whether it is cleanliness, health, sanitation, literacy, beautification, road construction, irrigation, child care, or work in the farm, the factory and the hospital.

National Curriculum for Elementary and Secondary Education

A FRAMEWORK

Revised Version



राष्ट्रीय शैक्षिक अनुसंधान और प्रशिक्षण परिषद्
NATIONAL COUNCIL OF EDUCATIONAL RESEARCH AND TRAINING

April 1988
Vaishakha 1910

P.D. 20T-SD

© National Council of Educational Research and Training, 1988

ALL RIGHTS RESERVED

- No part of this publication may be reproduced, stored in a retrieval system or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording or otherwise without the prior permission of the publisher.
- This book is sold subject to the condition that it shall not, by way of trade, be lent, re-sold, hired out or otherwise disposed off without the publisher's consent, in any form of binding or cover other than that in which it is published.

Published at the Publication Department by Shri O.P. Kelkar, Secretary, National Council of Educational Research and Training, Sri Aurobindo Marg, New Delhi-110016 and photocomposed by M/s Digvijay Phototype Setter, D 288-289, Vikas Marg, Lakshmi Nagar, Delhi-110092 and printed at Shree Om Enterprises Pvt. Ltd., A-98/3 Okhla Industrial Area, Phase II, New Delhi 110020.

Preface

The child of today is the builder of the India of tomorrow. It is only through a well designed and effectively implemented educational programme the child could be equipped to realise his inner potential and to contribute meaningfully to nation-building. The curriculum at the earlier stages of education is basic to the intellectual, physical and emotional development of the child. The main objective of the national curricular framework for elementary and secondary education is to build on the positive experiences of the past educational reforms and to reflect the present concerns. The national curriculum also aims at reducing the existing disparities in the quality of education provided by different institutions and the regional imbalances by setting national norms of threshold resources for achievement of the minimum levels of learning specified for each stage of school education. The curriculum articulates the educational objectives of the national system of education through a common scheme of studies for elementary and secondary education with a built-in flexibility ensuring greater initiative to the teacher, the school, and the local educational authorities. The curriculum derives its global objectives of all-round development of the child from the national educational traditions, the profound values enshrined in the Constitution of India and the contemporary concerns for strengthening India's emotional unity and preparing the nation to face the future challenges.

While the curriculum reflects the educational intent, it is equally concerned about its effective implementation. Much of the aberration of the present system of education in India is not due to lack of noble ideas but to lack of their appreciation and relevance to the management of education and day-to-day classroom practices. The present framework, therefore, highlights the major areas of intervention for its implementation. These are :

reorientation of the present practices of developing curricular and instructional materials with a view to making them child-centred and based on tested teaching and learning models;

reorientation of the inservice teachers through a nation-wide school improvement programme and imaginative use of mass media;

examination reform and introduction of continuous and comprehensive evaluation to improve the teaching-learning process at all stages of school education;

Acknowledgements

The work on the preparation of the present document had its beginning when the NCERT constituted in 1983 a Working Group to make a quick appraisal of the existing curricula at the school stage in different States and Union Territories and to assess these from the point of view of instructional load. Simultaneously, the NCERT had also initiated some research and evaluation studies related to different aspects of the curriculum. These highlighted the need to evolve a national curricular framework for primary and secondary education with a common scheme of studies.

In order to prepare a national curricular framework for elementary and secondary education, the NCERT constituted an in-house Steering Group in 1984. The curriculum concerns and issues identified by this group were deliberated in a national seminar and four regional seminars held during 1985. These seminars were attended by eminent educationists, curriculum specialists, subject experts, principals of schools, teachers, teacher educators, legislators, members of parliament, journalists and representatives of teachers organisations. The NCERT also had separate discussions with a large number of teachers, students and parents.

Based on the suggestions and recommendations made in the national and regional seminars, a draft of the national curricular framework was prepared. This draft was further discussed at a national level meeting attended by experts from various fields and it was revised on the basis of suggestions received from them. As is well known, simultaneously the country had undertaken the task of developing a new national policy on education. Since the document on the curricular framework preceded the National Policy on Education-1986 (NPE-86), it has been found imperative to modify it to incorporate the major thrusts and recommendations highlighted therein.

The NCERT takes this opportunity to thank all the State/Union Territory Governments for deputing their representatives to participate in the various seminars and meetings, and to the Governments of Maharashtra, Rajasthan, Tamil Nadu and West Bengal in particular, for hosting the regional seminars and providing excellent facilities for their organisation. The NCERT is also grateful to all the State Boards of School/Secondary Education, the Central Board of Secondary Education (CBSE) and the Kendriya Vidyalaya Sangathan (KVS) for deputing their representatives to participate in the seminars and meetings.

provision of the minimum essential physical and academic facilities in all schools and non-formal learning centres for effective transaction of the curriculum;

enhancement of the capability of the curriculum development centres at the State/UT level to generate innovative ideas and practices for curriculum development and preparation of instructional materials and training packages for use of teachers and pupils in schools and non-formal learning centres.

Several implementation strategies have been indicated for operationalisation of the national curricular framework. Besides stressing the need for additional physical resources the urgency to invest more on the development of the human resource, particularly in the rural and backward areas and specifically on the development of girls and women have emerged as crucial policy issues from the point of view of promoting equity with the improvement of the quality of education.

Augmentation of the traditional educational resources for elementary and secondary education has been envisaged through:

networking educational institutions at the elementary, secondary and tertiary levels for optimum utilisation of available resources for qualitative improvement through inter-institutional cooperation;

networking the existing educational resources support structure with the infrastructure for health, information and broadcasting, agriculture, industry, labour and other governmental and non-governmental agencies for resource development and training support for qualitative improvement of education at the school stage;

participation of the local community in the management and supervision of schools and other learning centres and mobilisation of additional resources through community and voluntary efforts;

utilization of mass media and educational technology, including radio, TV, video and computers, in a massive way for creating a general awareness of the quality of education and its relevance to culture, creativity, societal and environmental concerns, national development, and for the continuing education of teachers and students and as a tool for evolving new participative and interactive modes of teaching and learning.

While recommending the above strategies, it has been indicated that the existing curriculum and the general educational scene may not undergo qualitative change only through additional efforts on the part of the institutions involved in the delivery system. Unless there is a significant change in their style of functioning and the institutional management culture, any additional effort may mean a higher efficiency

for the existing ineffective practices rather than an improvement in their effectiveness. In this context, the need for formulating major mission-oriented, time-bound projects for making a decisive intervention in the implementation of the curriculum has been proposed. Such mission or task-oriented projects should, besides demonstrating superior technology of preparation and evaluation of curricular materials, methodology and approach to curriculum transaction, training of personnel, and management of institutions and their networking, also make the new culture in educational and curriculum management visible. The demonstration effect of such project model of implementation of curriculum reform will go a long way in creating a renewed sense of responsibility and accountability on the part of the existing institutional structure for curriculum research, development and dissemination.

In this context, the present curriculum framework may also be broadly interpreted as a framework for institutional reform in the field of education. The National Council of Educational Research and Training considers the framework as a guide to act as the major agency at the national level to facilitate the process of curriculum change with a thrust on institutional reform.

P.L. Malhotra

Director

National Council of Educational
Research and Training

Contents

<i>Acknowledgements</i>	<i>iii</i>
<i>Preface</i>	<i>iv</i>
CHAPTER 1. EMERGING CONCERNS AND IMPERATIVES	1—11
1.1 CURRICULUM SCENARIO IN RETROSPECT	
1.2 CURRICULAR CONCERNS	
1.3 NATIONAL SYSTEM OF EDUCATION	
CHAPTER 2. ORGANISATION OF CURRICULUM	12—36
2.1 NATIONAL CURRICULAR FRAMEWORK	
2.2 MINIMUM LEVELS OF LEARNING	
2.3 COMMON CORE COMPONENTS	
2.4 FORMULATION OF OBJECTIVES	
2.5 SCHEME OF STUDIES	
2.6 CURRICULAR AREAS AND DIFFERENT STAGES	
2.7 INSTRUCTIONAL STRATEGY	
2.8 MEDIUM OF INSTRUCTION	
2.9 INSTRUCTIONAL TIME	
2.10 TIME ALLOCATION FOR DIFFERENT AREAS	
CHAPTER 3. EVALUATION AND EXAMINATION REFORM	37—42
3.1 SCOPE OF EVALUATION	
3.2 TOOLS, TECHNIQUES AND MODES OF EVALUATION	
3.3 ASSIGNING VALUES, MAINTENANCE OF RECORDS AND REPORTING	
3.4 EXAMINATION REFORM	
3.5 EDUCATIONL TESTING SERVICE	
CHAPTER 4. IMPLEMENTATION	43—55
4.1 PROFESSIONAL SUPPORT FOR CURRICULUM DEVELOPMENT	
4.2 PROFESSIONAL SUPPORT FOR PRE-SERVICE AND IN-SERVICE TRAINING OF TEACHERS.	

- 4.3 EDUCATIONAL TECHNOLOGY SUPPORT TO TEACHING-LEARNING
- 4.4 INFRASTRUCTURE FOR IMPLEMENTATION OF WORK EXPERIENCE PROGRAMMES
- 4.5 INSTITUTIONAL AND ORGANISATIONAL REFORMS AND INSTRUMENTS OF INTERVENTION

CHAPTER 1

EMERGING CONCERNS AND IMPERATIVES

Education, by its very nature, influences and gets influenced by the whole development process. There is hardly any field of activity or sector of development which is not influenced by education in some form or other. There is no sector of development which does not have its impact on the system of education. Therefore, the dynamics of education and its role in social transformation and national development makes it essential that the content and processes of education are continuously renewed in order to make them in tune with the changing needs, aspirations and demands of the society.

School education is a sector of fundamental importance to both individual and national development processes. The rapid growth of knowledge and the emergence of new means and methods of communication make it essential that the curriculum at the school stage is renewed continuously to respond to the future challenges. In order to fulfil its role as a vehicle for social change, the school curriculum has to be dynamic enough to respond to the changing national priorities and long term development goals of the country.

1.1 CURRICULUM SCENARIO IN RETROSPECT

An important aspect of educational development in India during the past few

decades has been the continuous and sustained effort to evolve a national system of education. The father of the nation, Mahatma Gandhi, had visualised education as a basic tool for the development of national consciousness and reconstruction of our society. *Buniyadi Shiksha*, as *Nai Talim*, as expressed in the Wardha scheme of education in the late thirties, represented the first significant effort to develop an indigenous national system of education in conformity with the needs and aspirations of the people. The main thrusts of this scheme of education, commonly referred to as *basic education*, were emphasis on all-round development of the child, development of a secular national outlook and readiness to undergo and withstand pangs of nation building, use of the immediate environment and work as the source of knowledge, integration of and correlation between knowledge and work, emphasis on the importance of experience in acquisition of knowledge and use of mother tongue as the medium of instruction and learning. The main goal of education was character building and not mere acquisition of knowledge. The emphasis was on evolving an educational system that would enable an individual to discover his/her talents, to realise his/her physical and intellectual potentialities to the fullest, to develop character and desirable social and human values to function as a

responsible citizen.

The post-independence period was characterised by a series of efforts to restructure school education in the country and to give it an indigenous identity so as to reflect the Indian ethos and concerns of the society. The reports of the Secondary Education Commission (1952-53) and the Education Commission (1964-66) provided the basis for deliberations on the transformation of the educational system. The Secondary Education Commission put forward the idea of multi-purpose school and recommended an 11-year pattern of school education. The Education Commission took a comprehensive view of the entire educational system in relation to national development. It viewed education as an integral part of national development. Amongst other things, the Education Commission recommended a 10+2+3 pattern of education which was accepted by the Parliament through its Resolution on National Policy on Education in 1968.

The acceptance of a common educational structure, i.e., 10+2+3 pattern of education all over the country after the adoption of the National Policy on Education in 1968, could be considered as an important step in the efforts for evolving a national system of education. This was followed by steps to evolve a mechanism for ensuring a broad commonalty in terms of expected levels of attainment of pupils and standards of education at all levels of school education throughout the country.

The Curriculum for the Ten Year School — A Framework, brought out by the National Council of Educational Research and Training (NCERT) in 1975, attempted to give concrete shape to the recommendations of the Education Commission and also to the Resolution on National Policy on Education — 1968. It represented the first attempt to restructure and reorient the content and processes of school education based on a National Curriculum

Framework. The ten years of general education with a set of common objectives, common scheme of studies and other details as suggested in this document was gradually accepted by all the States and Union Territories.

However, the implementation of the curriculum framework remained uneven among the States and Union Territories. One of the reasons for this was the lack of a comprehensive plan to link the curriculum changes with the processes of teaching and learning, teacher training and examination reform. Another reason was the wide-spread disparities in the physical and human resources necessary for effective transaction of the curriculum in schools. The mismatch between the curricular objectives and the actual transaction of the curriculum in the classroom led to wide-spread disparities in the levels of attainment of pupils and in the standard of education among schools in different parts of the country.

While the structural uniformity of the educational system was a significant gain which needed to be consolidated by bringing out other reforms leading to qualitative improvement of education, one of the concerns that came to the fore was the curriculum load. The Ishwarbhai Patel Committee in 1977 examined this problem and a broad consensus with regard to the number of subject areas to be studied at the primary, upper primary, and secondary stages emerged. The Committee recommended that the units to be studied under a given subject area should, by and large, remain the same for all, but stressed the need for flexibility so that the details of the units in a subject area could be worked out by the Boards of School Education to suit their requirements. The Committee recommended the study of one optional subject from a prescribed list to permit pupils to develop special interests or talents. The Committee also recommended introduction of different levels of courses in mathematics and science at the secondary

stage. The practice of providing different levels of courses in science and mathematics was, however, given up later on.

Later on, the NCERT undertook a detailed study of the problem of curriculum load and made a critical analysis of the syllabi prescribed in the States. In 1983, NCERT constituted a Working Group to make a quick appraisal of the existing curricula at the school stage in different States and Union Territories and to assess these from the point of view of instructional load. The Working Group had discussions with teachers, students and parents, and conducted studies in Karnataka, Madhya Pradesh, Orissa, and Rajasthan. The report of the Working Group, "Curriculum Load at the School Level -- A Quick Appraisal" published in 1984 defined the nature of the problem and identified the basic causes leading to the perception of curriculum load. The report indicated that the curriculum load was not so much a problem of curriculum development as that of perception and management, accentuated by resource constraints. Various factors like lack of essential physical facilities and academic inputs, lack of pedagogical innovations, poor quality of instructional materials, inadequate preparation and orientation of teachers, and the domination of public examination were found to be responsible for depriving the pupil of the joy of learning.

A significant development in recent years has been the articulation of a national system of education based on a common educational structure, a national curricular framework and minimum levels of learning for each stage of education. The school curriculum and its transaction are expected to give concrete shape to the emerging national system of education. The main focus is on evolving a system of education which would promote India's unique socio-cultural identity, prepare

the country to meet the future challenges and develop the country's human resources enabling them to participate effectively in national development endeavours. This implies reorientation of the content and processes of education, particularly at the school stage, to make it in tune with the goals of the emerging national system of education.

1.2 CURRICULAR CONCERNS

For maintaining its relevance to the societal needs and personal needs of learners, the school curriculum should continuously undergo the process of renewal keeping in view the experiences gained in the past and the concerns and imperatives that have emerged in the light of changing national development goals and educational priorities. Some of the emerging concerns and imperatives which have a bearing on the school curriculum include the following

1.2.1 Socio-Cultural, Political and Economic Considerations

Education as a powerful instrument of human resource development should help in the process of desired social transformation and the achievement of national goals and priorities. Thus the content and process of education should be carefully planned so as to develop in the learners appropriate knowledge, skills, attitudes and values relevant in the context of social, economic, political and environmental goals in the local, national and global perspectives. The emerging concerns and imperatives of this nature, relevant in the context of school education include the following.

1.2.1.1 Equality of Education and Opportunity

For our society which is striving to bridge

the gap between the haves and the have-nots, the question of equality of educational opportunity assumes a profound importance. The educational deprivation inevitably leads to deprivation of other needs and to serious undermining of the potential not only for individual development and fulfilment but for national development as well. Special emphasis therefore, needs to be laid on the removal of disparities and equalisation of educational opportunity by attending to the specific needs of those who have been denied equality so far. To promote equality it is necessary to provide for equal opportunity to all not only in access, but also in the conditions for success. Education being a powerful instrument of social transformation, the value of equality of opportunity has to be demonstrated both by ensuring equal access to educational facilities and by ensuring that the conditions of learning provide equal chances of success to all. The design of the curriculum and its transaction will have to focus more on educational effects or learning outcomes and their equalisation among children belonging to different social, economic and cultural background. The concept of equality of educational opportunity will have to be strengthened through a broad common base laid down at the primary, upper primary and secondary stages of education. The curriculum should create an awareness of the inherent equality of all with a view to removing prejudices and complexes transmitted through the social environment and the accident of birth. The curriculum and its transaction will have to take note of the special requirements of the first generation learners who constitute a large proportion of the school going children in our country. The curriculum should provide for new methodologies for developing compensatory and remedial measures in education to suit the needs of the deprived, the disadvantaged and the disabled so that they could be brought on par with others

as early as possible. Similarly, without making any discrimination on the basis of sex, the curriculum should aim at bringing girls and boys on par. It should ensure that all pupils irrespective of caste, creed, location or sex have access to education of a comparable quality.

1.2.1.2 Preservation of Cultural Heritage
 therefore, strengthening of national identity and unity is intimately associated with the study of the cultural heritage of India. There is, therefore a need to bridge the existing schism between the system of education and the country's rich and varied cultural traditions. A major role of education should be to bring about the fine synthesis between change-oriented technologies and the country's continuity of cultural tradition. This requires enrichment of the curricula and processes of education by cultural content in as many manifestations as possible. The cultural components in the school curriculum, therefore, need to be reoriented and education and culture need to be interwoven in order to overcome the alienation of the educated from the cultural traditions of the country. The compositeness of our culture and unity in diversity which is the main theme of our national unity should be reflected in the content and processes of education at all stages of school education. The process of education should be characterised by efforts to promote culture through education and education through culture.

For strengthening the unity and integrity of the nation it is essential that the cultural heritage, traditions, and history of different ethnic groups and regions of the country are understood and appreciated in the right perspective. This will pave the way for the understanding of a pluralist society and of our composite culture. However, while highlighting the need to preserve the cultural heritage of our country, the school curriculum should also

help in making our younger generation aware of the need to reinterpret and reevaluate the past and to adapt the new practices and outlook appropriate for a modern society. The main objective should be to promote national pride and cultural identity and to foster national integration and greater understanding amongst different groups of people of India.

1.2.1.3 Constitutional Obligations

Creation of a citizenry conscious of their rights and duties and committed to the principles embodied in our Constitution is a prerequisite to social advancement, economic development and political progress of our country. Therefore, there is need to make conscious efforts to promote an awareness of the constitutional obligations among pupils. The Constitution of India visualises development of a pluralistic open society based on the principles of equality and social justice. It indicates the nation's resolve to develop a State which is socialistic, secular and democratic in nature. The school curriculum through its content and processes will have to consciously reflect the constitutional obligations. It will have to play an important role in preparing the pupils for assuming their rôles as constructive and responsible citizens.

1.2.1.4 Strengthening of National Identity and Unity

At this point of our history, the most urgent need is to consciously develop national spirit and national identity. Education, as an instrument of social transformation, should ensure that its beneficiaries and products demonstrate a national consciousness, a national spirit and national identity which are considered essential for national unity. This necessitates inclusion of specific content in the school curriculum designed to nurture national identity. The curriculum as a whole should help in promoting development in the pupils of a profound sense of patriotism, non-

sectarian attitudes, capacity for tolerating differences arising out of caste, religion, region, language, sex, etc. and ability to choose between alternate value systems, all directed to the sustained pursuit of unity and integrity of the country.

The national spirit and national identity came to the forefront first during our freedom struggle. The study of the history of India's freedom struggle by pupils at all stages of school education emerges to be significant in this context. It calls for an adequate and graded coverage of the freedom struggle as an integral component of the curriculum in order to acquaint the pupils with the events related to freedom struggle and with the sacrifices made by the people in different parts of the country in the struggle for freedom and for protecting the unity and integrity of the country.

1.2.1.5 Character Building and Incultation of Values

The growing concern over the erosion of values and an increasing cynicism in the society highlights the need to make readjustments in the curriculum in order to make education a forceful tool for the cultivation of social and moral values. Value education, therefore, will have to be made an integral part of the school curriculum. In a culturally pluralistic society like that of ours, value education should be directed to foster among children universal and eternal values, oriented towards the unity and integration of the people of India. The content of value education will have to be drawn from various sources — national goals, universal perceptions, ethical considerations and character building. In addition to the values that are concerned with the elimination of obscurantism, religious fanaticism, violence, superstition, fatalism, exploitation and injustice, value education should also have a positive content. Incultation of values like honesty, truthfulness, courage,

conviction, straightforwardness, fearlessness, tolerance, love for justice, dependability, compassion, etc. will help in creating a humane society and balanced individuals. Value education should particularly be aimed at creating an awareness that there is always a hierarchy of values in the value system of a person and that whenever there is, somehow, an incompatibility between two values, he/she should be able to give higher priority to the rightly deserving values, particularly those concerning the well-being of the society at large in comparison to those related to the individual, family, caste, etc. Character building which is closely related with the inculcation of values should be of a practical nature implying thereby determination on the part of the individual to pursue right kind of values even in the face of heavy odds.

1.2.1.6 A Global Perspective

The school curriculum, while promoting national identity and unity, should also strive to create among the pupils an awareness of the necessity to promote peace and understanding between nations for the prosperity of all mankind. The curriculum should reflect some of the major issues facing the world today such as disarmament, avoidance of nuclear war, prevention of violation of human rights, etc. It will have to make the pupils aware of the concept of world as a family of nations, the distinct culture of each nation and the interdependence among nations in different spheres. The school curriculum, while enabling the pupil to root oneself in the abiding national cultural traditions and value frame, should also enable him/her to learn and appreciate the richness and to see himself/herself as a member of the new and emerging international community of mankind.

1.2.1.7 Protection of the Environment and Conservation of Natural Resources

The indiscriminate destruction of the

environment and the use of the environmental resources, especially the non-renewable resources in nature by man have been upsetting the earth's ecological balance. Unfortunately, even some ambitious national developmental programmes, when not based on careful consideration of their consequences in terms of the ecology in the long run, may become sources of serious hazards for the ecological balance. There is urgent need of tapping new alternative sources of energy and development of new technology aimed at the protection of environment. This brings into focus the paramount need to create consciousness of the environment among all sections of the society. The school curriculum, therefore, should attempt to create a commitment on the part of pupils to protect the environment and conserve nature and its resources so that the ecological balances, especially the balance between man and nature, could be maintained and preserved. It should also promote an awareness of the need of counter pollution, whether caused by affluence or poverty, and of the impending energy crisis due to the ever increasing consumption of fuels available in nature and the exhaustion of these fuels at an alarmingly rapid rate. The school curriculum should highlight the measures for protection and care of the environment, prevention of pollution and conservation of energy. It should also highlight the inter-dependence between the material environment and the plant and animal (including human) life for survival, growth and development. The significance of renewable and non-conventional energy resources should also form an important component of the curriculum.

1.2.1.8 Observance of Small Family Norm

The nation is deeply concerned about the disquieting rate of population growth and its consequences for the individual, society and its

economy. Though the complexity of the problem needs a multi-pronged strategy, the school curriculum in particular has an important role to play in making the pupils aware of the problems caused by the rapid increase of population and of the various measures, such as observance of small family norm required for tackling them. In the context of the increasing emphasis on human resource development, population education components appropriate to the pupils of different age-groups need to be reflected in the curriculum at different stages of school education. These components could be integrated with topics and units in all subject areas. Environmental education, energy management and population education are to be seen as complementary to one another and they should be adequately reflected in the curriculum.

1.2.1.9 Future-oriented Education

The rapidly expanding frontiers of knowledge in all fields, especially in the fields of science and technology, and the changing socio-economic conditions of the society necessitates restructuring and modernisation of the school curriculum from time to time. The school-going pupil of today, when grown up as an adult in future, would be required to face new challenges and cope with new stresses and strains created by changed conditions. In view of the fact that one of the major goals of education is preparation of the pupil for his/her future life, it would be imperative that the school curriculum is duly forward looking and is directed to the development among the pupils the knowledge, skills, attitudes and values that would enable them to respond adequately to the challenge posed by the rapid scientific advancement and technological development and to adjust to the changing socio-economic conditions. The national goals and priorities are also likely to undergo some

change leading to corresponding changes in the outlook, behaviours and expectations of its citizens in the context of which school education has its due role to play.

1.2.2 Pedagogical Concerns

Curriculum, in order to be realistic, relevant and meaningful, has necessarily to be in tune with the pedagogical goals, and principles that have been the outcome of long systematic research about the nature of the learner and the learning process, and conditions and methods of learning. The following issues are particularly relevant for planning of school curriculum.

1.2.2.1 Education for All-round Development

Education is fundamental to all-round development — material and spiritual. Education is also viewed as an integral part of national development. Since the individual's capacity to contribute to national development is made possible and is enhanced by his or her development as an individual, one of the chief concerns of the curriculum at the school stage will have to be to facilitate individual development and fulfilment. The curriculum will have to be designed and transacted so as to enable the pupil to discover his/her talents, realise his/her potentialities to the fullest, develop in him/her productive and social skills, and enjoy emotional and physical well-being. It should equip a pupil with the knowledge, skills, attitudes and values necessary for leading a productive and happy life as a person, as a responsible citizen and as a worker. The content and processes of education will have to be designed keeping in view the developmental needs of the pupil, his/her intellectual development and capability for learning at different stages of his/her development and the process and modes of

his/her learning during these stages.

1.2.2.2 Evolving a Child - Centred Approach to Education

For the development of the pupil's personality, it is imperative that he/she is placed at the centre of curriculum planning and transaction. His/her individuality and dignity must be respected. His/her needs, interests, aptitudes and abilities are to be adequately taken note of. Well designed learning experiences, in and outside the school, are tools by which a pupil is enabled to acquire knowledge, skills, attitudes and values conducive to the actualisation of his/her potentialities.

A child-centred approach to education with the teacher as a facilitator in the learning process of pupils is considered to be the key to the new strategy in the transaction of the curriculum. Appropriate methods and techniques which would facilitate interactive process of teaching and learning need to be evolved for this purpose. This implies replacement of the existing teaching methods which are predominantly based on rote learning, lectures and reproduction of information by interactive modes of teaching which would focus on 'learning' and which would stimulate curiosity and independent thinking, develop problem solving skills, promote planning and execution of projects and self-learning. The teacher's role will be one of helping the pupil to develop skills in collecting information, their verification and evaluation for further processing and structuring for drawing inferences. He/she will be required to be not only an instructor but a resource person for information search and analysis. He/she will be required to devise diverse ways of learning unique to different areas of study which would help the pupil in developing self-confidence and in learning how to learn.

1.2.2.3 Facilitating 'Learning How to Learn'

The phenomenon of unprecedented rate of growth of knowledge has become a permanent curricular concern almost overriding many other considerations. While efforts should be made to ensure that the school curriculum keeps pace with the speed at which knowledge is generated and applied, there is a need to lay special emphasis on 'learning how to learn.' The transaction of the curriculum can no longer be a process of handing down a fixed body of knowledge but of developing in the learners a capacity to obtain, to sift and to evaluate information needed at any particular time. Training in the use of libraries, audio/video programmes and computerised data banks will have to be an important component of the instructional process. The instructional process will require to be directed not only towards enabling pupils to learn the effective ways of obtaining the information needed at any particular time or to learn how to comprehend effectively the written word or the tabulated information of the diagram but also to learn to formulate and test hypotheses, to make inferences and to draw rational conclusions. This implies a radical change in the teaching strategies which at present are more concerned with imparting information than with stimulating thought and enabling pupils to seek and discover knowledge.

1.2.2.4 Facilitating Creative Expression

Education for creative expression has not received adequate attention in school curriculum so far. In the context of the emphasis on the all-round development of the individual, the need to provide ample opportunity to each pupil to develop his/her originality and creative talents has emerged as an important curricular concern. One of the means of promoting creative expression among pupils is aesthetic activity. A well organised art

education programme as an integral part of the school education curriculum emerges to be significant in this context.

1.2.2.5 Inculcation of the Scientific Temper

The pursuit of scientific approach in almost all aspects of human life necessitate modernisation and restructuring of school curriculum. One of the major thrusts of the school curriculum should be to prepare the younger generation to respond adequately to the need of adopting scientific outlook and approach while dealing with various problems of life.

The curriculum at the school stage should help the individual in developing scientific temper and rational outlook which are characterised by a not-taken-for-granted attitude. The role of education in refining sensitivities and perceptions that contribute to scientific temper and independence of mind has been well recognised. The curriculum should develop in the pupil well defined abilities and values such as the spirit of inquiry, objectivity and the courage to question. There is a need to design various educational programmes in such a way that they would enable the learner to acquire problem solving and decision making skills. The emphasis of curriculum at different stages of school education, therefore, should be on developing in every pupil a scientific attitude characterised by the use of the scientific method of inquiry in solving problems. The curriculum should promote development in the pupil of qualities such as open mindedness, commitment to free inquiry, a habit of seeking more evidence before arriving at conclusions and a readiness to revise assumptions and hypotheses based on fresh evidence coming to light, all directed to the inculcation of the scientific temper. In teaching of various subjects it is important to keep in mind the interdisciplinary nature of

the current scientific research. Inter-disciplinarity and less compartmentalisation in teaching of various subjects seem to emerge as significant both in the context of our efforts to provide a broad-based education at the school stage and to prevent overcrowding of the school curriculum.

1.2.2.6 Interface Between Education and the World of Work

Acquisition of work skills, inculcation of work ethics and development of appropriate work habits are considered to be some of the important goals of school education. Besides, the significance of work as a medium of education has been globally accepted from the point of view of all-round development of human personality. Participation in work activities is expected to strengthen and develop certain special attitudes and values such as respect for manual labour, productivity consciousness and work ethics.

In view of the importance of linking education with work and productivity, work experience, viewed as purposive and meaningful manual work, organised as an integral part of the learning process and resulting in either goods or services useful to the community, is considered as an essential component of the curriculum at all stages of school education. Work experience should be provided through well-structured and graded programmes, comprising activities in accordance with the interests, abilities and needs of students and the level of skills and knowledge to be upgraded with the stage of education. Therefore, participation of learners in productive processes and services useful to the community will have to occupy a central place in the school curriculum. Simple work activities related to local programmes of development, social services related to the welfare of the local community and learning experiences related to areas of basic needs

such as health, hygiene, food, shelter, etc. at the primary stage should be followed by participation of pupils in well designed production and service oriented projects directed to more intensive skill formation at the upper primary stage and pre-vocational courses involving production oriented projects and site-work at the secondary stage.

1.2.2.7 Continuous and Comprehensive Evaluation

Though public examinations are generally conducted at certain terminal stages of school education, they tend to influence the teaching-learning process in other stages as well. Because of the dominance of the external examination, the curriculum transaction, assumes a form much different from what is desired. To remedy this situation, it is necessary to adopt continuous and comprehensive evaluation that incorporates both scholastic and non-scholastic aspects of education, spread over the total instruction time. Evaluation should also serve as a feedback mechanism with regard to the effectiveness of teaching-learning process in order to take corrective and remedial measures. There is also a need to recast the examination system so as to ensure a method of assessment that is valid and reliable measure of student development and a powerful instrument for improving teaching and learning.

1.2.2.8 Utilisation of Media and Educational Technology

The developments in communication technologies and informatics have contributed to a constructive interaction between technology and educational theory and processes. The emergence of new technological devices and new knowledge about learning process and about the process of communication have generated new patterns and modes of learning. As a result, the very approach to

curriculum transaction has been undergoing change over the years. Teaching methods using the new media are spreading rapidly. It is widely recognised that media and educational technology, if wisely employed, could bring about far more productive use of teacher's and pupil's time, give teaching-learning process a more systematic and analytical approach, and make access to education more equal and democratic by reaching the pupils hitherto unreached and by exposing them to rich learning environment. Educational technology needs to be employed in the spread of useful information, to improve quality of education, to sharpen awareness of art and culture, and to train teachers. This implies that television, radio, and other allied media will have to be used more extensively for performing supportive, enriching and substitutive roles in the transaction of the curriculum in both formal and non-formal sectors of education. Audio-visual media and micro-computers need to be used for supporting instruction and for providing information on national concerns and issues, and for upgrading knowledge and professional competence of teachers. Educational technology will have to be employed to bring about educational change with more emphasis on learning rather than teaching.

1.3 NATIONAL SYSTEM OF EDUCATION

The contemporary compulsions make it imperative to evolve a national system of education comprehensive of all educational process, fully integrated with the socio-cultural milieu and intended to develop potentials of the individuals. The National System of education is conceived of on the principles embodied in the Constitution of India. The concept of a national system of education implies that, up to a given level, all pupils, irrespective of caste, creed, location or sex, have access to education of a comparable

quality. The salient features of the emerging national system of education are as follows :

Provision of equal educational opportunity to all, not only in terms of access to educational facilities, but also in the conditions for success;

A common 10+2+3 structure of education;

A national curricular framework which contains a common core along with other components that are flexible;

Introduction of norms of minimum levels of learning for each stage of education;

Linkages with the world of work and development of entrepreneurship;

Educational programmes for fostering among pupils an understanding of the diverse cultural and socio-economic systems of the people living in the different parts of the country and for promoting national identity and unity;

Provision for lateral and vertical mobility of learners for the purpose of further education and training through different modes of learning.

A technical support system for continuous improvement of the quality of education.

CHAPTER 2

ORGANISATION OF CURRICULUM

The previous chapter dealt with some of the important curricular concerns and imperatives in the context of the national development goals and educational priorities. While designing a school curriculum for the national system of education it would be necessary that the guidelines for its formulation and its transaction are drawn keeping in view these concerns.

2.1 NATIONAL CURRICULAR FRAMEWORK

The national curricular framework for elementary and secondary education is envisaged in the context of the National System of Education as elaborated earlier. The basic features and the main thrusts of the curricular framework are as follows :

- (i) Emphasis on the development of human resources for the realisation of the national goals of development.
- (ii) Broad-based general education to all learners at the elementary (primary and upper primary) secondary stages.
- (iii) A common scheme of studies for elementary and secondary stages.
- (iv) The common core components comprising the following:
The history of India's freedom movement;

The constitutional obligations;
Content essential to nurture national identity;
India's common cultural heritage;
Egalitarianism, democracy, and secularism;
Equality of the sexes;
Protection of the environment;
Removal of social barriers;
Observance of the small family norm; and
Inculcation of the scientific temper.

- (v) Emphasis on defining Minimum Learning Outcomes (MLOs) for each area of learning at all stages of education.
- (vi) Provision for flexibility in terms of selection of content/components and learning experiences which would facilitate the attainment of minimum learning outcomes laid down for each stage of school education.
- (vii) Emphasis on child-centred and activity-based processes rather than the teacher-centred approach during the transaction of curriculum.
- (viii) Recasting of the examination system and introduction of continuous and comprehensive evaluation that incorporates both scholastic and

non-scholastic aspects of education spread over the total span of instructional time.

- (ix) Establishment of an appropriate machinery, such as a National Testing Service (NTS) for the selection, and the development of norms of comparable competence across the nation.
- (x) Applicability of the curriculum to all learners, irrespective of their modes/channels of learning in order to ensure comparability of attainment and to facilitate horizontal and vertical mobility of the learners.
- (xi) Provision of essential facilities for effective transaction of curriculum in all schools/non-formal learning centres.

2.2 MINIMUM LEVELS OF LEARNING

In order to bring about a broad commonality in the standards of education throughout the country, emphasis has been laid on the introduction of the norms of minimum levels of learning for each stage of school education indicated in terms of minimum learning outcomes to be attained by all the pupils in respect of each curricular area at each stage of school education. The minimum learning outcomes for each curricular area will have to be specified keeping in view the research findings regarding the mental ability of pupils at different stages of their development and the academic and physical resources that could be made available in the school for effective transaction of the curriculum.

The emphasis on defining the Minimum Levels of Learning highlights the importance of the integrative nature of learning-evaluation. Put differently, learning (development) and evaluation (assessment) have been construed as two inseparable aspects of the same

phenomenon. It is futile to evaluate the progress of the learners towards the stated objectives unless it is ensured that conscious efforts have been made to provide adequate and appropriate learning experiences for growth and development. Thus a major shift from evaluation (passing judgement) to learning (development in terms of desired objectives) has been advocated.

While emphasis has been laid on the introduction of the norms of minimum levels of learning and adoption of a common scheme of studies at different stages of school education, flexibility is envisaged in the selection of content and learning experiences as well as in the selection of strategy for curriculum transaction in order to make learning more relevant to the needs and environmental contexts of the pupils and to allow scope for initiatives and experimentation on the part of the teacher, the school and the local educational authorities. A high degree of flexibility and local initiatives are envisaged in designing and introducing remedial and enrichment programmes and materials not only by the State educational authorities but also by the individual schools and teachers to cater to the needs to slow and fast learners studying in the same class/grade in a school. However, the scope for flexibility in the methodology and approach to transaction of curriculum is not expected to be used for introducing differential courses or similar measures which would accentuate disparities in standards of education in different parts of the country.

2.3 COMMON CORE COMPONENTS

While the rationale underlying the school curriculum of a country reflects its socio-cultural and political ethos, its faithful transaction reflects the genius of its people. The search for national identity has been on since the resistance to colonisation of the country began. This search has not ended yet.

As a matter of fact it is more acutely felt now than ever before. Therefore it is but natural that there is a strong plea for centering the curricular efforts for promotion of national integration and social fusion and cultivation of values as enshrined in the Constitution. Thus an important aspect of the common core components is the emphasis on instilling a nationally shared perception and values and creation of an ethos and value system in which a common Indian identity could be strengthened.

The ways and means have to be found out to introduce the common core components at all levels of school education. Some suggestions are offered to initiate action on the subject.

After the minimum learning outcomes and related general content are identified for each area of learning and for each grade, further scrutiny may be made to explore the possibility of infusing the specific core component with the theme.

Where such natural infusion is not possible, an attempt can be made to select new content for each of the ten components to be added as topics/units to each relevant subject. One can envisage cyclic development of a new course of study pertaining to each of the components. For example, a set of courses on the history of India's struggle for freedom can be developed for grades I to X, independent of other subjects.

On the other hand, it is also possible to integrate such content appropriately in the regular subjects included in the present scheme of studies.

An eclectic organisation is possible by way of integrating clusters of components such as social science components or

science components or moral value components and designing syllabi for different grades.

At the primary stage, core components could be integrated with language and environmental studies so as to make them a medium to develop appreciation of culture and perception of the individual, social and national identity through activities, songs, stories, reading material, plays, skits, etc.

At the upper primary stage, both infusion and unit approach could be adopted.

At the secondary stage, the elements of civics, economics and sociology may be identified in an integrated manner. In addition to the common core components, the integrated course could cover the content which would reflect the contribution of India in the field of science, astronomy, metallurgy, medicine, creative arts, etc. in the ancient, medieval and contemporary periods. The core components could be made more interesting through visuals and biographical notes of scientists and eminent Indians in different fields. However, while introducing the core components, it is necessary to ensure that the depth and coverage of information is kept at the appropriate level and does not increase the total information load beyond the existing level in different subjects. This could be done by reducing the content in some of the existing subject areas and properly blending the core components in the total scheme of studies as far as possible.

2.4 FORMULATION OF OBJECTIVES

In curriculum organisation, formulation of objectives has a significant place because of the fundamental role they play in determining the content, strategies and evaluation as components of curriculum cycle. While identifying objectives, it is necessary to proceed towards various degrees of specificity, from very general objectives of curriculum, through somewhat

specific objectives for each stage of education, to precisely stated specific objectives of each subject area in the form of expected learning outcomes indicating what exact behaviour would a learner be able to demonstrate after the curriculum transaction. Thus, the curriculum organisers are required at the outset to indicate overall objectives of curriculum which would coincide with the overall aim of school education. It is necessary

the all-round development of their personality and commensurate with the social, cultural, economic and environmental realities at national and international levels.

School curriculum should, therefore, help to promote development in the learner of :

Language abilities and communication skills needed for social living and further learning:

into one's own personality;

Understanding of the environment and its limited resources and the need for conservation of natural resources and energy;

Appreciation of various consequences of large families and over population and need of checking population growth;

contributions made by the freedom fighters and social workers in the country's freedom struggle and social regeneration, and readiness to follow their ideals;

Appreciation of and readiness to practice in life the national goals of socialism, secularism, democracy and non-violence.

Divergent and independent thinking and ability to discover new relationships

processes. At this stage, the child's thinking remains pre-logical and is greatly influenced by perception and sensory experience. Intuitive thought begins at this stage and he/she can distinguish between different appearances of the same objects. However, there is no fully developed conceptualization of objects.

As compared to the kind of thought that involves true logical operations, intuitive thinking is rigid and irreversible. A child at pre-primary stage finds difficulty in putting sticks of different lengths together to form a series from shortest to longest. But he/she finds no difficulty in putting them in pairs and indicating which one of them is shorter. The difficulty arises in making a longer series. The same difficulty arises with respect to space.

The child enters the primary stage with the mental processes largely in the concrete operational stage. During this stage the child begins to think logically about the real world but is very much tied to concrete situations. There occur operations both of the logical and the arithmetical kind and also in the regions of space and time. These operations, however, are still carried out only on objects involving concrete situations. He/she still finds difficulty in generalising from one situation to another. But the intuitive structures, which have been more or less rigid and irreversible during the pre-operational stage, gradually lead to processes of higher thinking.

At the upper primary stage, the learner gradually moves on to the formal operational stage which starts from the age of about 12 onwards and goes on through adolescence. At this stage he/she will gradually be able to think logically in terms of all the hypothetical situations relevant to a particular problem. The operations previously performed only on what is closely related to concrete experiences can now be applied to propositions, either verbal or numerical. At earlier stages, formal logic and mathematical deductions have been

difficult for the learner. At the stage of formal operations, he/she will be able to think logically and perform mathematical deductions.

Since the intellectual development varies from age to age, it is essential that the curriculum is designed in consonance with these stages. New ideas and knowledge should be presented at a level consistent with the child's stage of mental development.

It is also necessary to promote social interactions among children. For effective learning and for intellectual development, learners should cooperate with their friends, share their experiences, discuss their discoveries and argue out their differences of opinion.

The development of concepts is a gradual one in a child. The teaching-learning process should be designed in such a way that it helps in promoting the continued development of the overall cognitive structures. This calls for the provision of a variety of tasks, materials and problems appropriate to the current cognitive structure of each learner. The learners should be presented with objects and ideas which could be manipulated and experienced, which would provide real opportunities for significant and meaningful sensory experience. They should be initiated and encouraged to explore texture, appearance, sound, odour and to sense movement. Emphasis should be laid on formal abstraction of attributes and relationships of objects and events appropriate to the level of development.

Characteristics other than the intellectual ones also provide important guidelines for designing curriculum which could be geared to the all-round development of the learner as a person and his development in the context of national goals and socio-cultural priorities. His physical, social and emotional characteristics and his attitudes and interests that emerge in him during the course of development during childhood, early adolescence and mid-adolescence, should be carefully taken into

consideration while determining the objectives, content and strategies of curriculum and its transaction at pre-primary, primary, upper primary and secondary stages.

With regard to the development of beliefs, habits and attitudes that have to do with physical well-being, emotional maturity and proper social orientation, the period of pre-primary and primary education is the most impressionable and formative period of the child's life after his/her entry to the school. This fact should be realised in all seriousness by the curriculum designer and practitioner so as to adequately provide appropriate learning experiences to the learner.

The entire span of pre-primary, primary, upper primary and secondary education is accompanied by significant physical growth and related needs, inclinations and motivations on the part of the learner. While undergoing pre-primary and primary education, the child, though relatively physically delicate, needs sufficient physical activities within and outside the school that would develop in him/her neuro-muscular coordination, keep him/her physically fit, ensure his/her future physical strength and provide a worthwhile channel for the bubbling energy he/she is endowed with during this period. What is of utmost importance during this period is imparting of appropriate knowledge, habits and attitudes conducive to personal hygiene and providing for regular guidance by medical experts.

Special need for enhanced consideration of physical characteristics of the learner arises with the onset of puberty in him/her towards the end of upper primary stage or during the secondary stage. The accompanying bodily changes, and also the associated feelings and interests, give rise to the need of imparting, sufficiently in advance, the relevant information and guidance.

During the period of secondary education, the learner is endowed with a fully developed

neuro-muscular system necessary for finer manipulations required in steady handling of delicate tools and apparatus including those used in laboratory work. Curriculum should make appropriate provisions for manual work.

By the time the child enters the school, he/she has, in normal course, already developed a readiness for participation in group life with his/her peers. However, a critical outlook towards social conventions and social events, and appreciation for lofty social ideals are yet to emerge in his/her behaviour. Similarly, though he/she begins at this stage to distinguish between right and wrong, he/she has not yet developed higher moral ideals that are involved in the process at a later stage of development. The child demonstrates in his/her behaviour a desire not to depend on others, but crystallization of desire to become self supporting takes place gradually till the learner is undergoing secondary education. In normal course, a learner, during the secondary stage of education, should develop a satisfying philosophy of life that would provide him/her appropriate motives and directives of behaviour as a future adult. Towards the end of upper primary stage, the learner starts critically evaluating the contradictions that he/she observes in the words and deeds of individuals and the society. Awareness of the need of standing on one's own legs and of choosing an appropriate career is normally demonstrated in the learner's behaviour.

These developmental features indicate the need for gradual introduction in the curriculum of learning experiences related to ideas, attitudes and skills that have to do with moral values, national ideals and priorities, socio-cultural cohesion and global fraternity. Systematic provision of information and guidance that would help the youth in making a right choice of career and vocation for themselves should not be overlooked towards the end of upper primary stage and particularly

during the secondary stage of education. For a large number of students, some kind of provocational orientation may be required to be a part of their education during the secondary stage.

During the period of secondary education, emergence of desire and inclinations of sexual nature is a normal feature of pupil's psycho-physical development. This dimension deserves careful attention of the curriculum organiser so as to make adequate provisions for inculcation in him/her of appropriate ideas regarding of, and healthy attitudes towards sex and members of opposite sex.

Curriculum designers could hardly afford to overlook the emotional dimensions of the child's life during the school period and the importance of emotional maturity in the life of a person. It is only gradually, through growth, that the child achieves emotional stability and emotional independence. There are occasions, particularly towards the end of upper primary and during the secondary education, when the learner has to face intense stress and strain which may result in emotional crisis. Curriculum should provide for appropriate activities and experiences, of scholastic and non-scholastic nature, and counselling and guidance in this regard.

2.5 SCHEME OF STUDIES

The minimum levels of learning envisaged in the national curricular framework will be provided through content and learning experiences related to different subject areas. The national curricular framework thus is characterized by a common scheme of studies as indicated below :

2.5.1 Pre-Primary Education (2 Years)

The basic mode of upbringing of children at this stage should be through group activities and play-way techniques, language games, number games and activities directed to

promote environmental awareness, etc. These should be used to make the learning experiences joyful to the children. No formal teaching of subjects is to be undertaken at this stage.

2.5.2 Elementary Education (8 Years)

2.5.2.1 Primary Stage (5 Years)

- (a) One language — the mother tongue/the regional language
- (b) Mathematics
- (c) Environmental Studies I & II
- (d) Work Experience
- (e) Art Education
- (f) Health and Physical Education

2.5.2.2 Upper Primary Stage (3 Years)

- (a) Three Languages
- (b) Mathematics
- (c) Science
- (d) Social Sciences
- (e) Work Experience
- (f) Art Education
- (g) Health and Physical Education

2.5.3 Secondary Stage (2 Years)

- (a) Three Languages
- (b) Mathematics
- (c) Science
- (d) Social Sciences
- (e) Work Experience
- (f) Art Education
- (g) Health and Physical Education

2.6 CURRICULAR AREAS AND DIFFERENT STAGES

Realisation of curriculum objectives requires imaginative planning of appropriate learning experiences. These would flow from well planned activities and teaching-learning strategies. Though, ideally, various learning experiences should make an integrated whole, they have to be classified under various subject areas for the sake of convenience. The

planning of objectives, learning activities and strategies under each curricular area has to be further guided by the considerations about the nature of various stages of education and the developmental stages of the learner. The curricular areas and their state-wise treatment, proposed for this purpose, are as follows:

2.6.1 Language

Child's learning with regard to language at primary stage is significant not only for its own sake but is also of basic importance to affect his learning in other subject areas, and his emotional, social and cognitive development. It has been conclusively demonstrated that the new entrants with poor language background remain all round poor learners unless special help is provided to them in the matter of language learning. Language education has the greatest potential as a means to develop, progressively through various stages, attitudes and values related to all the core components by incorporating appropriate themes and adopting suitable teaching-learning strategies. Hence, learning of language should find a central place in the total educational process.

Education in language should be used as a potential instrument for encouraging independent thinking among the learners right from the beginning. They should be not only allowed but positively encouraged to come up with their own opinions and interpretations of events around them and the events in the past. Learners should be helped to well realise that the nature of verbal language is distinctly different from that of mathematical language and, herein, all statements refer either to feelings or opinions.

Oral aspect of language should be duly emphasised in language education and oral examination should find its due place in the examination system.

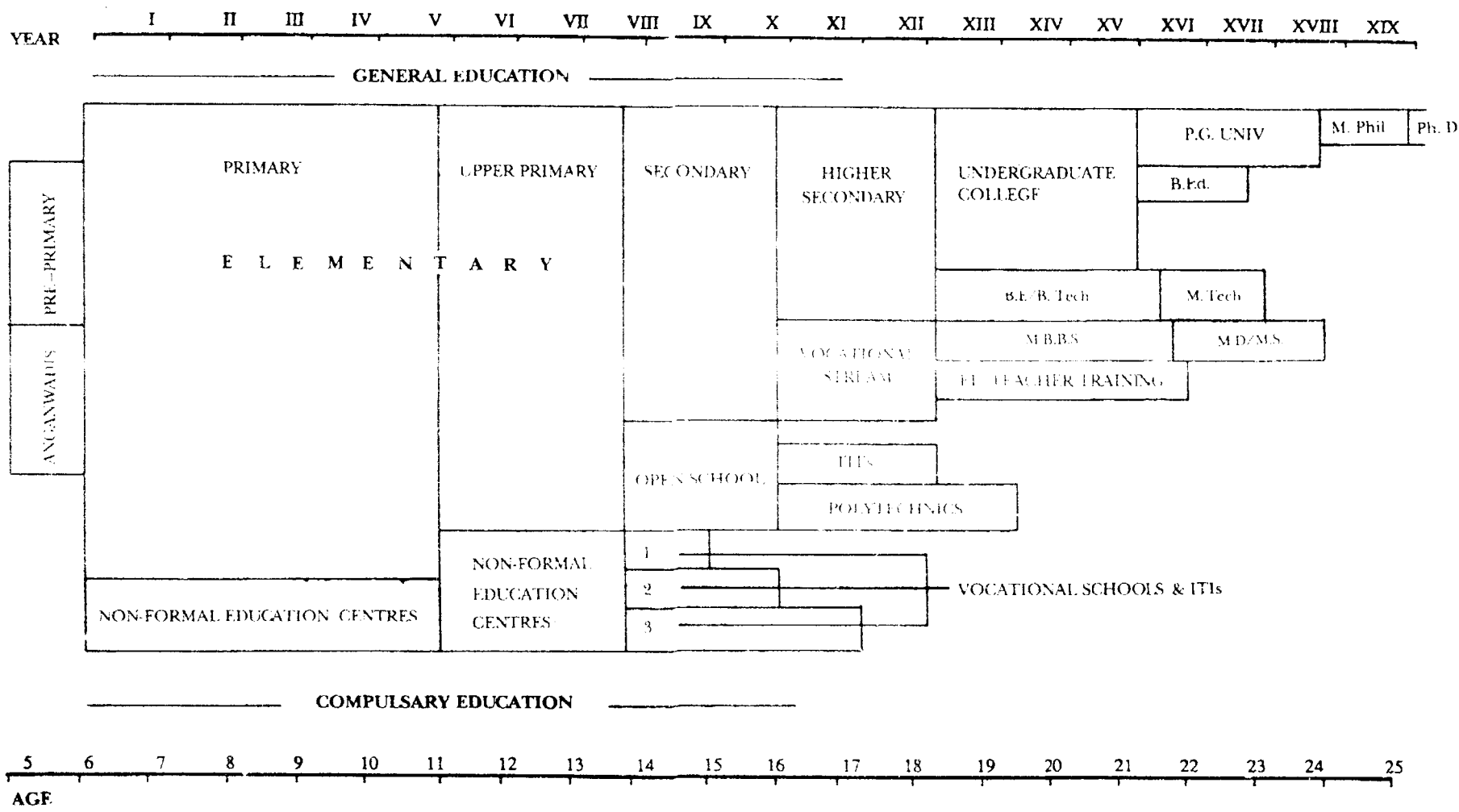
Emphasis should be shifted from the

teaching of textbooks to extensive reading and every year all the learners, from Class IV onwards, should be required to read at least 10 to 15 books in addition to their textbooks.

The three-language formula should be effectively implemented. The first language should be the mother tongue/regional language. The second language may be Hindi or English in case of non-Hindi speaking States and one of the modern Indian languages or English in the Hindi speaking States. The third language, in non-Hindi speaking States, should be Hindi or English whichever has not been studied as a second language. Similarly, in the Hindi speaking States, the third language should be English or modern Indian language whichever has not been taught as a second language.

The study of only one language — the mother tongue/regional language — is envisaged at the primary stage. However, if resources are available for teaching the second language in primary schools, the study of the second language may be introduced in a suitable grade/class at the primary stage. In case of States/UTs where only the first language is studied by pupils at the primary stage, the study of the second language should be introduced in the first year of the upper primary stage. The study of the third language should also be introduced at the upper primary stage. However, flexibility is envisaged in choosing the exact grade/class in which the study of third language might be introduced. Once introduced, all the three languages should be continued up to the end of Class X. A classical language may be taught as a part of a composite course with mother tongue/regional language. There is need to develop suitable methods of teaching modern Indian languages (as second and third languages) on the basis of systematic experiments and findings of research studies.

In the case of children from population



EDUCATIONAL STRUCTURE IN INDIA

groups such as Scheduled Tribes, wherever they have their own spoken languages, they may be taught orally through their mother tongue in Classes I and II. At the same time the children from these population groups should be taught the regional language which will become the sole medium of instruction by the end of the primary stage.

At the *pre-primary stage*, mother tongue will serve as the medium of socialisation of the child and making him/her feel at home in the new atmosphere of the school or 'anganwadi'. It will also help the child in his/her mental, moral, and emotional development. Formal methods of learning language and introduction of reading and writing should be discouraged at this stage. Story telling, recitation of rhymes, singing of songs and playing of games involving use of language may be profitably used at this stage. Free conversation with the teacher and participation in discussion should also be encouraged. Taking the children to outdoor trips and excursions would involve new experience and lead to increase in the vocabulary. Dramatisation, picture reading, puppet play, etc., which give opportunity to use orally, or listen to, language should also be provided for language learning at the pre-primary stage of education.

When the child enters the *primary stage* of education, he/she has, usually, already mastered the basic structures related to listening and speaking in his/her mother tongue. He/she is able to use orally his/her mother tongue for his/her immediate day-to-day communication needs. Children then usually have a vocabulary of about 1500 words of their mother tongue and it increases at a very fast speed at the primary stage. This should be taken advantage of in widening their mental horizon. In the first two years of primary stage (Classes I and II) the child should be helped to acquire the basic skills in reading and writing in his/her mother tongue/regional language.

Special attention should be paid to the improvement of pronunciation according to the standard usage in the mother tongue/regional language while reading loudly or speaking with correct modulation of voice. Similarly, the skill of good handwriting and correct spelling and right habit of silent reading with comprehension should also be acquired by the learner during this period. The programme of language teaching should also lead to the development of child's ability for creative self-expression. The total vocabulary of the child by the end of the primary stage, should be 5000 words in the first language.

At the *upper primary stage*, pupils, competence in language has to be strengthened further to an extent so as to enable them to use language effectively in their future day-to-day life. They should be introduced to various forms of literature in the mother tongue/regional language. They should be able to express their reactions, in speech and in writing, to whatever they read and listen. Special stress should be laid down on the applied side of language. Creative expression and the ability to think on one's own should be encouraged through language teaching with oral form of language finding important place in language curriculum. Teaching of language at the secondary stage will be required to be literature oriented and it is at the upper primary stage when its basis should be proposed. In upper primary classes pupils should also be exposed to applied grammar in order to enable them to develop additional insight into the nature, structure and functions of language. Learners at this stage are also required to be introduced to the second and third languages. However, teaching of the second and third languages is to be planned keeping in view that the exposure of the pupils to these languages is comparatively very much restricted. There is hardly any chance for them to enrich their command of these languages except through

reading. Therefore, the teacher of these languages should be satisfied if the pupil learns to operate satisfactorily within the limits of a controlled vocabulary and graded structure.

Teaching of mother tongue at the *secondary stage* (Classes IX and X) should provide to pupils full mastery over the applied form of language and acquaint them with literary language. During this period the pupils should achieve maturity in oral and written expressions. They should be able to express, orally and in writing, spontaneously their responses to what they listen or read. Special emphasis, at the secondary stage, should be laid on the teaching of literature by providing literary work in prose and poetry of their standard. Study of literature at this stage should bring to them opportunity to appreciate the depth and diversities of human mind. Teaching of grammar should be further strengthened revealing to them the subtle usages of language. However, while teaching English as second language, only functional grammar should be taught. Selection of content, particularly at this stage, must be such as to inculcate desirable attitudes, appreciations and values related to the core components of the curriculum. Teaching of the second and third languages should continue to develop in the pupils better insight into the structure of language without emphasising their literary aspects.

2.6.2 Mathematics

Mathematics should be visualised as a vehicle to train the pupil to think, reason, analyse and articulate logically. Since quantitative treatment, measurement, analysis and reasoning are being increasingly involved in many other subjects, the relevance of mathematics should be seen not only as a specific subject area but also in the context of, **and as concomitant to other concerned subject areas.** However, relevance of mathematics in relation to pupils' environment and day-to-day

living should not be forgotten. While redesigning the teaching of mathematics, it is also necessary to take into consideration the role of modern technological devices in the teaching-learning process, particularly in the context of the emergence of educational computing and learning through the understanding of interplay of variables including cause-effect relationship.

At the *pre-primary* level, it is visualised that many play-way activities have relevance for the development of number concepts among children. When the teacher draws the attention of children to number of fingers, toes, play equipment, individuals at home, chairs, legs of chairs, etc., or when they are involved in use of money, counting of objects, comparing and matching of collections of varying sizes, measurement of length, mass and volume etc., they learn the concepts of numbers, shapes and sizes informally.

At the *primary stage*, learning of mathematics should lay foundation for mathematical thinking about the numerical and spatial aspects of the objects and activities which the children at this stage are required to deal with. The pupils should **master basic vocabulary, symbolism and computational skills related to numbers, geometrical figures, money, time, measures of length, mass, volume, etc. and be able to apply them to day-to-day problems in his immediate environment.** They should also develop simple drawing skills and measuring skills. Learning by doing (with concrete materials) should be the main method of learning at this stage.

At the *upper primary stage* (Classes VI to VIII) the pupils should further acquire knowledge and understanding of facts, concepts, **principles, etc. related to commercial mathematics, mensuration, descriptive statistics, practical geometry and fundamentals of algebra.** They should develop proficiency in using **tables and ready reckoners, etc. in solving**

problems. The problems should be realistic, informative and data-based and should be selected from different sources like trade, commerce, industry, agriculture, population studies, etc. There should be practical work in the mathematics laboratory/work room/open field consisting of geometrical drawing, estimation, and measurement of lengths, areas and volumes, and verification/demonstration of geometrical facts with simple teaching aids including paper folding/cutting. The pupils should be enabled to read and interpret data from statistical graphs. The mathematics up to the upper primary stage should be mainly functional. The study of arithmetic, including commercial mathematics, should be completed to a very large extent by the end of the upper primary stage. Introduction of simple mathematical signs, international terms and symbols may be promoted as a curricular objective.

At the *secondary stage* (Classes IX and X), a beginning should be made for the transition from functional mathematics, studied till the upper primary stage to the study of mathematics as a discipline in appropriate form. The (logical) proofs of propositions, theorems, etc. should be introduced at this stage. The pupils should acquire knowledge and understanding of concepts, symbols and processes related to algebra, geometry, elementary trigonometry and statistics. The treatment of algebra should be simple but the basic algebraic skills, such as addition, subtraction, multiplication, division, factorisation, etc. of algebraic expressions should be mastered by the pupils. The pupils should also develop the ability to solve problems through algebraic methods. Geometry, including the experimental geometry, studied upto the upper primary stage, should be taught in the form of formal geometry with theorems and proofs. Proving results in the geometrical problems (riders) should be emphasised. Arithmetic and mensuration should be rein-

forced in the form of application of logarithms and of algebraic equations. The treatment of trigonometry should be elementary and sufficient enough to solve simple problems of "heights and distances". Practical work including simple projects, computation with calculators, use of ready reckoners and tables, working with computers (wherever feasible) could be an integral part of mathematical learning at the secondary stage. The most important part of computing is the concept of algorithm. The pupils should be introduced to the concept of computing, algorithm and flow-charting. However, at this stage, the scope should be limited to reading and interpreting flow-charts and preparation of simple flow-charts. As a part of general education there should not be differential courses in mathematics; there should be only one course in mathematics to be studied by all.

With regard to the common core components in the school curriculum and the related values, the most valuable contribution that mathematics should make directly is towards the inculcation of the scientific temper through the development of analytical thinking and reasoning. It would be necessary that the content and language of problems and questions included in mathematics books are so carefully designed as to highlight or at least not to contradict other core components like equality of sexes, protection of environment, removal of social barriers, observance of small family norms, etc.

2.6.3 Science

Science should be treated as one of the curricular areas that play a decisive role in equipping the learner for understanding, interpreting and dealing with, in a more scientific way, various things and phenomena around him/her. Education in science should aim at developing well defined abilities in cognitive, affective and psychomotor domains

such as spirit of inquiry, creativity, objectivity, the courage to question and aesthetic sensibility. Programmes in science education should be designed so as to enable the learner to acquire problem solving and decision-making skills and to discover the relationship of science with health, agriculture, industry and other aspects of daily life. Scientific knowledge and skills should help an individual to question the existing beliefs, prejudices and practices and act as a liberating force. They should also help him/her to search for truth, harmony and order in different aspects of life.

It is expected that a pupil studying science for ten years will acquire observation and analytical skills for self regulation, ability to use tools, apparatus and equipment appropriate to his/her immediate and future needs; ability to identify factors operating in his/her system and understand their causal relationships; collect, classify interpret data and make reasonable inferences. He/she will also understand the basic scientific concepts, laws and principles and apply them in solving problems.

Thus there are three aspects of the study of physical and natural environment under science education. The pupil has to learn *about* the flora and fauna, natural resources, sources of energy, etc. Secondly, the learning here should take place to a great extent, through the learner's physical and natural environment implying thereby systematic observation and exploration of the environment by applying scientific procedures of study. Thirdly, learning should be *for* the physical and natural environment, meaning thereby that it should be aimed at the development of a genuine concern, sensitivity and ability necessary for the preservation and protection of physical and natural resources.

Though *pre-primary* education does not aim at imparting formal instructions in any of the school curricular areas, a number of

activities like gardening, water play with different materials, cooking, maintaining pets going on nature walks, maintaining a science corner, etc., provided at that stage, help in developing science concepts related to plant and animal life, solids, liquids and gases, temperature, light and sound, work and energy, chemical changes, etc. through exploration, experimentation, assimilation and application.

At the *primary stage*, during the first two years (Classes I and II), study of science will form an integral part of environmental studies. In Classes III to V it will be one of the two parts of environmental studies — one devoted to science and the other to social studies. In Classes I and II, a child learns mainly through concrete situations related to his immediate environment. The major thrust of science education under environmental studies in Classes I and II, therefore, should not be to impart information to the children, but to sharpen their senses, to encourage them to observe and explore their environment, and to enrich their experiences related to different aspects of their immediate environment. This should involve informal and unstructured reactions to their environment which, during Classes III to V, should gradually be made more structured by systematically exposing the children to a variety of objects, events and phenomena in the environment. Thus, towards the later years of primary education, the child should be helped to discover and understand the scientific facts, concepts, principles and processes underlying various phenomena around them. In this process the child should be encouraged to systematically observe and explore things and occurrences in his/her environment, formulate precise questions related to them, record and classify the observations systematically, collect information based on concrete experiences and analyse it, and draw conclusions including those related to cause and effect relationship discovered

through simple experiments, activities and demonstrations. He/she should also be able to identify the resources in the locality and use them properly. To make his/her observations precise, he/she must develop skills of measuring length, areas, volume, time, temperature, etc. Science education at this stage should promote in children attitudes and values like objectivity, open mindedness, perserverence, precision, and concern for maintenance and improvement of environment.

At the *upper primary stage* (Classes VI to VIII), the learner is expected to consolidate and strengthen the abilities acquired at the primary stage. In addition, the objective should be to develop an understanding of nature of scientific knowledge, and certain physical, chemical and biological principles and their relationship to the operation of scientific principles in nature as well as in daily life. The learner should be helped in developing the capability of using the process of science in solving problems, making decisions and furthering his own understanding of the universe. The pupil should be made to develop skills of manipulating simple science equipment and designing of simple experiments to seek explanations of natural phenomena. Science education at this stage should help the learner to develop an understanding and appreciation of the joint enterprise of science and technology and the inter-relationship of these with other aspects of society.

The *secondary stage* (Classes IX and X) being the terminal stage of general education after which a large number of students would not go for higher education in science, there could be little justification in teaching something which is required only for higher studies in science. The aim of teaching of science for the secondary level would be primarily directed towards problem-solving and decision-making through the learning of

key concepts which cut across all the disciplines of science. After learning them in simple form at the upper primary stage, the learner, at the secondary stage, should be enabled to grasp further the basic nature, structure, principles, process and methodology of science with special reference to the relation of science with agriculture, industry and contemporary technology. The teaching of science should further develop insight into health and environment. More stress should be given on precision and accuracy while handling the equipment, such as simple science apparatus and tools for Work Experience, and dealing with the quantitative measurement, collection, presentation and analysis of data and drawing inferences from them.

The content of science should be organised on the basis of two guidelines, namely, contemporary science and learning ability of the learner. It should reflect that science is a continuing human endeavour and that it is international in character and method. The topics should be presented sequentially and hierarchically on the basis of complexity, from concrete to abstract.

Science, by its very nature, should provide sufficient scope for directly contributing to important core components and related values like equality of sexes, protection of environment, observance of small family norm, and inculcation of scientific temper.

2.6.4 Social Sciences

The study of social sciences as component of general education is of critical importance in facilitating the learner's growth into a well informed and responsible citizen. It should aim at developing in him/her an understanding of his/her physical and social environment, both immediate and remote, in terms of time and space, and an appreciation of the cultural heritage of India and various cultures of the world. The study of the present

physical and social environment should help him/her in developing an understanding of the interaction of man with his physical and social environment and with the institutions — social, economic and political — through which human beings inter-relate with one another and function in the society. The study of social sciences should also aim at enabling him to see the present in the perspective of past developments.

Similar to the study of physical and natural environment in science education, the study of social environment in social sciences should have three aspects, namely, learning *about* the social environment, learning *through* the social environment and learning *for* the social environment. This would mean that a pupil will learn, for example, about the social customs, cultural heritage, history of society, etc. through observation, exploration and scientific study of social phenomena and events, and will thereby develop genuine interest in, and an urge for, preservation of what is good in our culture and improvement of existing socio-economic cultural set-up.

Social sciences is perhaps the singular curricular area which can prove to be the most effective tool for providing education in the context of all the core components indicated in the NPE-86. Special care should, hence, be taken in designing the curriculum in social sciences so as not to overlook any of the core components.

Although *pre-primary education* naturally does not deal with the study of social sciences, social development of the child is a major objective to be achieved at this stage of education. To attain this objective, a variety of activities and programmes are directed at providing ample opportunities for a child to interact with other children and with his physical and natural environment. Education at this stage aims at, along with other things, developing in the child desirable social attitudes

and manners which would encourage him for healthy social participation and sensitize him to rights and privileges of others. The child is encouraged for independence, dependability and self-expression.

In Grades I and II, the child should be introduced to the environment as a whole without making any clear-cut distinction between natural and social elements that go into its making. It should be called environmental studies. In Grades III-V, while the environmental focus should continue, the physical and social aspects of the environment should be introduced into social studies as a broad and composite area of study, parallel to general science. The social studies at this stage should widen the child's mental horizon from his/her home, school and neighbourhood to the state, country and the world. Stories and narratives about major aspects of our cultural heritage and great personalities, events and developments that have acted as major influences in shaping the life of man in India and elsewhere may also be a part of the curriculum.

At the *upper primary stage*, the study of social sciences should comprise the study of history, geography, civics and contemporary issues and problems. The learner at this stage should be initiated into the study of India's past in all its major aspects such as social, cultural and scientific development. He/she should also be helped to appreciate diversities in ways of living and interdependence of various regions of India and the world. He/she should know the civic and political institutions and understand contemporary social and economic conditions and problems. Social skills and civic competencies, and a national perspective would thus equip him/her to participate in the task of social and economic reconstruction.

At the *secondary stage*, the study of social sciences should comprise elements of history, geography, civics and economics to promote

an understanding of contemporary India. He/she should be introduced to the stages of development of human civilization and to the historical forces and factors that have shaped the modern and the contemporary world. His/her understanding of contemporary historical perspective of India's heritage and the struggle for freedom should be enhanced. The other social science subjects should help him/her in understanding Indian society, polity and economy and the social, economic and political challenges facing the country. The study of social sciences at this stage should also develop his/her understanding of contemporary world problems and of India's role in relation to problems like world peace and international cooperation, decolonization and safeguarding of human rights.

The teaching of history should be objective and free from any communal, parochial and other prejudices. The perspective of the past should help in understanding the contemporary developments. Independent work by the learners through challenging assignments and project work should be encouraged. They should be introduced to the method of geography through practical work. Group activities such as organizing youth parliament, seminars and discussions should be increasingly used to encourage the learners' participation. The study of newspapers and the use of newspaper clippings in teaching-learning are of particular importance in promoting an understanding of contemporary events and problems. The study of economic activities, institutions and problems should be used to promote economic literacy among the learners.

2.6.5 Work Experience

Work experience, viewed as purposive and meaningful manual work, organised as an integral part of the learning process and resulting in either goods or services useful to the community, should be an essential

component at all stages of education, and be provided through well-structured and graded programmes. It should comprise activities in accordance with the interests, abilities and needs of learners, the level of skills, and knowledge to be upgraded with the stages of education.

Work experience should inculcate in the learners a respect for manual work, values of self-reliance, co-operativeness, perseverance, helpfulness, inquisitiveness, work ethics, attitudes and values related to productive work, and concern for the community. This experience would also be helpful on their entry into the work force. It should enable the learner to understand the concepts, facts, terms and scientific principles involved in various forms of work situations, know the sources of raw materials, understand the use of tools and equipment in production and service processes, acquire skills required in a technologically advancing society, and conceptualize his role in the productive situations. The programme should also help him/her in acquiring skills required for identifying, selecting, procuring, arranging and developing innovative methods and materials; observing, manipulating and participating in work practices thereby enhancing his productive efficiency. Pre-vocational programmes provided at the secondary stage should also facilitate the choice of the vocational courses at the higher secondary stage.

At the *primary stage*, many activities and programmes, though not exactly fitting into the definition of work experience, should help in preparing a strong foundation for work experience to be formally undertaken at the primary stage. They develop in the child neuro-muscular control and coordination, basic motor skills, desirable social behaviours and attitudes and positive self-concept in addition to habits of community living. Some of

the activities that are aimed at working of finer muscles are tearing and pasting, cutting, threading, painting and printing, clay modelling and buttoning clothes. Various group activities provided in pre-school education encourage community living which is necessary for work experience.

At the *primary stage*, work experience programme should emphasize development of desirable healthy living and practices of sanitation and beautification, awareness of the world of work and work ethics. Activities in relation to various need areas with regard to environment, experimentation with materials, tools and techniques, and work practice should be included in the programme. Each activity should lead to production of goods or services. Thus activities may have three dimensions, namely, (i) observation of work situations and identification of problems, (ii) participation in work situations, and (iii) preparing articles in large numbers. The work experience activities at this stage should be simple and enjoyable.

At the *upper primary stage*, learners are sufficiently mature to carry out strenuous work with higher skills requiring closer neuromuscular coordination. They should be encouraged to participate more intensively in production processes by understanding well-designed projects. By and large, the activities should lead to the enhancement in nutrition, health, sanitation, productivity and economic status of the community. The observation, manipulation and work practice should be the methodology to achieve the stipulated goals. At this stage, the learning and mastery of skills become more important than at the primary stage. This is the age when work experience should emphasize agricultural and technological processes to help the integration of science, mathematics and technology with the life of the community. Work experience should prove to be helpful to the learner on his/her

entry into the work force.

At the *secondary stage*, the nature of essential activities will remain more or less the same as during the upper primary stage, with the difference that they will be more complex. Work practice should assume a much greater dimension, and a clear pre-vocational orientation should be given to the programme, so as to facilitate the choice of the vocational courses at the higher secondary stage for those who opt for them after passing the secondary stage. Pupils in general should acquire the knowledge and skills required for entry into the world of work.

It would be most imperative to utilise community resources for the effective implementation of this programme. It will be particularly necessary for providing pre-vocational orientation that the experts from the community are duly involved in the programme. Although it is expected that all teachers should work as work experience teachers, a large number of activities may require specialised personnel. The involvement of all teachers in this programme would logically imply their proper orientation and training in this area.

2.6.6 Art Education

Art education should be treated as an important area of curricular activity for all round development of the child. The aim of art education should be to sensitize the learners so that they may learn to respond to the beauty in line, colour, form, movement and sound. The study of art and cultural heritage may enable them to appreciate and understand one another. The curriculum should aim at developing awareness of, and interest in, a wide variety of fine arts, both at the classical and folk level so that the learner is both the beneficiary and the performer. Art provides a most satisfying medium of creative expression. However, art education and creative expression

have not got adequate attention in school curriculum so far.

At the *pre-primary stage* a variety of activities and games like colour games, drawing and painting, construction play, thematic stories and songs, clay modelling, beautification of surroundings and classroom, music and movements are directed at sensory stimulation and aesthetic appreciation. They should be effectively organised at the pre-primary stage so as to provide joy to children and develop in them a readiness for art education at the primary level.

At the *primary stage*, the main objective of art education is to make the child aware of the good and beautiful in his environment and to express his feelings through simple performing arts like music, dance and drama, etc. spontaneously. At this stage, the main objective of art education should be to enable the child to discover and identify his/her own sensibilities and preferences through exposure to a variety of media and materials and to optimise his own capacity in one or more arts. The aim at this stage should be to provide to the child an integrated learning experience of various forms of art — drawing, painting, printing, collage, modelling, music, dance and drama. Emphasis should also be on sharpening the sensibilities of seeing, hearing, touching and moving.

At the *upper primary stage*, art education programme should comprise (i) handling of the materials for drawing, painting, printing, collage, clay modelling and construction of puppets; (ii) creating artistic things by free expression method and specific topics method; (iii) handling of simple musical instruments and sound producing bodies; (iv) movement, mime and simple dance forms; (v) community singing; (vi) simple concepts of visual and performing arts; (vii) stories of great personalities in the field of arts; and (viii) stories connected with other countries

Emphasis should be laid on the use of learner's own imagination and development of his/her own concepts and expression through exploration. He/she should be enabled to develop a sense of organisation and design, i.e., aesthetic arrangements permeating all life, and to feel a deep and lasting joy of art.

At the *secondary stage*, art education should comprise (i) study of visual and aural resources and their exploration; (ii) projects leading to creative expression and exhibition of the works in visual and aural forms; (iii) intergroup, interschool art activities; (iv) study trips and interaction with artists in the community; (v) exploration of traditional art forms available in the community and neighbourhood. This should also be treated as a transitional period between the creative expression of childhood and vocation biased education of later period. Normally learners at this stage also need to develop aesthetic sensibilities and social values through projects on conservation of natural and cultural heritage by providing opportunities for study of Indian culture, working with artists/artistes in the community, organising festivals and celebrations of the community at large, display of physical environment and surrounding landscape, etc.

Art education programme should concentrate on exposing the learner to folk arts, local specific art and other cultural components, leading to an awareness and appreciation of our national heritage. Activities and programmes and themes should also be chosen and designed so as to promote values related to other core components like India's common cultural heritage, history of freedom movement and protection of environment. Learning by doing and a wide exposure to art forms is a must for self-expression and widening of the learner's own experience. Art education should not be fragmented. It should adopt an integrative approach at all stages up to Class X.

2.6.7 Health and Physical Education

Health and physical education and sports should be an integral part of the learning process and be included in the evaluation of performance. Health and physical education should be concerned with the total Health of the learner and the community implying thereby the important place of mental and emotional health, in addition to the physical health. Thus it should enable the pupil to know that harmonious development of body and mind is essential for good health. He/she should be helped to develop desirable understanding, attitudes and practices with regard to nutrition, health and sanitation so that the health status of the family and community is improved. Thus, he should be enabled to develop awareness also as a conscious citizen about the health and sanitation at the community level and his role in that context. The physical education should aim at developing health, strength and fitness of the body. Acquisition of adequate neuro-muscular coordination should be an important component of the scheme of health and physical education. Some programmes related to physical education, such as scouting, guiding, N.C.C. etc. can be of help in cultivation of such basic qualities as endurance, courage, decision-making, resourcefulness, respect for others, truthfulness, faithfulness, loyalty to duty, and concern for common good.

The content of health and physical education during the first ten years should include those areas which are needed for general promotion of healthful living as well as those related to the major health problems of the country. Amongst sports and games activities, due stress should be laid on indigenous traditional games. As a system which promotes an integral development of body and mind, yoga should receive special attention.

Medical inspection and check-up should

be compulsory at all the stages with adequate follow-up in cases in which medical/physical defects are noticed.

At the *pre-primary stage*, development in the child of adequate personal hygiene habits, neuro-muscular coordination, emotional health and healthy community living is an important concern of education. Apart from various activities related to larger and finer muscles, adequate attention is expected to be paid to activities like regular visits to toilet, washing hands before and after meals, brushing/cleaning teeth regularly, taking regular baths, combing hair, keeping self and surroundings clean and the like. Training of senses that should take place at pre-primary stage should be an important component of this area.

In view of the characteristic physical growth, neuro-muscular coordination and social development that take place at the *upper primary stage*, it is desirable to provide for vigorous developmental exercises, rhythmic, gymnastics, calisthenics, athletics, aquatics, judo, yoga, drill and marching, scouting, camping and various team games and competitions at that stage. In health education, provisions should be made for creation among learners of awareness related to common health problems, safety measures, nutritional problems, adulteration, first-aid, sanitation and pollution.

With regard to physical, mental and emotional health of learners, the *secondary stage* of education is particularly crucial. Rapid acceleration of growth and changes in appearance and functions of the body associated with the onset of puberty indicate the need of provision of appropriate guidance and counselling that would facilitate the adjustment and growth of children. Interests during this period narrow down to fewer games. The pupil is likely to be more adventurous comparatively. Physical education should include more vigorous activities of

various sorts including athletics, major games including indigenous games, gymnastics, yogic exercises, combatives, judo and swimming. The NCC and social service should be encouraged in addition to the compulsory programmes of physical education. In Classes IX and X, health education should enable the pupils to learn, in comparatively more detail, about personal health, environmental health, food and nutrition, control of diseases, consumer education, first aid, home nursing, and safety measures.

2.7 INSTRUCTIONAL STRATEGY

The question of adopting appropriate strategies for providing learning experiences and organising teacher-pupil activities is crucial for effective use of curricular content and achievement of curricular objectives. While dealing with curriculum organisation, the curriculum designer should treat teaching-learning strategies as an essential component of curricular cycle, and, while transacting the curriculum, the curriculum practitioner should be consistently conscious about careful selection of appropriate strategies. It would be imperative that, in spite of the mastery over the content on the part of the teacher, he/she should be appropriately oriented with regard to the importance and various types of instructional strategies and the principles that should govern their selection and administration.

A teacher, in relation to pupils, has to act essentially as a friend, philosopher and guide. His/her role should generally be to suggest and present rather than to command. He/she must show the pupil how to learn the subject and how to devise his/her own methods of learning and organising the knowledge which he/she gathers or discovers. The child-centred and activity-based approach should be the main strategy for curriculum transaction. This implies many things which a teacher should be

consistently aware of. The curricular content, books, instructional materials, classroom and teachers should serve as means to the pupil's development and not as ends in themselves dominating over him/her. There should essentially be a warm, welcoming and encouraging approach that takes fully into consideration the needs and motives and the interests of the pupil. The involvement of the pupil in the learning process should go beyond the process of listening passively to that of thinking, reasoning, feeling and doing. In a nutshell, whole of the pupil's personality should be involved in the process of learning. Doing and discovering has been the natural and normal course through which the mankind has been able to gather, gradually, to this day, the vast fund of knowledge about, and control over, various facts and events. By following the same process as a teaching-learning strategy it would be possible to make learning more absorbing, meaningful, satisfying and stable.

While evolving an appropriate approach and method, a teacher has to take into consideration certain basic tenets that guide the direction in which he/she should proceed, viz., from simple to complex, easy to difficult, known to unknown, concrete to abstract, particular to general, and whole to parts.

Motivation is basic to learning, and teacher should judiciously adopt appropriate strategies accordingly. Application of positive reinforcements like, praise, recognition and other rewards promote better learning than the negative incentives like punishment, rebuke and embarrassment. The positive approach to motivation has an important implication for evaluation system as an integral part of teaching-learning process : that success is in itself a strong source of motivation for further success, and, hence, repeated failure is most damaging to the learning process.

Teaching-learning strategies may assume a variety of modes and may involve a variety of

activities on the part of learners and teachers, viz., observation, collection of materials and information, demonstration and experimentation, project assignments, play-way activities/educational games, educational excursions, role playing and dramatisation, group discussions and group activities, explaining/describing, conversations and discussions, inductive - deductive teaching, problem solving/discovery learning, creative writing, supplementary reading, story-telling, etc.

A number of factors on which the selection/choice of a particular strategy depends should be taken into consideration while adopting appropriate approach to teaching-learning : learner's capabilities, availability of resources, entry behaviour, type of organisational climate available, quality of teacher preparation, objectives to be achieved and nature of curricular content.

Use of physical, economic and socio-cultural environment, found around the school, for making learning more concrete and meaningful, should be regarded as one of the important approaches to teaching-learning. The teacher should identify the elements in the environment having a natural correlation with the curricular content. For example, the kind of vegetation and soils and natural resources found in the environment around the school could help in making many lessons in general sciences more lively and relevant. The religious and cultural celebrations observed by the community may be of help in adding meaning and reality to many content points in social studies and languages. Similarly, visits to various local industries and artisans, social institutions, government and administrative bodies, farming houses, poultries, etc. could be of great help in providing concrete learning experiences to children in the context of content of various subject areas.

Receiving regular feedback for the

improvement of both teaching and learning should form an in-built component of teaching-learning strategy. A system of continuous evaluation plays an important role in providing regular feedback indicating strengths and weaknesses of the process. A vigilant teacher should always be on a look-out for behaviour indicators through various interactions with pupils inside and outside the classroom that would provide feedback to him/her.

Paying individual attention to each learner, and allowing him/her to proceed at a pace suiting to his/her abilities and aptitudes, is one of the fundamentals of pedagogical approach. Pupils with special talents or aptitudes should be provided with opportunities to proceed at a faster pace and good quality education should be provided to them. Similarly, there should be provision for remedial instruction for those who are slow learners.

Need for adopting appropriate strategies directed at the development of non-scholastic dimensions of child's personality has generally not been fully appreciated and efforts on that count are seriously lacking. The so-called co-curricular activities should rather be treated as an integral part of school curriculum and should receive as careful attention of the curriculum practitioner as the scholastic activities. A long list of such activities could be prepared under various categories, viz., school assembly programmes, cultural and recreational activities, school beautification activities, activities in community living, creative activities, auxiliary activities, celebrations of special days/weeks, and celebration of days of national importance. Even bookish content in various areas provides enough scope for carefully gearing it, through scholastic activities, to the non-cognitive development of the learner.

For the effective realisation of curricular objectives through instruction, it should be

imperative that the teacher, while handling a particular curricular point, keeps consistently aware of the objectives to be achieved through that particular point, and the teaching-learning strategies relevant to that context. Detailed content-analysis in terms of related educational objectives and strategies, if made available in advance to the teacher, could be of great help to him in this context.

Rapid developments in the field of educational technology have created a wide scope for rendering teaching-learning strategies further effective with the help of various sophisticated teaching-aids and distance media. However, the poor conditions of, and poor resources available to, majority of the schools, particularly in rural areas, are the most discouraging features in this context.

In the context of the broader aim of 'all-round development' of pupil's personality, the nature of teacher-pupil interaction, inside and outside the school, assumes great significance as a dimension of teaching-learning strategy. Learning of many desirable ideas, attitudes, values and skills will be facilitated if the teacher-pupil interaction is marked, on the part of teacher, by impartiality, affection, kindness, sympathy, politeness, concern for the pupils' welfare, emotional control, emotional stability, integrity, broadmindedness, democratic approach, etc.

2.8 MEDIUM OF INSTRUCTION

The medium of instruction is a crucial question which has an important bearing on the quality of curriculum transaction. It is widely recognised that mother tongue is the child's most natural medium of communication. The medium of instruction should, therefore, be the mother tongue. In the case of learners whose mother tongue is also the language of the region, the medium of instruction at the elementary and secondary stages should be the regional language. In the case of those whose

mother tongue is different from the regional language, the mother tongue may be used as medium during the first two years of primary education, and the regional language should be used subsequently.

2.9 INSTRUCTIONAL TIME

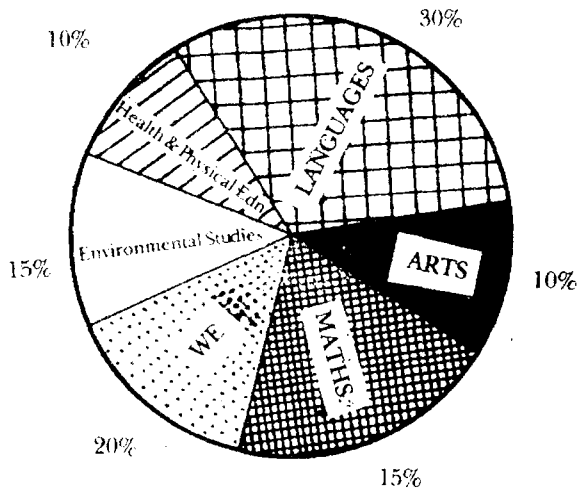
The effectiveness and the quality of curriculum transaction is also dependent upon the availability of adequate instructional time. All possible efforts should be made to ensure that the stipulated number of working days are available to schools. Loss of instructional time due to unspecified reasons should be minimized through better educational management. After taking into account the number of days required for holding terminal examinations, school functions, etc. at least 200 days in a year should be available for effective instruction.

An early childhood education centre should function for three hours a day. A primary school should function for five hours a day out of which four hours should be available for instructional work. For the upper primary and secondary schools, the duration of a school day should be six hours, out of which five hours should be kept for instructional work, and the rest utilised for morning assembly, recess, etc. The duration of a class period should be around 40 minutes.

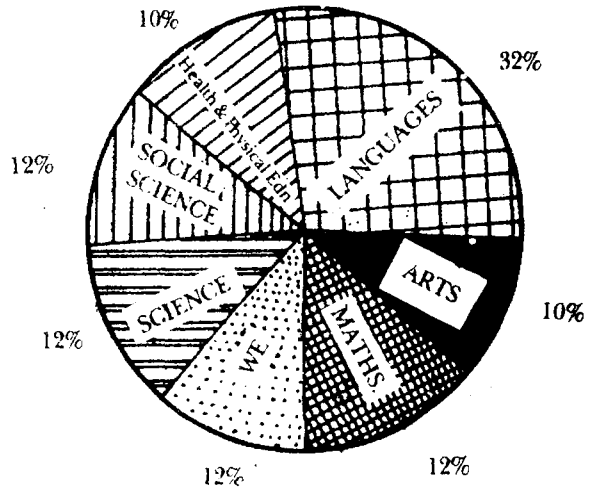
2.10 TIME ALLOCATION FOR DIFFERENT AREAS

There should not be a rigid allocation of time for different curricular areas in the school time table because projects and group activities which cut across subject boundaries need flexible scheduling. However, a broad indication of the time allotment in terms of the percentage of total time to be allotted to each curricular area is indicated below. The schools may make suitable modifications, wherever necessary.

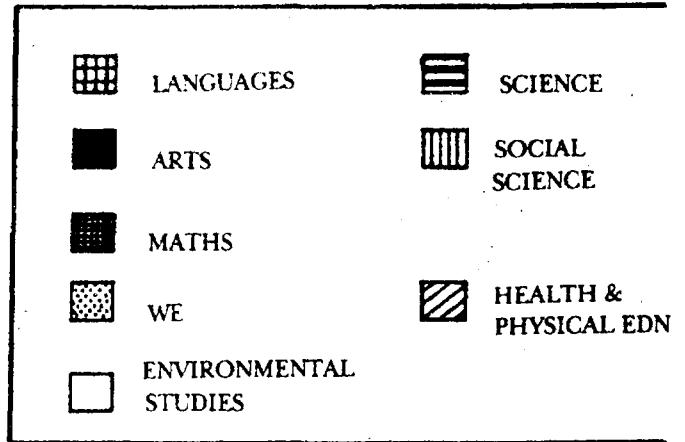
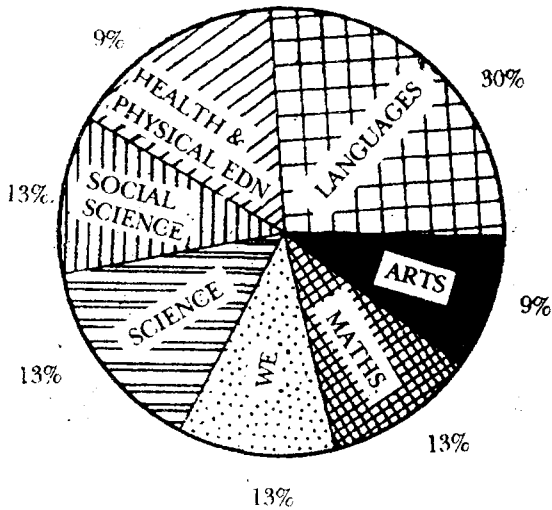
PRIMARY STAGE



UPPER PRIMARY STAGE



SECONDARY STAGE



TIME ALLOCATION FOR DIFFERENT CURRICULAR AREAS

Primary Stage		Work Experience	12
Language(s)	30	Art Education	10
Mathematics	15	Health & Physical Education	<u>10</u>
Environmental Studies	15	Total	<u><u>100</u></u>
Work Experience	20		
Art Education	10		
Health & Physical Education	<u>10</u>	Secondary Stage	
Total	<u><u>100</u></u>	Language(s)	30
		Mathematics	13
		Science	13
		Social Sciences	13
Upper Primary Stage		Work Experience	13
Language(s)	32	Art Education	9
Mathematics	12	Health & Physical Education	<u>9</u>
Science	12	Total	<u><u>100</u></u>
Social Sciences	12		

CHAPTER 3

EVALUATION AND EXAMINATION REFORM

While considerable innovations have been made in several aspects of school education, particularly at the primary stage, such as renewal of curricula, adoption of new methods or techniques or strategies of teaching and learning, etc., attempts at introducing examination reforms have not met with expected success. By and large the public examinations at the terminal stages of school education have dominated the Indian scene, the ill effects of which on the learners have been widely recognised by experts and layman alike.

While recommending the introduction of the 10+2+3 structure of education, the Education Commission (1964-66) also envisaged the need "to define national standards at three levels — end of the primary stage (Class VII); end of the lower secondary stage (Class X); and end of the higher secondary stage (Class XII)." Further it advised that "each State Government should prescribe the standards to be attained at each of these three levels *in view of local conditions and stage of development reached*. At the national level, steps should be taken to keep these national standards rising; and . . . projected standards to be reached over a period of development should also be defined from time to time. "Virtually nothing has happened in this direction. The NPE-1986 has, therefore, made a fervent plea both for "defining minimum levels of learning at all stages of education . . . and establishing an appropriate

machinery for paving the way for the emergence of norms of comparable competence across the nation." As far as the area of evaluation is concerned both these recommendations have far reaching implications.

Although it is well accepted that evaluation of attainment and performance are an integral part of planned education, current practices leave much to be desired. Dominance of the public examination apart, even the year-end evaluation in schools is modelled after the external Board Examination, and hence a great deal of importance is given to the one-shot examination at the cost of continuous and comprehensive internal evaluation. Thus the entire curriculum transaction is not only determined but also adversely affected by its dictates, for teachers gear their teaching to satisfy exam-requirements rather than the needs of learners and their growth and development in various areas of learning.

An external examination is not compatible with the efforts of all institutions which vary both in resources and in clientele they serve. Nor can a paper-pencil test, to be answered within constraints of time, be comprehensive enough to do justice to the objectives of education that go beyond knowledge and understanding. Thus, the external examination not only tends to introduce distortions in curriculum transaction but also tends to limit the scope of evaluation mainly to the scholastic

areas of learning, leaving non-scholastic areas altogether.

Examinations as in vogue have been primarily used more for grading the students than for ascertaining the pupils' progress in terms of the stated objectives, with a view to guiding them or evaluating the effectiveness of teaching-learning process for necessary modifications, if required. Since the marks or divisions (classes) are widely used for selection in institutions of higher learning and also for employment, they acquire undue importance for all—pupils, teachers and parents—thereby leading them away from meaningful and relevant education.

In order to rectify such aberrations, it is essential to give equal importance to both aspects of education—development of minimum levels of learning and evaluating the attainment of the learner in each area of learning at each stage of school education.

3.1 SCOPE OF EVALUATION

As has been discussed at length in Chapter II, the National Curricular Framework contains a common core along with other components that are flexible. The main implication underlying this is that conscious efforts will have to be made to identify and integrate *content* related to common core components in the syllabi of school education. It further implies that every teacher must keep these core components in view and make conscious efforts to enable every child to acquire knowledge, develop concepts/ideas, skills and inculcate interests, attitudes, appreciation and values pertaining to them. Coupled with this thrust is the recommendation of defining the minimum levels of learning at all stages of education. It is quite obvious that the same priority will have to be given to these components while evaluating the attainment of children. In other words, it has to be ensured that the selected Minimum Learning Outcomes

in respect of knowledge, concepts, skills, interests, attitudes, appreciation and values related to the common core components have been developed at the MASTERY level in the learners.

Evaluation as carried out today is quite restricted in scope, purpose and utility. Although the educational objectives are formulated keeping in view the total development of the learner, i.e. scholastic as well as non-scholastic, and the curriculum is so designed as to provide guidelines for organisation and systematisation of experiences which would lead to physical, cognitive, and socio-emotional growth and development of the learner, in practice evaluation rarely goes beyond the scholastic (cognitive) development. In view of the new thrusts envisaged, it is imperative that the scope of evaluation is broadened to pay equal attention to the assessment of psycho-motor skills and socio-emotional traits.

3.1.1 Attainment of Minimum Levels of Learning

Since a conscious decision has been taken to endeavour to first attain the minimum levels of learning rather than to pitch for the optimum levels of learning, it is necessary to ensure that —

continuous and comprehensive evaluation of the growth and development of the learner in each of the areas of learning is systematically conducted through the total span of instructional time;

minimum learning outcomes in respect of cognitive, psycho-motor and affective domains of learning are as clearly and concretely spelled out as possible;

minimum learning outcomes relating to

scholastic (cognitive) areas of learning comprise hierarchical levels of mental processes appropriate to age levels and abilities of the learners;

evaluation covers all learning outcomes in all areas of learning;

concrete, reliable and valid evidence of attainment of MLOs are collected; and

a range of mastery level attainment in each area of learning is empirically defined, as empirical distribution of marks and ranges of marks differ from subject to subject.

3.1.2 Purposes of Evaluation

The ultimate objective of evaluation is to bring about qualitative improvement in education. Therefore evaluation should be construed as a powerful instrument for improving teaching and learning. Instead of using it mainly as a grading device, it should be used more as an effective feedback mechanism for the benefit of the learners, teachers and parents so that timely corrective and remedial measures could be taken to ensure that the minimum levels of learning laid down are attained by one and all learners. Retrieval of such feedback should be of immense use to the concerned agencies for the introduction of concomitant changes in instructional materials and methodology of teaching. Evaluation should also help in improving the organisation of external examinations. Finally, in the long run, as suggested by the Education Commission (1964-66), it should help determine and gradually raise standards of attainment at the State and National levels.

While the purpose of evaluation should be diagnostic, that is, to ascertain strength and weaknesses of the learner, it should be predominantly so at the elementary stage of

school education. Since a majority of the learners quit school at the end of this stage, the school system must ensure that the learner is fully equipped with knowledge, concepts/ideas, attitudes and values expected from a good citizen of the country. It, therefore, necessitates that more emphasis is laid on development and assessment of *basic skills (competencies) and desired attitudes and values* rather than rote memorisation of information from books.

3.2 TOOLS, TECHNIQUES AND MODES OF EVALUATION

There is no gainsaying that tools, techniques and modes of evaluation employed by the school and teachers leave much to be desired. It has been observed earlier that undue reliance has been placed on the paper-pencil tests to measure the progress of the learners, even in the areas of learning where such a tool is found to be totally inadequate, if not altogether irrelevant or unsuitable.

There is indeed a dire need to employ a right technique or use an appropriate tool or a mode to assess the performance of the learner, making a judicious selection from among available tools and techniques such as observation schedules, rating scales, interviews, oral communications, interest inventories, anecdotal records etc. It is also necessary to de-formalise both internal and external examinations. It is time that more and more informal means of evaluation are adopted in order to reduce the anxiety and fear experienced by the learners at all stages of school education. The principles of relevance and flexibility applicable to curriculum development need to be followed in evaluating the attainment of the learners.

The primary stage should be considered as a period of transition from learning through informal playway activities to learning with the help of organised and formal methods of teaching. Similar informal and relaxed me-

thods and modes should be adopted in evaluating the growth and development of the young learners. No rigid and/or formal testing should be introduced at this stage. More use of oral testing should be made to assess the development of basic skills in language, numeracy, and health, nutrition and sanitation. Periodical check-ups of physical, social and emotional growth and development should be made and carefully recorded. Similar efforts should be made to record evidence regarding psycho-motor skills related to non-scholastic areas such as Work Experience, Art Education and Physical Education. In a nutshell, sufficient evidence should be collected with the help of informal and formal observations and other tools and techniques mentioned above in order to *prepare a profile of the growth and development of every learner*. From the middle stage onwards, written tests and examinations may be given more emphasis and importance, without discarding the good practices, modes, tools and techniques that are initiated at the primary stage.

3.3 ASSIGNING VALUES, MAINTENANCE OF RECORDS AND REPORTING

For too long evaluation has been used to pass judgement on the performance of the learner, ignoring the fact that many factors other than academic contribute to the final results. The negative effect of condemning the learner, particularly the youngsters at the tender age, has not been given adequate attention. In strongly recommending "*a warm, welcoming and encouraging approach, in which all concerned share a solicitude for the needs of the child and continuation of the policy of non-detention*", the NPE-1986 has advocated adoption of a more positive and flexible approach to evaluation.

3.3.1 GRADES VERSUS MARKS

As is apparent, marks or grades represent

condensed and highly abstract symbols, summarising and reporting the attainment of the learners. The controversy of marks versus grades has been an unsettled issue and perhaps will remain so far time to come, since it is at once both a cultural and psychometric phenomenon. In the present Indian context, the replacement of marks by grades is considered as an essential component of examination reform, is the marking system and marks have lost their psychometric and cultural perspectives. Undue meaning is attached to small variations or differences in marks of students or groups of students or institutions. For example, a very small (or even a fraction of) difference in marks or percentages—say interpreted for or against the learner. This approach ignores the effect of chance variations, making too precise an interpretation of evaluation of a trait which is not prone to such rigorous measurement. Thus both from the psychometric view point, i.e., measuring a characteristic and assigning a precise value to it and the cultural point of view, i.e., interpreting the value in mathematical or absolute terms, the use of grades seems to offer a better alternative

3.3.2 RECORDS AND REPORTING

Perhaps the weakest aspect of our educational system is the maintenance of record of growth and development of the learner. It is common knowledge that a school record generally contains marks obtained by the learners in different areas of learning, those in the scholastic areas being prominent during a particular year. Neither the school nor the parents feel the need of keeping a track of the child's progressive attainment during the entire span of schooling. Even the prospective employer does not care to know about the antecedents of his employee. That the new concept of attainment of Minimum Levels of Learning demands rigorous implementation of a system of continuous and comprehensive evaluation,

and a concurrent change in recording, maintaining and reporting of the attainment data, need not be over-emphasized. It will be, therefore, necessary to develop suitable proformae for recording the progress of each and every learner in respect of scholastic and non-scholastic areas of learning. It is advisable that each school plan out a detailed scheme of evaluation keeping the Minimum Learning Outcomes and Content in view. It will be desirable that guidelines for developing such schemes and training of teachers are developed at the National and State levels. The NPE-86 has recommended the creation of District Boards of Education to manage education up to the higher secondary level. With the creation of such boards, a multi-level structure of national (CBSE, NCERT, and NTS), state (State Boards of Education, SIEs/SCERTs) and district (DBEs, DIETs) level agencies will be available for planning, co-ordination, monitoring and evaluation.

3.4 EXAMINATION REFORM

The failure of the present external examination and effort to reform the same have been discussed above. Therefore, the need to recast the examination system and to streamline evaluation at the institutional level so as to reduce the predominance of external examinations emerges to be a significant.

Despite laudable intentions and emphatic pronouncements, it would not be practical nor immediately possible to dispense with a system on which institutions of higher learning have depended so far. Till such time an effective and efficient alternative to external examinations is developed, serious efforts to improve and reform the existing system should be urgently made.

Considerable progress has been achieved in improving the question papers. The efforts in this direction must be continued to make them more comprehensive to cover more

content as well as the higher mental abilities of the learner. The design of paper(s) will have to be improved for "*the elimination of excessive element of chance factor and subjectivity, ... and the de-emphasis of memorisation.*" Due weightage should be given to essay type questions, short-answer questions and objective type test items. Introduction of oral testing at all levels may also be explored. Immediate steps need to be taken to find out ways and means of defining empirically the minimum levels of learning or the minimum standards of attainment of the learners at all levels and assessing knowledge, understandings, skills, attitudes and values attained by the learners in respect of common core components. If deliberate and conscious efforts are not made in this direction it is very likely that they could be missed during the curriculum transaction also. This is indeed a challenge to psychometricians in the country. Measures must be taken to tackle the problems relating to both these aspects and that too with expedition.

3.4.1 MANAGEMENT OF EXTERNAL EXAMINATION

The Indian scenario of public examinations indicates that problems pertain more to organisation and/or management of examinations rather than to academic and/or psychometric aspects. Solutions of these problems have to be found out. One of the problems is the sheer number of students to be covered at a time. This creates difficulties in management, leaving room for malpractices and also problems of subjective evaluation by a large number of examiners. Although decentralisation of Boards to the District level will help reduce the pressure due to increase in number of students appearing at the public examinations, yet better management is required to obtain comparability of scoring. Centralised evaluation and detailed instructions to examiners, as the experience of some

Boards indicates, may help to a great extent.

Mass copying has emerged as a formidable problem in recent years. The problem arises because of the value attached to marks and certificates, devaluation of internal assessment and poor quality of teaching and learning in the educational institutions. Open-book examination has been attempted as one of the modes to combat it. Use of books and other resource materials in an evaluation situation is educationally sound and therefore should be encouraged. Now that the computer literacy is spreading fast it should be possible to shift the emphasis of public examinations to the processing of information for better understanding and problem solving. Open-book examinations will have a very healthy impact on teaching-learning practices, it should be tried out seriously on a larger scale. Needless to point out, the success of this innovation will depend upon the simultaneous change in the design and content of question papers suggested above as well as the proper training of the personnel involved in conducting examinations.

External examinations attempt evaluation in all subjects during a short period of time causing great strain to the learners. Low achievement in one or two subjects is used as a total condemnation, failing the learner. This practice is not healthy educationally. The system of credits for successful completion of specific areas need to be introduced. Credits should be considered cumulative for certifica-

tion. Provision for improvement in grades should also be made. Introduction of the semester system from the secondary stage will be immensely helpful in this matter.

3.5 EDUCATIONAL TESTING SERVICE

Specific mention of establishing Service has been made in NPE-86 to conduct tests to determine the suitability of candidates for specific jobs and to pave the way for the emergence of norms of comparable competence across the nation. These norms are expected to be made available to the teachers and administrators for judging the performance of institutions with reference to state norms. In the same manner, in order to determine the learning achievements of pupils at different levels, to make inter-group comparison, to identify disparities in performance by schools in a district and to gather feedback for designing remedial measures, it is necessary to establish an Educational Testing Service (ETS) at the district level. The primary objective of the ETS should be to technically assist the school administration to compare the achievement level of different institutions and to provide academic input to schools for introduction of more innovative internal assessment procedures by the schools on their own initiative. The testing service could also help in the selection of learners for entry to educational institutions at various levels and for grading of learners wherever necessary.

CHAPTER 4

IMPLEMENTATION

A curricular framework indicates the directions in which the desired changes could be brought about in the educational system within a reasonable period of time. The effectiveness of a framework depends on how far it proves to be dynamic in responding to a wide variety of cross-cultural settings where it has to be given a concrete shape in the form of syllabi, teaching-learning materials, evaluation, certification, etc.

The proposal for curriculum renewal as outlined in this framework calls for multi-pronged activities involving different agencies. The major intervention programmes necessary for implementation of the revised curriculum would include:

development, production and introduction of revised instructional packages, including textbooks;

orientation of teachers and other educational personnel to the new instructional packages and strategies of curriculum transaction;

strengthening of the technical support systems and development of professional capability at all levels for development of syllabi and instructional packages, and for the orientation of teachers and other educational personnel.

The major initiatives required for curricu-

lum renewal as visualized in the framework, are elaborated in the following sections:

Profession : Support for Curriculum Development;

Professional Support for the Pre-service and In-service Training of teachers;

Educational Technology Support to Teaching-learning;

Proposed Infrastructure for Teaching of Work Experience, and

Institutional and Organisational Reforms and Instruments of Intervention.

4.1 PROFESSIONAL SUPPORT FOR CURRICULUM DEVELOPMENT

During the last decade, several initiatives have been taken by the State educational authorities to promote curriculum development on a continuing basis by setting up the State Councils of Educational Research and Training (SCERTs) and similar bodies. In some States, the Boards of Secondary Education, which have been playing an important role in designing syllabi for the secondary and, in some cases also for the higher secondary levels, have been strengthened to provide professional support for curriculum development. Similarly, State Textbook Boards have been

established in almost all the States for commissioning of authors, preparation and production of textbooks and their distribution. These developments have resulted in an increasing awareness about the professional inputs required for renewal of curriculum and development of quality instructional packages. However, with the multiplication of the agencies involved in curriculum development for various stages of school education, the problem of coordination between these agencies have emerged as a major concern. In this context, establishment and development of a professional network at the national and state levels seems very essential. A professional network comprising the National Council of Educational Research and Training (NCERT) at the national level and the State Councils of Educational Research and Training (SCERTs) at the State level should co-ordinate the task related to development of curriculum, designing syllabi and preparation of instructional packages, including textbooks, based on the curricular framework. The NCERT at the national level and the SCERTs at the State level should be strengthened to perform this role effectively.

4.1.1 Innovative Approaches in Instructional Material Preparation

No meaningful improvement in curriculum transaction is possible without a major change in the strategy for the preparation, production, distribution and evaluation of not only the instructional materials for the students but also the materials designed for the professional needs of the teachers and other resource persons. At the present, curriculum transaction at the school level is almost dominated by a single textbook in each subject area. Attempts should be made to develop different textbooks which can fulfil the same curricular objectives for a particular age group in a given subject area. The multiplicity of approaches in preparing instructional materials, based on the

same syllabi and curricular guidelines will generate innovative ideas and practices for curriculum transaction in the classroom. This approach will bring into prominence the role of the teacher in curriculum development. This may also encourage innovations on the part of the teacher to develop a variety of learning resources.

The success of a curricular framework should also be seen in terms of local level innovations. These innovations may relate to decision-making, starting from school mapping, establishing of linkages between different kinds of developmental activities, recruitment and training of teachers. Innovations in the curriculum of primary schools in the rural areas have received very little attention, except in some national projects. The case studies of the national projects like Primary Education Curriculum Renewal (PECR) and Comprehensive Access to Primary Education (CAPE), reveal that a primary school teacher, when he/she has an exposure to an innovative programme of curriculum development, is more capable of improvising in the classroom situation than others.

4.1.2 Environment and Community as Resource for Curriculum

It is necessary to highlight the importance of the rural environment and community as resource for curriculum. The vastness and openness of the rural environment with its fields, ponds, rivers, trees and animals, is a major curriculum resource in the rural areas. However, it is very often observed that due to the inflexible nature of the instructional arrangements and also due to rigidity in the use of the materials prescribed, the rural school and the rural teacher fail to take advantage of the richness of the rural environment. Curriculum guides prepared by the local educational authorities should take note of the environmental resources in the rural areas.

while preparing curricular materials and teacher training programmes. Community can also provide physical resources to school by voluntary contributions and by also providing services of persons having special skills for curriculum transaction particularly relating to work experiences, art and culture, on a part-time basis.

4.1.3 Development of New Instructional Packages

Detailed curricular guidelines and model syllabi for primary, upper primary and secondary stages of education should be developed by the NCERT. The coverage in each subject area, its depth and treatment for each grade should be indicated in the curricular guidelines, keeping in view the learning outcomes to be attained by the learners. The scheme of studies should give equal importance to the scholastic as well as non-scholastic areas like work experience, art education, and health and physical education. This should be followed by development, production and introduction of textbooks for Classes I to X, in a phased manner.

The NCERT should also develop exemplar instructional packages on several work experience activities related to agriculture, commerce, home science and technology. In addition to the packages in print form, video programmes on selected work experience activities should also be prepared.

These exemplar instructional packages developed by the NCERT should be made available to all the States/UTs for adoption/adaptation or for using them as models for development of packages on different activities relevant to the needs of each State/UT. It should also provide necessary technical assistance to the States/UTs for development of instructional packages at the State/UT level.

Modular instructional packages for introduction of activities related to the com-

mon core components should be prepared by the NCERT. These instructional packages should be made available to all the States/UTs for adoption/adaptation and for their translation into various national languages so that they could be introduced as an integral part of the school curriculum. In addition to packages in print form, audio-video programmes on themes related to common core components should also be developed.

4.1.4 Strengthening of Research base for Curriculum Development

The existing effort at curriculum development and material preparation is generally delinked from the available infrastructure of educational research. The research base of the curriculum development centres is rather weak and professional linkages between these centres and educational researchers should be established as early and as effectively as possible. The research base of the curriculum development centres such as SCERTs should be strengthened by establishing linkages between them and education faculty of universities and teacher training college, which carry out educational research.

4.2 PROFESSIONAL SUPPORT FOR PRE-SERVICE AND IN-SERVICE TRAINING OF TEACHERS

The task of pre-service and in-service training of teachers has to be handled in more than one sector of education. The teacher training institutions generally rely on the subject matter competencies of the trainees which they possessed prior to their entry in the professional course. These training institutions as such are not equipped adequately to make up the deficiency in the pre-service training so far as the content knowledge of the trainee teachers is concerned. The lack of real integration of the method of teaching with the content of the teaching subject has still remained a

major weakness in the pre-service training. The curriculum research, development and evaluation component, and its linkage with pedagogy and learning theories in the training courses, is yet to be effectively established. It is, therefore, necessary to encourage innovations in designing the teacher education curriculum.

Orientation of teacher educators and administrators should be a part of the in-service education programmes. Relevance of the in-service programmes to the work expected of the teachers by headmasters, community, and even from the examination system, on the one hand, and facilities available to the teachers, on the other, have to be constantly kept in mind. Planners and administrators should do the total job of relating various aspects.

4.2.1 Reorientation of In-service Teachers

The introduction of new generation of instructional packages should be supported by training of teachers to facilitate the implementation of the National Curricular Framework, to better equip the teachers to handle the new generation of instructional packages and to acquaint them with innovative practices related to teaching-learning and evaluation processes at the school stage.

In addition to the general orientation/training programmes, special training programmes for Sciences, Mathematics, Work Experience, Art Education, and Health and Physical Education teachers will have to be organised. NCERT should train the key-personnel and resource teachers of the States/UTs who would, in turn, organise these special training programmes at the state level.

4.2.2 Establishing/Strengthening/Upgrading of Teacher Training Institutions

As part of the efforts to strengthen the technical support system for training of

teachers, District Institutes of Education and Training (DIETs) is proposed to be set up in a phased manner. The functions of the DIETs would include imparting of pre-service and in-service training of elementary school teachers and instructors of non-formal and adult education centres, providing planning and management support to schools and school complexes, providing academic and other resource support to elementary schools for qualitative improvement and undertaking evaluation and monitoring of educational programmes.

The colleges of education should also be strengthened in order to improve the quality of pre-service teacher training programme for secondary level teachers. A few secondary teacher training colleges should be developed as Institutions of Advanced Studies in Education. These institutions should have net-working arrangements with the University Department of Education, SCERTs, DIETs and Regional Colleges of Education (RCEs) of the NCERT.

In order to enhance professional capability for training of in-service teachers, the State Councils of Educational Research and Training (SCERTs) in States/UTs may be reorganised and strengthened to enable them to serve as catalytic resource agency primarily for restructuring and reorganisation of teacher education programmes at the elementary stage and for providing academic and resource support for improving the quality of education at the elementary stage.

4.2.3 Resource Centres at the School Complex Level

With the creation of resource support structure at the district level, it will be necessary to set up Resource Centres at the sub-district/school complex level also. It is necessary to establish linkages between the district education authority on the one hand and resource centres on the other by evolving a suitable collaborative arrangement for the

achievement of the desired goals. Such an arrangement may be established by identifying a group of resource persons to be associated with the improvement of quality of education in the district/school complex. This forum may be linked with the local level educational authority. The Education Officer at the sub-district level could act as nodal officer for organising all activities through the local resource centres and also for providing financial assistance to these centres.

Resource centres placed at the central points of school complexes should provide both material and manpower resources for school improvement programmes. The centres can also be used for providing support to distance education systems. In addition to a good library and audio-video equipment, all materials developed for in-service education should be made available at the resource centres. Physical facilities for short stay of teachers at the resource centres also deserve consideration. Availability and continuous strengthening of these facilities would be a big step towards in-service education of teachers. In the absence of this support, the impact of the current (mainly face to face) in-service programmes can only be limited.

One of the policies should be to recognise all educational institutions known for providing better quality of education as potential resource centres, irrespective of their management characteristics. The strategy should be to draw upon the physical and human resource of these institutions for the in-service training of teachers and other personnel from neighbouring institutions. At present, there are a large number of smaller towns and semi-urban areas where only a few schools exist, which could be cited as resource schools in those areas. Therefore, the establishment of a substantial number of schools for providing quality education to the under-privileged population and also to act as lead institutions in the

area should form a part of the strategy for school improvement.

4.2.4 Networking of Technical Support Structure for Teacher Training

As indicated in Diagram IV-a, at present several agencies such as National Institute of Educational Planning and Administration (NIEPA), Central Institute of English and Foreign Languages (CIEFL), Central Institute of Indian Languages (CIIL), Kendriya Hindi Sansthan (KHS), National Institutes for the Handicapped (NIH), at the national level, Regional Institutes of English (RIEs) and Technical Teacher's Training Institutes (TTTIs) at regional level, State Councils of Educational Research and Training (SCERTs), State Institutes of Education (SIEs) and Boards of Secondary Education, Departments of Education of the Universities, Colleges of Education at the State level, District Institutes of Education and Training (DIETs) and Centres of Continuing Education (CCEs) at the district level, are engaged in planning and extending in-service programmes. All India Radio and Doordarshan also extend some support to these programmes.

Different institutions and modalities for teacher education can coexist, but will be necessary for some institutions to take up the responsibility of planning and coordination. A national agency, supported by State level counter parts, may continuously identify the needs of in-service education, and recommend suitable modalities in designing teacher education programme.

The SCERT/SIE or any other institution may be the nodal institution in a State. It may be assisted by the district level agencies. It should involve teacher training institutions (University departments), general colleges, high school teachers and supervisory staff of the departments of education.

Strategies planned by agencies at the

national, state or even district levels should meet the requirements of reorientation of teachers that arise out of changes in curricula. Such strategies cannot meet all the needs arising out of a school situation, or a small group of individual teachers. These needs, however, cannot be underestimated. There should, therefore, be provision for less formalised, school-based inservice education of teachers as well.

Agencies mentioned in the Diagram IV-a, besides being associated with teacher training in the areas of their concern, would develop as national and regional curriculum development centres. In order that curriculum development work carried out at different institutions could be coordinated and utilised for mutual advantage at different levels, it would be imperative to establish some coordinating mechanism for dissemination of curriculum and teacher development strategies developed by the different centres.

This exercise will ultimately produce a network of institutions to provide professional support not only to curriculum development but also to teacher development. It needs hardly any emphasis that in a vast country like India there is an urgent need to have optimum benefits of the work being done by different agencies operating in different parts of the country. This strategy will accelerate improvement in different aspects of education.

4.2.5 Monitoring and Evaluation of Teacher Training Programmes

Finally, monitoring and evaluation of inservice education, like any other programme, should be a part of the total programme. Continued feedback on activities planned and undertaken, materials produced and extended, functioning of the agencies involved, and number of teachers oriented, should be utilised to correct, replan or redesign the modalities. Performance of the teachers also needs to

be evaluated frequently.

4.3 EDUCATIONAL TECHNOLOGY SUPPORT TO TEACHING-LEARNING

Developments in Educational Technology (ET) are increasingly influencing the teaching learning process. In simplistic terms, educational technology involves application of systems, media, methods, materials, human and non-human resources towards the improvement of teaching and learning and reaching wider cross-section of people. It has to answer basic educational questions related to needs, audience, objectives, means and resources, past experience(s), media and materials, administrative and organisational framework, feedback/evaluation. ET could be applied to a microscopic situation of a classroom, a course of planning of mass media at state, regional or national level.

In case of media support in education, the elements to be planned and provided for simultaneously are: hardware, training, software, distribution/transmission, utilization, support material, feedback and maintenance.

The application of media in education in the country has been devoid of comprehensive planning as an integral part of the system. Consequently, its success stories are few. But in case of Satellite Instructional Television Experiment (SIET) 1975-76, Radio Pilot Project in Rajasthan from 1978 onwards and INSAT for Educational Television from 1982 onwards, we do have examples of modern methods of media, planning and application. Media and its application in education in an Indian situation have to recognize the availability of software and access to hardware. The above projects are directed towards the rural children and teachers in primary schools. The radio and TV sets are provided in schools but the media and programmes need to be accessible also to the non-school going children to promote universalization of education. The All India Radio and the

Doordarshan would be required to extend their transmission facilities in the mornings and evenings to extend the coverage of educational programmes.

With the setting up of the Central Institute of Educational Technology (CIET) under the NCERT and six State Institutes of Educational Technology (SIETs) in the States of Orissa, Andhra Pradesh, Maharashtra, Gujarat, Uttar Pradesh and Bihar, the country is poised to undertake the gigantic task of continuing education of the teachers and teacher educators through mass media (radio, TV, audio and video cassette) in addition to contact and print. The growing of software production capability in the educational sector and expansion of Low and High Power Transmitters, AIR-FM Stations and Communication Satellite would provide continued access to teachers at all levels all the year round throughout the country. Through contact and Distance Education, the Teacher Educators could be trained first, followed by Teachers, in very large numbers.

At the school level, wide scale applications of Audio, Radio and Low Cost Aids and Experiments need to be undertaken for meaningful transaction of curriculum. Audio facilities for software production are now being installed indigenously. With the growth of SIETs and meaningful participation of teachers in planning and production, it should be possible to reach out to children in large number through radio and audio cassette programmes.

If the potential of educational technology has to be fully exploited for improving the quality of education and widening access to education, the necessary infrastructure has to be created. The allocations for education must, therefore, increase substantially. The investments in INSAT, LPTs and the radio network which have extended communications to remote areas cannot be justified, if they are not utilised for educational purposes.

As in any other curriculum development work, there is a need to strengthen the existing research and development component for the preparation and design of materials for the mass media as well. Strengthening of ET inputs in the DIETs and Colleges of Education to be strengthened/upgraded will go a long way in improving teaching-learning.

The tasks related to utilisation of mass media such as radio and television for instructional purposes at the school stage and for training of teachers and teacher-educators will have to be co-ordinated at the national level by the CIET in the NCERT and SIETs at the state level in collaboration with other agencies engaged in task related to production of educational TV programmes and training of teachers and teacher-educators through distance education techniques by using mass media.

4.4 INFRASTRUCTURE FOR IMPLEMENTATION OF WORK EXPERIENCE PROGRAMMES

At present there is hardly any management system worth the name for Work Experience (WE), but there is a definite need for better implementation of WE in terms of administration, resource support, evaluation, accreditation, etc. at all levels through a well-coordinated management system. A comprehensive management system for vocationalization (Diagram IV-b) visualises various agencies at national, regional, state, district and institute levels with well defined functions for each of them. The broad functions earmarked are: (i) Policy and Coordination, (ii) R&D, Evaluation and Monitoring, (iii) Administration and Implementation, and (iv) Examination and Certification. This system ensures better coordination between various ministries, departments, boards, councils, etc. involvement of grass-root level functionaries, agencies, organizations and thus, finally it leads to proper utilization of community resources, better voca-

FUNCTIONS LEVELS	POLICY AND COORDINATION	R & D EVALUATION AND MONITORING	ADMINISTRATION AND IMPLEMENTATION	EXAMINATION AND CERTIFICATION
NATIONAL	JOINT COUNCIL OF VOCATIONAL EDUCATION *	NCERT/CENTRAL INSTITUTE OF VOCATIONAL EDUCATION *	MINISTRY OF HRD DUREAU OF VOCATIONAL EDUCATION *	ALL INDIA BOARD OF VOCATIONAL EDUCATION (AIBVE)
REGIONAL	—	RCEs, TTTIs	BOARDS OF APPRENTICESHIP TRAINING	—
STATE	STATE COUNCIL OF VOCATIONAL EDUCATION *	SCERT/STATE INSTITUTE OF VOCATIONAL EDUCATION *	STATE MINISTRY OF EDUCATION	STATE BOARDS OF EXAMINATION
DISTRICT	DISTRICT VOCATIONAL COORDINATION COMMITTEE *	DISTRICT VOCATIONAL TRAINING CENTRES *	DISTRICT VOCATIONAL EDUCATION OFFICER	—
INSTITUTE	ADVISORY COMMITTEE *	CURRICULUM DEVELOPMENT AND PLACEMENT CELL *	PRINCIPAL/ HEAD OF VOCATIONAL EDUCATION	—

* TO BE IMPLEMENTED

**INFRASTRUCTURE FOR VOCATIONAL EDUCATION INCLUDING PRE-VOCATIONAL
EDUCATION AND WORK EXPERIENCE**

tional training, appropriate placement of the students and greater awareness about the vocational programme among the masses.

While the above system has been visualised for comprehensive management of vocational educational programmes in various sectors, it may be pointed out that these be effectively utilized in respect of WE at all stages of school education, particularly at the upper primary and secondary levels. The pre-vocational programmes in secondary schools may be so introduced that the latter provide a cluster of courses facilitating the choice of vocational courses at the higher secondary stage.

The management system for WE should provide for effective functioning of the "meaningful partnership" of the States and Centre vis-a-vis WE as stipulated in the NPE-86. In order to derive the best from the national level R&D support system, the States will have to build up greater capabilities which will meet the specific requirements concerning resource, curricular material development, administration, supervision, monitoring, evaluation, training in their drive for actual implementation of the WE programme. Thus, implementation strategies for WE will have to be worked out for various operational levels defining functions of all agencies involved in it.

At the national level, the R&D support for WE will have to be essentially provided by the Central Institute of Vocational Education (CIVE) to be set up in the NCERT which will function as National Resource Centre. Its functions inter alia, should include orientation of key-persons from states, development of exemplar curricular materials, evaluation and monitoring, involvement of voluntary organization and consultancy. The Bureau of Vocational Education taking care of WE as well as the Ministry of Human Resource Development (MHRD) should strengthen administrative linkages with counterpart State Directorates.

Actual implementation of the WE programme being the responsibility of States, sea changes are envisaged at the state level. A state-based resource group may be created in the Directorate/SCERT, which will have interaction with the national level institutions to make use of the R&D support system. The resource group may include experts from other institutions as well as from the WE cells/units already existing in the Directorate. The resource group should eventually be merged with the proposed State Council of Vocational Education (SCVE). It should essentially work for WE planning, implementation, monitoring and development of curricular materials.

District institute of Education and Training (DIET) should provide in-service training programmes of various durations to WE teachers at the elementary stage. Similarly the Colleges of Teacher Education (CTE) should perform the corresponding functions in respect of the secondary stage. These institutions should use community resources including District Vocational Training Centre as well in consultation with the District Coordination Committee on WE. District level planning will have to be more relevantly done by the DIET and CTEs taking cognizance of local conditions, needs and facilities for WE.

At the institutional level WE committees may be formed in each school which will be headed by the principal/headmaster. It should have WE/Craft teachers, representatives from the community, parent-teacher associations and students as its members. This committee should help in the actual implementation of WE programme regarding resource mobilization, working out WE annual plan, identification of work situations, organization of WE activities, motivation to students, parents and community, etc.

Vocational guidance and counselling services have an important role to play at all levels of education in the context of the proposal to

introduce pre-vocational courses at the secondary stage. The work activities have to be so selected as to conform to the psychological needs, aptitudes and abilities of the growing child, which could be systematically identified if the guidance and counselling services are made available in all the secondary schools. Efforts should, therefore, be made to provide one visiting school counsellor for a cluster of three to four secondary schools in a phased manner. In addition to the fully trained counsellors, a career teacher for each secondary school should be provided. Facilities for training in guidance and counselling should also be augmented.

4.5 INSTITUTIONAL AND ORGANISATIONAL REFORM AND INSTRUMENT OF INTERVENTION

Traditionally the technical support system for school improvement functions in isolation from the educational decision making and administrative structure. In order to bring about a qualitative improvement in the situation there is a need to establish strong linkages between the two structures and to extend their role through a systematic process of intra and inter-sectoral network of the existing country wide infrastructure which is responsible for Human Resource Development under the aegis of different sectoral administrations.

A systems design with an in-built project model, has been suggested in this framework for improving the effectiveness of the existing delivery system and for introducing new ideas and practices through decisive interventions in key areas. The major considerations in the proposed design should include:

Improvement of existing delivery system of education through administrative reform, delegation of responsibility with accountability to the lower levels of administration and creation of an effective

educational authority at the district level.

Networking the existing country-wide infrastructure for human resource development for optimum utilisation of sectoral resources for education and training.

Formulation and implementation of mission oriented, time-bound projects for the improvement of the quality of school education through demonstration of cost-effective management models.

4.5.1 Resource Support for Equity

From the point of view of promoting equity there is need to ensure enhanced resource support for the improvement of the quality of education. The issues relating to the upgrading of the standard of curriculum and instruction cannot be taken up in isolation of the overall sociological issues of education, particularly those related to equity. Equity should be seen not only as an index of access to education, but also as an outcome of an educational process. Once the outcome of an educational programme is accepted as a measure of equity in terms of the performance of the children from the disadvantaged groups, the yardstick presently used for the assessment of the performance of a school or a teacher will require a thorough re-examination. The concern for equity calls for differential allocation of additional resources to the institutions which are presently below the threshold level.

4.5.2 Provision of the Minimum Essential Facilities

Provision of the essential facilities required for effective transaction of the curriculum in all schools/non-formal learning centres needs to be articulated effectively in all the plans and programmes for educational development. It is necessary to ensure that all schools have the

minimum essential facilities in terms of classrooms, teachers, teaching aids, etc. A phased drive should be undertaken to provide the essential facilities necessary for effective transaction of the curriculum in all schools. Government, local bodies, voluntary agencies and individuals in the community will have to be involved in this task. There exists a considerable disparity in the facilities available in the rural and urban schools. There is an urgent need to provide adequate physical facilities to the rural schools to bring them to the level of urban schools.

The introduction of a normative common scheme of studies is likely to ensure equity in terms of participation of children from the backward areas, and girls, in curricular areas like sciences and mathematics particularly at the secondary level. On the plea of inadequate resources, such secondary schools located in the backward areas do not provide facilities for teaching these subjects. Thus an unwritten diversification of courses, on the basis of access to resources by the educational institutions, in violation of the accepted curricular norms, comes into being and should be effectively restricted. Such measures will also make it obligatory on the part of the local educational authorities to ensure that the threshold facilities and arrangements required for teaching all the subjects under the common scheme of studies are provided to all schools.

4.5.3 Institutional Management and Supervision

The supervising authority of primary schools being located away from the villages, the traditional mode of supervision has lost much of its significance. The whole gamut of institutional management and supervision at the primary level requires a serious re-examination from the point of view of generating local level management and control systems. Recognition of the local community

which includes the parents of the children, as a responsible party for the purpose of management and supervision of local schools, may prove to be a valid measure. This may ensure making the local educational authorities accountable not only to the higher level authorities but also to the local community.

Supervision and management of primary schools should not be seen in isolation of the need to provide technical and academic resource support to these institutions. There should be adequate provision for inducting curriculum advisers to the lowest level of administration responsible for primary education. Through such advisers, it may be possible to provide day-to-day guidance to the local teachers and to ensure the availability of the essential inputs for curriculum transaction.

4.5.4 Effective Utilisation of Financial Resources

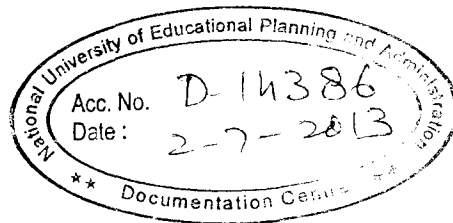
Amongst the major hurdles in ensuring the required financial inputs for the improvement of the quality of school education is not only their inadequacy but also their possible diversion to other areas of educational or non-educational activities by the implementing agencies. It is, therefore, necessary that with the increase in the allocation of funds for the improvement of the quality of school education, appropriate measures are initiated by the educational authorities for their proper and effective utilisation. Again, earmarking of funds in the state budgets in itself may not always guarantee their effective utilisation unless a well designed infrastructure for providing timely technical support services to the grass-root level institutions is also ensured. As indicated earlier, the efficiency of the delivery system can be considerably improved by articulating an institutional network within the State for providing technical support in a participative and decentralised manner. Often the existing institutional and management culture

in the field of education overshadows new educational ideas and practices. This trend could be countered by adoption of decisive measures under dedicated educational leadership. This would demonstrate the efficiency and results of the new ideas and practices over a reasonably large area in the shortest possible time.

4.5.5 Project Model of Implementation

Implementation of new strategies for the improvement of the quality of education should be made through well designed, time bound projects. A new management culture with a strong social commitment for the administration of the projects is expected to make an immediate impact on the educational scene. The performance budgeting system used to monitor the progress of the projects will set new trends in providing professional support

service to the local educational authorities. One of the major advantages of adopting a project model for bringing about qualitative improvement in educational programmes will be its openness to public scrutiny and accountability. Being time-bound and task oriented in nature, the project model will have a compulsion to attract the best talent available for completion of the tasks. Once quality consciousness is aroused through such decisive efforts within the existing system of education, it is likely that some of the practices introduced through such a model may create a popular demand for their continuation. The NCERT is expected to play a pivotal role in the formulation and implementation of mission-oriented projects for the implementation of the National Curricular Framework for Elementary and Secondary Education under the overall perspective of the National Policy on Education.



NUEPA DC



D14386