

Curriculum, Methods and Textbooks

A TREND REPORT

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In any modern national society, it is the educational system that is intended to guarantee the effective functioning of the socio-economic system. In our country also, education has been recognized as an instrument for national development. Within the educational system, it is the curriculum that is considered to be the most potent tool in the educator's repertoire to bring about the desired changes. By designing and executing the curriculum for specific social and cultural objectives, the teacher controls and guides the learning experiences of developing human beings. The curriculum, designed and carried out as a series of meaningful, guided experiences directed toward the attainment of specific objectives, is the basic instrument of the educative process. It is also the medium through which we translate social-educational philosophies into teaching procedures. Since the process of education takes place in a society, the basic element in the design of a curriculum must be the social forces operating within that particular social structure. The values enshrined in the curriculum stem from the values of society at large. The very complexity and multitude of the decisions and the fact that these decisions are to be arrived at by different segments in the educational organization at various levels make it necessary for the curriculum to be developed on the basis of valid research evidences. In the post-Independence era in India, the several educational committees and commissions appointed to study the nation's educational system, have rightly emphasized the urgent need to update and modernize the current curriculum. The acceptance of the uniform educational structure (10+2+3) by the different States has made this need all the more urgent. Chari and Ghosh (1973) in a chapter in the Fourth Indian Year Book of Education and Shib K. Mitra in

Curriculum for Ten-Year School — An Approach Paper (1975) have stressed the importance of modernizing the curriculum keeping in view the current and emerging needs of the Indian society. A clear conception of the methods and approaches that are appropriate in planning, designing and evaluating a rational and scientific curriculum is of fundamental importance. The research reported in this section may give us some idea about the contemporary scene of educational research in our country in this area of crucial importance.

In addition to the research abstracts included here, one may also find useful information in the following publications: (i) Behavioural Science Research in India: a Directory, 1925-65 (Pareek and Kumar, 1966); (ii) Directory of Indian Behavioural Science Research (Pareek and Sood, 1971); (iii) The NCERT publications giving the list of titles of Ph.D. theses in education and M.Ed. dissertations carried out in Indian universities during the period 1939 to 1966. The Third Indian Year Book of Education (1968), published by the NCERT, gives a review of thirty-one studies on curriculum and eighty-five studies on the methods of teaching school subjects, the studies being mostly M.Ed. dissertations and very few at doctoral level. UNESCO's Regional Office for Education in Asia located in Bangkok has also taken up under its Asian Programme of Educational Innovation for Development the task of putting across the idea of a living, reacting, relevant curriculum to the educators in Asia. The periodical publications brought out by the Curriculum Group of the NCERT carry useful information for planners and researchers. In A Survey of Research in Education (Buch, 1974), Desai and Roy presented a review of studies on curriculum, methods and textbooks, based on sixty-nine studies at the

Ph.D. level and also an equal number of research projects undertaken at the institutional level. In the Second Survey of Research in Education (Buch, 1979), Roy reviewed the studies in this area, covering, in all, one hundred and eight studies. The present report includes all the studies reviewed in the last two surveys published by the Buch (1974, 1979) in addition to quite a number of other studies in the area. Thus the present review is based on all the studies at the doctoral and institutional levels in this country.

The studies in this area may be classified into a variety of ways, though there is always a possibility of overlap. In this survey, they have been classified into the following categories more or less in the same manner in which they have been done in the second survey.

A. CURRICULUM

1. General Curriculum
 - (a) Trend or developmental history
 - (b) Co-curricular aspects
 - (c) Moral instruction
2. Linguistic Studies
3. Vocabulary Studies
4. Studies on Reading
5. Teaching of Languages
 - (a) English
 - (b) Other languages
6. Mathematics and Science
7. Social Studies.

B. METHODS

C. TEXTBOOKS

An annotated account with respect to some important features of the studies under review is given in the following paragraphs:

A. CURRICULUM

1. General Curriculum

(a) *Trend or Developmental History*

A few studies are related to broader aspects of the curriculum. They have attempted to examine the general trend of curriculum development at various levels. Soon after Independence, it was Gothiverekar (1947) who first made a comprehensive study of school curriculum in the province of Bombay and made several suggestions

for its improvement. After about two decades, Chanana (1967) conducted a survey of the high school curriculum in Punjab and advocated a new and effective curriculum. Ghosal (1973) analysed the curricular trends in secondary education in India during the British rule in the context of developments in England. Gupta (1973) critically analysed the elementary school curriculum in NEFA and found it quite unrelated to NEFA environment. Overemphasis on the three R's, social irrelevance, inadequate provision for the needs of the learner, subject centredness and domination by examination were some of the major defects found in the existing curriculum. A few researchers attempted to evaluate the new curriculum introduced in different States. These studies also focussed attention on several of its defects. For example, Tharyani (1978) found the new curriculum of the Maharashtra State out of tune with the social, economic, philosophical, psychological and educational requirements of students and society. Shukla (1975) reviewed the changes introduced in the curriculum of primary education during the years 1940-70 in the State of Gujarat. Absence of moral education, low level of education in history, regional geography, the local trade and industry were among the defects found in the primary school curriculum. Ghorai (1980) analysed the views of teachers on the efficacy of the new curriculum of secondary education in West Bengal. The findings showed that most teachers felt the secondary curriculum was quite heavy in content and lacked balance. Arora and others (1981) attempted to examine the load of curriculum on students of secondary stage in different States and found that the curriculum in these States was not well balanced. Some attempts were made to prepare instructional materials or develop curriculum in certain specified areas of school education. The State Institute of Science Education, Jabalpur (1981) developed instructional materials for students and teachers in nutrition and health education relevant to local environment. Muttaqi (1981) attempted to develop an ecology curriculum suitable and effective in developing environmental literacy for Grades VI, VII and VIII. Shukla (1979) developed a curriculum for mentally handicapped children. Basu and Rao (1979) identified some attitudinal elements necessary for developing the concept of national integration. These included brotherhood amongst people, coexistence with sub-cultures, tolerance of different languages, religions and culture, respect for dignity of man, open-mindedness and inculcation of democratic method and outlook.

The Maharashtra State Bureau of Textbook Production and Curriculum Research (1975) conducted a study

of pupils' attitude towards school subjects. The findings showed physics as the least liked subject. In a similar study Sali (1978b) reported science, English and mathematics were the difficult subjects for teachers and students. Chaturvedi and Mohale (1972) found that the time allotted for language teaching was more than 40 per cent of the total time in school time-table.

Two studies were in the area of curriculum in pre-school education. Thakkar (1979) attempted to seek a rationale for a pre-school curriculum. He studied the philosophies, methods and practices existing in the field and provided some guidelines in planning the learning experiences of pre-school children. Rao (1981) studied the effects of pre-school education on primary and secondary school education and found that certain personal and social characteristics and habits developed at the pre-school stage had a lasting and powerful influence in later years of schooling.

A few research studies were in the area of environmental education. The environmental approach is in fact an approach to learning through activities based on the child's natural and familiar environment. This approach cuts across all subject boundaries to facilitate a continuous flow of learning across the whole spectrum of the curriculum. The basic philosophy underlying this approach is that children will, in this way, become more sensitive to their own culture and social background and more concerned about the quality of their environment. Gupta (1981) identified the components of environment in which children from rural and urban areas were lacking and suggested means for developing environment-based curriculum at the primary school level. Pai (1981) prepared and tried out a curriculum in environmental studies leading to life-long education for college students. Manuel (1982) attempted to analyse some worthwhile environmental education models in India and abroad and other relevant materials from the point of view of developing a functional theory of environmental education.

The area of work experience attracted the attention of quite a few researchers. With the report of the Review Committee on Ten-Year School Curriculum (1977), the advocated view of linking education with work, with the important objective of promoting dignity of labour and making every member of society self-reliant, cooperative and socially productive, has received some currency. Sali (1978a) conducted a survey on work experience in the secondary schools of Maharashtra and recommended the introduction of work experience subjects which were productive and useful to the society. Lahi (1981) made a critical study of work experience

programme in the secondary schools of Kerala and found that school subjects were given more importance than work experience programme. Kulkarni (1975) reported pupils had a favourable attitude towards work experience. Pany (1981) attempted to develop a programme of work experience for the secondary schools of Orissa by identifying the potential factors of the schools, TTIs and the community. While Vasantha (1972) investigated the work values of students, Sinha (1971) attempted to find out some correlates of job-orientation of university students. Dash (1981) attempted to develop models of curriculum in work education for primary classes.

There were a few studies in the area of polytechnic and engineering education. Balaraman and others (1982) identified the goals of engineering education and their priorities using the Delphi technique. Panjwani (1973) conducted a job-analysis survey for the development of technician education and training programme. Mukhopadhyay and others (1981) undertook a polytechnic curriculum evaluation project covering civil, mechanical and electrical engineering courses and identified gaps and overlaps in the content organization.

The area of population education also attracted a few researchers. Sundararaj (1978) developed a curriculum on population education for college students and studied its efficacy using pretest-posttest control-experimental group design. Thakore (1979) developed a curriculum in population education for secondary teachers under training. Nalinadevi (1981) assessed the population awareness of school-going children and found that rural pupils showed greater awareness than urban pupils.

Two studies were in the area of home science curriculum. While Shah (1975) made a critical inquiry into the programme of home science education in the secondary schools of India, Deulkar (1967) evaluated home science curriculum with special reference to its functional implementation and the personal and professional satisfaction of students.

Gupta (1979) conducted a study on agricultural education and found that the percentage of students offering agriculture as a subject at the middle school level in rural schools was far greater than those in urban schools. Prasad (1970) made a vehement plea for the inclusion of folk literature and folk culture in the school curriculum. Punja (1981) studied the objectives of art education and focussed attention on the historical and philosophical issues.

(b) *Co-curricular Aspects*

A major criticism levelled against the school cur-

riculum in our country is that it is too bookish. There is little scope for activities such as physical education, crafts and various co-curricular programmes. Several studies drew attention to this aspect. Daisy (1963) analysed the need for physical education for girls. Chaturvedi (1957) discussed the role of craft as a medium of education in elementary schools. Pani (1969) found that participation and achievement of pupils in co-curricular activities were closely associated with the personal development of pupils. Rao and Patel (1965) investigated the intramural and interschool competitions in games and sports. They found an increase of favourable attitude towards cooperative group activities. Agarkar (1947) recommended the introduction of folk dance in the school curriculum as a means of physical education. Banerjee (1980) studied the need and objectives of music education and also the place of music in the curriculum. Chandra and others (1970) conducted a survey of physical education in high and higher secondary schools in Haryana and found that the provision of playground facilities quite inadequate. Gopi (1981) conducted a study of the existing state of affairs with respect to the condition of games and sports in the higher secondary schools of Allahabad. Lack of interest among students and teachers, teachers' involvement in tuitions, shortage of funds, were among the factors responsible for low standards in games and sports. Devi (1979) found that physical education played a very important role in the adjustment of adolescent girls. Sahasrabudhe (1975) studied "the community living programme as implemented in the primary schools in the district of Nagpur and found lack of sincerity on the part of teachers and paucity of funds as the main difficulties in the implementation of this programme. Gupta (1981) assessed the attitudes of girls towards NCC training and found a highly favourable attitude towards such training.

(c) Moral Instruction

Many critics have pointed out that a serious defect in our school curriculum is the absence of provision for education in moral values. In the words of the Education Commission (1964-66), "the weakening of social and moral values in the younger generation is creating many serious social and ethical conflicts...." In a secular democratic country, curriculum planners have to decide whether values can be taught and, if so, what values are to be inculcated in children at the school stage. Kohlberg's work (1975), in particular, was concerned

not only with the description of a universal stage theory of moral reasoning but also with the question of how schooling and educational experience might facilitate moral development. Experimental and longitudinal studies (Kohlberg and Kramer, 1969) carried out in other countries have demonstrated that the stages form a developmentally invariant sequence in which each stage is a reorganization of the previous stage. Development, therefore, does not represent an increasing knowledge of cultural values; rather it represents the transformations that occur in the child's form of thought and action. This area is comparatively a neglected area in Indian research. Seetharamu (1971) took up this problem and attempted to find the effect of direct moral instruction and moral development of children. More studies of this nature may provide the experimental validation for the basic proposition of our approach that development involves transformations in organized structures of thought and action.

2. Linguistic Studies

Linguistic research and linguistic studies are of fundamental importance in curriculum development and textbook production as they supply relevant and useful information to gain a deeper insight into the several components of language acquisition and language learning. Several researchers concerned themselves with linguistic analysis and comparisons with reference to vocabulary, sound systems, grammatical structures and their pedagogical implications. Modi (1966) made a comparative study of English and Gujarati syntaxes. Jagannathan (1969) analysed Hindi and Tamil words having the same source but differing in meaning, while Vishwamitra (1969) compared Hindi and Tamil phonetic sounds. Chaturvedi (1972) made a linguistic analysis of the phonological variations in Standard Hindi. In another study Chaturvedi (1974) made a graphemic analysis of Devanagari script as used in reading and writing Hindi and finally attempted to work out the rules of Hindi orthography along with the use of punctuation marks. Pattanayak and others (1972) developed graded instructional materials for improving language skills in the mother tongue. Subrahmanyam (1974) attempted to classify the minimum grammatical essentials required for Telugu students with a view to improving their written expression. Dongre (1968) studied the functions of some Marathi auxiliary verbs, while Borude (1975) tried to measure association value of nonsense syllables and meaningful words in Marathi. In a psycho-linguistic study Barr (1974) analysed the auditory perceptual dis-

orders in children with reference to language learning. He found that syntactical complexity rather than auditory memory *per se* was the critical factor in correct sentence repetition. There were a few studies on bilingualism. Misra and others (1974) studied the differences in the grammatical structure and in the modes of linguistic expression of Hindi used by non-Hindi speakers. They found that non-Hindi speakers carried over grammatical features as well as modes of literary expression from their mother tongues into Hindi, some of which were in the process of assimilation. Chickermane (1967) studied the impact of bilingualism on the progress of children in primary schools in rural areas and found that children felt handicapped in acquiring a mastery over the school language, when the environmental language differed from school language.

3. Vocabulary Studies

Vocabulary studies constitute an important component of language research. This area attracted the attention of several researchers. Basic vocabulary of children was studied in Hindi by Rukmani (1960), in Kannada by Chandrasekhariah (1964), and in Marathi by Tamhane (1965) and Patil (1979). Functional vocabulary of pre-school-age children was studied by Arunajatai and Srinivasachari (1968). They found that the mean number of words used in a sentence was 3.7 and the mean number of syllables was 9.7. Shankar (1971) and Sarma (1972) studied the basic Hindi vocabulary in Haryana. Basic Punjabi vocabulary was studied by Soch (1974). Vakil (1955), Raval (1959) and Lakdawala (1960) studied the basic Gujarati-vocabulary in the case of children of eleven plus, twelve plus and thirteen plus, respectively. Pasricha and Das (1959) studied the written vocabulary of Delhi children of Class VI. Active vocabulary was surveyed by Sinha (1975) in respect of Mundari children, by Pai and Jeyapaul (1974) in respect of Tripuri children. CIIL (1972) compiled common vocabulary between Hindi and thirteen other regional languages. In another study, CIIL (1971) compiled recall vocabulary of thirteen Indian languages. Bernard (1966) tested the English reading vocabulary of P.U.C. students while Rao (1981) assessed the Telugu reading vocabulary of children in Standards 3 to 8. Chadda (1971) investigated the vocabulary resources of the third year degree students. Keskar (1972) prepared a three thousand five hundred word vocabulary for high school students in India.

4. Studies on Reading

Reading plays an important role in school education. It forms the basic tool for achieving proficiency in all other school subjects. The success of any student in the school is largely dependent on the extent to which his reading skills have been developed.

Numerous studies have been conducted in recent years in foreign countries in the field of reading from various perspectives. Many of them are on reading habits, reading readiness, reading speed and comprehension, reading interests and methods of teaching reading. In our country also attention of educationists and researchers has been directed to this field and a few studies have been reported by the investigators in the languages of Marathi, Gujarati, Hindi, Kannada and Tamil. These studies have indicated the need for greater refinement in measuring reading achievement and monitoring standards and progress in reading at different levels of schooling.

Several tools and testing materials are available in English to measure the reading skills, like reading readiness, reading speed, comprehension, word recognition and other language skills. Iowa Test of Basic Skills, Nelson Silent Reading Tests, Watts-Vernon Reading Test, Schonell's Graded Reading Vocabulary Test and Visual Word Discrimination Test are some of the well-known tools in English. But there is a real dearth of such tests in various Indian languages for measuring students' proficiency in the first language, viz., his mother tongue.

Several reading surveys were conducted in many countries at different periods to ascertain reading standards and also the incidence of backwardness in reading. Notable among these surveys were those carried out in England and Wales by the National Foundation of Educational Research for the Ministry of Education and later for the Department of Education and Science. It was estimated that in England, during the sixteen years covered by the surveys there had been an advance of 17 months of reading age for 11-year olds and 20-30 months for 15-year olds. But such large scale surveys which are of immense value have not been attempted in our country. Similarly, there are not many reported research studies on reading and reading disability in our country. Few researchers have attempted to assess the reading comprehension and reading speed by selecting a limited sample. Narayanaswamy (1969), who studied the level of reading comprehension at the college level, found the average reading speed in English to be 150 words per minute for a slow reader, 250 words for a fair reader and 350 words for a good reader with about 70 per cent com-

prehension. Ahuja and Ahuja (1974) assessed speed and comprehension in silent and oral reading of children of Standard VIII. Rao (1981) developed reading comprehension tests for Standards III, IV, V, VI and VII-VIII and found significant differences in comprehension and vocabulary scores between rural and urban samples. The performance of children of schools located in deprived areas was found to be poor as compared to the achievement of children belonging to other areas.

Studies on reading interests and reading readiness attracted several investigators. Badami and Badami (1970) studied reading interests of college students through a questionnaire. Reading readiness of pre-school children was assessed by Krishnamurthi (1971) by developing reading readiness tests and other materials. Dunakhe (1978) studied the reading interests and habits of Marathi students of the first year of the degree course. Rao (1982) made a diagnostic study of reading disability among children studying Telugu in Standards V, VI and VII. The general performance of children in subtests of word meaning with prefixes and suffixes and word meaning with their roots was found to be rather low.

Subrahmanyam (1981) studied the correlates of reading achievement of primary school children and found that reading achievement in Telugu was positively related to the general mental ability, visual ability and speech habits of children. Rajagopalan (1981) studied the relationships of selected variables to reading comprehension in English and found that pupils experienced greater difficulty in recognizing the meanings of words than in dealing with sentence forms and continuous pieces of writing.

Ansuya (1970) attempted to establish criteria for the improvement of reading efficiency of the pre-university students. Rahman (1959) studied different aspects of reading for pleasure and found a real paucity of good English language books in school libraries. Deshpande (1973) attempted improvement of teaching to beginners through improvement in the preparation of reading materials and in the process of evaluating reading programmes. Bhagoliwal (1973) tried to find out whether the different typographical dimensions, viz., type size, line width and interlinear spacing had any direct effect on readability of Hindi book print and found no direct effect from any of the three dimensions under study when taken up individually.

5. Teaching of Languages¹

¹Language education as a special area of study is dealt with in Chapter 11. — Editor

(a) English

English holds today the pride of place as a world language. It is the mother tongue of more than 200,000,000 people. Information about recent advances in sciences and technology is available to us through the medium of English. In our country English continues to be the official language at the Centre. It is now an important link-language in a multi-lingual country like ours. It is no wonder then that the English language continues to occupy a prominent place in our school curriculum. Research on teaching English as a foreign language has therefore assumed great importance. Curriculum, methods of teaching, development of language skills and evaluation have all provided areas of investigation for research scholars in recent years. Rajagopalan (1972) made a critical study of the English curriculum at the primary and secondary stages in Tamil Nadu in order to identify inadequacies in respect of objectives of teaching the language, existing syllabi, textbooks used, audio-visual aids available, methods of instruction followed, organization of English curriculum, administrative barriers to implement it, and the evaluation procedures utilized. Tiwari (1971) studied the effect of making English optional at the high school and intermediate stages and also attempted to determine the place of English in the existing curriculum. Looking to the needs of the time, he found the position of English in the curriculum should be kept as it was. Rangachar and Kulkarni (1967) examined the provision of teaching facilities for English in Mysore and found that most of the schools had neither school libraries nor aids in language teaching. A few other studies centred round specific aspects of teaching and learning of English. Ghanchi (1972) compared the grammatical structures of English and Gujarati at different levels and made suggestions for developing a curricular programme of English for schools. Nagalakshmi (1962) constructed simple oral comprehension tests for use at the school-leaving level. Dave and Saha (1968) analysed the errors in English committed by students at the higher secondary level suggesting remedial treatment. Nair (1966) studied the common language difficulties of secondary school pupils of Kerala and offered suggestions to correct them. Sinha (1967) identified areas of English language teaching which needed most immediate attention for remedial work at the pre-university class and first year degree stage in Hindi-speaking areas. Singh and Srivastava (1960) studied the common errors committed by pupils of Class VIII in written English. They found that pupils were constantly influenced by the familiar

patterns of their native languages, which caused mistakes in the use of the foreign language. Theodore (1957) carried out an evaluation of the study of poetry, while Shastri (1972) attempted to locate the areas of students' weaknesses with regard to their knowledge of certain structures and vocabulary. Misra (1969) studied the problems and difficulties of language teaching at the secondary stage. Mutali and Borude (1969) found, through a questionnaire study, the concern of a majority of parents for taking immediate and forceful steps to improve the standard of English.

(b) *Other Languages*

Several aspects of teaching Indian languages have already been discussed in the sections dealing with linguistic and vocabulary studies. Here, only a few studies which have a direct bearing on the teaching of Indian languages, are considered. Dwivedi (1968) studied the development of Sanskrit education in Madhya Pradesh through the years 1901 to 1962. He found lack of encouragement and indifference on the part of the government as main obstacles in the spread of Sanskrit education in this State. Mishra (1969) identified the problems and difficulties of Hindi and Sanskrit language teaching at the secondary stage. In general, the processes and techniques of language teaching were found to be obsolete although teachers were conscious of the glaring inadequacies in the practices followed. Sawant (1970) studied composition in Marathi in primary schools in its different aspects. Verma (1971) attempted to study the place of Hindi in the school curriculum and to define an outline of literature for children and adolescents. Subramaniam (1975) developed tests and teaching materials and applied cognate method to teach learners in courses for Malayalam, Tamil, Kannada and Telugu.

6. Mathematics and Science

The importance of science and technology in the development of modern civilized society cannot be over-emphasized. All the countries of the world realize the importance of incorporating new content and techniques of instruction into the two related subject fields of science and mathematics. While most Asian countries are eager to benefit from the experiences of new curriculum programmes of countries like U.K., U.S.A., U.S.S.R., etc., the thinking in most places has been not to transplant the programmes in their entirety but to study and adopt the same according to the needs of the country. In our country, attempts are being made

to introduce gradually new mathematics and also to update and vitalize the science courses. But these facts are not amply reflected in the studies under review in this section. Wanchoo and Sharma (1974) made a survey of the research in science and mathematics education in the country and found that the quantum of research done at the primary level was meagre. They also found that the research work done in the area of evaluation was mostly confined to test construction. Dave and Saxena (1965) studied the existing curriculum in mathematics in higher secondary schools of various States and found them to be defective in several respects. Samant (1944) and Pillai (1970) carried out surveys of teaching mathematics in the secondary schools and brought to light certain defects in the existing state of affairs.

The Maharashtra State Bureau of Textbook Production and Curriculum Research (1974) carried out a survey of primary teachers' opinions regarding mathematics and science syllabi in their primary schools. The majority of the teachers felt that the modern mathematics portion of the syllabus was difficult for pupils. The survey findings also revealed that a vast majority of the teachers favoured the teaching of science as separate disciplines — physics, chemistry and biology. It was Joshi (1970) who focussed attention on concept development. He studied the development of algebraic concepts in pupils at junior secondary stage. Gupta (1972) studied the causes of backwardness in mathematics and found that low achievers in mathematics had poor command over basic arithmetic skills. Paranjape (1977) collected the various mathematical syllabi so far used in primary schools of Maharashtra since 1901 and studied the changes in the objectives of teaching mathematics using the method of historical survey. Mishra (1978) studied the attitude of students towards mathematics using a Likert-type scale. Bansal (1979) and Vinit Bala (1980) compared the modern and traditional mathematics curricula and found that the former was superior to the latter in several respects. Shukla (1982) identified some major teaching skills in the area of mathematics education at the secondary stage.

Science claimed significantly a fewer studies. These studies concerned themselves mainly with the trend, course of study and teaching of science. Veerappa (1958) examined the trends in science education from the primary through the degree course level. Sharma (1982) studied the growth and development of science education in Bihar. Rajput and others (1978) made a survey of science laboratories in the western region of the country and listed the main problems faced by science teachers in planning laboratory work. Patole

(1967) explored the existing weaknesses of teaching science in rural primary schools and offered suggestions for improvement. Three studies were mainly on the development of curriculum in science. Kelkar (1950) offered a tentative course of study in general science for the secondary schools. Uppal (1977) attempted to develop a curriculum in science for the secondary schools in the State of Maharashtra. Muttaqi (1981) made an attempt to develop an ecology curriculum for Grades VI, VII and VIII of some selected schools of Bangladesh. The study was both a developmental and an evaluative one. The first phase consisted of the development of the curriculum and the curricular materials, while the second phase included the evaluation of the developed material in real classroom situations.

7. Social Studies

Growing out of a base of history and geography instruction, the rubric of social studies has come into use in our schools. It is not merely a combination of history and geography as it is sometimes misconceived. Rather, social studies is growing as a new discipline of human relations. It is likely to furnish substantial background for understanding the basic nature of society and to develop the social skills and sensitivity needed by our children of today who are the citizens of tomorrow. But this aspect of the subject has not received the attention it deserves. Srivastava (1969) assessed the achievements of the students of social studies in regard to the development of certain democratic understandings, attitudes and abilities. A few studies centred round the curriculum and teaching methods of social studies. Pires and Katyal (1957) attempted to develop a social studies curriculum suitable for junior basic classes on the basis of items selected from daily experience of pupils and important current events. Narayanaswami (1960) made an inquiry into the teaching of social studies in the secondary schools of Madurai district. Inadequacy of books and other teaching materials, failure to use audio-visual aids in teaching and learning the subject, and inadequate evaluation measures were some of the defects located. Khushdil (1960) compared the integrated and the traditional methods of teaching social studies. He found that in respect of assimilation and acquisition of knowledge the former was more effective than the latter. Veerkar (1980) studied the effect of the integrated approach of teaching social studies on the performance of pupils of standard IV of primary schools. The findings showed that the integrated approach was superior to the conventional approach in several respects.

There were three studies in the area of geography teaching. In the study of GCPI (1963) areas of difficulty in the field of geographical concepts were identified. As remedial measure, emphasis on the practical part of teaching the subject was suggested. In another study (GCPI, 1981) the errors committed by examinees in response to a question related to the map of India were studied. The findings showed the deficiencies of students in map drawing and map location abilities. D'Souza (1971) compared the teaching of geography by two methods — the systematic method, i.e., by taking the whole country as the geographic unit, and the regional method, i.e., by taking a region of a country as the geographic unit. The findings revealed that the regional method resulted in higher achievement in terms of scores on the objective test. The only study on history by Gupta (1953) related to the present apathy towards teaching and learning history in our schools. A rigid syllabus, traditional nature of questions, uninteresting and ineffective way of teaching and lack of good textbooks, were some of the major factors responsible for the present-day apathy towards history.

B. METHODS

Curriculum and methods are closely interconnected with each other. Even the best curriculum will remain ineffective unless it is activated by dynamic methods of teaching. A curricular programme is brought into action only through appropriate method of instruction. With the impact of modern technology along with its hard and software and also with rapid strides of development in educational psychology, sociology and other related disciplines, there is a strong urge to refine and improve our teaching strategies and instructional techniques with a view to realizing the fullest potentialities of the individual learner. In a country like India, where the problem is to educate teeming millions with a large number of first generation learners, methods and procedures suited to large classes with wide individual differences are also to be evolved by research. The use of audio-visual aids or a particular instructional procedure may increase the effectiveness of teaching. But this is one aspect of development concerning research on methods. Another new development is that more and more interactional approaches are incorporated into teaching methods to make them effective in different learning situations. A useful way of looking at an instructional situation is in terms of the familiar trichotomy of independent, dependent and intervening variables — independent variables include methods, materials or media of

instruction, the characteristics of teachers or learners, etc. The dependent variables are the objectives of education—knowledge, understanding, skills, attitudes, interests, etc. The intervening variables are those processes, activities or events, usually not directly observed, whose presence is inferred to explain why a particular set of independent variables effectively leads to the observed values of the dependent variables.

Some of the studies concerned with methods of teaching are reviewed in this section. These studies relate to methods of teaching in general as well as teaching methods as applied to a particular subject. Some of them have already been reported while dealing with a particular subject matter area. The research wing of Bombay Municipal Corporation (1957 and 1969) studied the effect of child-centred teaching practice and correlated play activities on children's attainment, attendance and discipline. Studies on the effective use of audio-visual aids, learning modules and learning packages attracted the attention of some researchers. The investigations by George (1966), Sonar (1975) and Bharadwaj (1981) related to the use of audio-visual aids as applicable to the teaching of school subjects. Roy (1974) studied the cognitive effects of ETV programmes, while Shah (1973) surveyed the scope, utility and limitations of ETV in India. Adinarayana (1979) found that students taught by the method of learning packages performed better than the control group taught by the conventional method. Sahajahan (1980) designed and developed modules for teaching science in Standards VI and VII and found the modular way of learning more effective than the conventional method. In a similar study, Hopper (1982) designed and developed modules for teaching certain units in biology in Standard XI and found that all the three structured modular approaches of teaching, viz., self-learning, peer group learning and peer group learning with teacher intervention, were effective in terms of mean gain score in cognitive achievement. Thus, the multimedia approach, which incorporates a variety of instructional modes and media in a teaching situation, appears to be a promising area of research.

Some researchers were mainly concerned with the study of the existing state of affairs regarding the use of teaching methods. Swarnamma (1978) conducted an enquiry into the teaching of biology in the upper primary schools of Kerala and found that most teachers resorted to the lecture-demonstration method in teaching the subject. Muddu (1978) studied the prevalent status of instructional procedures in biology in the high schools of Hyderabad and Secunderabad and reported that most teachers preferred only the lecture-demonstration

method. Dev (1979) made a critical study of the methods of teaching in the secondary schools of Nagaland and found that teachers were more interested in the lecture method than any other instructional procedure.

A few investigations (Kushdil, 1960; Kamalakanthan, 1968; Rajput and others, 1980; Malhotra, 1982; Patole, 1967) were carried out to compare the traditional approach with an integrated approach or problem-solving approach or activity-based approach or environmental approach. All these studies have shown that the traditional approach is ineffective. It is interesting to note that the term, 'traditional approach' is used in these studies as a well-demarcated and a clearly distinguishable teaching procedure, free from any ambiguity. This assumption is likely to be questioned. Further, in studies of this nature there is a very real need for removing, or at least minimizing, what are generally known as the Placebo and the Hawthorne effects.

Murthy (1968) and Nagaraj (1970) compared the direct method with the bilingual method and found that the latter was superior to the former. Shukla (1968) tested the effectiveness of the translation method and found it to be very much restricted in its applicability. Patankar (1964) developed textbooks and workbooks on the basis of pedagogic principles to teach Marathi as a regional language to non-Marathi-speaking pupils. Mitra (1974) evolved a method of teaching English and validated it through classroom experimentation. While Sinha (1967) identified areas of remedial work in English, Ghosh (1982) studied scholastic backwardness in the basic processes in arithmetic. Gupta (1979) compared the analytic-synthetic (A-S) method with the narration-explanation (N-E) method of teaching geometry and found that the A-S method was significantly more effective in terms of overall geometry achievement than the N-E method in Class IX. Mohammad Miyan (1982) examined the effectiveness of three methods of teaching mathematics, viz., tell and do, guided discovery and pure discovery, in developing mathematical creativity and found that the guided discovery method was most effective in enhancing originality as compared to the other two methods. In a similar study Sharma (1978) found that guided activity was more effective than self activity in respect of concept-formation in natural science. Jha (1979) compared the different methods of teaching high school biology and reported superior performance in the case of activity-based approach. Sivadasan (1979) attempted to compare the effectiveness of different classroom situations on the attainment of objectives of science education. Prasannakumar (1979) carried out a study of instruction

and evaluation in postgraduate courses and found that teacher questioning was extremely limited and where it was used, was confined to lower levels of student thinking and response. In another study Kumar (1981) found that the multimedia method was an effective strategy for learning. Jain (1982) studied the impact of COSIP and COHSSIP sponsored by the UGC in some selected colleges and made useful suggestions for the improvement of these programmes. Jarial (1981) attempted to study the effectiveness of verbal and non-verbal instructional materials in the development of creativity of students. The findings revealed that creativity mean scores of the experimental group were significantly higher than those of the control group.

Teaching situation in small groups was studied by Mehrotra (1972) following survey method. The findings showed that more institutions were organizing their instructional programme in small groups to supplement the classroom work. Rao (1982) studied the influence of continuous evaluation on learning in school and found it having positive influence on learning. Barki and others (1981) carried out an action research programme and found the library method of teaching more effective than the traditional method in improving achievement. Ankleshwaria (1980) made a comparative study of different strategies to teach nutrition to home science college students and reported that the strategy involving structured lecture with blackboard and laboratory demonstration and library reference work was more effective with the high intelligence group than others. Five studies were in the area of physical education. Venkateswarlu (1971) conducted a study to find out the effect of training in physical activities on cardiovascular and respiratory functions and found that these functions improved significantly as a result of eight months of training. In a similar study Uppal (1980) found that slow continuous running, Fartlek and interval running methods were effective in developing cardio-respiratory endurance. Gharote (1974) studied the effect of selected yogic exercises on the physical fitness of secondary school students. The results revealed that practice of yogic exercises helped to increase the physical fitness index. Moorthy (1981) conducted a survey of minimum muscular fitness of school children and found the percentage improvement was much greater in yogic exercise group than in physical exercise group. Oommen (1981) also reported that yogic physical culture is more helpful in developing extent flexibility and dynamic flexibility than isometric and combination groups. Research on teaching is one source of information that can be used in designing optimum conditions for learning motor skills and

teachers of physical education are really to be benefited if more experimental evaluations of movement education programmes are carried out on proper lines.

C. TEXTBOOKS

Textbooks and teachers' guides occupy a unique place in the teaching-learning process. The selection and revision of textbooks and allied materials cannot be done in a haphazard fashion. This has to be done on the basis of systematic evaluation and research. There are quite a few studies conducted in our country in this area. The NCERT took the lead in this direction. A crash programme to evaluate textbooks in all languages in the country was undertaken by the NCERT. The Department of Textbooks, NCERT (1970-72) conducted studies and developed the basic principles and procedures in the preparation and evaluation of textbooks separately in different language subjects, history, geography, general science, physics and biology. Kher (1972), Lalithamma (1981), Pattabhiram (1973), Ponkshe (1972) and Walavalkar (1971) carried out the evaluation of school textbooks, while Dharmadhikari (1973) attempted to evaluate teachers' handbooks for work experience. Rastogi and others (1975) developed principles for the preparation of textbooks of mother tongue and made a comprehensive study of certain language textbooks. Gagneja (1974) studied the treatment of six leading countries in the world in textbooks of social studies, geography and history.

Vaghamare (1971) examined the exercises in history textbooks prescribed for Standard IV in Maharashtra. Manuel (1982) analysed the textbooks in environmental studies of the NCERT and found them to be defective in several respects. Gopalakrishnan (1977), Joshi (1972), Karandikar (1973) and Karim (1982) carried out an analysis of the contents of textbooks from different points of view. Joshi (1979) attempted to evolve suitable category scheme for the analysis of a school science textbooks. The Maharashtra State Bureau of Textbook Production and Curriculum Research studied the position of women in school textbooks for Standards I to X and found a definite sex bias in these books.

With the nationalization of textbooks, the State took up the responsibility for producing school textbooks. However, in some States, there is considerable delay in making available these textbooks for school use and it is debatable whether the quality of such textbooks has really improved.

Conclusion

A closer analysis of the studies in the area of curriculum, methods and textbooks may lead one to make the following few observations with respect to research and development and current practice. The quality of researches in the area of curriculum for the last three decades and more does not seem to be quite encouraging and leaves much to be desired. Very few of the studies delve deep into the real issues and problems of curriculum development. Most of the studies touch only the surface problem and deal with the peripheral issues. Studies concerning the vital issues of curriculum and instruction relating to the primary school stage are few and far between.

It is true that the school curriculum is in a state of flux and continuous change all over the world today. Even in advanced countries, it is criticized as being inadequate, out-dated and far removed from the real needs of modern society. Against the background of striking curricular developments in these advanced countries, the school curriculum in India is narrowly conceived and largely out-of-date. It places undue emphasis on bookish knowledge and rote learning. There is, thus, an urgent need to raise, upgrade and improve the school curriculum in our country. The curricular and instructional dimensions of school education have remained static without sufficient guiding research. There is thus a real need for carefully planned and cumulative research to guide decisions in matters relating to curriculum development. Another phenomenon noticed in regard to curricular revisions in many States is that such a change or innovation too often forges ahead with evaluation lagging far behind, whereas evaluation should be an early phase of every developmental project.

Research related to methods of teaching school subjects has steadily improved. However, there is a great need for further refinement in tool development as well as in methodology of research. The limited scope of their sampling restricts, to a large extent, the validity of their conclusions. In many experimental studies the question that is often raised is: Which approach is better — Approach A or Approach B? This question is important from the point of view of curriculum as well as the methods of teaching different school subjects. However, there seems to be little profit from an either-or position in this issue. The description of experimental treatments is usually so brief or obscure that generalization to other teaching situations is often difficult to make. Such studies do little more than demonstrate the obvious or they add to the confusion. It is, therefore, necessary

to emphasize that such researches should focus on careful study of more specific questions. Further, instead of concentrating on narrow conceptions of academic achievement usually summarized by a single test score, emphasis should be on the measurement of multidimensional outcomes. Long-term follow-up studies and transaction studies focussing on actual classroom processes are very much needed.

There is much current discussion on developing a theory of instruction (Bruner, 1966). The type of thinking required to develop and test such a theory is very desirable from the point of view of the improvement of teaching certain school subjects such as mathematics and science. There is a real need for determining the several variables such as content, teacher behaviour, student characteristics, etc., and to determine the distinct set in the content area that matches the specific teacher behaviour and also the learner characteristics. In recent years, there has been increasing interest in the studies of Piaget, particularly in advanced countries. Such studies, in the Indian context, may provide great deal of information concerning the thinking of children before, during and after the particular type of instruction in school subjects.

There are no simple answers to language teaching. In spite of decades of research, the continuous questioning of our efforts and the persistent dissatisfaction among learners are still with us. Attention needs to be focussed on the ways and means of adapting teaching to the specific needs of the learner. Great progress has been made in the field of reading disability in several advanced countries. But, surprisingly, little attention has been paid by Indian researchers in this vital area of school education. This appears to be a fruitful domain of research.

Generally, the decisions about curriculum and teaching methods have often been explicitly rooted in or at least rationalized by reference to some form of psychological theory. Bruner's emphasis on general structures and heuristics of discovery as objectives, Gagne's concern with intellectual skills, and Asubel's commitment to the teaching of organized bodies of subject-matter knowledge, are all rooted in their contrasting views of the psychology of learning. These debates serve as the bases for the controversies in education concerning objectives. Thus a psychological analysis of the curricular materials and pedagogical method may raise ways in which specific psychological theories are to be translated into pedagogical prescriptions.

Little effort seems to have gone into developing and standardizing tests and other measuring instruments.

Based, as they are, on instruments lacking validity or reliability, the generalizations of some of the studies become suspect. There is, therefore, a great need for developing tests and measuring instruments with greater refinement and precision for data collection purposes.

It is important to realize that the controversies that characterized the debate in the past few decades in the area of curriculum and methods were really rooted in certain fundamental issues relating to epistemology, psychology and educational theory and centred round questions such as: what is knowledge most worth?, how

does learning take place?, what constitutes readiness for learning?, and how should objectives be expressed? It is only by reference to these broader issues that their particular manifestations in curriculum, methods and textbooks can be understood.

Research in the teaching of school subjects often seems to have little effect on classroom practices. It is axiomatic that for research to be worth while the results must be used. There is a real need to find ways of putting research findings to use.

ABSTRACTS : 742—841

742. ADINARAYAN, K., *A Teaching Strategy for Developing Appropriate Skills Required in Students for Conducting Scientific Investigations*, Ph.D. Edu., MSU, 1979

The objectives of the investigation were: (i) to develop competence criteria for the skills in operational terms, (ii) to construct learning packages suitable for average children in an ordinary classroom situation, (iii) to determine the advantages and effectiveness of learning through the packages by individuals and groups, (iv) to extend the study of the classroom situation and evaluate the outcomes, (v) to study the sources of variation in learning through the packages at the extended phase, and (vi) to obtain evidence concerning the ability of Standard VII children to conduct simple scientific investigations in a laboratory situation.

The sample consisted of students of Standard VII in the age group 11+. One hundred students selected for this purpose were divided into two equivalent groups. The subject chosen for the study was science. The study was conducted in six phases, in sequence. The six phases were: (i) pilot study, (ii) preparation of learning packages, (iii) individual and group tryouts, (iv) demonstration phase, (v) extension phase, and (vi) laboratory phase. Data were collected with the help of the individual record sheets, revision data sheet and error sheet prepared to modify the learning packages, criterion tests for four units prepared to measure the development of skills, performance test and checklist prepared to measure students' competence in conducting investigations and reaction and attitude scales. The obtained data were analysed using t-test.

The major findings of the investigation were: (i) At the demonstration phase the performance of the experimental group taught through the learning packages was significantly better than that of the control group taught by the conventional method. (ii) The effectiveness of learning through the packages did not differ from unit to unit when examined in terms of knowledge acquisition, but differed significantly when examined in terms of knowledge and development of skills. (iii) The development of laboratory skills was not uniform. At the laboratory stage it was found that in conducting scientific investigations in a laboratory situation as measured by the performance test, the performance of the students who were exposed to the learning packages and

given good training was significantly higher than that of the students who were not exposed to the learning packages but given conventional treatment. (iv) The students had favourable reactions towards the learning packages. (v) The teachers who were involved in the programme had favourable attitude towards the learning packages.

- *743. AHMAD, A., *A Critical Study of Basic Concepts and Skills to be Acquired in the First Two Years Course of Bookkeeping and Accountancy in Indian Higher Secondary Schools*, Ph.D. Edu., AMU, 1983

The objective of the study was to develop a list of basic concepts, skills and an improved syllabus for the first two-year course of bookkeeping and accountancy in Indian higher secondary schools.

Opinions of 150 school teachers and 50 college and university teachers regarding different topics, concepts and skills included in the syllabus were collected with the help of a five-point Likert-type scale constructed by the investigator. Chi-square test was employed to test the significance of difference between the opinions, which helped in inclusion or exclusion of a particular topic, concept or skill.

The study suggested that the following topics be included in the syllabus of the first two-year course of bookkeeping and accountancy: meaning and importance of bookkeeping and accountancy, principles of double entry bookkeeping, journal, ledger, cash book, other subsidiary books of accounts, bank transactions, and bill of exchange. The study also suggested the concepts and skills to be included in each of the above topics as also a model syllabus.

744. ANKLESHWARIA, M.T., *A Comparative Study of Different Strategies to Teach Nutrition to the Home Science College Students of Varying Intelligence*, Ph.D. Edu., MSU, 1980

The objectives of the study were: (i) to prepare programmed learning material with response sheets, structured lecture notes and taped teaching material with charts and worksheets containing sets of questions — all in the English language — on three units of nutrition, (ii) to find out the relative effectiveness of the three instructional strategies, viz., PLM + laboratory demonstration + discussion (strategy S₁), struc-

tured lectures with blackboard work + laboratory demonstration + library reference work (strategy S_2), and taped commentary with charts and worksheets + laboratory demonstration + discussion (strategy S_3), and (iii) to find out the differences in the effective use of the three instructional strategies as judged in terms of achievement of instructional objectives by the students of three levels of intelligence.

The experiment was conducted on 105 second year home science girl students using Latin square design and randomized group design. The students were divided into three equal groups of thirty-five each. The three units taught were on proteins, carbohydrates and fats. In the first phase the instructional materials were developed. The second phase included individual tryout of the strategies and the third phase involved field study, which was conducted to test the working of each component in each strategy. Data were collected through the achievement tests developed by the investigator and the intelligence of the students was measured using Raven's Standard Progressive Matrices. All the three groups were exposed to the three instructional strategies. The teaching was followed by the administration of the corresponding criterion tests. The data were analysed using statistical techniques like mean, standard deviation, F-test and t-test.

The major findings of the study were : (i) There were no significant differences between strategies S_1 and S_3 as well as strategies S_2 and S_3 . (ii) The strategy S_1 differed significantly from strategy S_2 in the case of unit one on proteins, in its effectiveness. (iii) Strategy S_2 was more effective with the high intelligence group. Regarding the other two strategies, the level of intelligence played no significant role. (iv) Equivalence in the effectiveness of the three strategies to a very great extent indicated that if enough pains were taken to provide similar learning environment through careful combination of suitable components to form each strategy, keeping in view the maximum participation of the learner, the strategies with different components may prove to be equally effective.

745. ARORA, G.L. and GUPTA, B.P., *Comparison of Curriculum Load at the Secondary Stage in Different States (Delhi, Haryana, Maharashtra, Kerala)*, Curriculum Group, NCERT, 1981

The major objective of the study was to analyse the load of curriculum on students of secondary stage, viz.,

Classes IX and X.

Techniques used for data collection included questionnaire, rating scales, interview, deliberations, group discussion, observation, etc. The study was conducted in Delhi, Haryana, Kerala and Maharashtra. A number of schools of various types, viz., rural and urban schools, boys and girls schools, government and government-aided schools, in the four States, were contacted to obtain data.

Analysis was done with respect to teachers' opinions about the purposes of teaching and of the existing curricula, reasons for their inability to finish the courses in time, approaches followed for covering course content, suggestions for the adjustment of curriculum load and difficulty index of the course content.

The main findings of the study were: (i) In Delhi, at the secondary stage, the existing curricula in English, mathematics, and Hindi were considered negligibly heavy while the curricula in science and social studies were considered somewhat heavy by teachers. In the opinion of students, science was the only subject with a heavy curriculum. (ii) In Maharashtra, the existing curricula in English and social studies were considered negligibly heavy while the curricula in Marathi, science and mathematics were considered to be somewhat heavy. In the opinion of students science was the only subject with a heavy curriculum. (iii) In Haryana at the secondary stage, the present curricula in all the five subjects, namely, English, Hindi, science, mathematics and social studies were negligibly heavy. According to students, mathematics had a heavy curriculum. (iv) In Kerala, at the secondary stage, the curricula in English, Malayalam, mathematics and social studies were somewhat heavy while that in science was considered to be negligibly heavy. Students considered mathematics to be the only subject which had a heavy curriculum.

746. BALA, V., *A Comparative Study of the Effects of Modern and Traditional Mathematics Curricula on Piagetian Concrete and Formal Logical Thinking*, Ph.D. Edu., Pan. U., 1980

The major hypotheses of the study were: (i) Modern mathematics curriculum facilitated Piagetian concrete logical thinking in a greater degree than the traditional curriculum at the primary school level. (ii) Pupils of lower secondary schools exposed to modern mathematics curriculum performed significantly better on Piagetian formal operational tasks than pupils studying traditional mathematics. (iii) Boys and girls of modern

mathematics group of Grade IV performed significantly better than those of the traditional group on Piagetian concrete operational tasks. (iv) Boys and girls of modern mathematics group of Grade VII showed significantly better performance on Piagetian formal operational tasks than those of the traditional group.

The study was designed as a single factor experiment. A mixed sample (boys and girls) of fifty-eight students of Grade IV, and sixty of Grade VII, selected from a school in Ambala (Haryana), was taken. The sample was randomly divided into two treatment groups which were separately exposed to the two curricula by the same teacher, for a period of sixteen weeks. The two groups of both the grades were found to be alike on means and standard deviations on Cattell's Culture Fair Intelligence Test. Means and standard deviations of ages of the two groups, of each of the two grades, were also almost equal. Experimental controls and controls of variables were exercised. Both the groups of both the grades were posttested on Piagetian concrete and formal operational tasks and scoring was done according to the stages given by Piaget himself.

The major findings of the study were: (i) Modern mathematics facilitated Piagetian cognitive thinking ability to a greater degree than the traditional mathematics, at the primary school level. (ii) On Piagetian formal operational tasks both the groups (modern and traditional) of Grade VII were found to be nearly equal. (iii) Boys and girls of the modern group of Grade IV, performed significantly better than those of the traditional group on several of the Piagetian concrete logical measures. (iv) Boys and girls of both the groups (modern and traditional) fared almost equally well on Piagetian formal operational tasks. (v) Acceleration of concrete logical thinking through modern mathematics was indicated. (vi) Acceleration of cognitive abilities could be declared only with some reservation, as scholars and studies have pointed out temporary gain in these.

747. BALARAMAN, S., HEGDE, K.S. and RAMANI, S., *Goals of Basic Engineering Education in India*, IIT, Madras, 1982

The objectives of this nationwide study were: (i) to enable experts to identify goals and arrive at a consensus on the goals of engineering education in India, and (ii) to determine the priorities of these goals for the coming decades.

One hundred and nine Indian experts from industry, research and development organizations, engineering

colleges, and institutes and defence and government services participated in a Delphi exercise to arrive at a consensus on the goals of engineering education. Forty goals were identified on the basis of a content analysis of the responses to an unstructured first round questionnaire. During the second round, the goal statements were presented to the panelists in the form of a five-point Likert-type scale, the Priority of Goals Questionnaire. The 40 goals were placed in three categories, viz., national tasks, professional skills and professional attitudes. The priority ratings were summarized and the model values indicated during the third Delphi round. The panelists were required to give reasons for their ratings which coincided with majority ratings. During the final round, lists of reasons for majority ratings were summarized for each goal and presented to the panelists who were then requested to reconsider their majority ratings after studying the feedback. They were free to move to the majority or any other rating or continue to support their majority rating.

At the end of the final (fourth) round, the consensus among the Delphi panelists had increased for every goal without exception. The consensus levels for most of the goals ranged between 50 per cent and 79 per cent. Goals receiving the highest priority ranks and fairly high consensus percentages (above 60 per cent) were national tasks, energy sources and systems, food production and processing and industrial development, professional skills and professional attitudes with reference to professional integrity, interest in updating professional skills and knowledge, willingness to work in a team towards common objectives and a sense of professional pride. The highest consensus percentages (above 70 per cent) were obtained for energy sources and systems, food production and processing and professional integrity. The results suggested that the developing countries must strike a balance between the goals for engineering education and the specific national goals such as the development of energy sources and systems, increasing food production and processing and accelerating industrial and rural development. The national tasks category of goals might be viewed as the mission of engineering in Indian society. At the same time, this mission of engineering cannot be fulfilled without the inculcation of certain skills and attitudes in our young engineers and technologists.

748. BALARAMAN, S. and KRISHNAN, R.K., *Toward Institutional Goal Consciousness — a Faculty Study of Perceived Goals and Goal Orien-*

tations in Engineering Education, IIT, Madras, 1982

The objectives of the study were: (i) to determine the priorities of basic engineering education goals as perceived by engineering college faculty, and (ii) to compare the perceived priorities of goals and goal orientations of engineering college faculty with that of 109 experts who participated earlier in a Delphi on Goals of Basic Engineering Education in India.

A goals survey was conducted with a national sample of engineering college faculty. A stratified random sample of 2,000 faculty members was drawn from the target population of 9,603 full-time teaching faculty employed in the 112 recognised engineering college/institutes (1976-77). It was observed that the faculty came from both urban and rural families and only a negligible percentage came from the weaker sections of society. Data were gathered with the Priority of Goals Questionnaire (a five-point Likert-type scale with forty goal statements) and a brief biographical information blank. The goal statements were placed in three categories, viz., national tasks, professional skills and professional attitudes. Six hundred and forty-six faculty members sent in their responses.

When the priority ratings given by the Delphi experts and engineering college faculty were compared, it was observed that both the groups were in close agreement on 70 per cent of the goals of basic engineering education. The consensus percentages received from the overall faculty group were consistently lower than those received from the Delphi experts in the final Delphi round. To assess whether there were patterns of goal orientation among engineering academics and the Delphi experts, a new Goal Orientation Index was calculated. When applied to the data, this index revealed both groups had given a higher priority to attitudinal goals than to professional skills and national service goals. Priorities assigned by the faculty to the goal categories were not influenced by faculty background variables. However, within each faculty subgroup, significant differences were found between the distribution of the goal orientation index for the three goal categories, viz., national tasks, professional skills and professional attitudes.

The objectives of the investigation were: (i) to study the school of music (sangeet gharana) of Vindhya Pradesh, and (ii) to study the music education and training in Vindhya Pradesh.

The study was conducted in three parts. In the historical part of the study, the investigator made library searches and visited places, music schools and colleges, musicians and patrons, and interviewed them to ascertain the specific characteristics of the school of music of Vindhya Pradesh. In order to ascertain the need and objectives of music education, the place of music in the curriculum and also in the life of the schools and colleges, and its teaching techniques, the investigator conducted interviews and also collected data through a questionnaire from a selected sample of teachers and musicians. Further, the investigator made efforts to identify the qualities and characteristics of naturally gifted musicians. To identify the musical talents on the criteria, a random sample of school students from all the districts of Madhya Pradesh was selected, and from Rewa and Maihar the sample was selected from the music schools. Finally, four groups of students, five in each group, were selected for experimental observation. Two groups were students of vocal music and the other two groups were from instrumental music groups.

The study revealed that culture of music was prevalent in Vindhya Pradesh even before Tansen. It was evident from the frequent mention of the musicians of Bundel and Baghel royal dynasties that there was a tradition of music in this part of the country though no authentic history was available. According to history, it seemed that with the advent of the Baghel dynasty, Kabir and Dharmdas were the pioneers in music, later on came Tansen and that seemed to be the beginning of the Vindhya tradition or school of music. The survey of the musical talents and characteristics revealed that a taste and devotion to music, an urge to create or recreate, keeping oneself submerged in an atmosphere of music, regular exercise and hard labour, efforts to bring in novelty and apply new things, were the important requirements to be a musician. From the experimental observation it was found that there was need for teachers to pay individual attention and attend to the natural talents of students and that in this way, taste and capacity be developed slowly to take music as a serious endeavour.

749. BANERJEE, R. K., *School of Music and Its Teaching Techniques in Vindhya Pradesh*, Ph.D. Edu., APSU, 1980

750. BANSAL, I. K., *A Comparative Study of the Abilities of Students of Modern and Traditional Mathematics*, Ph.D. Edu., Del. U., 1979

The objectives of the study were: (i) to find out whether the school students studying modern mathematics at the secondary level possessed more critical thinking abilities than those studying traditional mathematics at that level, (ii) to find out whether at the secondary school level, the students studying modern mathematics possessed more creative thinking abilities than those studying traditional mathematics, (iii) to find out the factor patterns of the abilities of students studying modern mathematics as well as of students studying traditional mathematics at the secondary school level, and (iv) to compare the factor patterns of the abilities of students studying modern mathematics with those studying traditional mathematics at the secondary school level. The hypotheses framed were that there was no significant difference between the secondary school pupils studying modern mathematics and those studying traditional mathematics as regards the critical thinking abilities, the creative thinking abilities and the factor patterns of abilities.

The sample consisted of 424 and 404 students from Delhi and Meerut, respectively. For data collection, two achievement tests in mathematics for Class VIII students and two batteries of tests of critical and creative thinking abilities were constructed. Besides the above tests, Jenkin's Non-verbal Group Test of Intelligence, Mehrotra's Test of Space Visualization and Verma's Socio-Economic Status Scale were administered to the students. Statistical techniques like mean, median, standard deviation, quartile deviation, significance of difference, factor analysis and product moment correlation were used in analysing the data.

The major findings were : (i) Students of modern mathematics possessed more critical thinking than those studying traditional mathematics curriculum. They possessed to a greater extent the reasoning power of if-then type. (ii) The modern mathematics students had more developed ability of judging whether certain statements contradicted each other and utilized explanatory hypotheses more often than the students of traditional mathematics. (iii) The factor analysis did yield two identical factors, termed as hypothesis verification and divergent thinking, for the students of modern mathematics as well as for the students of traditional mathematics. (iv) Results obtained by orthogonal rotation were: (a) critical thinking ability as well as other variables of critical thinking, namely, number series, number classification, inference and symbol manipulation had moderate loadings in the factor of hypothesis verification, for both the samples. The remaining variable of critical thinking, namely, sign changes, had moderate loading on the fac-

tor of hypothesis verification for the students of modern mathematics only and (b) creative thinking ability, as well as other variables of creative thinking, namely, first and last letters, utility test, number combinations and make-up problems, had moderate loadings on divergent thinking for both the samples.

751. BARKI, B. G. and BHAT, R.N., *Improving the Utilization of Library Resources in Polytechnics*, TTTI, Madras, 1981 (UNDP-assisted)

Since the library formed an important component of polytechnic education, a considerable amount of money was being spent in equipping it. This project aimed at (i) finding out the extent of library use by the students of polytechnics, (ii) identifying causes for inadequate library use, and (iii) carrying out action research programme to improve library use.

Eleven polytechnics from the four States of southern region were selected for the study. Questionnaires were administered to the teachers handling final year class and students of the final year class. Based on the results of this phase of the project four institutions were selected for the action research programme. The library method of teaching was implemented in these institutions. Difference in the attitude scores and achievement test scores was computed for the experimental and the control groups to find out the effectiveness of the library method of teaching in improving the effectiveness of library use by students.

The important findings of the study were: (i) Libraries were not put to optimal use by students. (ii) The teaching methods used by teachers did not encourage students to use their institutional library. (iii) Students had considerable difficulty in borrowing books. (iv) The physical environment of the library was not conducive to reading in the library. (v) The library method of teaching was more effective than the traditional method in improving the achievement of students through proper utilization of library resources.

752. BASU, B. and RAO, V.K., *The Concept of National Integration*, N.S.R. College of Education, Hyderabad, 1979

The study attempted to formulate a concept of national integration. The sample consisted of thirty expert educationists in the departments of philosophy, sociology, languages and faculty of education of

Osmania University, Hyderabad. On the basis of various definitions of national integration given by different thinkers, an opinionnaire was constructed. The aspects were stated under the subheadings of knowledge, understanding, attitude, interest and values. The attitude scale was of three points: essential, necessary and not necessary. The chi-square test was employed to analyse the data.

The findings of the study were: (i) Elements from the knowledge subheading which were found to be significant were physical features, mineral resources, other natural resources, industries, trade and commerce, social customs of the people, social development, rituals followed by different people, important festivals, the political history of different parts of the country, the national movement of the country, great leaders in different fields, great writings of the country, great poets and musicians and educationists of different parts of the country. (ii) Elements from the understanding subheading which were found to be significant were understanding of national heritage, techniques of grouping concept of patriotism, secularism, inter-cultural understanding amongst subcultures, ideals of democratic pluralism, social, economic and political justice, liberty of thought, expression, belief, etc. (iii) Elements from the attitude subheading which were found to be significant were brotherhood amongst people, coexistence with subcultures, tolerance of different languages, religions and cultures, respect for dignity of man, open-mindedness, dependence among different regional standards, inclusion of democratic method and outlook and respect for equality of opportunity for all. (iv) From the interest subheading such elements as interest about subcultures were found to be significant. (v) Cultural values and democratic values were found to be significant from the subheading, values.

753. BHARADWAJ, L. P., *Survey of KAVAL Towns with regard to the Availability and Use of Teaching Aids in Schools*, 1981 (NCERT-financed)

The status study was an attempt to find out the position of audio-visual teaching aids. A sample of two hundred private and government boys' and girls' schools comprising pre-primary, primary, junior high schools and higher secondary schools was selected from Kanpur, Agra, Varanasi, Allahabad and Lucknow. Data were collected through questionnaires and interviews of teachers, students, principals, suppliers of teaching aids and other official and non-official agencies.

The study analysed: (i) the position of audio-visual aids with respect to availability and use of teaching aids along with difficulties encountered in the availability of appropriate aids, and (ii) their use in respect of existing facilities of trained persons as well as the administrative difficulties encountered in procuring them.

754. CENTRAL REGIONAL CENTRE, *Nutrition Health Education and Environmental Sanitation in Primary School*, State Institute of Science Education, Jabalpur, 1981 (NCERT-financed)

The objectives of the project were: (i) to ascertain the local condition and nutrition, health and sanitation habits of experimental area, (ii) to develop instructional material for students and teachers relevant to local environment, (iii) to orient the educational supervisors and teacher-educators of the area, (iv) to train teachers, one each from the selected tribal/rural schools, and (v) to implement the programme in selected schools and evaluate the impact of the programme.

The project experimentation was carried out in eleven selected villages with the help of teachers ranging from thirty-six to thirty-nine. Activities of the experimentation-participating teachers were to carry out a base line survey of five families, to introduce the message in at least forty families, to check the nutrition, health and sanitation habits of each family as per checklist, evaluate the impact of the messages introduced in subsequent visits as per checklist and provide remedial suggestions, to help develop desirable practices in school children, observe behavioural changes during school hours and evaluate the progress as per checklist, and to maintain records of the health status of the village as per proforma supplied. The entire experimentation was monitored through a three-phased orientation programme. In the first programme, the teachers were oriented to the task, subsequent programmes were devoted to reviewing the progress, discussing and solving the problems, and so on. The teachers reported their evaluation data in six trials, each at an interval of a fortnight. The data thus generated were treated qualitatively; however, means and standard deviations were calculated for each item for the first and the sixth trials and the t-test applied.

The main findings of the project were: (i) The impact was observable in (a) awareness of the cleanliness of clothes, hand and feet and cutting of nails, (b) the use of soap and waste water in the kitchen garden, (c) the bathing habits—keeping a distance from the well, defecating habits — maintaining a longer distance from

the village, using water in containers rather than from ponds directly, (d) the preparation of food — using starch and flour, washing vegetables before cutting, eating green vegetables, etc. (ii) The t-values were found significant between the first and the sixth trials on the primary school children with respect to cleanliness of teeth, tongue, nails and feet, spitting in spittoons, urinating in urinals, throwing garbage and waste into the dustbin or compost pit, washing hands and mouth before and after eating, and covering mouth and nose while coughing and sneezing. (iii) The t-values were not significant with respect to cleanliness of eyes, nose, ears and hands. (iv) For the community at large, improvements were found in all the twenty-eight items. The percentage gains ranged from 0.30 per cent to 62.73 per cent. The highest gains were recorded in washing vegetables before cutting (62.73 per cent), cooking food in sufficient water (58.63 per cent), using leaves of carrot, raddish, etc. (49.07 per cent) providing supplementary food at the age of four months (45.12 per cent), feeding the child when sick (44.74 per cent), keeping clothes clean (40.09 per cent); the lowest gains were in covering the excreta with mud (0.30 per cent), defecating in latrines (0.42 per cent) and washing hands after defecation (0.94 per cent).

755. CHANDRA, H. and BHAN, C., *A Survey of Physical Education in High and Higher Secondary Schools in Haryana*, State Institute of Education, Karnal, 1970

The specific aims of the study were: (i) to obtain a first-hand picture of the existing conditions in high and higher secondary schools for imparting physical education, (ii) to ascertain the position of such activities as gymnastics and hiking, which particularly aimed at creating in children a love for open air and healthy way of living and also developing in them a spirit of adventure and cheerful disposition, (iii) to ascertain the position of existing facilities with regard to the organizing of health services in schools, (iv) to determine those specific difficulties that stood in the way of organizing programmes of physical education in schools, (v) to find out the efforts were being made by the educational institutions to determine the health and physical status of children in the light of national/international standards as evolved in the National Physical Efficiency (NFE) Test, and (vi) to explore whether the educational institutions located at the same place could have some improved common programmes of organizing health and physical education activities by pooling their

resources.

The study was confined to 314 high and higher secondary schools of Haryana. A questionnaire consisting of thirty-five questions was constructed for collecting data.

The major findings of the study were: (i) There was no provision of trained regular staff in government (13.1 per cent) and private (62.5 per cent) schools. PTIs were working in 63.8 per cent government schools. There was no provision of playgrounds in government girls (50 per cent) schools and there was no gymnasium except in 6.2 per cent private schools. (ii) A major portion of expenditure on physical education was on refreshment to teams and payment of TA and DA to players and teachers during tournaments and comparatively much less on sports material. (iii) Health and physical education activities mainly consisted of various games and were organised after school hours in 78 per cent schools, in 90 per cent schools a mass PT programme was organised in the morning daily. A majority of girls' schools did not organize athletic activities. (iv) Most of the boys' schools (93.8 per cent) participated in school tournaments. (v) There was no provision for health and physical examination of children in government schools (87.5 per cent). (vi) A very few (government 3.9 per cent and private 12.5 per cent) participated in National Physical Efficiency Test. (vii) Stress on academic achievement, shortage of funds and equipment, inadequate playgrounds, lack of provision for school dispensary, lack of provision of separate room-cum-stores, etc., were the common difficulties in organizing programmes of health and physical education. Shortage of trained and experienced staff of physical education to provision of regular refreshment and lack of interest of other staff members were the uncommon difficulties in organizing the programmes of health and physical education. Indigenous games and yogic exercises, fancy marching, action songs, gymnastics, box work, athletics, scouting, hiking, programmes of play for all, etc., were the suggested activities under health and physical education programmes. (viii) Trained and efficient staff, adequate playgrounds, more funds, films on health and physical education, midday meals, regular refreshment, in-service/ refresher courses, posts of physical education staff, health records, more periods for physical education, etc. were the opinions expressed by the secondary schools, regarding the help which they expected from government/management for organizing health and physical education programmes in order to achieve the desired objectives.

756. DASH, S.C., *Introduction of Work Education in*

Primary Schools — a Pilot Study, SCERT, Orissa, 1981

The major aim of the study was to develop models of curriculum in work education for primary classes. The specific objectives were: (i) to identify the situations related to work education, (ii) to develop necessary instructional materials, and (iii) to develop tools to evaluate outcomes of activities related to work education.

The sample consisted of ten schools. In five schools, cane work was introduced and palm leaf work was introduced in the second set of five schools. Facilities which would support work education were surveyed. A questionnaire was developed to collect information regarding village, school, enrolment and other relevant factors. An interview schedule was also developed.

The major outcomes of the pilot study were: (i) The curriculum of work education could be conveniently divided into three groups as for Classes I and II, Classes III, IV and V and Classes VI and VII. (ii) It was found difficult to clarify the skills and processes to be acquired by students of each class and combination of different classes. (iii) A curriculum on work education and instructional materials were developed, tried out and found satisfactory. (iv) Curriculum for work education should be based on local resources and work situations available.

757. DEV, S.K., *A Critical Study of the Methods of Teaching in the Secondary Schools of Nagaland*, Ph.D. Edu., Gau. U., 1979

The major objectives of the investigation were: (i) to study methods of teaching school mathematics in Nagaland, and (ii) to evolve an effective instructional programme in mathematics especially for the schools in Nagaland.

An attempt was made to evaluate classroom teaching in mathematics. Keeping in view the principles of teaching mathematics, twenty-one classroom teaching activities were conceptualized. After analysing the opinions of ten experts regarding the efficiency of these activities, they were employed in measuring classroom teaching effectiveness. Data were collected through structured interview, questionnaire, observation, inventory and tests. The Pupil Attitude Inventory, Mathematics Teaching Competence Scale, headmaster's rating scale for teacher behaviour and Minnesota Teacher Attitude Inventory were employed to collect data. For

measuring effectiveness of existing mathematics syllabi and for investigating learning facilities and departmental supervision Pupil's Maturity Test and Arithmetic and Teaching Learning Facility Schedule were used. The study was based on the observation of a stratified random sample of twenty schools (eight urban and twelve rural) selected from three districts of Nagaland, viz., Kohima, Mokokchung and Tuensang. In all, forty-nine teachers and 1,877 pupils from Classes III to VI were included in the final sample.

The study revealed: (i) Teachers were more interested in lecture method. They had a negative attitude towards reflective type questioning. (ii) A large number of teachers could not maintain logical succession of steps and 40 per cent of the teachers could neither do sums correctly nor explain through correct and economic procedures. (iii) Teachers were poor in questioning skill mainly because they were weak in subject matter. (iv) The percentage of teachers having positive attitude towards making the lesson objective was the highest and it was the lowest towards ensuring assimilation. (v) About 82 per cent teachers did not ensure whether the concept was understood by the students or not. (vi) In all, 65 per cent teachers did not strive to evoke non-coercive participation from students. (vii) About 61 per cent teachers could not effectively guide pupils' ideas towards objectives of the lesson. (viii) About 61 per cent teachers followed what had been said in textbooks. (ix) The majority of the teachers did not have creative ability. (x) The intercorrelations of teaching behaviours were quite substantial. (xi) The factorial study of teaching behaviour revealed that the teaching behaviour for pre-learning activities had a high impact on in-learning process. In all, three learning modules, viz., pre, in and post, were identified. (xii) The teaching behaviour appeared to have a functional relationship with teaching experience. (xiii) Teachers who took college courses in mathematics (pre-degree or degree) seemed to be more efficient in teaching mathematics than matriculate and under-graduate teachers. (xiv) Teaching success depended partly on the teacher's personal feelings towards the profession. (xv) The existing mathematics syllabi were unscientific. (xvi) The mathematics textbooks were defective. (xvii) The teaching-learning facilities were inadequate in a majority of the schools. (xviii) The teacher behaviour and the achievement of the pupils were interrelated.

758. DEVI, C. J., *Physical Education and Its Influence in the Adjustment of Adolescent Girls in Secondary*

Schools of Manipur, Ph.D. Edu., Gau. U., 1979

The main objectives of the study were: (i) to understand and analyse the prevailing conditions of physical education in Manipur schools, (ii) to compare the adjustment levels of students in five areas of adjustment, and (iii) to offer suggestions for the improvement of facilities and standards of physical education in schools.

The normative survey method was employed. Data were collected from headmasters/headmistresses of 100 selected schools of the State of Manipur by means of a questionnaire. The selected maladjusted adolescent girls were studied in depth. The interview technique was used for this purpose. To study the influence of physical education on adjustment related to five areas, viz., home, school or college, social, health and emotional, the matched group method was adopted. Two matched groups, 100 girls in each group, similar in respect of age, class, intelligence and socio-economic status, were formed by selecting students from Classes VIII to XII of ten selected secondary schools in Manipur. The experimental group consisted of girls who took part and did well in physical education activities, specially games and sports. The control group consisted of girls who did not take part and were not interested in these activities. Bhatia's Battery of Performance Test of Intelligence, Socio-Economic Status Scale (Urban-Kuppuswamy) and Adjustment Inventory (Saxena) were the tools used. Teachers in charge of games or physical education instructors of the selected ten schools were interviewed.

The study revealed: (i) There was significant difference between the adjustment of girls in the experimental and control groups in social, health, home, emotional and school areas. (ii) Except in the area of home adjustment the influence of physical education was positive in other areas, viz., health, social, school and emotional. (iii) Physical education played a very important part in the adjustment of the adolescent girls. (iv) Physical education provided ample scope for the development of total personality of an individual. (v) The prevailing condition of physical education in Manipur was very poor and the facilities provided were inadequate.

759. DHARMADHIKARI, V. V., *A Critical Evaluation of Teachers' Handbooks for Work Experience*, Government Technical High School, Jalgaon, 1973 (MSBTPCR-financed)

The main objectives of the study were: (i) to analyse whether the handbooks were helpful in achieving the

objectives of work experience mentioned in the syllabus, and (ii) to examine whether the handbooks contained any errors with respect to illustrations, figures, explanations, etc.

The study was confined to the analysis of three handbooks, namely, *Repairs and Care of Electrical Appliances*, *Repairs and Care of Stoves and Book-binding*. The study was undertaken in twenty-seven urban and rural schools in Jalgaon district where the three work experience subjects were taught, and five technical high schools located in Jalgaon, Dhulia and Nasik districts. Data for the study were collected through two questionnaires sent to twenty-seven teachers of work experience and to thirteen experts working in the five technical high schools.

The main findings of the study were: (i) The handbooks, in general, contained sufficient information and appropriate work charts for achieving the relevant educational objectives. (ii) The figures given in the book needed to be revised as some of them were unnecessary and some faulty. (iii) British weights and measures used in the handbooks had not been replaced by the metric measures. (iv) The original English technical terms existed in the handbooks. (v) In some schools, the time-schedule did not permit demonstration and practical work specified in the handbooks.

760. DUNAKHE, A. R., *An Investigation into the Reading Interests and Habits of the First Year Degree Course Marathi Students Studying in Colleges Affiliated to the University of Poona*, Ph.D. Edu., Poona U., 1978

The major objectives of the inquiry were: (i) to compare the place of reading in the overall leisure-time activities of students, (ii) to find out the features of magazines and newspapers which were read by students, (iii) to study the reading interests of college students, (iv) to compare the overall purposes of reading, time spent on reading, sources of getting reading material, etc., of students of different sexes, faculties and locations, (v) to ascertain the effects of reading on students, and (vi) to survey the library facilities provided for students in colleges.

The sample comprised forty-three out of the seventy-six colleges affiliated to the University of Poona. These colleges were distributed over five districts and in rural and urban areas. The sample further comprised 2,290 students — about 13.31 per cent of the student population. The tools of research consisted of questionnaires

for students and librarians, diary form and interview. The statistical techniques used for data analysis were chi-square test, t-test and percentages.

Some of the major findings of the inquiry were: (i) The majority of the students of arts, science and commerce faculties got more than four hours of leisure time on Sundays and holidays. (ii) Students of arts faculty preferred reading as a leisure-time activity unlike students of other faculties. (iii) More students of commerce and science faculties were found regularly reading newspapers than students of arts faculty. Arts students read newspapers occasionally; they read only Marathi newspapers. Not a single English newspaper has a place among the first five newspapers in order of preference. (iv) On an average, a commerce student spent more time on reading newspapers than arts or science students. Commerce students preferred reading business and company affairs. The students preferred light items like cine world, accidents, sports and games, strikes, morchas, crime news, etc. Not more than 18.6 per cent of the students read editorials of newspapers. (v) No English weekly had a place in the first few choices of weeklies given by students. (vi) Science students read extra books more regularly than arts and commerce students. (vii) Normally, the home was the source for newspaper for a majority of students whereas for magazines, the sources were the public library, home and friends. (viii) A fewer number of science students used the college library as compared to arts and commerce students. (ix) Very few students participated in activities like book exhibition, lectures on books, etc. (x) On an average, a science student and a commerce student had more books in his personal library than an arts student. (xi) Regular college study requirements came in the way of regular reading of other books, according to a majority of students. (xii) Some of the purposes given for reading were developing some ideals, passing time and keeping oneself informed. (xiii) Women preferred reading as a leisure-time activity more than men. Sex had no influence on periodicity of reading newspapers. (xiv) An urban student spent more time on reading weeklies than a rural student. But a rural student spent more time on reading newspapers.

761. DWIVEDI, K., *Development of Study of Sanskrit in Madhya Pradesh (1901 to 1962)*, Ph.D. Sans., Saug., U., 1968

The objectives of the study were to investigate: (i) the educational traditions in the early history, (ii) the problems faced in the development of education, (iii) the

place of Sanskrit schools and their participation in the educational scene of Madhya Pradesh, and (iv) the place of Sanskrit in public education in the light of education in the early ages.

A questionnaire was prepared and sent to 1,156 institutions, both government and private, all over India imparting Sanskrit education at various levels. A little more than 40 per cent of the institutions returned the questionnaire. In Madhya Pradesh some selected Sanskrit institutions were visited and observed; interviews were conducted with some important personalities in the field. Further, considerable amount of data was collected from records and books available in libraries and government departments.

Some of the major findings of the study were: (i) More than 34 per cent Sanskrit schools were run by the public, another 31.65 per cent by the government, the rest were supported by scholars, rich people, religious organizations, etc. (ii) Between 1901 and 1962, there were 278 Sanskrit schools and colleges, two Ayurvedic institutions and three astrological schools. (iii) Despite governmental support the enrolment in these institutions remained inadequate; it rose from an average of 18.5 in 1900 to 44.1 in 1962 per institution. (iv) Many of these institutions were single-teacher schools. (v) The teachers in the Sanskrit institutions had a consistent history of being paid low salary as compared to other teachers. (vi) In the absence of provision for training, teachers in the Sanskrit schools and colleges remained untrained. (vii) The subjects taught were Navya Vyakaran and Kavya, Darshan, Puran, Itihas, Karma Kanda, Prachin Vyakaran, Jyotish, Ayurved and religion. (viii) Most institutions either did not have a library or had a poor one; teachers and students sat on the floor with mattresses or jute mats. (ix) The major problems faced in the spread of Sanskrit education were lack of encouragement and information about it restricting the popularity of Sanskrit education, indifference of the government towards Sanskrit education and lack of provision of education in religion and religious practices except in Jain institutions. (x) During the period quite a few Sanskrit schools were closed, the enrolment reduced in other institutions; the reasons forwarded for this situation were lack of missionary spirit, self-centred life, religious education in the name of Sanskrit education, governmental policies and the like. (xi) In order to improve the situation it was felt necessary that abilities be developed in Sanskrit scholars to conduct comparative linguistic studies and that a new generation who were equally educated in Sanskrit as well as Western traditions of medicine, tantra and shilpa vigyan be trained.

- 762.** GCPI, *A Study of the Errors Committed by the Examinees at High School Stage in Response to Questions related to the Map of India*, Allahabad, 1981

The main objectives of the study were: (i) to diagnostically analyse the nature and extent of the errors committed by the examinees in response to a question related to the map of India, and (ii) to suggest a few remedial measures for improving the students' ability in drawing the maps.

A sample of fifty answerbooks of Geography from the April 1980 high school examination of the Uttar Pradesh Board of High School Examination was randomly drawn. A random sample of ten female students from the Women Inter College, Allahabad, and five male students from the Government Inter College, Allahabad, was also drawn for the purpose of filling up the map. The main points which served as the criteria while analysing the students' responses were the drawing of the map, showing of mountains, rivers, lakes, cities, mineral oil, tea regions, railway lines, etc. The data were analysed by computing percentages and frequencies.

The findings of the study were: (i) More than 60 per cent of the students failed in drawing the map correctly. (ii) Of the 50 students, only five showed the locations of mountains on the map correctly; thirty-six students gave incorrect responses whereas the responses of the rest of the students were partially correct. (iii) More than 75 per cent of the students failed in indicating the lakes, rivers and cities correctly. They did not have complete knowledge of the sign/symbols of these objects. (iv) For the improvement of students' skills in drawing maps correctly the remedial measures should include a good integration of theoretical and practical knowledge regarding the maps and thorough information and practice of the different signs to show different objects on the map.

- 763.** GCPI, *A Study of the Existing State of Affairs with respect to the Condition of Games and Sports in Higher Secondary Schools*, Allahabad, 1981

The objectives of the investigation were: (i) to study the existing condition of games and sports in higher secondary schools, (ii) to find out the various factors responsible for the fall in standards of games and sports, and (iii) to suggest various possible measures to improve the standard of games and sports in higher secondary schools.

The investigation was carried out in thirty schools

from all over the State of Uttar Pradesh, representing the various regions, such as eastern, western, central, and hilly regions and Bundelkhand. The schools were selected by random sampling. The various instruments used for collection of data were a questionnaire for the principals to know their reactions pertaining to the existing conditions of games and sports, a questionnaire for games teachers and for games experts to know their views regarding the various reasons for the fall in standards in games and sports and methods to uplift them, and a proforma for students to get their reactions on the existing conditions of games and sports and suggestions to improve upon them. The frequencies and percentages were computed for analysing the data.

The factors responsible for the low standard of games and sports were: (i) Lack of interest among students and teachers in games and sports; teachers' involvement in tuitions after their regular teaching time; shortage of funds and space for indoor games and improper playgrounds, absence of paper on sports and games in the examinations; non-compulsoriness of participation in regional and inter-school competitions; lack of reorientation to the games teachers in new techniques of games; shortage of trained and capable games teachers; lack of proper coaching for good sportsmen; shortage of games equipment; scarcity of time for games and sports in double-shift schools; non-cooperation from other teachers of the school; teaching of other papers by games teachers; absence of encouragement and motivation to games teachers; lack of consideration to efficiency in games and sports while giving admissions in schools of physical education; absence of class IV staff to manage games and sports; heavy work-load of the games teacher; lack of provision for the supervision of physical education; non-availability of chances of promotion for games teachers; absence of planning of games and sports by the technical experts; lack of proper structuring and organization of games and sports at different stages; absence of fixed time for games and sports before and after the school timings; lack of encouragement and motivation to players, and non-availability of games and sports equipment to students. (ii) Suggestions for improving the existing condition of games and sports included the availability of material facilities, of proper care and time for games and sports and of trained and capable staff for organizing games and sports competitions at different levels.

- 764.** GHAROTE, M. L., *Physical Fitness in relation to the Practice of Selected Yogic Exercises*, Ph.D. An

throp., Poona U., 1974

The objectives of the study were: (i) to determine whether general physical fitness, as measured by the Fleishman Battery of Basic Fitness Tests, would improve with the selected yogic exercises, (ii) to determine whether different items of this physical fitness test battery also recorded significant improvement, (iii) to determine whether the improvement in general physical fitness, if there be any, was sustained after discontinuation of the practice of the selected yogic exercises for a period of three weeks, (iv) to determine whether the improvement was also sustained uniformly in different items of the test battery after discontinuing the practice of the selected yogic exercises for a period of three weeks, and (v) to examine the effect of the practice of selected yogic exercises for a period of three weeks on the body fat percentage, body density and the skinfold distribution of adults.

The study consisted of two experiments. The first experiment was conducted on forty secondary school students residing in school hostel at Lonavala in order to study the effect of selected yogic exercises on their physical fitness. The second experiment was conducted on forty-four healthy male adult individuals, mostly physical education students and teachers from all parts of India, to study the effect of selected yogic exercises on their body composition. The first experiment used a matched group design while the second, a single group pretest-posttest design. Physical fitness was measured by Fleishman Battery of Physical Fitness Tests. Appropriate measures of height, weight, skinfold, body density and body fat were used. The experimental treatment consisted of three weeks' of selected yogic exercises. In the first experiment, after three weeks' of yogic exercises, a three weeks' period of detraining was observed by the experimental group to make delayed effect observations.

The main observations from the study were: (i) Practice of the selected yogic exercises helped to increase the physical fitness index derived from the Fleishman Battery of Basic Fitness Tests. (ii) Improvements in leg lifts, shuttle run and balance were observed. (iii) No improvement was seen in extent flexibility, dynamic flexibility, softball throw, cable jump, pull ups and 600 yards run after the yogic practice at the end of three weeks. (iv) The detraining effect showed that the subjects lost significantly in the physical fitness index, though not completely. (v) The detraining effect on the individual test items of the Fleishman Battery revealed the group showed significant improvement in extent flexibility,

dynamic flexibility, soft ball throw, balance and 600 yard run, indicating a delayed effect of the practice. (vi) The scores in the leg lift were maintained while the scores on shuttle run and pull ups were reduced after the detraining period. (vii) The body fat did not show any change for the group as a whole but further analysis revealed that those who initially had higher body fat percentage lost significantly (losing group) whereas those who had lower body fat percentage gained significantly (gaining group). (viii) Changes in body density were not found to be statistically significant. (ix) The losing group showed significant reduction in all the skinfolds except in biceps. (x) The gaining group had significant increase only in iliac-crest skinfold. Added skinfolds like triceps plus subscapular and sum of six skinfolds showed increase in the gaining group.

*765. GHORAI, I., *The New Curriculum of Secondary Education (in the West Bengal in the Light of Curricular History)*, Ph.D. Edu., Cal. U., 1980

The main aim of the study was to know the views and opinions of teachers and the taught on the efficacy of the new secondary curriculum, Madhyamik as it was called in West Bengal, and to find out the relation between teaching at secondary level and learning the same content by students.

Twelve hundred teachers and five hundred students of one hundred selected schools of West Bengal were selected on the basis of location as rural, urban and industrial areas. The questionnaire technique was used. Opinions of secondary teachers of West Bengal were collected. Opinions of secondary students of West Bengal were also collected regarding their learning. To estimate the relationship between teachers' opinion and students' opinion, correlation coefficient was calculated.

The major findings of the study were: (i) Most of the teachers (51.16 per cent) felt that secondary curriculum was quite heavy in its content and lacked balance. (ii) A section of teachers (21.39 per cent) felt teaching aids and equipments should be provided to teachers for better teaching. (iii) Teachers (37.21 per cent) felt that spiritual education, moral education, hygiene and sex education should be included in the curriculum. (iv) A section of teachers (23.25 per cent) thought the syllabus for work education should be modified. (v) In Bengali Paper I, out of sixteen expected behaviours only in one item there was association between teaching and learning; students learnt what teachers taught. (vi) In Bengali Paper II, only for two items, out of twenty-seven items,

teachers' opinions and students' opinions were identical. (vii) In English, out of thirty-four items, only in one item there was association between teaching and learning; students learnt what teachers taught. (viii) In the third language out of sixteen items, for three items students' opinions and teachers' opinions were the same. (ix) In mathematics, out of twenty-four items students agreed with their teachers only on one item. (x) Out of thirty-two items of physical science only for one item teachers' and students' opinions were the same. (xi) In life science, out of twenty-six items, for four items students agreed with their teachers. (xii) In geography, out of thirty-two items for five items there was association between teaching and learning. (xiii) In history, out of thirty-two items only on four items students agreed with their teachers. (xiv) Out of twelve items of physical education, students agreed with their teachers on one item. (xv) In work education there were eight items. Students were not at all in agreement with their teachers even for a single item. (xvi) In social service out of six items students agreed with their teachers on one item. (xvii) Opinions of students were different from those of their teachers on some items of different subjects.

766. GHOSH, A. K., *Scholastic Backwardness in the Basic Processes in Arithmetic — Diagnosis and Prevention*, Ph.D. Edu., Kal. U., 1982

The objectives of the study were: (i) to diagnose children's disabilities in specific areas of addition and subtraction in arithmetic with the help of specially developed diagnostic tools, and (ii) to suggest preventive measures for removing the expected learning disabilities in those areas.

The sample for diagnosis of scholastic backwardness consisted of 200 students of Class II of six primary schools selected from culturally, socially and economically disadvantaged areas, while the experiment was conducted on students of Class I from four primary schools situated in similar disadvantaged areas. The developed diagnostic tools in addition covered nine major objectives, thirty-four specific objectives and consisted of 100 test items while those in subtraction consisted of four major objectives, sixteen specific objectives with 100 test items. The test-retest reliability coefficients for tools in addition and subtraction were 0.98 and 0.94, respectively. An individual structured interview was conducted with 20 per cent students selected at random from the sample to validate the tools. The validity coefficients were found to be 0.99 for both the tools. For

suggesting preventive measures twenty clusters of disabilities in addition and sixteen in subtraction were identified as the basis for the experimental study. Nine teaching units were specially developed on the basis of qualitative and quantitative analysis of learning disabilities already diagnosed. The experimental groups were treated by Piagetian methods of instruction of the child's conception of numbers; the controlled groups were taught conventionally. Nine independent variables were controlled either by physical or selective manipulation. Kamat's Intelligence Test was used as pretest for covariance design. The diagnostic tools developed were used as posttests. Conclusions were drawn from covariance analysis.

The conclusions were: (i) The experimental groups taught by the Piagetian methods achieved more than the control groups taught conventionally. (ii) The experimental groups showed significantly better achievement than the control groups when both the groups were evaluated on the posttest 15 days after the experiment. (iii) The experimental groups showed greater motivation in learning.

767. GOPALAKRISHNAN, K. R., *A Critical Analysis of the New Mathematics Syllabus and Textbooks Used in the Upper Primary Classes in Kerala*, Ph.D. Edu., Ker. U., 1977

The main objectives of the investigation were: (i) to find out how far the syllabus prescribed in mathematics was adequate in the light of the main qualities expected of textbooks, (ii) to find out the constraints that affect the implementation of the current syllabus, (iii) to attempt a comparative study of the current syllabus (1970-73) with that of the immediately preceding years, (iv) to locate areas or topics to be deleted from and/or added to the syllabus under study, and (v) to find out how the syllabus in mathematics prescribed for the Kerala schools was comparable with that of advanced countries.

The main tools used in the study were questionnaire and interviews. A sample of 1,500 teachers from 250 schools was selected for the study. Interviews were carried out with a selected number of parents, students, educational experts and teachers.

The major findings of the investigation were: (i) Pre-determined percentage of promotion, over-crowding in classrooms, low socio-economic status of the parents, frequent strikes and agitations, poor academic background of students, lack of adequate foundation in

mathematics, lack of parental interest, lack of interest on the part of the students and lack of textbooks dominated among the causes that adversely affected the introduction of new mathematics. (ii) The structure and rigour of the mathematics textbooks were appropriate. The rate of introduction of new terms was uneven. Typographical errors, errors due to carelessness and real errors were found here and there in the textbooks. Almost all topics needed gradation. The revision exercises, diagnostic tests and general exercises were, in general, appropriate. The inclusion of enrichment programmes was a good feature of the textbooks but the diagrams were not satisfactory. There was some disagreement between the syllabus and the textbooks due to omission of certain topics and sub-units. (iii) The syllabus of 1970-73 was better than that of the immediately preceding years. (iv) The coverage of content of textbooks of Kerala was not at par with that of the SMSG and the SMP series; the Kerala syllabus differed from even the NCERT syllabus. (v) The additions to the syllabus suggested by the respondents were more exercises suitable for homework, problems related to life, English equivalents of new terms and life history and important events of mathematicians. The deletions suggested included discovering patterns, enrichment programmes, difficult problems and fundamental laws.

768. GUPTA, A., *A Study of Attitude towards NCC Training of Girl Students of Intermediate Level*, Ph.D. Psy., Kum. U., 1981

The major objectives of the study were: (i) to develop feelings of cooperation, self-dependence and discipline among girls through NCC training, and (ii) to develop sentiments regarding self-respect, moral duties, character-building and patriotism.

First, intermediate girls' colleges were selected randomly from three districts — Nainital, Rampur and Muradabad. Then 500 girls of intermediate level from the arts (N = 350) and science (N = 150) streams of these sample institutions were chosen randomly. The SES and the five-point attitude scales were administered to the sample subjects and the collected data were analysed with the help of quartile deviation, coefficient of correlation and t-test.

The study revealed: (i) The girls showed keen interest in NCC training. (ii) The girls with different socio-economic status backgrounds had a highly favourable attitude towards NCC training. (iii) People of high and low income groups were similar in their attitudes

towards NCC training. (iv) As compared to the arts group students, the science group students had a highly favourable attitude towards NCC training. (v) The attitude towards NCC training was almost similar in brahmin, kshatriya, vaishya, kayastha and Muslim girls. (vi) The students of Government Khurshid Girls' Inter College, Rampur, had a highly favourable attitude towards NCC training as compared to the students of the remaining five girls colleges. (vii) The guardians with different vocational statuses had almost similar attitude towards NCC training programme for girls.

769. GUPTA, B.S., *An Experimental Evaluation of the Effectiveness of the Methods of Teaching Geometry in High Schools*, Ph.D. Edu., Agra U., 1979

The main objectives of the investigation were: (i) to study the overall relative effectiveness of analytic-synthetic (A-S) method and traditional (narration-explanation N-E) method of teaching geometry to students of Classes VIII and IX, (ii) to evaluate their effectiveness with respect to knowledge, understanding, application and skill objectives, (iii) to compare their overall effectiveness in the case of high and low groups of mathematical and mental abilities, and (iv) to evaluate their effectiveness in terms of the four objectives in the case of high and low intelligence groups.

The experiment based on bi-group rotational design was conducted in actual classroom conditions in a boys' high school of Aligarh. The investigator himself taught two periods daily to one of the two equated sections of each of the two classes for about eight months covering the entire course. There were twenty-three students in each section of Class IX and thirty-two in each section of Class VIII. Six geometry achievement tests were standardized for the purpose; their validity and reliability were established. The Group Test of Intelligence of U.P. Bureau of Psychology, Allahabad, was used. The techniques of chi-square, t-test, correlation and analysis of covariance were employed.

The major findings of the investigation were: (i) The A-S method was significantly more effective in terms of overall geometry achievement than the N-E method in Class IX but both the methods were equally effective in Class VIII. (ii) Both the methods were equally effective in terms of the four objectives in Class VIII and application objective in Class IX but the A-S method was definitely more effective than the N-E method. (iii) The A-S method was significantly superior in terms of overall geometry achievement in the case of high and low intel-

ligence groups of Class IX and low intelligence group of Class VIII but both the methods were equally effective in the case of high intelligence group of Class VIII. (iv) The A-S method proved superior as measured in terms of overall achievement in geometry in the case of mathematically low achievers of Class IX but in the case of high achievers of Classes VIII and IX and low achievers of Class VIII both the methods were equally effective. (v) Both the methods were equally effective in terms of the four objectives in the case of high and low intelligence groups of Class VIII but the A-S method was significantly more effective in achieving understanding and skill objectives in the case of high intelligence students of Class IX and for achieving objectives pertaining to knowledge and understanding of low intelligence students of Class IX; however, they did not differ significantly in the case of high intelligence students for knowledge and application objectives and for application and skill objectives of Class IX of low intelligence students.

770. GUPTA, D. K., *A Study of the Agricultural Education as a Subject in the Secondary/Senior Secondary Schools of Delhi*, Government Co-educational Teachers' Training Institute, Delhi, 1979 (NCERT-financed)

The objectives of the study were: (i) to find out which subject teachers were responsible for teaching agriculture as an academic subject at the plus 2 level and as a work experience activity at the secondary level, (ii) to find out the number of schools offering agriculture, the number of students offering it, its weightage in the timetable and the physical facilities available, (iii) to know the views of students offering it, and (iv) to offer suggestions for the improvement of agriculture education.

Data were collected from sixty secondary/senior secondary schools. These schools comprised boys and girls, rural and urban schools of the Union Territory of Delhi. Data were collected on the basis of responses to a 34-item questionnaire prepared on the basis of relevant literature and interviews of 400 students who had offered agriculture and belonged to different schools and came from varying socio-economic strata. Personal observations were also made to supplement information obtained through the questionnaire and interviews.

The findings of the study were: (i) The percentage of students offering agriculture as a subject at the middle level in rural schools was 22.8, 0.85 in urban and 23.8 in co-educational schools; at the senior secondary level

35.8 per cent students offered it in the rural area while none in the urban area. (ii) Only 50.5 per cent teachers were professionally qualified to teach agriculture while the remaining teachers helped because of their interest in the subject. (iii) Agriculture teachers were also expected to teach subjects like biology, physics, chemistry and general science, and in some cases economics too. (iv) Besides space for practical work, other facilities like implements, finances per student, laboratories, library, assistants (malis), storage space and irrigation were also poor. Only twenty-four schools had tubewells in functioning order, twenty-six had tap water facilities and twenty-one had water pump facilities. In fact, some schools had access to three types of irrigation facilities while several to only one. (v) The plants were safeguarded by 50 per cent schools independently, while in 50 per cent of schools they relied on the school watchman. (vi) As many as 53 per cent teachers desired in-service programmes for supplementing their knowledge. (vii) Half of the students of fifty-one schools finally took to farming.

On the basis of the findings it could be suggested that (a) only professionally trained agriculture graduates be appointed as teachers, (b) for qualitative improvement of teachers and their assistants (malis) in-service and orientation courses be held from time to time, (c) organizations like the ICAR/IARI/NCERT should have special cells for improving agriculture education, (d) topics in which teachers face difficulty be broadcast by Door-darshan and AIR, and (e) students having completed the senior secondary stage be considered qualified to work as village level workers, laboratory assistants and on other equivalent posts.

771. GUPTA, V.P., GREWAL, J.S. and RAJPUT, J.S., *A Study of the Environmental Awareness among Children of Rural and Urban Schools and Non-formal Education Centres*, Regional College of Education, Bhopal, 1981

The objectives of the study were: (i) to know the components of environment in which children from rural (R) and urban (U) areas were lacking and the areas in which the students from both the streams were well acquainted, (ii) to compare the environmental awareness of school-going children (F) and children studying in non-formal education centres (NFR), and (iii) to suggest means for developing environment-based curriculum for universalization of elementary education.

The study was conducted on 115 students of Standard

IV, twenty from rural schools, thirty-five from urban schools and sixty from the non-formal education centres. An environmental questionnaire by Rajput and his associates was administered on the sample. The performance of students of the three groups was compared. Differences were tested for significance by t-test. First and the last ten ranking questions for each of the groups were identified and compared.

It was found : (i) The difference between FR and FU on environmental awareness was significant and in favour of FR. (ii) Difference between NFR and FU was also significant on environmental awareness and in favour of NFR. (iii) The difference between NFR and FR on environmental awareness was not significant. (iv) The common aspects in the first ten were: source of getting cotton (FU/FR/NFR), edible portion of tomato plant (FU/FR/NFR), animal for watching the house (FU/FR/NFR), effect of weather on the growth of plants (FU/FR/NFR), direction of sunrise (FR/NFR), source of getting wool (FR/NFR). (v) Some common aspects in the last ten ranked items were: ways of preventing rusting of objects (FU/FR/NFR), shape of the earth (application part) (FU/FR/NFR), the way of finding out the direction of the wind (FU/FR/NFR), idea of evaporation of water (FU/FR/NFR), relationship between rocks and stones (FU/FR), reasons for night being dark (FU/FR), the reason for giving boiled water to patients (FU/NFR), the reasons for shadow not being formed in the dark (FU/NFR), relationship between rocks and soil (FR/NFR), finding out time in a watch (FR/NFR), and the role of bone skeleton in giving a definite shape to the body (NFR/FR).

772. HOPPER, W. A. F., *An Experimental Study in the Use of Modular Approach for Teaching Biology in Standard XI*, Ph. D. Edu., MSU, 1982

The main objectives of the study were: (i) to design and develop instructional modules on selected units in morphology, physiology and ecology for higher secondary classes, (ii) to find out the relative effectiveness of three modular approaches involving self-learning, peer group learning and peer group learning with teacher intervention with reference to the cognitive objectives, (iii) to compare the cumulative achievements of students through three different sequences of content presentation, (iv) to find out the effect of different modular courses of study on the academic motivation of students, and (v) to find out the relationship between intelligence and achievement through modular instruction.

The effectiveness of the three modular approaches was evaluated through an experiment conducted with Standard XI students studying in three higher secondary schools of Madras. The sample consisted of fifty-three, fifty, and fifty-three students studying in Standard XI of these schools. No deliberate attempt was made to match the three experimental groups, however, pretest measures on previous learning, academic motivation and intelligence revealed the three groups were equivalent in terms of means and standard deviations. Achievement scores on the three module tests were the criterion variables. Experimental variables were the three types of modular approaches and the three modules. Experiment was conducted adopting the rotation group design. Duration of the experiment was twelve weeks involving learner-engaged time of sixty-six periods. Tools used in the study included Cognitive Entry Behaviour Test and Module Reaction Opinionnaire developed by the investigator. Frymier's Junior Index of Motivation, and the Test of General Intelligence by Cattell and Cattell. Data were analysed by using such statistical techniques as product moment correlation, t-test, analysis of variance and chi-square.

The major findings of the study were: (i) All the three structured modular approaches of teaching were effective in terms of mean gain in cognitive achievement in morphology, physiology and ecology. However, the self-learning approach was more effective than the other two modular approaches. (ii) All the three modular approaches were effective for the attainment of mean gain in higher mental abilities with respect to morphology and ecology. But none of them was effective enough as regards physiology. (iii) The most effective modular course of study with respect to cognitive achievements and retentivity of the content and objectives was that which had the sequence of ecology-morphology-physiology. (iv) Interaction between method and content was significant influencing total achievement as well as achievement with respect to knowledge and comprehension objectives but the interaction effect was not statistically significant with respect to attainment of higher mental abilities. (v) The modular approach of teaching biology led to a significant increase in the academic motivation of the students. (vi) There was no relationship between intelligence and mean gain in achievement through modular instruction. (vii) In the total sample, 84 per cent pupils favoured the modular approach involving peer group learning with the teacher available at the time of need. Opinion was divided with respect to peer group learning approach without the help of teacher. Self-learning approach was also

favoured by 62 per cent of the students.

773. JAIN, R. P., *A Study of COSIP and COHSSIP Sponsored by the U.G.C. in Selected Colleges of India*, Ph. D.Edu., MSU, 1982

The major aims of the investigation were: (i) to study the objectives of COSIP and COHSSIP as accepted by teachers and the emphasis laid by teachers on their attainment, (ii) to study the present position of COSIP and COHSSIP with regard to instructional process, evaluation procedures, syllabus, news bulletin and library facilities and their effectiveness as perceived by teachers, (iii) to study the students' reactions towards the effectiveness of activities organized under COSIP and COHSSIP, (iv) to study the problems faced by the principals in the implementation of COSIP and COHSSIP, (v) to study the utilization of funds granted to the institutions for the implementation of COSIP and COHSSIP, and (vi) to study the trend of students' achievement in science, humanities and social sciences at the undergraduate level after the introduction of COSIP and COHSSIP.

A purposive sample of principals, teachers and students was drawn from the randomly selected colleges where COSIP and COHSSIP were currently in operation. Nine colleges with COSIP only, eight with COHSSIP only and four with both the programmes were selected. Data were collected from 21 principals, 273 teachers and 500 students from the selected colleges. A checklist was used to ascertain the objectives accepted and emphasized by the teachers. Separate questionnaires were used for collecting the necessary information from students, teachers and principals. Data were processed by computing percentages and making graphical representations.

The major findings of the investigation were: (i) The three objectives of COSIP and COHSSIP which were accepted by all teachers were introduction of new methods of instruction, enrichment of the library and development of self-study habits among students. These were also the objectives on which greatest emphasis was laid by COSIP and COHSSIP teachers. (ii) New methods of instruction such as seminar, symposium, group discussion and project method, were adopted by a number of teachers after the introduction of COSIP and COHSSIP programmes. (iii) Libraries were enriched under these programmes, however, a majority of teachers reported the non-existence of departmental libraries. (iv) Guest lectures were organized by 46.58 per cent teachers of

COSIP and 58.27 per cent of COHSSIP teachers. Question banks were developed by only 23.29 per cent of COSIP teachers and 16.53 per cent of COHSSIP teachers, but, internal assessment was adopted by a majority of teachers of COSIP (76.72 per cent) and COHSSIP (65.35 per cent). (v) A low percentage of teachers reported that their departments made an effort to revise the syllabus. (vi) According to the teachers, heavy workload, lack of incentives, lack of academic autonomy and lack of physical facilities were some of the factors inhibiting the implementation of the programmes. (vii) Most of the activities introduced under these programmes were found to be quite helpful by the students. However, they found guest lectures, question bank and use of audio-visual aids to be of limited use. (viii) Failure of the UGC to disburse grants in time, lack of motivation among teachers, rigid curriculum and lack of cooperation from the students were some of the problems faced by the principals in implementing COSIP and COHSSIP. (ix) The majority of colleges which implemented COSIP and COHSSIP were not able to make full use of grants received from the UGC. (x) Colleges having COSIP had utilized greater proportion of resources for the academic growth of students than the colleges having COHSSIP. (xi) Significant impact of COSIP and COHSSIP was found in terms of increase in the number of first divisioners and fall in the number of third divisioners in science, humanities and social sciences at the undergraduate level in all the colleges.

774. JARIAL, G. S., *Instructional Materials for Developing Creativity in Students*, Ph.D. Edu., Indore U., 1981

The main objectives of the study were: (i) to prepare verbal and non-verbal instructional materials, (ii) to assess the effectiveness of verbal and non-verbal instructional materials in the development of creativity of students, (iii) to compare the gains of male and female students in creativity after treating them with verbal and non-verbal instructional materials, (iv) to compare the gains of students of high and low SES in creativity after treating them with verbal and non-verbal instructional materials, and (v) to compare the gains of initially high and low creative students in creativity after treating them with verbal and non-verbal instructional materials.

The sample for the study consisted of 160 Class IX students who were divided into two treatment groups, namely verbal (N=80) and non-verbal (N=80). Each of

these groups was further divided into two groups, experimental (N=40) and control (N=40). The students of the verbal experimental group were matched against the verbal control group on verbal creativity and intelligence variables whereas the students of the non-verbal experimental group were matched against the non-verbal control group on non-verbal creativity and intelligence variables. The study employed a pretest-posttest experimental-control group design. Students of the verbal experimental group were, given treatment in prepared verbal instructional materials for a period of fifty days, whereas their control counterparts were not given any treatment. Similarly, the students of the non-verbal experimental group were given treatment in non-verbal instructional materials for a period of fifty days, whereas their counterparts of control group had no such treatment. The Torrance Tests of Creative Thinking — Verbal and Figural (form A and form B), the Kulshresta and Dey's Socio-Economic Status (SES) Scale, and the Jalota's General Mental Ability Test were used for collecting data in respect of verbal and non-verbal creativity, SES and intelligence, respectively. The data were analysed by computing mean, standard deviation, t-values and analysis of covariance.

The findings of the study were: (i) The posttest creativity mean scores of students of verbal and non-verbal experimental groups were significantly higher than those of the students of the verbal and non-verbal control groups. (ii) The posttest mean scores of male and female students of verbal experimental group were not significantly different in any of the four aspects of verbal creativity. The posttest mean scores of male and female students of non-verbal experimental group were not significantly different in four of the five aspects of non-verbal creativity, namely, fluency, flexibility, originality and total creativity, whereas in elaboration aspect of non-verbal creativity, female students of the experimental group scored significantly higher than male students of the experimental group. (iii) The mean posttest scores of high and low SES students of verbal and non-verbal experimental groups were not significantly different in any of the aspects of verbal or non-verbal creativity. (iv) There was no significant difference in the posttest verbal creativity scores of initially high and initially low creative students of verbal experimental group. The initially high and initially low creative students of the non-verbal experimental group did not differ significantly in four of the five aspects of non-verbal creativity, namely, fluency, flexibility, originality, and total creativity at the posttest level, whereas with respect to elaboration aspect of non-verbal creativity, the initially low creative

students of non-verbal experimental group scored significantly higher than initially high creative students of the non-verbal experimental group.

775. JHA, I., *An Experimental Comparison of Different Methods of Teaching High School Biology*, Ph.D. Edu., Pat. U., 1979

The study was designed to test, experimentally, the relative effectiveness of various methods of teaching biology. The experimental study was conducted on a sample of sixty students reading in Class X in Bankipur Government Girls' High School, Patna. These students were regular students and they were selected out of a total number of 100 students in the class. Again, the sixty students were divided into three groups, randomly. The first group was control group, the second demonstration group and the third activity group. The investigator herself taught all the groups after administering pretest. Only one group was taught in a day. To avoid fatigue, every group was taught in the first period. Posttest was administered at the end of the experiment. Analysis of covariance was employed to analyse the results. The difference was further examined by paired t-test.

The main finding of the study was that there was strong evidence in favour of activity-based approach in teaching school science in respect of acquisition of knowledge, application of the scientific knowledge and development of scientific skill.

776. JOSHI, M.G., *Content Analysis of General Science Textbook for Standard IV*, College of Education, Jalgaon, 1972 (MSBTPCR-financed)

The objectives of the investigation were: (i) to examine whether the content of the textbook was suitable to the age and the understanding level of the pupils, (ii) to study the suitability of the explanations and illustrations provided in the textbook, and (iii) to ascertain whether the language and vocabulary used in the textbook were appropriate.

The study was carried out adopting the technique of content analysis. The investigator used an information unit as the basic unit for content analysis. An information unit was defined as an independent piece of information which was meaningful even when separated from its context. The content of each lesson was analysed into information units by paying special attention towards denoting pre- and post-context. Each information unit

was then cut out from the textbook and pasted on a card and the central statement of the information unit, its placement, its supportedness or unsupportedness, nature of the support, etc., were specified. Thus a set of cards was prepared for each of the twenty lessons, the total number of information units being 493. These were then analysed again after further scrutiny raising the number of information units from 493 to 733. The implied objective of science teaching for each information unit was noted in terms of knowledge, understanding, application, skill and appreciation. The frequency of occurrence of these objectives in the textbook as a whole was calculated, and the relative weightage given to each objective was examined. Also, the supports that accompanied the various central statements were categorized into six types, namely, experiments, visual illustrations, verbal illustrations, reasoning, statistics and reinforcements on the basis of which the frequency of occurrence of each category of support in the whole textbook was calculated.

The major findings of the investigation were: (i) The contents of the textbook except in the case of one lesson were suitable to the age of the pupils. (ii) The sequence of presentation of information units was quite proper. (iii) There were a few grammatical errors but the content was free from factual errors. (iv) Weightages given to the objectives of developing scientific skills and appreciation of science needed to be increased and weightage for the knowledge objective reduced proportionately. (v) There was need for more use to be made of statistics in tabular form in supporting the central statements of information units. (vi) There was need to increase colour pictures in the textbook; some of the pictorial illustrations were not accompanied by definite description and instruction regarding what to look for.

777. JOSHI, M.G., *Development of an Edit Code for Evaluating School Science Textbooks*, Ph.D. Edu., Poona U., 1979

The objectives of the study were: (i) to devise a suitable unit for utilization of the school science textbooks, (ii) to evolve suitable category scheme for both the aspects of content analysis, namely, status, analysis and error analysis, (iii) to evolve suitable strategy, viz., the edit code, for suggesting improvements in school science textbooks on the strength of the content analysis data, and (iv) to evaluate the concepts and the tools devised for the purpose of application of the edit code to school science content situations.

Four studies were completed as part of this research. These were: (i) developing the error categories, (ii) providing scientific basis for the unitization and content analysis procedures, (iii) establishing the validity of application of the edit code as a whole process, and (iv) demonstrating the utility of the content analysis by undertaking comparative evaluation of school science textbooks. Different studies used different methodological approaches like content analysis, experimental techniques and psychometric evaluation.

The findings of the study were: (i) The procedures developed for unitization and content analysis-status analysis were reliable. Performances of different participants as well as the researcher were homogeneous. Objectivity was high in these procedures developed. (ii) By analysing errors, error category system was developed. This was the basis of content analysis-error analysis. This was also the basis for editing, and bringing about improvement in the content of the textbooks. (iii) The content analysis, when used to improve learning units of the textbooks, proved to be an empirically valid procedure for the said purpose. (iv) Different textbooks translated the purposes of the syllabi in different ways and though the syllabus remained the same, it was the textbook that ultimately decided the learning experiences in the classroom. (v) An evolved edit code could be used for improving textbooks through content analysis.

778. KAMALAKANTHAN, T. S., *An Experimental Study of Teaching Physics by the Traditional and Problem-solving Methods*, SCERT, Hyderabad, 1968

The study attempted to find out which of the two specific methods, traditional (conventional) or problem-solving, provided for students' gain in and retention of knowledge and abilities. The sample consisted of thirty-two students of Class X. A test on the unit on heat was prepared. After consultation with subject teachers and experts in the field, items comprising the pretest, numbering sixty, were finalized and were administered to all the thirty-two students at the same time, under exactly similar conditions. On the basis of the scores obtained, the students were divided into two groups, comprising sixteen students in each group. One group was designated the control group while the other was designated the experimental group. The control group was taught by the traditional method. The experimental group was taught by the problem-solving method. The two groups were taught, for a period of eight days, the unit on Elec-

tricity and Magnetism by the traditional and problem-solving methods, respectively, at the rate of an hour for each group. The gain in or retention of knowledge and abilities was measured by noting the score points in the three group tests — base test, posttest and delayed retest of identical nature—given at the start, at the close and after the lapse of some time. Mean, standard deviation and t-test were employed to analyse the data.

The study gave the following findings: (i) The differences in respect of both growth and retention were not at all statistically significant. (ii) The difference in the percentage of growth between the control and the experimental groups together was not statistically significant (t-ratio = 0.78). (iii) Neither of the methods was significantly superior to the other. (iv) The difference in the percentage of retention was not statistically significant for both the groups (t-ratio = 1.79). (v) However, from the point of view of objectives and the end-products of science teaching, the problem-solving method had positive favourable points as compared to the traditional method of teaching.

779. KARANDIKAR, S.P., *A Study of Mathematical Concepts in Syllabus and Textbooks for Standards II and VII*, Adarsha Comprehensive College of Education, Pune, 1973 (MSBTPCR-financed)

The study was conducted with the following objectives: (i) to examine whether the mathematical concepts mentioned in the syllabus for Standards II to VII were in consonance with the intellectual maturity of the students, and (ii) to analyse the corresponding textbooks to ascertain whether the presentation of various concepts was appropriate to the students' intellectual maturity.

The study essentially involved a detailed analysis of the prescribed syllabi and textbooks. The investigator's findings were supplemented by teachers' opinions obtained through a questionnaire. For analysing the prescribed syllabus, the investigator evolved a set of criteria based on the Piagetian stages of cognitive development. The textbooks were analysed with respect to fifteen criteria representing three important characteristics of mathematical concepts. These data were then supplemented by the data obtained through the teachers' questionnaire which was administered to thirty mathematics teachers teaching at the primary and the secondary levels.

The major findings and conclusions of the study were: (i) All mathematical concepts in the syllabi for Standards II to VII, except those of time and space, were in

consonance with the intellectual maturity of the pupils. (ii) According to teachers, out of forty concepts in the mathematics syllabus for Standards II to VII, twenty were easy and twenty were difficult to teach. (iii) Teachers hardly read the syllabus; they just followed the textbooks. (iv) The presentation of concepts in the textbooks was logical rather than psychological. (v) The presentation gave little scope for concrete experiences and self-effort by pupils. (vi) Teachers felt that textbooks gave them very little help in introducing new concepts by providing suitable learning experiences followed by adequate drill. (vii) According to teachers, textbooks were deficient in pictures, figures and examples conducive to the development of mathematical concepts. (viii) In the syllabus, it was necessary to indicate the relationship between specific concepts and the objectives of teaching mathematics.

780. KARIM, P.I.A., *An Analysis of the Contents of the History Textbooks followed in Kerala Schools with a view to Developing Models and Materials for National Integration*, Dept. of Edu., Ker. U., 1982 (UGC-financed)

The study was intended to analyse the history textbooks prescribed for Standards VIII, IX and X in Kerala to assess the extent to which they promoted national integration.

The textbooks were analysed to identify instances which would hinder promotion of national integration classified under obscurantism, communalism and regionalism and instances which would promote national integration.

It was found that while instances of obscurantism, communalism and regionalism were rare, the content of the textbooks was not consciously intended to promote national integration.

781. KHER, S.V., *A Critical Evaluation of History Textbook for Standard VI*, College of Education, Dhule, 1972 (MSBTPCR-financed)

The study was conducted with the purpose of evaluating the textbook used for teaching history to Standard VI in Maharashtra and providing suitable recommendations for its improvement. The specific objectives of the study were: (i) to analyse the textbook with a view to finding out how far it helped in achieving the objectives of teaching history as mentioned in the prescribed syl-

labus, (ii) to find out whether the textbook was suited to the level of the understanding of the pupils of Standard VI, (iii) to examine whether the text material promoted fearless quest for knowledge among the pupils, (iv) to find out the extent to which the textbook was helpful in creating an awareness of difference in values of the past and of the present, and (v) to ascertain whether the text material enabled the pupils to apply relevant lessons of history to their lives.

The method of research used for the study was the survey method. The tools used were questionnaires for teachers, parents and subject experts and group interviews with teachers, parents, experts and pupils. The sample selected for the study consisted of 150 teachers from 150 schools in Dhulia district, the parents of forty pupils randomly selected from among those studying in Standard VI in these schools, twenty-five subject experts and all Standard VI pupils of three of the 150 schools selected randomly. The response to questionnaires was not quite satisfactory. Only fifty-five of the 150 teachers, eight out of the forty parents and sixteen of the twenty-five experts responded, and with them group interviews were conducted. Interviews were held with all the Standard VI pupils from the three selected schools.

The main findings and conclusions of the study were: (i) The textbook was helpful in creating among the pupils awareness of their social heritage and developing patriotism and emotional integration but was not helpful in creating international understanding and in interpreting the present in the light of the past history. (ii) All the topics in the syllabus were appropriately represented in the textbook. (iii) There were several mistakes in the text, several of them factual, errors of omission also appeared. (iv) The text material was easy to read and the biographical style of presentation was suited to the age of the pupils. (v) The book was attractive and rich in visual aids as it contained a number of pictures, figures and maps. (vi) There was need for greater variety in the exercises so that all objectives of history teaching could receive due weightage.

782. KULKARNI, B. G., *An Investigation into the Attitudes of Pupils, Parents and Teachers towards Work Experience*, College of Education, Sangli, 1975 (MSBTPCR-financed)

The objectives of the investigation were: (i) to measure the attitude of pupils, teachers and parents towards work experience, (ii) to compare the attitude towards work experience among boys and girls, and among rural

and urban pupils, (iii) to find out pupils' preferences for different crafts included under work experience, and (iv) to assess how far the objectives of work experience were realised in schools.

The study included the analysis of work experience programme prescribed for Standards I to VII. However, pupils of Standards IV to VII only were considered for studying the attitude. A stratified random sample of fifty urban and fifty rural schools was selected from Miraj taluka in Sangli district. The respondents selected from these schools included 100 teachers, 100 parents, 250 boys and 250 girls. In order to measure the attitude, an attitude scale was prepared following the Likert method of summated ratings. The scale consisted of ten positive and ten negative items. Means and standard deviations were calculated for the different categories of respondents; critical ratios were computed in order to compare the scores of urban and rural pupils and of boys and girls.

The major findings and conclusions of the study were: (i) About 90 per cent of the pupils had a favourable attitude towards work experience. (ii) About 96 per cent teachers and 88 per cent parents had a favourable attitude towards work experience. (iii) The majority of the respondents expressed that work experience was effective in inculcating in the pupils love of labour, curiosity, scientific attitude and such other characteristics. (iv) Among the different crafts introduced both boys and girls gave first preference to drawing; boys gave second place to gardening while girls chose sewing; neither boys nor girls liked spinning as a craft. (v) There was need to develop a handbook for teachers of work experience and to provide them suitable training. (vi) In Standards IV and V only the rudiments of work experience should be introduced and it would be treated as a full-fledged and compulsory subject in Standards VI and VII. (vii) Availability of raw material should be a basic criterion for selecting particular crafts under work experience.

783. LAHI, C. M., *A Critical Study of the Work Experience Programme in Secondary Schools of Kerala*, Ph.D. Edu., Ker. U., 1981

The major objectives of the investigation were: (i) to study the functioning of the work experience programme and the difficulties experienced in its working, (ii) to study the advantages the pupils get from the programme and their difficulties in participating in it, (iii) to find out pupils' attitude towards work experience programme and their interest in it, (iv) to find out parents' attitude towards work experience programme, and (v) to

find out the improvement needed for the proper functioning of the work experience programme in schools.

The study was based on a sample of 120 heads of secondary schools, 282 teachers, 520 pupils and 242 parents. Questionnaires, attitude scales and an interest inventory were prepared and used to collect data. Interviews and observations were also used to supplement the data.

The major findings of the investigation were: (i) Most of the schools (67 per cent) made the work experience programme compulsory during 1975-79, but participation in the programme by pupils of Standard IX was not compulsory. The school subjects were given more importance than the work experience programme. (ii) Heads of schools faced difficulties in organizing the work experience programme for want of accommodation, funds, trained teachers and textbooks. (iii) The cleaning, and maintenance of the school building and beautification of classroom and gardening were found the most common activities in all schools. Many schools assigned group work to pupils in the work experience classes and at the same time individual attention was given to them. (iv) The most important change found among pupils was that aversion towards work was reduced considerably. They acquired basic practical knowledge in various kinds of work. (v) Pupils had keen interest and positive attitude towards work experience programmes even though they were not found aware of the importance of work. The schools had no programme of evaluating pupils' attitude for work experience. (vi) Parents also had very favourable attitude towards work experience. (vii) The work experience programme was considered as important as other subjects in the school curriculum. A graded syllabus for the programme was found necessary. Since most of the activities were either simple or too irrelevant to meet the social needs, there was need for selecting more socially useful productive work.

784. LALITHAMMA, K. N., *Formulation of Criteria for Writing Textbooks in Mathematics and Evaluation of the Mathematics Textbooks Prescribed for the Secondary Schools of Kerala*, Dept. of Edu., Ker. U., 1981 (UGC-financed)

The study was intended to evaluate the textbooks in Modern Mathematics introduced in secondary school classes in Kerala consequent on the curriculum revision effected in 1973. The main objectives were: (i) to develop criteria for the preparation of a good textbook in

mathematics, (ii) to prepare an analysis sheet based on the criteria developed, and (iii) to evaluate the six textbooks prescribed for Standards VIII, IX and X for the year 1980-81 for both English and Malayalam media classes, by the application of the analysis sheets.

A questionnaire prepared to collect the criteria for evaluating the textbooks based on the objectives of teaching mathematics and the characteristics which determine the goodness of mathematics textbooks, was administered to a representative sample of 240 experienced secondary school teachers of mathematics. The criteria identified through the analysis of the responses and classified into two categories, viz., academic aspects and physical aspects, were used to prepare the analysis sheet, the second tool used in the study. A sample of 240 experienced secondary school teachers of mathematics was then requested to evaluate the six textbooks by applying the analysis sheet.

The main findings of the study were: (i) More emphasis was given to process operations than to the product to be obtained. (ii) Minor omissions in particular areas were present in all the textbooks. (iii) The instances in the textbook of presentation of ideas through life situations were not adequate. (iv) The enrichment materials provided for all standards needed to be increased. (v) Historical notes provided for Sets and Geometry in the Standard VIII textbook were not sufficient. (vi) Reference materials were not provided in any of the textbooks. (vii) Specific errors could be identified in all the textbooks. (viii) The different topics included were properly correlated using the concept of Set and Real Numbers. (ix) The grading and sequencing of topics and problems were properly done. (x) The fundamental principles which give structure to the subjects were emphasized. (xi) Sufficient exercises were provided and a variety of problems were included. (xii) Answers were not given for any of the problems to be worked out. (xiii) The physical aspects of the book were adequate; however, it was seen that the table of content could have been more detailed. The test of formulae should have been given in the textbook for Standard X also.

785. MALHOTRA, M. M., *Effects of Systematic Approach to Instruction in Mechanics of Structures on the Achievement, Transfer of Learning, Motivation, Study Habits and Attitudes of Polytechnic Students*, Ph.D. Edu., MSU, 1982

The major objectives of the study were: (i) to develop a model of systematic approach to instruction based on

psychological principles of learning and motivation, (ii) to compare the effects of systematic approach to teaching and conventional method of teaching on the achievement, transfer of learning, motivation, study habits and attitudes of polytechnic students, (iii) to examine the effects of systematic approach to instruction and conventional method on the mean achievement of students, and (iv) to examine the effects of systematic approach and conventional method of teaching on the scores of transfer of learning tasks.

A total of 439 students of the fourth semester diploma in civil engineering from five polytechnics of Punjab and Haryana were involved in the study. These students constituted three experimental and three control classes taught by systematic approach to instruction and conventional method of teaching, respectively. Pretest-posttest control group design and recurrent institutional cycle design were employed. Data were also collected by using tools to measure motivation, perception, study habits and achievement of students. The collected data were analysed by using t-test and chi-square test.

The major findings of the study were: (i) All the group taught under systematic approach achieved significantly higher mean scores on the comprehensive achievement test in mechanics of structure than those under the conventional method of teaching. (ii) All the groups taught under systematic approach achieved significantly higher scores on the transfer of learning tasks than those taught by the conventional method. (iii) Students taught under systematic approach significantly improved their perceptions and motivation to learn as compared to those taught by the conventional method. (iv) Students taught under the systematic approach to instruction did not improve their study habits and attitudes during the semester.

786. MANUEL, N.V., *Using Environmental Potentialities in Education*, Dept. of Edu., Ker. U., 1982 (UGC-financed)

The objectives of the study were: (i) to analyse the textbooks in environmental studies of the NCERT and of some State systems from the point of view of components which might facilitate or hinder genuine environmental approach, (ii) to analyse some texts in areas other than what has been formally designated as environmental studies from the point of view of potentialities for environmental education (EE), (iii) to analyse some worthwhile EE models in India and abroad and other relevant materials from the point of view

of developing a functional theory of EE, (iv) to identify some typical resources other than textbooks which can be useful for EE, (v) to develop some models for tapping the hidden curriculum in the ordinary environmental situations, and (vi) to develop some models for EE representing a reasonable compromise between the EE theory and the practical conditions in the majority of Indian schools and non-formal educational content.

The materials analysed in detail included the relevant textbooks (Classes III to V) at the national level, Kerala and Tamil Nadu. A few books from other States, at the same level, and a few books in regional languages were also analysed. Collateral materials from the USA, the USSR, the UK, France, UNESCO and other developed systems were also analysed. In addition to analysis and critical appraisal, interviews, observation and focussed group discussion with teachers, non-formal science education workers and administrative officers were conducted.

The main findings of the study were: (i) A very few genuine EE-type activities, as understood in modern developed systems, seemed to be undertaken in the primary schools. (ii) The effective lead materials (textbooks) at the national level seemed to have some worthy aspects such as process approach in science, activation, some directives to observation and visits, stimulating questions with open tables to fill in the answers, thought excursion through the country profusely illustrated with pictures (in history portions), clear verbal processing and the like. (iii) The national-level textbooks lacked the higher specifications commonly adopted in modern EE procedures and in open, multidisciplinary approaches to the environment. Defects such as preempting investigation (by suggesting the answers), premature precision (overlooking the initial phase of romance in environmental exploration), simulations and artificial situations even where natural situations were available in the environment, defective concept processing (particularly in astronomy, physics, geology and geography), overuse of technical terms (in food and health), non-recognition of the time dimension in real observations in astronomy, botany, etc., non-recognition of the developments in genetic epistemology, adoption of spectator approach where participant approach was possible, insufficient respect to work culture were frequent. (iv) The NCERT's curriculum framework which had obviously guided the textbook gave negative guidelines (what EE is not) but distinct positive guidelines were lacking. The lead paper by the NCERT of December, 1981, on EE, was an analysis of conference reports (from Stockholm) and some generalized theory, but was

not on modern EE curricula in transaction. An upward environment as reference point rather than actual ground level EE material production process also seemed to be reflected. (v) As regards the State-level textbooks, some of the drawbacks of the national-level books were carried over and some of the merits seemed to have been missed like replacing open exploratory tables by closed preempting environmental exploration. (vi) The content loading of science in Tamil Nadu was much less while activities were plentiful, yet it was formal science and not EE. The social studies portion in both the southern States was heavily loaded with facts. (vii) Tamil Nadu also produced taluk-level and district-level books for geography which did reflect concern about starting from the ground. (viii) Tamil Nadu books made a reference to the ancient Sangam classification of land, but it was a formal, symbolic and a looking-back reference. The difference in titles suggested a heavy carry-over of content and approaches from the past, even at the national level. (ix) Theoretical analysis of environmental knowledge, way-finding in a natural and man-made environment, cognitive mapping, spatial encoding and linguistic encoding, anticipation of alternative futures and Piagetian studies conducted in larger environments provided insight for organizing EE programmes. (x) Work at the Vikram Sarabhai Community Science Centre, Ahmedabad, Kerala Sastra Sahitya Parishad and workshops conducted with the British Council collaboration in Tamil Nadu and Kerala were instances of functional EE starting from the ground environment and developing sophisticated and useful constructs. (xi) Some relevant models representing a synthesis between the modern EE theory and the local context and culture were suggested.

787. MISHRA, L. S., *A Contractive Study of Segmental Phonemic, Supra-segmental Phonemic and Different Articulatory Features in Gujarati and Hindi, from the View-point of Teaching Hindi as a Second Language in Gujarati*, Ph.D. Edu., Gujarat Vidyaapeeth, 1981

The objectives of the study were: (i) to find out pronunciation error in speaking Hindi by Gujarati-speaking students, (ii) to find out different features, vowels and consonants of Gujarati and Hindi, (iii) to know different features of speech sounds in Gujarati and Hindi, and (iv) to discuss articulatory features of speech sounds in both the languages.

The study was an experiment with two sections of

Class IX of a secondary school. The experimental and the control groups had 25 students each. The treatment was training in speech sounds provided to students in the experimental group. The tools of the research included a tape-recorder test to measure the quality of pronunciation and training material specially developed for the experiment. A pre-test, post-test design was used for the experiment. Analysis of covariance was used for data analysis.

The major findings of the study were: (i) There are contrasts in vowels in Hindi and Gujarati. (ii) There are vowels which are similar in both the languages and they are not the teaching points. On the other hand, there are dissimilar vowels also which form the teaching points. (iii) Contrast was found in nasalization. Some sounds are partially similar requiring focussed teaching and some difficult to pronounce for Gujarati-speaking children. (iv) In Hindi, one feature is coloured nasalization not found in Gujarati. (v) There are certain consonants which are not found in one or the other language.

788. MISHRA, R., *A Study of Attitude towards Mathematics of Secondary School Students*, Ph.D. Edu., Pat. U., 1978

The objectives of the study were: (i) to develop a Likert-type scale to measure attitude towards mathematics, (ii) to find out the relationship between attitude score and parents' qualification, (iii) to find out the relationship between attitude score and parents' profession, (iv) to find out the relationship between attitude score and parents' income, (v) to find out the relationship between attitude score and family size, (vi) to find out the relationship between attitude score and type of schools attended by students, and (vii) to find out the relationship between attitude score and reading facility.

On the basis of opinions from 500 students of secondary schools, seventy attitude statements were prepared of which thirty were finally accepted for the scale. The scale value and the t-value of each statement were computed. The coefficient of reliability by the split-half method was 0.72. A stratified random sample of 505 students (345 boys and 160 girls) was selected from the population of Classes X and XI students of Patna Municipal Corporation for studying the relationship. Analysis of variance and t-test were employed for the treatment of the data.

The main findings of the study were: (i) Boys whose parents were better qualified and in prestigious professions, had more favourable attitude towards mathema-

tics than others but this was not true in the case of girls. (ii) Boys and girls from rich families had more favourable attitude towards mathematics than those from poor homes. (iii) The types of institutions attended earlier had no impact on attitudes. (iv) Boys and girls with study facilities had more favourable attitudes than others.

789. MOHAMMAD MIYAN, *A Study to Examine the Effectiveness of Methods of Teaching Mathematics in Developing Mathematical Creativity*, Ph.D. Edu., JMI, 1982

The objectives of the study were: (i) to find out the comparative effectiveness of three methods of teaching and learning for developing mathematical creativity in high school students, (ii) to examine whether the methods of teaching had any effect on the development of convergent and divergent thinking components of mathematical creativity, and (iii) to assess the effect of methods of teaching on low, medium and high creative students in mathematics.

Students of three sections of Class IX of a Kendriya Vidyalaya, New Delhi, comprised the sample. These three sections were administered the Test of Mathematical Creativity (developed by the investigator) in order to know the level of creativity of the subjects before being exposed to different methods of teaching. These three sections of Class IX were taught simultaneous linear equations and inequations, logarithms and logarithmic tables, and percentage, profit and loss and discount by the tell and do guided discovery and pure discovery methods. The Test of Mathematical Creativity was again administered at the end of the treatment which lasted about six weeks.

The analysis of the data revealed: (i) None of the three methods was significantly different in developing mathematical creativity. (ii) None of the methods of teaching was markedly better than the others in developing fluency and flexibility. (iii) The guided discovery method was most effective in enhancing originality as compared with the tell and do and the pure discovery methods. (iv) None of the methods was significantly different in developing divergent thinking and convergent thinking abilities. (v) There was no differential effect of the three methods of teaching on any one of the three levels (low, medium and high) of creative performers in mathematics.

790. MOORTHY, A.M., *Survey of Minimum Muscu-*

lar Fitness of the School Children of Age Group 6 to 11 Years and Comparison of the Influence of Selected Yogic Exercises and Physical Exercises on Them, Ph.D. Edu., Poona U., 1981

The study aimed at examining four hypotheses: (i) Practice of selected yogic exercises improved the minimum muscular fitness. (ii) Practice of physical exercises improved the minimum muscular fitness. (iii) As compared to the effects of physical exercises, yogic exercises brought about better results. (iv) During the detraining period, the results gained by the training in yogic exercises are significantly retained as compared to the group which has training in physical exercises.

The sample included 1,000 children (571 boys and 429 girls) from Class II to Class VII from the three Central Schools of Pune selected on random basis. The tools used were Kraus-Weber tests. The treatments were yogic exercises and physical exercises. For the experiment, ninety boys and ninety girls were randomly selected from the failures on the basis of Kraus-Weber tests. Thirty boys and thirty girls were randomly assigned to control group, experimental group I (physical exercises) and experimental group II (yogic exercises).

The major findings of the study were: (i) In the Kraus-Weber test survey, failures among children were found to be 81.79 per cent among boys and 87.88 per cent among girls. (ii) The maximum failure of 92.54 per cent among boys was found at seven years of age while in girls the maximum failure was 94.87 per cent at six years of age. (iii) Both the experimental groups showed significant improvement after six weeks of training as compared to the control group. (iv) Percentage improvement was seen much greater in the yogic exercises group than in the physical exercises group though statistically it was not significant. Among the girls this difference was statistically significant. (v) The results of detraining effect in boys showed that in the experimental group I improvement was reduced to the extent of 26.67 per cent, whereas in the experimental group II the improvement was reduced to the extent of 20 per cent only. In the experimental group II the residual effect was maintained more than in the experimental group I.

791. MSBTPCR, *A Survey of Primary Teachers' Qualifications — Their Opinions Regarding Mathematics and Science Syllabi*, Pune, 1974

The major aims of the study were: (i) to collect data regarding qualifications, experience and training of

mathematics and science teachers in primary schools, (ii) to find out the opinions of mathematics teachers regarding the new syllabus of mathematics for Classes I to VII, and (iii) to find out the opinions of science teachers regarding the science syllabus for Standards I to VII.

The sample consisted of schools selected from twenty-five districts of the State with thirty rural and twenty urban schools from each district. Two hundred and seventy-five schools were selected from Greater Bombay. All the teachers from these schools teaching mathematics and science in Classes V, VI and VII were covered. Two questionnaires, one for mathematics teachers and the other for science teachers, were used to collect data.

The important findings of the study were: (i) Seven per cent teachers who taught mathematics were B.Sc., 6 per cent were B.A., 72 per cent had S.S.C. certificate, 12 per cent had passed the primary school certificate examination and 3 per cent were either F.Y.B.Sc. or F.Y.B.A. (ii) Among the mathematics teachers of Classes V, VI, VII, 87 per cent were trained, 72 per cent had more than five years' teaching experience, and 47 per cent had undergone an orientation course in mathematics. (iii) Ten per cent of the mathematics teachers felt the modern mathematics portion of the syllabus was very difficult for pupils, 63 per cent felt that it was somewhat difficult and 27 per cent felt it was easy. (iv) Seventy-four per cent teachers thought that modern mathematics should not be kept optional but made compulsory. (v) Some teachers felt that to do justice to modern mathematics, orientation courses of long duration should be organized for teachers, the mathematics periods should be increased and new teaching aids should be provided. (vi) The qualifications of teachers teaching science to Classes V, VI and VII were B.Sc. — 10 per cent; B.A. — 6 per cent; S.S.C. — 69 per cent; primary school certificate — 12 per cent, remaining either F.Y.B.Sc. or F.Y.B.A. (vii) Seventy per cent teachers complained that adequate equipment to demonstrate experiments was not available, whereas 24 per cent teachers stated that they gave opportunities to the pupils to perform experiments. (viii) Seventy-five per cent teachers were of the opinion that science should be taught as separate disciplines, physics, chemistry and biology. (ix) Eighty-six per cent teachers were confident they would be able to teach science subjects as separate disciplines.

792. MSBTPCR, *Statewide Survey of Use of Textbooks*, Pune, 1974

The major objectives of the survey were: (i) to find out

the percentage of pupils who had textbooks, (ii) to find out what percentage of them had second-hand textbooks, (iii) to find out differences between boys and girls and between urban and rural pupils, regarding the use of textbooks, (iv) to find out why some pupils did not have textbooks, and (v) to find out the extent of use of non-textual materials produced by the Bureau.

The sample consisted of thirty rural and twenty urban schools from each of the twenty-five districts in Maharashtra excluding Greater Bombay from where 275 schools were included. In all 7,72,000 children were covered. The survey was limited to textbooks used in Classes I to VII in Marathi-medium Schools. An information schedule was used as the tool for data collection.

The major findings of the survey were: (i) The percentage of pupils present without their Marathi language textbooks was only 4.6 in Class VII but was 43.8 in Class I. (ii) The percentage of pupils using second-hand mathematics textbooks varied from 32.1 in Class II to 65.9 in Class VII. (iii) When a new textbook was introduced, its sale dropped continuously for the first three years after which it went on increasing slowly. It indicated that a textbook was usable for about three years. (iv) The percentage of pupils in urban schools who were without books was higher than that in rural schools by about 4.5. (v) As compared to boys, 5 per cent more girls were found without books. (vi) As compared to girls, 3 per cent more boys used second-hand books. (vii) Marathi copybooks were used by only 17 per cent pupils. (viii) Some pupils were without books because their books were torn or the parents could not afford to buy them or the books were not available or they shared the books with brothers or sisters.

793. MSBTPCR, *A Study of Pupils' Attitudes towards School Subjects*, Pune, 1975

The major objectives of the study were: (i) to find out the subjects which pupils liked and those they did not, (ii) to find out the subjects which pupils thought to be easy to learn and socially useful and those which gave freedom of study and expression, and (iii) to find out sex differences, if any, in the case of pupils' attitude towards mathematics.

The sample comprised seventy schools of which ten were from Marathwada, twenty-one from Vidarbha, twenty-nine from Western Maharashtra and ten from Bombay. Thirty-four of the seventy schools were from rural areas. The sample of students from these schools comprised 6,361 boys and 3,605 girls. The tools con-

sisted of two scales for measuring attitudes towards school subjects — an adapted version of Duckworth's Scale and Dutton's Scale for measuring attitude towards arithmetic.

The major findings of the study were: (i) The students of Class X liked Marathi the most and physics the least. (ii) There was no sex difference in respect of the most liked and the most disliked subjects. (iii) Class X pupils considered English to be the most difficult and Marathi the easiest subject. (iv) Boys and girls differed in their opinion regarding the difficulty of school subjects. Urban and rural pupils also exhibited some differences in this respect. (v) According to Class X pupils, biology was the most socially useful subject and geometry the least useful. Sex and environmental differences influenced the opinion of pupils in this respect. (vi) According to Class X pupils, Marathi offered the greatest freedom of study and expression and physics the least. This aspect was influenced by the sex of pupils and their residence (urban or rural). (vii) Pupils' attitude was different towards different subjects, unfavourable to English and physics but favourable to Marathi and biology. (viii) After the introduction of the new curriculum in 1972, mathematics became less popular while science became more popular. Pupils considered modern mathematics easy but less useful. Mathematics became more unpopular as pupils progressed from Class VIII to Class X. Boys liked mathematics more than girls but there was no appreciable difference in the attitude of urban and rural pupils towards mathematics.

794. MSBTPCR, *The Position of Women in School Textbooks*, Pune, 1976

The important objectives of the study were: (i) to determine the extent of representation of women in the characters occurring in the textbooks, in fiction and mythology, in the authorship of lessons and in biography, and (ii) to analyse the nature of recreational activities, professional roles and character traits of males and females portrayed in the textbooks.

The study was confined to Marathi textbooks prescribed for Standards I to X in Maharashtra. The procedure adopted was to scan the textbooks, lesson-wise, and analyse the content regarding the nature of male and female representation. Analysis was done in respect of eight different aspects, namely, characters depicted, pictorial illustrations, fiction and mythology, biography, authorship of lessons, recreational activities, professional roles and character traits of men and women por-

trayed in the lesson.

The major findings of the study were: (i) In the ten textbooks taken together male characters were appearing three times more of ten than female characters. (ii) Out of a total of 1,397 human figures in the illustrations only 325 were female figures. (iii) Out of the sixty-six main characters occurring in fiction and mythology, forty-nine were males and seventeen were females. (iv) Among the 392 authors who had written the matter for the ten textbooks the number of females was only forty-two. (v) Out of sixty-eight biographies sixty-three were of males and only five were of females. (vi) The textbooks mentioned twenty-four recreational activities of males and four of females, the recreational activities of males were quite commonplace. (vii) Male characters portrayed in fiction and mythology were related to fifty different professional roles while female characters played only seventeen. (viii) The textbooks had a tendency towards stereotyping of male and female characters in respect of their character traits. (ix) Though there was a definite sex bias in the textbook, it could have been unintentional. (x) Stories in the textbooks were largely male-centred. (xi) Males were depicted as intellectual and cultural while females were shown as inferior to males in these qualities. (xii) While the textbooks provided a variety of male models the roles portrayed by females were narrow enough to inhibit the ambitions of girls and restrict them to stereotyped homemaking roles.

795. MUDDU;V., *A Study of Prevalent Status of Instructional Procedures in Biology in High Schools*, Dept. of Edu., Osm. U., 1978(UGC-financed)

The objectives of the study were: (i) to evaluate the facilities provided to teachers, such as laboratories, audio-visuals, etc., (ii) to find out the type of instruction adopted in teaching biology in accordance with the concepts envisaged in the syllabi, and (iii) to find out the extent to which the instructional procedures met the demands of biology syllabi in the process of reorganizing the scheme of secondary education.

The study was designed as a quantitative empirical study. The sample consisted of teachers of 120 high schools teaching biology in Classes VIII, IX and X of the twin cities of Hyderabad and Secunderabad. The variables involved in the investigation were: (a) the present status of instructional procedures followed by teachers in biology teaching, (b) the adequacy of classroom instruction to effect behavioural changes in students, and (c) adequacy of the laboratories, reading materials,

extra-curricular activities, etc., in secondary schools. A questionnaire was prepared and administered to the selected teachers. Percentages were computed to process the data.

Analysis of the data revealed: (i) Fifty-nine per cent of the teachers stated they did not have adequate classrooms to teach biology. For 85 per cent of the teachers, instructional procedures followed by them were not according to the aims and objectives of biology teaching. This was due to non-availability of adequate teaching aids. (ii) Most teachers preferred only the lecture-demonstration method. (iii) Facilities of reference books, informative pamphlets, magazines and general books on biology were not adequately available in school libraries. (iv) Sixty-six per cent teachers were found to give priority to knowledge objectives in dealing with the topics in biology while application and interest aspects were accorded least preference. (v) In 70 per cent schools there were no separate laboratories for biological sciences and in 30 per cent schools there were improvised laboratory facilities for biological instruments. Only 35 per cent students maintained good practical notebooks. (vi) Teachers expressed their difficulty in conducting demonstrations and practicals in biology, because of the absence of adequately equipped laboratories, lack of leisure periods and over-crowded classrooms. (vii) Tools such as demonstration tables, bulletin board, etc., were in poor condition and were rarely used in biology instruction; availability of aids like filmstrips, projectors, microscopes, etc., were very inadequate.

796. MUKHOPADHYAY, M. and Others, *Polytechnic Curriculum Evaluation Project Gujarat*, TTTI, Bhopal, 1981

The project had three sets of objectives pertaining to objectives and contents, teaching-learning process, and resource needs and utilization. The main objectives were: (i) to examine the adequacy of the contents, (ii) to analyse and validate the sequencing of contents, (iii) to identify the gaps and overlaps in the content organization, (iv) to collect teachers' experiences and suggestions for content reorganization, (v) to assess the awareness of teaching-learning innovations in teachers, (vi) to determine the teaching strategies used by teachers in classrooms, laboratories, workshops and project works, (vii) to identify problems in using new teaching-learning strategies/techniques and suggest measures to improve the implementation of the curriculum, (viii) to deter-

mine the training needs of teachers in innovative teaching-learning strategies/techniques, (ix) to determine the learning strategies used by students in order to accomplish the curriculum objectives, (x) to survey the existing resources and compare them with curricular needs, (xi) to assess the degree of utilization of the existing resources and also factors contributing to under utilization, if any, and (xii) to suggest alternatives for increasing the utilization of the resources.

The study was conducted on all the civil, mechanical, and electrical engineering courses. In all, 288 teachers and 888 students responded to the evaluation instrument. The instrument contained both structured and open-ended items. The data were tabulated and subjected to descriptive analysis, results presented primarily through descriptive tables.

The major findings of the project were: (i) Eighty-six per cent teachers did not agree to the structure of the new curriculum. Twelve different topics were found irrelevant. Thirty-three topics were identified, which needed to be added, a few subjects needed resequencing to topics and also the treatments. (ii) About 74 per cent teachers used demonstration method, 31 per cent used project method, 33 per cent used case studies in teaching, 19 per cent used seminars, 17 per cent used games and simulation. (iii) The percentage of teachers who prepared new experiments was 77.1, 89 per cent prepared lesson plans, 84 per cent prepared charts and 34.5 per cent prepared OHP transparencies. (iv) Thirty-eight per cent teachers used templates, 76 per cent used flip charts, 14.5 per cent used magnetic cutouts, 20 per cent used overhead projectors and 68.6 per cent used models. (v) There was need to train more teachers in project methods and case study approach. (vi) A large majority of students knew the objectives and attempted to achieve them. About 90.6 per cent students used the library. (vii) Three dimensional models and charts were adequately available across the subjects. (viii) 16 mm film projector, epidiascope and ink duplicators were also adequately available. (ix) Students as well as teachers felt the need of new instructional material produced by the CDC, Bhopal. (x) The instructional materials were not easily available.

797. MUTALI, K. and BORUDE, R., *The Attitude of the Parents and Students of Aurangabad to the Learning of and Performance in English*, 1979 (NCERT-financed)

The objectives of the study were: (i) to know the at-

titude of students towards learning English, (ii) to find out the level of performance of students in English, and (iii) to know the attitude of parents towards learning English.

The sample consisted of 625 students, 999 parents and 418 teachers. Of the 2,042 subjects, 1,121 were male and 921 were female. Independent variables included in the study were age, sex, educational status, economic level and religious status. Three separate questionnaires were prepared for students, parents and teachers. The aspects covered in the questionnaires were teaching methods, references, textbooks, life experiences, future prospects, teachers, environment, and linguistic and personal aspects.

The findings of the study were: (i) Girls were more interested in the learning of other languages than boys. (ii) Hindus, Muslims and Sikhs had relatively less liking for English than Parsees, Jains and Christians. The high percentage (97.8) registered by the neo-Buddhists was rather surprising. (iii) Forty-three per cent males indicated liking for the language, 34 per cent thought it was an instrument to know more about the world and 23 per cent just learnt it as part of their curriculum. (iv) A love for the language and its potentialities as a window to world knowledge motivated the majority of girls (74 per cent) to learn English. (v) More than half of the males wanted English to be taught from the primary to the college level and a very small percentage (2 per cent) wanted no English at all. (vi) All religious groups, except Jains, wanted English from the primary to the college level. (vii) Jain girl students had more language difficulties than any other subgroup. They faced problems in grammar, punctuation, structure and word meaning to a greater extent than others. (viii) Muslim and Jain male students had more difficulties in grammar; pronunciation was a major obstacle for Sikhs; the remaining groups faced all difficulties in equal proportion. (ix) One-third of the males found recitation of English poems a hard task. Almost all the age groups showed a similar trend. (x) Only one-fourth of the girls found English textbooks boring. Jain groups indicated this attitude more strongly (66 per cent) while none among the Christians had anything against English textbooks. (xi) Both male and female teachers were in close agreement about deterioration of the standard of English and strongly felt the need to take immediate and forceful steps to improve it. (xii) The complaint of low standard of English was voiced by Hindu and Muslim teachers but not so loudly by Christians and neo-Buddhists. (xiii) Male teachers were predominantly in favour of revising the policy of English language teaching. (xiv) Rigour in

teaching English was emphasized by a majority of teachers of both sexes in all income groups, with a slightly higher emphasis by the female teachers. (xv) About 40 per cent of the teachers held themselves responsible for the poor standard of English. (xvi) Teachers of both sexes, irrespective of their economic background, strongly desired that students be able to express better in English. (xvii) Upper income level male teachers did not want the students to be told stories in English for gaining attraction but lower income group felt so. (xviii) Less than half of the male teachers and more than half of the female teachers admitted that they did not possess sufficient command over English. (xix) Of the total parent population 70 per cent males and 60 per cent females knew English. (xx) Indifferent attitude was more predominantly indicated by older parents; over three-quarters of the parents indicated a very favourable attitude to English. (xxi) Most of the male parents wanted their children to learn English to become officers while a majority of female parents wanted their children to learn English for the sake of knowing world progress. (xxii) Almost two-thirds of the entire parent population expressed its grave concern over the falling standard of English. (xxiii) Only 40 per cent male and 16 per cent female parents ever talked with their sons and daughters in English.

798. MUTTAQI, I.A., *Development of a Curriculum in Biology for Secondary Schools of Bangladesh*, Ph.D. Edu., MSU, 1981

The general objective of the study was to develop an ecology curriculum which was suitable and effective in developing environmental literacy among the students of Grades VI, VII and VIII of some selected schools of Bangladesh. The study was both a developmental and an evaluative research. The first phase of the study consisted of the development of curriculum, curricular materials and their preliminary and formative evaluation. The second phase of the study comprised summative evaluation or evaluation of the developed materials in the real classroom situations.

The design of the study necessitated sampling in two phases, for the formative evaluation and for the summative evaluation. For formative evaluation the samples drawn were subject specialists (four), curriculum specialists (four), classroom teachers (twelve), headmasters (four), textbook writers (three) and parents (twelve) whereas for summative evaluation two urban and two rural schools, twelve classroom science

teachers, and 552 boys and girls of Grades VI, VII and VIII were selected. The experimental treatment for the teachers consisted of teachers' orientation programmes, through discussion of content of the students' materials and the use of the teachers' manual. The experimental treatment for pupils consisted of twelve ecology units. During formative evaluation six types of questionnaires were used whereas for summative evaluation achievement tests for teachers and students were used. Attitude scales for teachers and students were also used. The formative evaluation data were analysed using statistical measures like frequencies and summated means; for summative evaluation t-test was applied.

The major findings of the study were: (i) In the formative evaluation, the curriculum and the curricular materials were found suitable and appropriate for the purpose of the study. (ii) The curricular materials were effective in producing significant gain in knowledge of the students about ecological facts, principles, information and the related problems as well as their possible solution. (iii) The curricular materials were effective in producing significant changes in the attitudes of the students towards environment in the majority of the grades. (iv) The teachers' manual was effective in producing significant positive changes in the attitudes of teachers. (v) The teachers' manual was effective in producing significant gains in knowledge of teachers about ecological facts and related problems with possible solutions. (vi) There was low correlation between the gain in ecological knowledge and the change in attitude towards environment. (vii) Rural students possessed significantly less ecological knowledge. (viii) In two grades the rural students showed more favourable attitudes towards environment than the urban students of the same grades while in the majority of grades there was no significant difference in the mean gain in achievement of the rural and the urban students. (ix) There was no difference between the rural and the urban students with respect to mean gain in attitudes. (x) There was significant difference in the level of ecological knowledge of boys and girls; the girls possessed more knowledge than the boys. (xi) In the majority of the grades there was no difference in attitudes of boys and girls towards environment. (xii) In the majority of the grades the difference between the rural and the urban boys in respect of knowledge in ecology was significant, the knowledge in ecology of urban boys was greater. (xiii) The difference between the rural and the urban boys in respect of attitudes towards environment was significant; the rural boys had more positive attitudes. (iv) There was significant difference between the rural and the urban girls in respect of ecological

knowledge, the urban girls possessed more ecological knowledge. (xv) The difference in attitudes towards environment between the rural and the urban girls was significant in the majority of the grades; the urban girls possessed more favourable attitudes in the majority of the grades.

799. NALINADEVI, K., *A Study on the Population Awareness of School-going Children and Their Willingness to Receive Population Education in Schools*, Ph.D. Home Sc., Madras U., 1981

The objectives of the study were: (i) to assess awareness of children about population education, (ii) to determine their willingness to receive population education, and (iii) to impart population education to students and test its impact on their population awareness and willingness to receive population education in schools.

A questionnaire consisting of both open-end and closed type questions was constructed by the investigator. The sample was drawn from Coimbatore City, and from Perianaickenpalayam and Karamadai panchayat union. The number of schools in this universe was listed and stratified as primary, middle and high schools and fourteen urban and eleven rural schools were chosen at random. The questionnaire was administered to 1,200 pupils, 400 pupils from each stratum. The specially developed course on population education was taught to 100 students from each stratum. The impact of the course was tested by administering the same questionnaire. Depending upon the data structure and information base, simple percentage and analysis of variance techniques were employed for interpretation.

Some of the findings of the study were: (i) Rural pupils, boys in general, showed greater population awareness than urban pupils and girls. (ii) The high school pupils showed significantly more awareness than the primary and the middle school pupils while no significant difference was found between the primary and the middle school pupils. (iii) Willingness to learn population education was expressed by a majority of the pupils. (iv) The school course imparted to the pupils had significantly improved their population awareness.

800. OOMMEN, T., *Comparison of Isometrics, Yogic Physical Culture and Combination Training on Body Composition and Physical Fitness Status of High School Boys.*, Ph.D. Phy. Edu., Kur. U., 1981

The objectives of the study were: (i) to find out the effect of isometrics, yogic physical culture and combination training on the variables of body composition, (ii) to compare the effect of isometrics, yogic physical culture and combination training on the variables of body composition, (iii) to find out the effect of isometrics, yogic physical culture and combination training on physical fitness index, and (iv) to find out whether yoga-isometric combination is superior to the other type of training to promote physical fitness.

In this experimental study 148 students of Grades IX and X were divided into four groups of thirty-seven each, after matching them on physical fitness index by paired comparison method. Three groups were designated as experimental groups and one as control group. Of the three experimental groups one group practised isometrics, another yogic asanas and the third a combination of isometrics and yogic exercises. The groups were designated as per the exercise schedule they practised. The control group was not given any type of exercise. The criterion measures in the study were variables of body composition and physical fitness. The body composition was estimated through skinfold measurement taken with the help of skinfold caliper. The variable of physical fitness was measured with the help of Physical Fitness Test Battery, which included seven factors, viz., explosive strength, static strength, dynamic strength, trunk strength, extent flexibility, dynamic flexibility and cardio-vascular endurance. The groups were compared on the basis of t-test.

The findings of the study were: (i) Isometric and combination groups showed an improvement in body density after the training session. (ii) Isometric and combination groups had significant preponderance over the yogic physical culture group in the reduction of the percentage of fat. (iii) There was significant increase in the gain scores of lean body mass in all the groups after the training period. (iv) Isometric and combination groups were superior to the yogic physical culture group in the reduction of fat weight. (v) Isometric and combination groups were better than the yogic physical culture groups in reducing the skinfold thickness. (vi) Yogic asanas and combination exercises were helpful in skinfold fat reduction. (vii) The combination group superseded all the groups in the mean gain scores on physical fitness index. (viii) The combination group was better in developing explosive strength, grip strength, dynamic strength and trunk strength than all the other groups. (ix) Yogic physical culture group was more helpful in developing extent flexibility and dynamic flexibility than the isometric and combination groups. (x) The mean differences between

pretest and posttest scores for cardio-vascular endurance were significant for all the groups but the comparison of the groups did not show any significant difference.

801. PAI, S.G., *Preparation and Tryout of Curriculum in Environmental Studies Leading to Lifelong Education for College Students*, Ph.D. Edu., MSU, 1981

The main objectives of the study were: (i) to help students acquire an awareness of the interrelationships, interactions and interdependence existing between biological and physical aspects of the total environment and sensitivity towards the environment and its applied problems, (ii) to help students acquire strong positive attitudes, sound ecological values towards the needs for a better environment and the necessary motivation for actively participating in its protection and improvement, and (iii) to help students develop skills necessary for solving environmental problems and taking preventive measures.

In the first phase, the curriculum was developed by studying and analysing the existing literature on curriculum development, the concept of lifelong education and environmental education. The draft curriculum was modified after the preliminary tryout. The study employed pretest-posttest experimental-control groups design. Seventy-two students in the experimental and eighty students in the control group were involved in the study. The data were collected using Environmental Achievement Test, unit test, Environmental Attitude Inventory and Environmental Activities Inventory. The collected data were analysed using t-test.

The findings of the study were: (i) There was significant difference in the performance of the experimental groups as compared with control group on knowledge scores and attitude scores. (ii) The experimental group had gained more than the control group in environmental activities inventory, indicating effectiveness of the curriculum. (iii) As a result of instructions for using the curriculum, students reflected clearer and more vivid images perceived in terms of their sensitivity towards the environment. (iv) Unit-wise analysis of the performance of the students in the experimental group showed they had gained in overall knowledge in environmental problems as a result of instructions for using the curriculum.

802. PANDE, A., *An Inquiry into the Effectiveness of Systems Approach in Curriculum Planning*, Ph.D.

Edu., SGU, 1979

The objectives of the study were: (i) to analyse the Class VIII biology curriculum from the view-points of systems components, (ii) to examine the appropriateness of the teaching methodologies suggested in the teachers' guide, (iii) to examine the curriculum in the light of needs perceived by the teachers, school principals, students and parents, (iv) to develop an optimal curriculum for one sample unit, (v) to evaluate the effectiveness of the optimal curriculum, and (vi) to evaluate the effectiveness of systems approach in planning a curriculum.

Sixty-two students from Class VIII were divided into experimental and control groups. Both the groups were matched on the variables like age, socio-economic status, previous achievement, intelligence and sex. Data were collected using tools like Shah's Non-Verbal Group Intelligence Test, Kuppaswamy's Socio-Economic Status Scale, Need Assessment Questionnaire, questionnaires to teachers, students, school principals and parents, twelve unit tests and two achievement tests based on the course taught during the experiment. The experimental group was taught using appropriate media and methods and the control group by the traditional method. The collected data were analysed using t-test.

The major findings of the study were: (i) The experimental group obtained higher scores with respect to three units out of the twelve units taught than the control group. (ii) For summative evaluation on two criterion tests the difference was not significant between the experimental and the control groups. (iii) There was no significant difference on retention scores between the experimental and the control groups. (iv) The optimal curriculum was evaluated in terms of students' performance on criterion tests; there was significant difference in favour of the experimental group. Optimal curriculum produced significantly better results in terms of students' performance.

803. PANJWANI, S.S., *A Pilot Project on Job Analysis for Development of Technician Education and Training Programmes*, TTTI, Calcutta, 1973

The main objective of the study was to develop a framework of job analysis, concept of job analysis and methodology of job analysis as may be applicable to the development of educational and training programmes for technicians.

An actual job analysis survey was conducted at Indian Cable Co. Ltd., Jamshedpur. The survey was only illustrative of the application of the concept and methodology of job analysis so developed. The survey used mainly interview and discussion methods. The information collected was compiled and presented in tabular form in terms of requirements of the objectives of job analysis and curriculum development activities. Job descriptions already available with the industry for certain groups of technicians were made use of.

The findings of the study were: (i) Conventional fields of engineering for educational purpose needed to be diversified into different technician specialities. (ii) Prominent job titles/positions on which technicians work were foreman, supervisor, chargehand, planning chaser, design draftsman, technical assistant, quality controller, estimator, etc., and the educational qualifications of technicians in position ranged from matriculation with apprenticeship training or on the job experience to a degree in engineering.

804. PANY, S.M., *A Programme of Work-education for the Schools of Orissa*, Ph.D. Edu., Utkal U., 1981

The study was primarily intended to develop a programme of work-education for the schools of Orissa. The objectives were: (i) to study the programme of work-education in operation in other States and Union Territories of the country, (ii) to investigate the possibilities of providing socially useful exploratory experience leading to productive work and services to school students, (iii) to identify the potential factors of the schools, TTIs and the community for the introduction of work-education in the schools, (iv) to study the opinion of experts, teachers and community members relating to the development of a workable concept, clarification of some controversial issues and organizational strategies of work-education in the schools, (v) to examine the possibility of integrating the formal, non-formal and incidental components of education with a view to providing a meaningful and effective programme of work-education, (vi) to investigate the possibility of breaking caste barriers and promotion of social integration through the appreciation of conceptual implication of work and cooperation, (vii) to identify the limiting factors and problems that may entail the introduction of work-education, (viii) on the basis of the above and on the basis of the experience gained from other countries, to design a programme of work-education for the ten-year schools

of Orissa, and (ix) on the basis of the above to design a programme of teacher education for work-education.

Data were collected through questionnaires and interviews from a sample of 2,013 schools and 1,050 experts, teachers and community members. In addition, all the States and Union Territories and all the teacher training institutions were included for eliciting information relating to the study. Data were analysed in terms of percentages.

The major findings of the study were: (i) The position of school facilities in Orissa were better than in other States and Union Territories. (ii) Sixty-one subjects were included in the school curriculum throughout the country under work-education and the terminology used for this curricular area varied from State to State; a majority has integrated work-education with the general curriculum. (iii) In the majority of the cases the programme of work-education was somewhat responsive to the local economic needs. (iv) Integration of out-of-school experience with school experience, the supplementing of existing knowledge and skills by the school and linking of education with productivity were found to be important aspects in developing the concept of work-education. (v) In the majority of the urban schools, pot cultivation and in the majority of the rural schools agriculture and cleanliness programme in all the schools could be organized as the core programme. (vi) In most schools some kind of work-activities were organized. (vii) Government fund, school fund, students' and teachers' subscription and grant from the managing committee were the main source of finance for the programme. (viii) The local environment, houses and schools were the important sources of raw materials, tools and equipment. (ix) The negative attitude of students, teachers and parents, inadequacy of facilities, lack of provision in the instructional schedule, funds, raw materials, tools and equipments and departmental coordination were the important problems of organization of different activities. (x) Mostly the regular teachers of the schools managed the organization of different work activities. (xi) The majority of the TTIs had physical facilities for the organization of work-education and in the majority of the TTIs agriculture could be organised. (xii) The student-teachers of all the TTIs participated in a number of work activities for two to five hours, which could be included under work-education. (xiii) Negative attitudes towards manual work and lack of resources, qualified teachers, provision in the examination, time schedule and departmental co-ordination, were the limiting factors. (xiv) All the TTIs were well equipped to organize common activities, community

services, and agriculture and in two or three TTIs, vocational activities as well.

805. PARANJAPE, D.G., *A Critical Study of the Changes in the Objectives of Teaching Mathematics in the Primary Schools*, Smt. Putalaben Shah College of Education, Sangli, 1977(MSBTPCR-financed)

The main objectives of the study were: (i) to collect the mathematics syllabi used in the primary schools of Maharashtra since 1901, (ii) to analyse the syllabi and determine their objectives, (iii) to determine how the objectives changed from time to time, and (iv) to find out the deficiencies, if any, in the changes brought about in the syllabus.

The method used in the study was that of historical survey. Thus, it was essentially a library study. First, all the syllabi in mathematics used in Maharashtra from 1901 onwards were procured. With the help of the documents available, it was found that the mathematics syllabus had been revised several times during this period, namely, in 1901, 1913, 1928, 1940, 1947-49, 1955 and 1966. The next step was to list the objectives of teaching mathematics according to each of the seven syllabi. It was found that there was no statement of objectives in several of the past syllabi. The investigator, therefore, made a detailed content analysis of the syllabi along with the corresponding textbooks and question papers. Based on this analysis the implied objectives for each syllabus were stated in explicit terms. These seven sets of objectives were then analysed in a comparative frame to discern the changes that had been made over the period under study.

The major findings of the investigation were: (i) There were deficiencies in knowledge of reading and writing vulgar and decimal fractions, knowledge of reading and writing numbers, skill in the four fundamental processes, ability to handle personal money transactions, efficiency in understanding the environment and skill in drawing geometrical figures. (ii) The two objectives which were introduced for the first time in 1966 were to develop the concept of fractional notation and to lay a firm foundation for higher mathematical education. (iii) The disciplinary and vocational aims emphasized in some of the previous syllabi were dropped in the 1966 syllabus. (iv) Two objectives which were greatly emphasized in the 1966 syllabus and which continued to be included were development of complete mastery over the four fundamental operations of arithmetic and de-

velopment of a deeper understanding of the basic concepts and structure of mathematics.

806. PATIL, S.K., *Basic Vocabulary in Marathi of Children of Standards III and IV*, Ph.D. Edu., Poona U., 1979

The objectives of the study were: (i) to prepare recognition vocabulary of pupils in Standards III and IV on the basis of textbooks prescribed for these standards and classroom situation, (ii) to prepare reproduction vocabulary of pupils in Standards III and IV on the basis of their syllabi, and (iii) to prepare classified wordlists based on the parts of speech and origin of words.

The study was limited to municipal and private schools with Marathi medium, falling within the Pune corporation area. For recognition vocabulary, wordlist was prepared by analysing textbooks used by the pupils, children's magazines and school broadcasts. This wordlist was subdivided into two parts, one for oral testing and the other for written testing. Suitable test materials based on these were developed. For reproduction vocabulary, essay tests in language and content subjects were prepared on the basis of syllabi. Written as well as oral tests were used to collect the wordlists separately for each standard. Though earlier researchers had taken age as the basis for developing wordlists, the present investigator chose grade as the basis because of its functional utility. Care was taken to include schools serving different strata of the society and also having varying standards of instruction. From classes also selection of pupils was random and not more than twenty-five pupils were taken from any school.

The findings of the study were: (i) In Marathi textbooks of Standards III and IV the vocabulary burden was 5.8 and 7.92, respectively, which was far from expectations; the vocabulary burden in children's magazines was found to be quite satisfactory, which showed proper attention of the publishers of children's magazines to controlled vocabulary. (ii) The number of different words for determining recognition vocabulary listed from all different sources of Standard III was 4,012 out of which 2,093 (52.17 per cent) words were recognized by 75 per cent and above children and 3,065 (76.40 per cent) by 50 per cent and above children. (iii) The words collected for recognition purposes of Standard IV were 5,682 out of which 3,331 (58.63 per cent) were recognized by 75 per cent and above pupils and 4,421 (77.81 per cent) recognized by 50 per cent and above pupils. (iv) Nouns dominated recognition vocabulary of both the standards. (v) Reproduction vocabulary of pupils in

Standard III was of 2,304 words and of pupils in Standard IV was of 2,792 words. (vi) In the reproduction vocabulary of Standard III, 724 words (31.42 per cent) had a frequency of more than ten. For Standard IV this figure was 1,041 (37.28 per cent). (vii) In the recognition and reproduction vocabularies of both the standards more than 70 per cent of words were derived from Sanskrit. The contribution of Kannada, was comparatively more than other Indian languages in the vocabularies of both the standards. The proportion of words borrowed from the Persian language was more than that of any other foreign language.

807. PONKSHE, D.B., *A Critical Evaluation of Geography Textbook of Standard VI*, College of Education, Dhule, 1972 (MSBTPCR-financed)

The main objectives of the investigation were: (i) to analyse the textbook in relation to the objectives of the geography syllabus for Standard VI, (ii) to study the textbook in relation to the level of understanding of pupils in Standard VI, (iii) to find out if it was necessary to make any changes in the objectives of the syllabus, and (iv) to make recommendations for improving both the syllabus and the textbook.

A stratified random sample of sixty schools in Dhulia district was selected. Of these sixty schools, twenty-eight were urban and thirty-two rural, forty-nine were primary and eleven secondary. All the 150 geography teachers from these schools were respondents. A questionnaire was sent to the teachers in order to elicit their opinions; however, responses were received from only sixty teachers. Opinions of twenty-five parents and twenty experts were also collected through questionnaires. Pupils' reactions were gathered by conducting group interviews of fifty-four pupils from eight schools.

The major findings of the investigation were: (i) The textbook was written according to the syllabus. (ii) The textbook was greatly helpful in achieving the various objectives of the syllabus except for recognition of cause and effect relationship, stimulation of the power of observation and encouragement of the use of the maps. (iii) In all, two lessons were unduly long and three others were disproportionately small. (iv) The language was easy and well within the understanding of the pupils. (v) Pictures, maps and figures were adequate in number. It was necessary to have colour pictures and bigger maps showing natural regions. (vi) Exercises presented at the end of lessons contained thirty-five essay-type questions, eighty-four short answer questions, twenty-two very short

answer questions and thirty-two objective-type questions. The proportion of objective-type questions was very small. (vii) Most of the questions in the exercises catered to two objectives, namely search for knowledge in the lesson, and stimulation of independent thinking. Map reading was neglected. (viii) In the study of the natural regions, progress should have been from the equatorial regions, to the Tundra and not vice versa. (ix) Some portion of physical geography from Standard V should be transferred to Standard VI syllabus. (x) The textbook should contain a large colour map showing natural regions.

808. PRASANNAKUMAR, S.L., *An Analytical, Comparative and Evaluative Study of Instruction and Evaluation in Postgraduate Courses*, Ph.D. Edu., Mys. U., 1979

The study aimed at analysing, comparing and evaluating practices in postgraduate courses in four broad subject groups, namely, languages, social sciences, physical/natural sciences and applied sciences. It also sought to evolve a framework of instructional objectives and to identify teaching-learning activities conducive to their realization and evaluation techniques and tools appropriate to testing their realization.

Data were collected through questionnaire, observation and interview techniques. An adapted version of Nayar's System for Analysing Instruction was used to analyse instruction in postgraduate classes. Questions set in theory examinations were analysed for the analytical study of evaluation. Opinions of 150 teachers were collected with regard to instructional objectives, teaching-learning activities and evaluation procedures. Two hundred and two theory lessons of different subject groups and thirty practical sessions were observed. Two hundred and forty-five theory question papers were analysed and sixteen practical examination sessions were observed and the examiners were interviewed.

Some of the major findings were: (i) The major cognitive and other objectives perceived by teachers as important were not pursued with clarity, rigour and appropriate emphasis in instruction and the picture was still bleaker in the case of evaluation. (ii) Instruction in theory was performed mostly through lectures employing a narrow range of imparting acts like telling, elucidation, description and exemplification. (iii) Visual aids were rarely used, especially in languages. (iv) Teacher questioning was extremely limited and where it was used it was confined to lower levels of student thinking and re-

sponse. (v) The logical operations employed by the teacher in exposition were also limited to a narrow range. (vi) Practicals reflected a dull routine of tasks performed more or less mechanically. Many of the possible and promising methods and activities appreciated by teachers were seldom used with purpose and advantage. (vii) The system of evaluation employed a narrow range of techniques and tools in a defective way defeating much of its purpose. (viii) Different objectives were not tested adequately. (ix) Questions meant to test higher level objectives/outcomes often got reduced to lower levels in actuality. (x) Familiar types of questions on familiar content abounded in question papers with almost systematic repetition. (xi) The provision of choice vitiated the whole exercise, affecting its coverage, balance, difficulty, reliability, comparability and discriminative power. (xii) The types and kinds of questions asked adversely affected their objectivity, reliability and validity. (xiii) In practical examinations process and product were emphasized in varying degrees with most of the examiners stressing process rather than product. Skills employed therein were not systematically observed or assessed. (xiv) Only a few examiners had marking schemes previously worked out in detail. (xv) Questions on theoretical aspects and sequential and consequential questions were put by many examiners during the viva-voce examination held after the practical examination. (xvi) Most examiners checked the correctness of student performance and accuracy of readings taken by students at different stages of the experiments.

809. PUNJA, S., *An Approach to Art Education — a Survey and Tryout of a Renewed Programme for Art Education*, Ph.D. Edu., MSU, 1981

The major objectives of the study were: (i) to analyse the objectives and categorize them, so as to highlight any changes in trends in the philosophy of school education and art education in particular, (ii) to highlight the discrepancies, if any, in the existing process of translating curriculum objectives into a curriculum outline for art in the school programme. (iii) to develop an approach and a conceptual frame-work for a renewed programme of art education, and (iv) to observe the implementation of the units of renewed approach to art education in classroom situation.

This study focussed on historical and philosophical issues related to the role of art education. Data were collected through reports of the various committees, curriculum analysis and a questionnaire administered to art

teachers. On the basis of first phase of the study, the investigator developed renewed approach to art education which was implemented in the school. The data related to tryout were collected with the help of observation schedule, reactions and observations by teachers and students. Only qualitative analysis was done to improve the general framework or art education.

The major findings of the study were: (i) The effect of an inconsistent educational philosophy gave art education a low status in schools as an extra-curricular activity. (ii) The philosophy of aesthetics and art history analysed during the period 1947-79 was not based on democratic ideals. (iii) An examination of art education content revealed that education in the fine arts had no cultural history content and the activities were restricted to drawing and painting. (iv) Art-making contributed to the development of qualitative concept formation and qualitative problem-solving skills.

***810.** RAI, U.C., *A Study of Objectives, Courses and Methods of Teaching Followed at the Undergraduate Level Social Sciences*, Ph.D. Edu., BHU, 1982

The major objectives of the study were: (i) to find out the extent to which the general and specific objectives were realized through the teaching of social sciences at the B.A. level, (ii) to find out the relevant general as well as specific objectives in teaching social sciences, (iii) to find out the items of study prescribed in social sciences for realizing general objectives and their relevance, (iv) to find out the items prescribed for realizing specific objectives and the extent to which they were essential for realizing these objectives in the teaching of social sciences, (v) to find out whether the organization of courses in social sciences was acceptable to students and teachers of social sciences, (vi) to find out methods/techniques/teaching aids used at the B.A. level for the teaching of social sciences, and (vii) to find out whether these techniques and tools were useful in the opinion of parents, teachers and students.

A sample of 135 teachers and 191 students was drawn from four universities, viz. Banaras Hindu University, Kashi Vidyapeeth, and Allahabad and Gorakhpur universities, working or studying in the postgraduate departments of history, political science, sociology, economics and psychology. The tool used was a questionnaire prepared by the investigator. The data were analysed by employing percentages, chi-square test and t-test.

The major findings of the study were: (i) None of the general objectives was being realized by the courses and methods of social sciences at the undergraduate level. (ii) All the sixteen general objectives were considered relevant by a large majority of the respondents. (iii) There was no significant difference in the perception of students and teachers about the relevance of the objectives except the two objectives, viz., to enable students to be mature and sensitive to the world around them and to inculcate in them a commitment to society through involvement in nation-building programmes. (iv) The specific objectives of teaching history, political science, sociology, economics and psychology were not being realized fully but all of them were considered useful and essential by a large majority of the respondents. (v) In the core courses, about 50 per cent items were prescribed but all the items were considered relevant and useful by a significant majority of the respondents. (vi) Items mentioned for applied studies in all the branches of social sciences were not prescribed in any one of them but were perceived as essential and useful by the respondents. (vii) Items mentioned for being prescribed in extension programme of social science courses were not prescribed in any of the subjects but were claimed to be essential and useful by the respondents. (viii) All the five subject groups agreed with the organization of courses into foundation, core, and applied courses and extension programmes. There was no significant difference in the perception of teachers and students regarding the organization of courses. (ix) Lecture method was the only method which claimed to be used daily by 93.87 per cent followed by dictation, which claimed to be used daily by 28.15 per cent of respondents. (x) Tutorial, lecture-cum-assignment, problem-solving, group, discussion and seminar methods were considered highly useful whereas individual library work, experimental method, multimedia approach and programmed instruction were not considered useful by a majority of the respondents. (xi) Charts, films, maps, models and cyclostyled materials were considered more useful than other ones but in the opinion of a large majority of the students and the teachers; teaching aids were generally not used.

811. RAJGOPALAN, S., *A Study of the Relationships of Selected Variables to Reading Comprehension in English*, Anna.U., 1981 (SITU-financed)

The study aimed at determining the relative importance of the pupils' command of vocabulary, their know-

ledge of grammatical devices as well as the medium of instruction in respect of their achievement in reading comprehension. The objectives of the investigation were: (i) to construct and standardize a battery of reading tests in English for use in Standard IX, (ii) to measure pupils' level of reading comprehension, (iii) to find out if there were any differences among the pupils of this grade in respect of their attainment in reading comprehension due to different media of instruction, and (iv) to estimate the relative importance of pupils' command of vocabulary and their grammatical knowledge in their attainment of reading comprehension.

A battery of three tests was used to gather the necessary data for the study. The first test measured the pupils' ability to recognize the meanings of words. As many as 120 words were included in it. The second test was meant to measure their skill of comprehending the meanings of grammatical forms. Fifty-two sentence structures were included in it. The third was used to measure the pupils' ability to comprehend paragraph meaning. As many as ten passages were given, each passage followed by multiple choice questions. The specific learning outcomes sought to be tested by them were: ability to grasp the central idea of the given passage, ability to locate facts, ability to reason, and ability to make simple inferences. The pilot study involved 252 pupils studying in five high schools situated in different parts of Tamil Nadu. Appropriate correlational techniques were employed in the analysis of the data.

The major findings of the study were: (i) The pupils' reading comprehension ability in English was far from satisfactory. (ii) The pupils differed widely in their reading attainments. (iii) The pupils experienced greater difficulty in recognizing the meanings of words than in dealing with sentence forms and continuous pieces of writing. (iv) Pupils' recognition vocabulary had much more to do with their understanding of paragraph meaning than their knowledge of grammatical forms. (v) In the matter of acquisition of the skill of paragraph meaning, the relative importance of recognition vocabulary was more than twice than that of the knowledge of grammar, on the part of the pupils. (vi) The English-medium students had a greater knowledge of recognition vocabulary but did not seem to be better than the Tamil-medium students in respect of the other factors, namely, knowledge of grammar and comprehension of paragraphs.

812. RAJPUT, J.S., GUPTA, V.P. and VAIDYA, N., *Survey of Science Laboratories in the Western Region*, Regional College of Education, Bhopal, 1978

The objective of the survey was to study the role of laboratories in the basic education of science as perceived by science teachers. It intended to analyse (i) the main objectives of laboratory work in the opinion of science teachers, (ii) the extent to which the objectives were realized, (iii) the area of the laboratory, (iv) the number of experimental tables in the laboratory, (v) the total time allotted for laboratory work in each subject, (vi) the problems faced in conducting the laboratory classes, (vii) the procedures adopted for making purchases for the laboratory, (viii) the total grant available for the laboratory, (ix) the additional grant needed for laboratory, and (x) the assistance in the conduct of laboratory work by trained laboratory attendants and helpers.

The study was conducted on ninety-four science teachers of whom thirty-five were from M.P., twenty-seven from Gujarat, twenty-two from Maharashtra and ten from Goa, who attended the correspondence-cum-contact programme at the Regional College of Education, Bhopal. A questionnaire was developed to collect data. The responses received through open-ended questions were coded, classified and used for qualitative interpretations.

The main findings of the survey were: (i) The objectives of laboratory work outlined by the teachers were: to verify facts taught in theory classes, to develop habit of doing independent work among the students, to create interest in science, to prepare students for higher studies and ultimately to prepare good scientists for the country, to develop skills of handling the apparatus/equipments, to observe and critically think about the results, to develop the habit of reasoning, to avoid memorizing the subject, to create interest for research, to have clear understanding of the concepts of the respective subjects and to find limitations and drawbacks in the theory portion and to develop habit of doing systematic work. (ii) The major unwritten goal of laboratory work was, however, to prepare students for practical examinations held externally. (iii) In M.P. 68.7 per cent schools did not have any arrangement for water supply in the laboratories, 91.43 per cent schools had no gas supply, 28.57 per cent schools did not have electric fittings, 77.14 per cent did not have any botanical garden, and 88.57 per cent schools did not have any workshop for undertaking minor repairs. (iv) In Maharashtra, the percentage of schools having water supply was 45.45, gas 31.8, electricity 81.82, botanical gardens 22.73 and workshops 45.45 while corresponding percentages in Gujarat were 44.4, 18.5, almost nil, and 22.2, respectively. (v) As many as half the schools included in the

sample won prizes and certificates for distinctive work in science. (vi) Surprisingly, 10 per cent schools did not have any laboratory. (vii) In M.P. 15 per cent schools did not have any experimental tables, and in Gujarat and Maharashtra the corresponding percentages were 8 and 5 respectively. (viii) Practical work was not attempted in Class IX in about 55 per cent schools in M.P. and for Maharashtra and Gujarat the corresponding figure was 20 per cent. (ix) The main problems faced by the teachers were: lack of free time for them to arrange for practical work, laboratory assistant being busy elsewhere, the poor quality of equipment and chemicals supplied by firms offering lowest quotations and disciplinary problems of students.

813. RAJPUT, J.S., SAXENA, A.B., JADHAO, V.G., *A Research Study in Environmental Approach of Teaching at Primary Level*, Regional College of Education, Bhopal, 1980 (NCERT-financed)

The objectives of the project were: (i) to study the existing awareness towards the scientific and social environment in children, and (ii) to identify the available community resources which can be gainfully utilized for teaching.

The study was conducted in three distinct phases. In the first phase, the M.P. state curriculum for Classes III and IV was redesigned to build scope for environmental approach of teaching. The second phase comprised development of an environmental awareness test. The third phase was the experimentation phase where the effect of implementing the redesigned curriculum was assessed on environmental awareness and achievement in science. In the second phase, the draft test was administered on 140 children from Classes III and IV, subsequently on 200 children from the same classes but from two other schools, and a third time on 275 children from another two schools. The fifty-seven items had a reliability of 0.80. For each item the difficulty index ranged between 25 per cent to 70 per cent and a discrimination index was more than 0.40. The experiment in phase three was conducted on 197 students from two schools in Bhopal, 102 students belonging to Class IV and 95 to Class III. Fifty-seven students from Class IV and 47 from Class III (two sections each) were in the experimental group and the rest in the control group. Mean, standard deviation and t-tests were applied for data analyses and hypothesis verification.

The study revealed: (i) Only one of the four groups (2

schools × 2 classes) was significantly different on environmental awareness at pretest stage, whereas at the post-test stage two experimental groups were significantly better than the control group. (ii) The difference between the experimental group and the control group on a traditional achievement test was not significant.

***814. RAMDAS, J.,** *Curriculum Development in Science relevant to the Indian School System*, Ph.D. Phy., Poona U., 1981

The objectives of the study were: (i) to formulate operational objectives to be achieved by science teachers in the classroom, (ii) to implement these objectives and to evaluate their effectiveness in terms of changes in teacher and pupil behaviour, and (iii) to develop and test strategies for curriculum change which would be suitable for Indian conditions.

Two experiments were conducted under this study. One was carried out with general science curriculum for Standards I to VII in fifteen primary schools situated in a rural area near Khiroda in Jalgaon district in Maharashtra. The other was carried out with physics curriculum in Standard IX in fifty selected secondary schools of the Bombay Municipal Corporation. The experiments were designed to demonstrate that without altering syllabus, textbooks and other material conditions in the schools, and only with some training inputs to the teachers, science teaching could be improved. Experimental and control groups were used for the study. In both the experiments, the teachers were given orientation in objective-based teaching strategies and more participatory teaching styles. Handbooks were prepared for teachers' use. The experiment in the primary schools used a systematic observation sheet for observing classroom behaviour and an interview schedule for the teachers. In addition, attendance record and examination marks were used for evaluating the outcomes of the experiment. In the secondary schools written tests were prepared specially for the purpose.

The study led to some broad generalizations. The comparison of the control and the experimental groups revealed: (i) Teachers showed some significant changes such as willingness to change their teaching methods and go beyond the textual material to include real life experiences and to encourage participation of pupils. (ii) An improvement in the pupils' ability to apply concepts in physics to non-textual situations was also observed. (iii) There was no difference in the use of novel ideas of the experimental and the control groups. Pupils in the ex-

perimental group contributed more to discussions in the classroom; however, improvement of pupils in the skill of experimentation and other group activities was not significantly different in the two groups compared. (iv) Suggestions were made to pay more attention to the actual process of education in the classroom and bring about a conceptual change in its role, to study in the field actual effectiveness of the curricula, and to adapt teaching methods and curricula to the changing needs of society.

815. RAO, S.K., *A Study of the Influence of Continuous Evaluation on Learning in School*, Ph.D. Psy., Del. U., 1982

The hypotheses of the study were : (i) There was no difference in the performance of students of control and experimental groups. (ii) There was no difference in the performance of the students of central and public schools. (iii) There was no difference in the performance of boys and girls. (vi) There was no difference in the performance among the four different age groups (9 years/10 years/11 years/12 years). (v) There was no difference in the performance among the students who were first born, middle born and last born. (vi) There was no difference in the performance of students of low and high educated fathers. (vii) There was no difference in the performance of students of low and high occupation fathers. (viii) There was no difference in the performance of low and high economic groups. (ix) There was no difference in the performance of the students who belonged to two children families and those who belonged to more than two children families. (x) There was no difference in the performance of the students who liked a particular subject and a particular subject teacher.

The sample for the study consisted of 800 students (boys and girls) in science and 641 students (boys and girls) in mathematics studying in Standard V of public and Central schools of South Delhi, age ranging from 9 to 12 years. Thirteen teachers who were teaching science and mathematics to these students were also involved in the study. Out of four sections of Standard V in each school, one section was kept as control group and the other sections as experimental groups. Data were collected in three stages. In the first stage data regarding IQ and creativity were obtained through the administration of Raven's Progressive Matrices (Forms A, B, C, D, E) and Torrance Tests of Creative Thinking (Figural Form, A and B) to match the experimental and the control groups. In the second stage nine science and nine mathematics objective-based tests were administered. In

each test after checking the answer sheets treatment was given to the experimental group students whereas no treatment was given to the control group. In the third stage, data regarding the likes and dislikes of students for science and mathematics as well as the subject teacher and the family details were obtained by administering students' opinionnaire and family inventory. The data were analysed with the help of t-test, F-test, central tendency and dispersion.

The major findings of the study were: (i) More than the feedback, it was the continuous evaluation which seemed to have positive influence on learning under normal school situation. This finding was noted for all variables and for all subgroups under each variable and also the six cognitive objectives studied in this investigation. (ii) On all the tests except two, F-ratio showed significant differences at 0.01 level. (iii) The Central school students seemed to get more influenced by continuous evaluation with feedback than the public school students. (iv) The learning in Central schools, when continuous evaluation was done, seemed to get influenced better than that in public schools, otherwise public and Central schools differed significantly in their achievement in all the nine tests. (v) No significant difference in the learning of boys and girls was noticed. (vi) As the level of hierarchy of objectives was increased, the mean performance decreased in both science and mathematics, and also on all the tests. (vii) Learning of mathematics was less influenced by different variables whereas learning of science was influenced by some of the variables such as school, father's income, education and number of children. (viii) Although no significant differences were found where feedback was used, a trend in the direction of better performance in science was noted for those who received feedback treatment after each test, whereas in mathematics the feedback had no influence on the learning outcome.

816. SAHAJAHAN, M.M., *An Experimental Study of Teaching Science in Standards VI and VII through Modules*, Ph.D. Edu., MSU, 1980

The objectives of the investigation were: (i) to design and develop modules for teaching science in Standards VI and VII, (ii) to study the effectiveness of the modules as an instructional method with respect to the conventional method, (iii) to study the relationship between the students' achievement through modules and the attitude of the students towards the module as well as academic motivation of the students, and (iv) to compare the

achievements through modules of high achievers and low achievers, boys and girls, high academic motivation and low academic motivation and the like.

Two classes from Dacca City in Bangladesh were selected for the study. Matched group design was used for the study. The duration of the experiment was one and a half months. Data were collected using achievement tests, module evaluation checklist and attitude scales for studying students' attitudes towards modules. The data were analysed by t-test, chi-square test and other statistical techniques.

The major findings of the investigation were: (i) The modular way of learning was more effective than the conventional method in the case of some modules while in the case of other modules it was found as effective as the conventional method. (ii) An overwhelming majority of the students possessed a favourable attitude towards modular instruction and their attitude was stable throughout the period of experimentation. (iii) The teachers' reactions to modular approach to instruction were favourable. (iv) The achievement of students through instructional modules seemed to have a low positive correlation with their attitude towards modular way of learning. (v) While learning through modules, no significant difference was found between the achievement of extremely high and extremely low achievers and between girls and boys. (vi) The attitudes of students towards instructional modules, academic motivation of students and their reading comprehension were not related to one another.

- 817.** SAHASRABUDHE, D.H., *A Study of Community Living Programme as Implemented in Primary Schools*, Dharam Peth, Nagpur, 1975 (MSBTPCR-financed)

The main objectives of the investigation were: (i) to collect information regarding the daily programme of community living in respect of time allotted, activities undertaken, and the method of implementation, (ii) to find out how the periods allotted for community living in the weekly time-table were utilized, (iii) to find out which days and anniversaries were observed in primary schools and the way they were celebrated, and (iv) to study the difficulties faced in implementing the community living programme.

The investigation was carried out in lower primary, full primary and also in secondary schools having Standards V to VII. The sample selected consisted of 100 schools from the district of Nagpur. Of these 100

schools, forty-seven were lower primary, thirteen full primary and forty secondary. In terms of geographical location, thirty-five were urban, twenty-five semi-urban and forty rural. Data for the study were collected through a questionnaire addressed to the teachers in these schools. Additional data were collected through holding discussions with the concerned teachers and heads of thirteen schools.

The major findings of the investigation were: (i) In only 20 per cent of the schools appropriate time was allotted to the daily programme of community living. (ii) The national anthem was sung daily in 50 per cent schools; the school song was sung in 49 per cent schools while neither was sung in 34 per cent of the schools. (iii) Only in 56 per cent schools adequate number of periods was given for the weekly programme of community living. (iv) Implementation of weekly programmes was properly done in only 5 per cent schools. (v) The main difficulties involved in the implementation of community living programmes, according to heads of schools, were lack of sincere teachers, the exclusion of community living in the annual examination and inadequate financial provision. (vi) There was need to identify and evolve community living activities which did not involve additional expenditure or special teaching aids and orient teachers to their implementation.

- *818.** SAINT, S., *An Experiment on Open Learning*, Vidya Bhavan, Udaipur, 1980 (NCERT-financed)

The objective was to provide an open learning environment to children to enable them to develop at their own pace.

Children from varying backgrounds were enrolled. The age range of the children was 5-10 years and they were grouped on the basis of age—Grade IA comprised 5-6 year olds, Grade IB 6-7 year olds and Grade II 8-9 year olds. The entire school met in a large hall which contained a variety of play equipment as well as display material for different subjects. Through the activities the children were exposed to basic skills in Mathematics, English and Hindi. Though the children were encouraged to participate in the activities organized by the teachers, they were allowed to work on their own.

The principles on which the experiment was undertaken were: greater freedom to the learner and to teachers to plan learning experiences, self-pacing in learning, individual attention, cooperative effort in learning, ungraded structure, encouragement to self-learning, less emphasis on teaching and more on learn-

ing, bilingual programme, the child's progress to be evaluated according to his own ability rather than on the basis of examinations, and close involvement of parents.

The case studies of ten children revealed: (i) There were marked differences in their interest and participation in activities, those who earlier disliked school and had even left the previous school began enjoying coming to school. (ii) There was significant development as regards social skills both in the school as well as at home, and also of values. (iii) Streaming to other schools was smooth in the case of children who had been in the open learning environment. (iv) With the help of a parent-teacher discussion group, close contact was maintained between parents and teachers; the progress of the children was discussed with the teachers along with general discussions pertaining to education of the children; the parents were encouraged to visit the programme.

- 819.** SALI, V.Z., *Survey Report on Work Experience in the Secondary Schools and the Teaching of Optional Subjects pertaining thereof*, SIE, Poona, Maharashtra, 1978a

The investigation was conducted with the main purpose of studying the status of work experience in the secondary schools of Maharashtra. The proforma was mailed to all the secondary schools but 2,490 (44.5 per cent) schools returned the filled in proforma.

The study revealed: (i) Most schools included two work experience subjects; a few schools offered more than two subjects. (ii) There were eleven schools without any provision of work experience. (iii) Only 1,405 (57.58 per cent) schools offered agricultural subjects under work experience; of the 1,405 schools offering these subjects 1,095 schools were in rural areas and 310 in urban areas. (iv) Four hundred and fifty-four schools most of which were in urban areas, had facilities for technical subjects. (v) Regarding evaluation procedures 1,732 (69.3 per cent) schools were in favour of internal evaluation. (vi) The number of periods allocated for the teaching of the subject was adequate. (vii) The number of teachers teaching these subjects in Classes VIII and IX was 4,783 and 4,330, respectively. (viii) In Class VIII the percentage of trained teachers was 86.6 and in Class IX 84.2. The training provided to most of these teachers (70 per cent) was through inservice workshops.

- 820.** SALI, V.Z., *The Difficulties in Implementing New Curriculum of the Secondary Schools and Re-*

medies for It — a Critical Study, SIE, Poona, 1978b

The investigation was conducted with the main purposes of (i) studying subject-wise difficulties while implementing new curriculum of secondary schools and suggesting remedies for them, and (ii) studying the reasons of poor results at the school-leaving examinations.

The study included twelve secondary schools of Kolhapur district as the sample. Along with some factual information, the view-points of teachers, guardians, principals, education officers, teacher associations and students were collected. The questionnaire, interview, record survey, discussion and observation techniques were used for the conduct of the study. The descriptive approach was used for the analysis of data.

The investigation revealed: (i) Mathematics was considered the most difficult subject for teachers and students along with science and English; when more care was taken for teaching these difficult subjects, the teaching of Marathi and social sciences was neglected. (ii) It was difficult to supplement new curriculum in the schools lacking physical facilities like buildings, laboratories, libraries, etc. (iii) Non-availability of enough teachers from the educational departments, lack of preparation on the part of teachers, teachers' lack of understanding the objectives of the curriculum, lack of motivation of teachers for conducting research, negligence in school inspection and guidance by administrative authorities, insufficient management of in-service training, lack of proper guidance by parents and their poor economic background, were barriers in the implementation of the new curriculum. (iv) Suggestions for improvement of in-service teacher education programmes, efficient administration and supervision of schools, implementation of school complex programmes, research on secondary education, etc., were provided.

- *821.** SHARMA, C.K., *An Experimental Study of Different Methods of Teaching Sanskrit Grammar to High School Classes*, Ph.D. Edu., Mee. U., 1975

The main objectives of the investigation were: (i) to prepare a programme in Sanskrit grammar using Hindi as the medium of presentation, (ii) to evaluate the functional effectiveness of the programme on Sanskrit grammar at high, average and low academic achievement, and (iii) to find out the relative effectiveness of three methods — traditional, lecture and programmed instruction — of teaching Sanskrit grammar separately at

high, average and low achievement levels as well as to a composite group.

A sample of 122 subjects was selected from Class IX from a school in Meerut district. The subjects were divided into three sub-groups of high, average and low achievement on the basis of marks in the previous examination. With the three methods of teaching and the three groups of students, the study adopted a 3×3 factorial design. A criterion test was administered to ascertain the quantum of knowledge in Sanskrit grammar. Equal time was allotted for teaching through each of the three methods after which the same test of Sanskrit grammar was again administered. The t-test and the F-test were used to analyse the data.

The findings of the investigation were: (i) There was significant difference in the three methods of teaching Sanskrit grammar, the programmed instruction being the most effective. (ii) The difference in the attainment of the three achievement groups was significant, the attainment of students of the high group was superior for all the three methods of teaching, the average attainment groups also achieved significantly higher under each of the three treatments. (iii) The three different achievement levels responded differently to the three methods; the high achievers under the programmed instruction attained higher than low achievers under the traditional method; the attainment of high achievers was higher than that of high and average achievers when taught by the traditional method; the average achievers taught by the programmed instruction performed significantly higher than high, average and low achievers under the traditional method and average achievers taught by the lecture method. (iv) On the whole, the performance of the high achieving group was higher than that of the students belonging to average and low levels of achievement in the three methods of teaching. (v) The attainment of students in the high achievement group was higher when taught by the programmed instruction than when taught by the lecture and the traditional methods. (vi) The attainment of high achievers under the programmed instruction was higher than that of low achievers when taught by the same method. (vii) Average achievers taught through the programmed instruction performed significantly higher than average achievers taught by the lecture method. (viii) High achievers taught through the lecture method performed significantly higher than low achievers taught through the programmed instruction.

*822. SHARMA, M.M., *A Comparative Study of*

Teaching Mathematics by the Method of Programmed Instruction and Conventional Classroom Method, Ph.D. Edu., AMU, 1981

The objectives of the study were: (i) to compare the outcomes of learning mathematics through programmed instruction and conventional methods of teaching, (ii) to find out whether intelligence, introversion-extraversion, rigidity-flexibility, study habits and previous achievement of students were differentially related to their achievement and retention when they learn mathematics through the aforesaid two methods.

The study was conducted on two groups of 189 Class IX students, matched on the basis of age, socio-economic status and locality of habitat. One of these groups (experimental group) was taught through a linear programme on Set Theory constructed by the investigator. The other group (control group) was taught through the conventional method of teaching. A test of achievement was administered at the conclusion of teaching. Another achievement test was administered after two months for measuring retention in mathematics. Subjects securing 60th percentile or above and 40th percentile or below on the different variables were called high and low groups, respectively. A $2 \times 2 \times 2$ factorial design was used.

The major findings of the study were: (i) Programmed instruction was a more effective method than conventional teaching not only in relation to achievement but also in relation to retention. (ii) The personality dimension introversion-extraversion had highly significant effect on achievement and some effect on retention scores, introverts being superior to extraverts. This dimension had little differential effect on achievement or retention through the two methods of teaching employed. However, introverts with poor study habits achieved better than extraverts with poor study habits when taught through the programmed instruction. (iii) Intelligence had a significant effect on achievement and no significant effect on retention of achievement. It did not show any differential effect on achievement and its retention through the two methods of teaching employed. (iv) Good study habits had significant effect on retention of achievement but no significant effect on immediate achievement. (v) The flexibles achieved higher through the programmed instruction and the rigids achieved higher through the conventional method of teaching. (vi) Students with high previous achievement achieved and retained higher than those who had poor previous achievement. Students with low previous achievement achieved better through the programmed instruction

than those with high previous achievement taught through the conventional method of teaching.

823. SHARMA, N.D., *An Experimental Study of Teaching Natural Sciences at the Primary Level in Central Schools*, Ph.D. Edu., Pat. U., 1978

The study was undertaken: (i) to ascertain the existing position of teaching natural sciences at the primary level in the Central Schools, and (ii) to compare the effectiveness of different methods of teaching science at the primary school level.

To ascertain the existing position of teaching natural sciences, a survey study was first undertaken. A questionnaire consisting of 106 items was prepared and sent to forty-five teachers teaching natural sciences at the primary stage in eleven Central Schools in the State of Punjab. Forty-three persons returned the completed questionnaires. The second part of the study examined, experimentally, the relative effectiveness of the self activity and guided activity. The experimental study was based on a sample of ninety students of Class III. The students were divided into three matched groups of equal size. Three units were selected from the curriculum for teaching all the three groups. Before starting the experiment, students were tested. After the experiment (teaching) lasting six months, three posttests each of half hour duration specially prepared for the purpose were administered on the three groups. The answer papers were scored and the pretest data and the posttest data were subjected to analysis of covariance.

The results of the study were: (i) Most of the teachers used traditional methods for teaching natural sciences. Some tended to make natural sciences teaching at this level activity-oriented. (ii) The teachers were not well equipped for teaching science at this level. (iii) It was admitted by most of the teachers that activity should be the basis of teaching natural sciences at the primary level. (iv) Guided activity was more effective than self activity in respect of concept formation, development of scientific attitude, acquisition of scientific knowledge, training in scientific skill and development of scientific attitude.

824. SHARMA, Y.K., *Growth and Development of Science Education in Bihar*, Ph.D. Edu., Pat. U., 1982

The objective of the study was to analyse the aims,

curriculum, textbooks and techniques, materials and equipment, teacher training programmes, supervision and inspection, and agencies for the improvement of science education in Bihar.

The population of the study consisted of all the schools, primary as well as secondary, of Bihar and other institutions connected with science education at the school stage. Data were collected from ten primary schools, ten middle schools, ten secondary schools and the State Council for Educational Research and Training. Five science teacher-educators of secondary education colleges and ten science teacher-educators of primary teacher education colleges were interviewed with the help of a specially prepared interview schedule.

At the time of the study the State Government was making attempts to reorganize the educational structure on the 10+2+3 pattern. As a result, curricula, textbooks, methods, teacher education programme and process of evaluation were being revised. It was emphasized that while science education had largely expanded during the last decade, the administrative bodies and methods had remained more or less unchanged. Thus, there was need for modernizing and strengthening administration in the field of science education. There was also an urgent need for exploring the possibilities of using modern approaches and devices which were being adopted in advanced countries for the teaching of science so as to maximize the performance of teachers and students in teaching and learning science.

825. SHUKLA, G.B., *A Critical Study of Curriculum Development at the Stage of Elementary Education in the State of Gujarat: 1940-1970*, Ph.D. Edu., Gujarat Vidyapeeth, 1975

The major objectives of the investigation were: (i) to review the changes introduced in the curriculum of primary education during the years 1940-1970, (ii) to make a comparative study of the modifications introduced in the curriculum, (iii) to study critically the primary school curriculum introduced in Gujarat in 1967, (iv) to inquire into the factors responsible for the curriculum change, and (v) to evaluate the various curricula of primary schools during the years 1940-1970. The investigation also developed a scheme of curriculum construction.

The sample consisted of teachers, headmasters, supervisors and teacher-educators selected from all the districts in the State. The sample included twenty-five headmasters, thirty teachers, ten supervisors from each district and sixty teacher-educators from ten primary

teacher training colleges. The total number of respondents was 1184. The tools for data-collection were documents, questionnaires and interviews. The statistical techniques used were descriptive statistics.

The major findings of the investigation were: (i) The primary education curriculum was divided into two phases, for Classes I to IV and for Classes V to VIII. (ii) The major defects of the primary school curriculum were lack of practical knowledge, inadequate arithmetic in the lower classes, emphasis on information rather than understanding, a heavy load of subject matter, absence of moral education, low level of instruction in history, regional geography, the local trade, industry, etc., a curriculum devoid of flexibility and the like. (iii) The respondents felt an urgent need for a continuous programme of monitoring and evaluation of the curriculum. (iv) The need to undertake studies for improving teacher motivation was felt. (v) Teachers and teacher-educators felt a lack of involvement in the process of curriculum construction.

826. SHUKLA, N.N., *Development and Tryout of a Curriculum for Mentally Handicapped Children*, Gujarat Research Society, 1979 (NCERT-financed)

The objectives of the study were to develop a curriculum: (i) catering to individual abilities and interests of mentally retarded children, (ii) enabling mentally retarded children to be integrated into society, and (iii) of a more or less uniform pattern for schools of the mentally handicapped.

Three schools in Greater Bombay having Marathi and Gujarati as media were selected. The sample was selected on the basis of level of I.Q. (between 50 and 70) and level of achievement, omitting repeaters. Subjects in the curriculum were language, arithmetic, general knowledge, hygiene and community living, physical education and music. The syllabus was analysed into objectives, behavioural outcomes, content, method and evaluation procedure. Pretests comprised oral tests on the various subjects while the posttests comprised oral tests and, wherever possible, written objective tests. A parents' opinionnaire on behavioural improvement in their children during the period, a questionnaire requiring observation of children's behaviour at various stages of teaching and individual records of each child were also used to collect data on children.

The findings of the study were: (i) The Gujarati-medium students taught by the modified instructional

material fared better in language and arithmetic in the first evaluation while in the second evaluation they were significantly better in all aspects. (ii) Among the two groups of the Marathi-medium students there was no difference in the first evaluation while in the second evaluation those exposed to the modified syllabus fared better in arithmetic, general knowledge, community living, drawing and handicraft. (iii) According to teachers' opinions regarding improvement of Gujarati-medium students chi-square values were not significant. However, there was significant improvement in several aspects of some training, arithmetic, language, general knowledge and health and community living among those exposed to the new curriculum while there was no improvement in handicrafts, music and physical education. (iv) Teachers' opinion regarding improvement of Marathi-medium students taught through the new curriculum indicated significant improvement in general knowledge, language, arithmetic, sense training, music, health and community living while in handicrafts and physical education the difference was not significant. (v) Parents' opinions indicated there was improvement in the behaviour of students exposed to the new curriculum in almost all aspects.

827. SIVADASAN, K.R., *Group Behaviour of Pupils and the Attainment of Educational Objectives in Secondary Schools*, Ph.D. Edu., Ker. U., 1979

The major objectives of the study were: (i) to find out and compare the effectiveness of different classroom situations on the attainment of objectives of science education, (ii) to find out the extent to which different situations were used in schools for the attainment of objectives of science education, the possibility of practising them in schools and the teachers' acceptability of these situations, (iii) to find out whether there was any significant difference in the relative effectiveness of classroom situations on pupils' achievement in science, and (iv) to find out whether there was significant difference in the relative effectiveness of classroom situations at different levels of intelligence and socio-economic levels of pupils on their achievement in science.

A sample of 435 science teachers in secondary schools in Kerala rated the schedule containing objectives and different classroom situations and sub-situations. The weighted scores for ratings were subjected to analysis of variance. The null hypotheses framed from the objectives (iii) and (iv) of the study were tested using counter

balanced design and randomized blocks design. The teacher-oriented, the pupil-oriented and the group-oriented classroom situations were taken as the three experimental variables and pupils' achievement in physics was fixed as the dependent variable. Three divisions of Standard IX, each containing forty pupils, were taught physics according to the three situations identified as the experimental variables. Statistical studies of the groups were made by applying analysis of variance to pupils' achievement scores.

The major findings of the study were: (i) The classroom learning behaviour was a factor which largely contributed to the attainment of objectives of science education. (ii) The group-oriented classroom situation was more effective than the pupil-oriented and the teacher-oriented situations in the attainment of certain objectives. (iii) The school category, sex and teaching experience discriminated teachers' responses to the extent of attainment of different sections of objectives under various situations. (iv) Even though the classroom situations did not differ significantly in their effectiveness upon the attainment of many of the objectives, the mean achievement scores of pupils under the group-oriented situation were higher than those under the teacher-oriented and the pupil-oriented situations, indicating that the former had an edge over the other two situations. (v) The teacher-oriented classroom situation scored the highest in prevalence while the possibility of using the group-oriented situation was significantly higher than the teacher-oriented and the pupil-oriented situations. (vi) The effectiveness of classroom learning behaviours was found to be independent of pupils' intelligence and socio-economic status with respect to the realization of most of the categories of objectives of science education.

828. SIVADASAN, K.R., *Project on Developing Science Kits and Self-instructional Software for Audio-tutorial System*, Dept. of Edu., Ker. U., 1981 (UGC-financed)

The main objectives of the project were: (i) to prepare materials for individualized instruction, and (ii) to test them for their efficiency as learning strategy.

The topic 'Light' in physics prescribed for Standard IX in the schools of Kerala was selected for preparing audio lessons. By administering diagnostic tests on Reflection, Refraction and Mirrors and Lenses the concepts that were not understood by the students were located. Six concepts in Reflection, five in Refraction and four in Mirrors and Lenses were thus identified. Scripts for

audio lessons in all the fifteen concepts were prepared following the guided discovery approach as a strategy for learning. The lessons were recorded on tapes. Pupils' activities were given prominence in the audio lessons. A ray box was constructed in such a way that the box could be used as a kit. The kit contained an instruction sheet, equipment for experiments, a tape recorder, cassettes containing taped lessons, learning aids, figures and evaluation sheets.

For pilot study ten students were asked to learn the topic using the taped lessons. The lessons were revised on the basis of the results of observation of the students, interview with them and evaluation of their performance. The revised lessons were given to a group of twenty students for learning. The students' performance was evaluated after they had learnt all the audio lessons.

The major outcomes of the project were: (i) The audio-tutorial system was an effective strategy for learning. (ii) In the audio-tutorial system the guided discovery approach was possible and effective. (iii) Students could learn at their own pace under this system. (iv) The teacher's role was minimized in the audio-tutorial system. (v) The ray box could be used as a small science kit.

***829.** SRIVASTAVA, N.K. and KAUSHIK, H.C., *Preparation of Improvised and Low-cost Educational Teaching Aids with the Help of Waste Materials*, STC School, Garhi, 1983 (NCERT-financed)

The objectives of the study were: (i) to prepare teaching aids through waste materials available in the environment, (ii) to make teachers aware of the importance of waste materials in the environment, and (iii) to provide a better education in an economized way.

The study was limited to the teaching aids for the primary and upper primary schools from waste material available in the environment of Rajasthan. Entire Rajasthan was divided into six geographical regions from where the waste materials were collected. An exhibition of the teaching aids thus prepared was arranged while 100 primary and upper primary school teachers were invited and asked to give their opinion about the aids and suggestions for their improvement; however, only eighty-two responded. The responses were collected on a questionnaire prepared for the purpose. Most of the aids were meant to teach science and mathematics.

The result of the study indicated: (i) As regards availability of materials in the villages, 68.29 per cent claimed they were not available, 4.88 per cent felt a very few

were available while 26.83 per cent felt some of the materials were available. (ii) Though 26.83 per cent teachers felt they required technical help in the preparation of similar teaching aids, 48.78 per cent felt they required some such help while 24.39 per cent required no help. (iii) Though 59.76 per cent respondents expressed their desire to prepare the teaching aids in the extra periods, 34.15 per cent preferred preparing them in the vacant periods while 6.09 per cent could not propose a definite time for their preparation. (iv) The prepared aids were considered very helpful for class teaching by 57.32 per cent teachers, of some use by 28.04 per cent and of hardly any use in classroom teaching by 14.63 per cent. (v) All teachers considered the aids to be of low cost as compared to the cost of the commercially prepared ones. (vi) Along with the students and community, 68.29 per cent teachers felt they could prepare such teaching aids while 14.63 per cent teachers felt they could prepare them along with the students; 10.98 per cent felt they could be prepared by students and the community. (vii) The teachers felt that a write-up of all the aids should be provided to the primary and upper primary teachers and that the aids should be categorized according to class and subject.

830. SUNDARARAJ, S., *Development of Curriculum on Population Education for College Students*, Ph.D. Edu., MSU, 1978

The major objectives of the study were: (i) to prepare a curriculum on population education for collegiate students, (ii) to examine its efficacy in terms of pupils' knowledge, understanding, application as well as conditioning, awareness, opinion and attitude, and (iii) to make suggestions and recommendations for effective use of population education curriculum at the collegiate level.

Considering the impact or consequences of population growth phenomena in selected aspects of social and natural environment, the course content was prepared. This was modified after tryout on teacher-trainees. The improved syllabus was tried out in eight arts colleges, both men's and women's in the rural and the urban areas. For studying the efficacy of curriculum pretest-posttest control group design was adopted. Data were collected using a questionnaire for college students' reactions to population education and a set of unit tests. The data were analysed using t-test.

The findings of the study were: (i) Improvement in overall performance through instruction was shown by

the significant difference in the mean scores of the experimental group in the posttest as compared to those in the pretest. (ii) Performance of the experimental group in the posttest was significantly higher than that of the control group on conditioning scores. (iii) Performance of the experimental group on awareness scores in the posttest was significantly higher than that of the control group. (iv) Performance of the experimental group on the opinion scores in the posttest was significantly higher than that of the control group. (v) The adjusted posttest mean attitude score of the experimental group was significantly higher than the adjusted posttest mean score of the control group.

831. SWARNAMMA, G., *An Enquiry into the Teaching of Biology in the Upper Primary Schools of Kerala*, Ph.D. Edu., Ker. U., 1978

The important objectives of the study were: (i) to identify topics to be deleted from the biology syllabus of Standards VI and VII from the point of view of pupils, (ii) to identify activities which are found rather difficult by pupils of Standards VI and VII, (iii) to identify the techniques of teaching adopted by teachers for teaching biology in the upper primary classes in the Trivandrum district, (iv) to identify the objectives aimed at by the teachers of biology of the upper primary stage, and (v) to find out the level of attainment of pupils of Standard VII in biology.

Twelve schools were selected on a stratified random basis for the study. Three classes each from Standards VI and VII of the schools were observed by the investigator for collecting information about the method of teaching biology in those classes. An achievement test was administered to 500 pupils studying in Standard VII of the selected schools towards the end of the academic year. A group of fifty experts in the field of biology education was interviewed to collect their opinion about the teaching of biology in the primary classes.

The major findings of the study were: (i) The topics identified as very difficult by the pupils of Standard VI were the structure of the cell, protozoa and classification of plants and animals. (ii) Lack of facilities in schools, lack of mastery of the subject matter on the part of the teachers, lack of experimentation in the classroom, overdependence of teachers on textbooks, overcrowding in classrooms, were listed by the pupils as some of the reasons for finding biology a difficult subject. (iii) The ability to analyse materials by simple techniques had not been developed among the pupils to a desired extent.

(iv) Most teachers resorted to lecture-demonstration method in the teaching of biology in the upper primary classes. (v) The objectives aimed at by the teachers in teaching biology at the upper primary level were oral and written expression in science, functional knowledge of facts and concepts, interest in scientific hobbies and interest in surroundings. (vi) The pupils found it difficult to draw diagrams and to mark parts thereof. (vii) The achievement level of the pupils was not quite satisfactory. Even in the case of simple skills, adequate mastery was not gained by the pupils. (viii) The teachers, in general failed to develop scientific attitude among pupils of upper primary classes. (ix) There was high positive correlation between expected realizability and actual realization in regard to recognition and appreciation type objectives.

832. THAKKAR, A.P., *Curriculum in Pre-school Education*, Ph.D. Edu., Bom. U., 1979

The main objectives of the investigation were: (i) to seek a rationale for a pre-school curriculum, (ii) to study the existing philosophies, methods and practices in the field, (iii) to carry out an initial exploratory survey of the pre-school curriculum in Bombay to elicit the awareness of a cognitive base to the curriculum in the schools, and (iv) to study the visual perception tasks involving not only perceptual discriminations and categorizations but also perceptual sequencing of thought processes, perceiving connection, etc., developing perceptual and language skills and also logical thought processes.

Development of visual perception being a basis of form discrimination, the Visual Perception Test (VPT) consisted of pictorial representations of objects from an urban Indian child's environment. The tasks included twenty-one pictures under ten different heads, namely, similarities, differences, size discriminations, what is missing, directions, things that go together, juxtaposition, identical inversion, spatial configuration, and hidden pictures. For administering the VPT, the sample was from three groups of pre-schoolers from three different schools between the ages of three and a half to four and a half (in their first year at school). The three strata of urban Indian society considered were school A upper class (Rs.1000 per month), school B middle class II (Rs.800 – Rs.1000 per month), and school C lower middle class III (Rs.400 – Rs.500 per month). The number of children included from the three schools was fifty for the experimental group and fifty for the control group.

First part of the experiment, E1, involved using the

VPT as a teaching device for the fifty children of the experimental group in the three schools. Second part of the experiment, E2, tested the experimental and control groups by using six papers under six heads (using the most distinctly different concepts) to evaluate the differences in the performance of the two groups. To evaluate the influences of the factors, namely, school or socio-economic group effect, and their resulting interactions, a fixed effect model was adopted.

833. THAKORE, R., *Developing a Curriculum in Population Education for Secondary Teachers under Training*, Ph.D. Edu., Guj. U., 1979

For developing a curriculum in population education for secondary teachers under training, the investigator made an elaborate study of all the relevant literature available both in the area of the curriculum theory and that of population education. In the investigation, the theory of curriculum has been applied for developing a curriculum in population education for secondary teachers under training for whom there was no precedent or parallel. The model for the process of curriculum development was innovated and its six phases were gone through. The curriculum thus developed was actually tried out for the whole academic year in the normal working conditions. For pretest and posttest measurements, the investigator constructed tools such as an attitude scale and an achievement test in population education. The measurement aspect of evaluation was complemented by the assessment aspect. Finally, the curriculum package was developed for the teacher trainees.

834. THARYANI, D.K., *Critical Study of the Effectiveness of the Revised Curriculum for Classes VIII, IX and X in Maharashtra State*, Ph.D. Edu., Bom. U., 1978

The main objectives of the study were: (i) to examine the various measures taken by the Government of Maharashtra for the effective implementation of the new curriculum in Classes VIII, IX and X, (ii) to look at the existing facilities in both the rural and the urban schools in the State for effective implementation of the new curriculum, and (iii) to find out the difficulties experienced by schools in implementing the new curriculum.

The methodology used for the study was the normative survey method. The technique of sampling used was

stratified purposive technique. The tools used for data collection were the questionnaire and the interview schedule.

The major findings of the study were: (i) A large number of schools, especially those in the rural areas, were not self-sufficient. (ii) The necessary resources in the form of funds, space and materials and equipment were not available in most of the schools for bringing about the effective changes required by the new curriculum. (iii) The new curriculum was out of tune with the social, economic, philosophical, psychological and educational requirements of the students and society. (iv) The programmes of work experience and social service included in the new curriculum were not properly integrated with the programme of general education. (v) The compulsory teaching of the subjects of mathematics, science and English introduced in the new curriculum was responsible for a large number of failures at the Secondary School Certificate Examination. (vi) The efforts made by the Government of Maharashtra for the effective implementation of the new curriculum proved ineffective due to lack of funds, lack of coordination, inconsistent changes and bureaucratic and mechanical procedures of the State Department of Education.

835. UPPAL, A.K., *Comparative Effects of Two Duration Load Methods and Interval Running Methods on Cardio-respiratory Endurance and Selected Physiological Variables*, Ph.D. Phy. Edu., Jiw. U., 1980

It was hypothesized: (i) No difference would be effected by the three methods of endurance training, namely, slow continuous running, Fartlek and interval running methods, on cardio-respiratory endurance. (ii) No difference would result from the effects of three endurance training methods on physiological variables, namely, maximal oxygen uptake, resting pulse rate, vital capacity, leg strength, resting blood pressure, after exercise recovery time, breath-holding time, blood haemoglobin content, red blood and white blood corpuscle counts, serum cholesterol and skin-fold measurement.

Out of 164 students of Classes X and XI, 126 students were taken as subjects. Of them, eighty students were selected randomly. It was ensured that all the students were medically fit for the project. The average age was 16 years, the age ranging from 15 to 17 years. Random group experimental design was adopted for the study, equal number of subjects were assigned randomly to four groups of twenty-subjects each. Each group was as-

signed at random to either of the three experimental treatments, namely, slow continuous running training, Fartlek training and training by interval running, to promote cardio-respiratory endurance. The fourth group was used as control group. For the slow continuous running group the initial duration of the training was 45 minutes. The progression in the training load was ensured by increasing the duration of running by five minutes every two weeks. The subjects ran at a uniform pace throughout the duration of the run. The Fartlek group commenced its training by running for 30 minutes each session during the first two weeks and progressively increased the duration of running to 55 minutes in the last two weeks. Fartlek running was performed over a five-kilometre track with frequent changes in inclination and landscape specially developed for the purpose. The total duration of training session in the case of interval running increased from 30 minutes in the first two weeks to 45 minutes in the last two weeks. The stimulus intensity and stimulus volume were fixed according to the ability of the subjects. The principle of worthwhile break was fully utilized. Quantitative measurements by standard techniques of the selected variables for each of the subjects were taken at the beginning and at the conclusion of an experimental period. The training was carried out thrice a week. The mean differences in each of the variables were tested for significance by applying t-test. The differential gain of the groups were also tested by F-test followed by Scheffe test whenever intergroup variance was found to be statistically significant.

The findings of the study were: (i) Slow continuous running, Fartlek and interval running methods were effective in developing cardio-respiratory endurance as measured by Cooper's 12-minute run/walk test. (ii) Slow continuous running and Fartlek methods brought about significantly higher cardio-respiratory endurance scores than interval running methods. (iii) There was no difference in the effects produced by slow continuous running and Fartlek method. (iv) Slow continuous running, Fartlek and interval running methods were effective in improving maximal oxygen uptake, vital capacity, leg strength, positive breath-holding time and negative breath-holding time. (v) In the cases of maximal oxygen uptake, vital capacity, leg strength and positive breath-holding time, all the three methods for developing endurance had equal training effects. (vi) Slow continuous running, Fartlek and interval running methods improved resting pulse pressure whereas the improvement shown by the Fartlek method was not statistically significant within the period of the experiment. (vii) Slow continuous running, Fartlek and inter-

val running methods did not seem to affect diastolic blood pressure after exercise, blood haemoglobin content and red and white blood corpuscle counts. (viii) The control group did not show any significant change in cardio-respiratory endurance and selected physiological variables except serum cholesterol level in the blood, which showed a significant increase which was obviously a reflection of inactivity.

836. UPPAL, S.S., *Development of Curriculum in Science for Secondary Schools in the State of Maharashtra*, Ph.D. Edu., Bom. U., 1977

The objective of the study was to develop a curriculum in science for Standard VIII of the secondary schools in the State of Maharashtra. Data were collected by means of a questionnaire administered to science teachers and by conducting an experiment on pupils of Standard VIII of English-medium schools.

The main findings of the study were: (i) The existing syllabus in force in the State needed modification. (ii) The syllabus suggested by the investigator was effective.

837. VAGHAMARE, S.G., *A Study of Exercises in History Textbook Prescribed for Standard IV in Maharashtra State*, Government College of Education, Aurangabad, 1971 (MSBTPCR-financed)

The major objectives of the study were: (i) to examine the extent to which the exercises provided in the textbook measured the objectives of history teaching, (ii) to find out the weightage given to different types of exercises, (iii) to prepare a new set of exercises with due consideration to the different objectives of teaching history, and (iv) to evaluate the suitability of the newly prepared set of exercises.

The exercises given in the textbook were analysed and classified according to the objectives of teaching history. The classification was done in terms of knowledge, understanding, application, skills and personal development. The exercises were then classified according to different item types, namely, objective type, short-answer type, activity-oriented type, essay type and the type involving dramatization. Based on these analyses the actual weightages given to the five different objectives and to the five different item types were calculated. The actual weightages were compared with the desired weightages. Desired weightages were fixed on the basis of the opinions collected from fourteen teachers teach-

ing in two colleges of education located in Aurangabad. The new exercises were prepared mainly with a view to bringing the weightage given to the objectives and item types to the desired level. These exercises were first evaluated by a committee of experts. They were then field-tested with 173 pupils including eighty-eight boys and eighty-five girls studying in four primary schools in Aurangabad.

The major findings of the study were: (i) The exercises given in the history textbook for Standard IV contained ninety-five items, thirty-nine of which were related to the objectives of knowledge, fifty-five to the objectives of understanding, and one on the objective of personal development; there were no items related to the objectives of application and skill. (ii) Of the ninety-five items, fourteen were objective type, sixty-one short-answer type, nineteen essay type and one item involved dramatization; there was no activity-oriented item. (iii) The comparison of the actual and desired weightages revealed considerable discrepancy in respect of objective coverage as well as item types. Desired weightages for the objectives of knowledge, understanding, application, skill and personal development were 40 per cent, 45 per cent, 3 per cent, 5 per cent and 7 per cent, respectively; the actual weightages given were 41 per cent for the objectives of knowledge, 58 per cent for the objectives of understanding and 1 per cent for personal development with no representation for the objectives of application and skill. Desired weightages for the five-item types, in terms of percentages, were 85, 45, 10, 5 and 5, respectively, but the corresponding actual weightages were 15, 64, 20, 1 and 0. (iv) Of the ninety-five items provided in the textbook twenty-four were faulty; of the faulty items it was possible to improve seventeen while the remaining seven had to be discarded altogether. (v) The final set of exercises consisted of one hundred and fifty-six items, which included sixty-eight newly developed items.

838. VEERKAR, P.P., *A Study of the Effect of Integrated Approach of Teaching Social Studies on the Performance of the Pupils of Fourth Standard of the Primary School*, Ph.D. Edu., MSU, 1980

The objectives of the study were: (i) to develop a syllabus for the integrated social studies course for Standard IV in primary schools in the State of Maharashtra, (ii) to develop instructional strategy for teaching the course, (iii) to find out the effectiveness of the integrated approach in terms of pupils' performance, and (iv) to

compare the performance of pupils taught through the integrated approach and the conventional approach with respect to developing knowledge, comprehension, skill and attitudes. In the light of the objectives, four hypotheses of no significant difference between the mean achievements in total performance, and those in knowledge, comprehension, skill and attitude of the two groups of pupils taught by the two approaches were formulated.

It was an experiment with two groups of pupils of Class IV matched on intelligence. The tools used in the experiment were integrated syllabus of social studies, a specially designed instructional strategy, Non-Verbal Group Test of Intelligence by Shah, an achievement test, observation schedules and two attitude scales specially developed by the investigator. The treatment consisted of the integrated syllabus taught by a specially developed instructional strategy. The strategy included planning of each unit, introduction to the unit, exploratory observation of display work from the printed material, discussion, activity by the whole class, presentation of reports, evaluation of the unit using unit tests, feedback and use of teaching aids at appropriate times. The technique of t-test was used to test the difference in achievement.

The major findings of the study were: (i) The treatment resulted in better achievement as far as total performance and performance related to knowledge, comprehension, skill and attitude objectives were concerned. (ii) The treatment benefited the pupils of average intelligence in developing skills and the pupils of below-average intelligence in total performance and skill and attitude development.

839. VENKATESWARLU, M., *Comparative Study of the Effect of Training in Certain Physical Activities on Some Cardio-Vascular Respiratory and Renal Functions*, Ph.D. Phy. Edu., Pun. U., 1971

The objectives of the study were: (i) to find out the effect of prolonged duration of training in physical activities on changes in cardio-vascular, respiratory and renal functions, and (ii) to find out the comparative effect of different training activities on these physiological functions.

The regular trainees of the National Institute of Sports undergoing training in gymnastics, football, swimming, volleyball, track and field and basketball were selected. They were tested in the selected cardio-vascular, respiratory and renal functions. The tests used for cardio-

vascular purpose were Harward Step Test, pulse rate, ECG and blood pressure; for respiratory functions the tests used were tidal volume, inspiratory reserve capacity, expiratory reserve capacity, vital capacity, oxygen consumption and respiratory frequency; the renal tests consisted of Urine Concentration and Urea Clearance Test. The subjects were given training in their respective sports by the respective coaches for eight months. During this period of training, all the subjects were tested in the selected physiological functions each month for a period of eight months. The data were analysed using t-test.

The findings of the study were: (i) Cardio-vascular and respiratory endurance as assessed by the Harward Step Test improved significantly as a result of eight months of training. (ii) The training caused significant decline in the resting and post-exercise pulse rates. (iii) Resting and post-exercise systolic and diastolic blood pressure dropped significantly after training. (iv) Of all the electro-cardiographic deflections, P-wave decreased, R and T waves, QRS complex and PR intervals increased in amplitude in all groups. (v) Post-exercise ECG change in P, R and T waves significantly declined due to training in selected activity groups. (vi) Training caused changes in respiratory frequency, post-exercise oxygen consumption, expiratory reserve capacity and tidal volume. (vii) Training did not produce any significant change in urine concentration and urea clearance. (viii) The swimming and track and field groups showed the most significant changes and the least significant changes were among the gymnastics and volleyball groups in the selected cardio-vascular and respiratory functions. These changes were rapid in the first three months and extremely insignificant in the last two months of training. (ix) The most significant difference in the influence of training on the selected cardio-vascular and respiratory functions were found between swimming and track and field groups.

840. WALAVALKAR, Y.N., *A Critical Evaluation of Mathematics Textbooks for Standards II, III and IV*, Government Polytechnic, Ratnagiri, 1971 (MSBTPCR-financed)

The main objectives of the study were: (i) to find out errors, if any, in the mathematics textbooks prescribed for Standards II, III and IV, and (ii) to examine the suitability of these textbooks for the level of understanding of the pupils.

The mathematics textbooks prescribed for Standards

II, III and IV in Maharashtra were carefully read and the contents analysed in detail. Based on the analysis, different tools for data collection were constructed. Data were collected from sixty-five schools, including schools located in urban and rural areas. The tools used were a questionnaire for teachers, a questionnaire for parents and a set of achievement tests for pupils of Standards III and IV. Questionnaire data were collected from about fifty teachers for each of the three standards. Parents' questionnaire was administered to about fifty parents of the pupils from each of the three standards. The achievement tests were administered to 324 pupils of Standard III of whom 203 were rural and 121 urban and to 300 pupils of Standards IV of whom 188 were rural and 112 urban. These data were augmented with the data obtained through personal discussions held with the concerned teachers in the various schools.

The major findings and conclusions of the study were: (i) The textbooks were, in general, suited to the capacity of the pupils. (ii) The text material was related to the day-to-day life of the pupils. (iii) The text material was appropriate for creating pupils' interest in mathematics. (iv) There were a number of minor faults in the textbooks which needed to be rectified. (v) There was need to resequence some of the topics in the textbooks for Standard II and Standard III. (vi) It was appropriate to include the topic Vulgar Fractions in Standard IV instead of Standard III. (vii) It was necessary to provide an answer key for all the exercises given in the textbooks.

*841. YADAV, R.S., *An Experimental Study of Effectiveness of Lecture and Guided Discovery Methods in Developing a Hierarchy of Learning in Cognitive Domain*, D. Phil. Edu., Garh. U., 1982

The major objectives of the study were: (i) to find out the comparative effectiveness between the lecture method (LM) and the guided discovery method (GDM) at different intellectual levels, (ii) to identify the effectiveness of GDM over LM in terms of proposed hierarchical order, and (iii) to assess the feasibility of hierarchy of learning objectives with their related behavioural processes.

The sample consisted of 78 students from almost all strata of society (rural/urban, ranging in income from Rs. 250 to Rs. 2500 P.M.) selected randomly. On Jalota's Group Intelligence Test two equivalent groups were formed with the help of one to one matching. The control group A was taught through the traditional lecture method while the experimental group B was taught

through the guided discovery method. The data obtained on pretest and posttest were logically interpreted by applying t-test of correlated means, t-test of uncorrelated means, analysis of variance and finally factor analysis.

The conclusions of the study were: (i) There was significant difference between the mean achievement scores obtained in the posttest by the subjects of groups A and B. (ii) No significant difference was observed in the mean achievement scores of the superior, the high average, the average, the low average and the borderline defective subjects of group A on pretest and posttest. (iii) Significant differences were found in the mean scores of the superior, the high average, the average, the low average and the borderline defective subjects of group B on pretest and posttest, respectively. (iv) The subjects of group B gained significantly better the concept of knowledge on posttest than did the subjects on pretest. (v) A significant difference was found in the mean achievement scores obtained for the objective understanding on pre- and posttests, respectively in favour of posttest in group B. (vi) Similarly, significant difference in the mean scores obtained on pretest and posttest by the subjects of group B were identified for application, discovery and creativity components. No such difference was revealed on the variable evaluation. (vii) Likewise, there were significant differences between the mean scores obtained on posttest by the subjects of groups A and B respectively, on knowledge, understanding, evaluation and creativity. (viii) There was significant difference between the mean achievement scores obtained for cumulatively defined learning objectives within the hierarchy of learning in group A on posttest. (ix) There were significant differences between the mean scores obtained for cumulatively treated learning objectives — knowledge and application, knowledge and discovery, knowledge and evaluation and knowledge and creativity, respectively, on posttest in group A. (x) Analysis of variance indicated a highly significant difference among cumulatively treated learning objectives on posttest in group B. (xi) The values of correlation coefficients among different learning objectives (treated independently) were found to be highly significant on pretest and posttest in group A and group B, respectively. (xii) Knowledge was identified as the most significant factor among all the objectives within the proposed hierarchy of learning. (xiii) As a result of factor analysis, it was observed that knowledge, understanding, application, discovery, evaluation and creativity took out 87.06, 4.99, 2.95, 2.24 and 1.18 per cent of the common factor variance on pretest in group A. (xiv) It was further ob-

served that the objectives knowledge, application, discovery, evaluation and creativity appeared within the percentage contribution of 79.62, 7.59, 6.05, 2.96, 2.28 and 1.5, respectively, on posttest in group A. (xv) The percentage contribution made by knowledge, understanding, application, discovery, evaluation in group B

in pretest was observed to be 90.9, 2.34, 2.45, 1.79 and 1.16, respectively. (xvi) Different learning objectives—knowledge, understanding, application, discovery, evaluation and creativity took out 84.58, 5.82, 4.97, 2.99, 1.27 and 0.45 per cent of the common factor variance in group B on the posttest.