CHAPTER - 2

REVIEW OF RELATED STUDIES

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2.0.0 Introduction

As mentioned in the chapter I, the studies in the area of primary education, Environmental Science and strategies to improve the instructions have been reviewed and presented in this chapter. The reviewed study for sake of clarity have been categorised. The categories are as follows:

1. Intervention studies in primary education.
2. Studies in academic achievement in various subject.
3. Studies in the area of Environmental Science teaching.
4. Studies in development of various teaching strategies in order to improve the quality of education.

The studies reviewed are both at national and international level.

2.1.0 Studies on Interventions in Primary Education

There are some interventions done by the government of India and other countries to improve the quality of primary education. Bangladesh is committed to the world declaration on education for all (Jomtein, March 1990) and the world summit on children (New York, September 1990) Bangladesh has prepared a National Plan of Action to achieve 'Education for All' by the y ear 2000. The targets of the plan are (I) to raise the gross enrolment rate at the primary level from 76% (1991) to 95% by the year 2000; (ii) to raise girls gross enrolment rate at the primary level to 95% by the year 2000; (iii) to raise the completion rate at

the primary level from 40% to 70% by the year 2000; and (iv) to raise adult literacy rate from 35% (1991) to 62% by the year 2000.

To improve the quality of primary education Bangladesh Government is taking following steps.

1. Establishment of satellite primary schools for enhancing the enrolment of the children who have not been enrolled. 2. Establishment of low cost community schools with community participation in areas where there are no primary schools at all. 3. Introduction of 'Food for Education' scheme in 17,203 primary schools for reducing drop out rates and improving nutrition level of the learners. 4. Introduction of **'School Attractiveness Programme'** inclusive of supply of learning materials. 4. Creation of 3138 primary education week as a part of well thought out process of extension of primary education movement in society. 5. Preparation of teachers' edition and teachers guide and their distribution to teachers. 6. Identification of one primary school in each Thana that is a total of 481 primary schools in 481 Thanas of the country, or turning them into model schools and for utilising them as inservice training centres of respective Thanas.

In Nepal the concern for quality has increased in recent years. They have introduced several innovative projects i. Education for rural development ; The Lahachowk Approach. Ii. Basic primary education project (BPEP) iii. **Instructional Improvement in primary schools An experimental Study**. and iv. Primary education development project (PEDP).

In Sri Lanka the major objective for introducing reforms was (i) to introduce a viable system of education which will facilitate development of basic competencies in the child and ultimately contribute to character building, nation building, development of general competencies and specific capabilities and ii . to address the key issues and problems in the existing system of education. A commission was appointed to suggest measures to be adopted to improve the educational situation of Sri Lanka. All recent reforms emanate from this National Education Commission. The commission suggested reform in five main areas. These are: Extending Educational Opportunity; **Improvement of Quality of Education**; Imparting Technical and Practical Skills through Education; Management of Education and Resource Provision.

Studies have shown that levels of learner achievement are rather low among the primary school children(Dave et. al. 1988; Govinda and Varghese, 1993; Shukla, 1994; Bashir et.al. 1993; Jangira, 1994; Varghese 1994a; Bashir,1994). Many of these studies have pointed out **the importance of minimum facilities to be provided in the schools and improving teaching and learning process and teacher competency**. Therefore, from the mid- eighties onwards the emphasis of public policy measures on primary education is increasingly shifted to improving the quality of primary education through different types of interventions. Some of the measures initiated in this regard in the recent past are : (i) the Operation Blackboard Scheme; (ii) establishment of District Institutes of Education and Training (DIET); (iii) defining the Minimum Level of Learning :

and (iv) decentralisation of educational planning and management (Varghese 1995b). The periodic educational surveys conducted by the National Council of Educational Research and Training (NCERT, 1990) have highlighted poor facilities in primary schools and the Operation Blackboard Scheme was an effort to provide minimum facilities to the primary schools. Under the operation blackboard (OB) scheme all primary schools in the country are ensured of (i) a minimum of two rooms; (ii) a minimum of two teachers; (iii) a minimum of two blackboards, two teacher chair and tables; and (iv) a limited number of teaching learning materials which include maps, charts, globe, mathematics kit, science kits etc., This scheme was started in 1987-88 and upto 1993 it has covered around 460 thousand primary schools. From the provision of facilities the next effort was **to improve the curriculum transaction and classroom practices**. An effort was first made to clearly define competencies to be achieved by children in primary grades. The Minimum Level of Learning (MLL) committee headed by Dave was an effort in this direction. The fact, the teachers can make or break the whole educational process (Bray, 1990). Therefore, another important policy measure initiated was to improve the teacher competencies. This is visualised to be achieved not only through pre-service training programmes but also through frequent in service training of teachers. The DIET's are established . It is expected that all the districts will be covered under the programme by the end of the eighth five year plan i.e. by 1997.

Govinda, R and Verghese N. V.(1991) derived the conclusion that the level of infrastructure facilities provided in the schools played an important role in improving the teaching learning environment and consequently, the learners achievement level as well as overall school quality.

Gupta and Gupta (1992) investigated the extent of utilisation of the equipment and educational materials supplied to primary schools in three states, viz. Gujarat, Rajasthan and Tamilnadu, under the centrally sponsored Operation Blackboard Scheme (OBS). They reported that (1) 83.8 % of schools had two all weather rooms and 55.6% of schools had verandas whereas only 9.7% of schools had toilet facilities; (2) While 46.2% schools had at least two teachers, 20.4% had more than two teachers; (3) The female teachers constituted less than 50% of the total teachers; (4) The majority of the schools receive the educational materials although the percentage of items received differed from item to item i.e. 56% (syllabi) to 99.5% (mathematics kit - the receipt of newspapers and magazines 0.00% being an exception); (5) **The majority of the teachers opined that these supplies would help to improve enrolment, retention and achievement levels of pupils.**

Packkiam (1990) investigated the implementation of OBS in Sakkottai Panchayat Union , Tamil Nadu . The conclusions of the study were : (1) 83% of primary school did not have adequate physical facilities; (2) The OB materials were utilised to a great extent by the teachers; however, the private school teachers utilised the classroom equipment to a greater materials, i.e., primary

science kit, library books and classroom equipment to a great extent than their counterparts in the government schools. There was no significant difference between these two groups in the use of play materials, game materials, mathematics kit and musical instruments. Sarma et al (1991) studied primary education problems in Jorha district of Assam. Their conclusions were: (1) Lack of physical facilities at schools was a major problem; (2) In 81.0% of school no teaching aids were available. The same team of researchers undertook a similar study to identify the problem of the upper primary stage, i.e., Classes VI to VIII. The major findings were that these schools were much better off than the primary schools with respect to physical facilities and teaching aids, i.e., 74.0% had permanent building as well as blackboards (BBs), 57% had urinals, (exclusive of 16% latrines). 44% had drinking-water facility, 68% had teaching aids, 58% had playgrounds and 68% had a games teacher. Ralte (1992) reported that only 55% of the schools had properly partitioned classrooms. Store room, students common room and library room, were almost non existent.

Thus, the researches reviewed here very clearly shows that number of interventions have taken place in different stated of India as well as some other Asian countries in the field of primary education. This is primarily due to the reason that these countries have not been able to achieve satisfactory progress with respect to primary education focused on (I) decentralisation of educational planning and management (ii) defining minimum levels of learning for learners (iii) Provision of minimum facilities (iv) improvement of instructional material, transaction of curriculum in classrooms and teachers competencies.

All these interventions have taken place in last two decades through various government schemes, programmes from time to time. They all in general aimed at improvement of quality of primary education.

2.2.0 Studies on Academic Achievement in Various Subject

Bhattacharya, S. (1991) studied the relationship of several variables to pupil achievement in nutrition, health and environmental sanitation. The crucial criterion for judging the impact of the innovative project was total pupil achievement (T. Ach.) which was further divided into more sub- components viz., Knowledge (K), Understanding (U), Application (A) and Skills (S). The major findings were; (1) The impact of the project intervention was significantly positive in enhancing the level of pupil achievement in all the five criterion components; (2) The total achievement of pupils of classes I and II were quite high (Class 1 M= 71.095 and class II M= 62.36%) thereby indicating almost mastery level of achievement of pupils of classes II and V were below the average (Class III M= 45.87% and class V M=44.94%) Whereas that of pupils of class IV was above the average i.e. M=55.50. Thus there was a sudden slump from a high level of pupil achievement in classes I and II (4) No relationship existed between sex and achievement that in any of the components. (5) Achievement and socio economic variables, namely, parental income, fathers and mothers' occupations, education and social status of pupils (disadvantaged or advantaged) were significantly related to these criterion variables; however, the magnitude of the relationship was so small that at no time they accounted for more than 10% and 5% of the total variance respectively; (6) The factors of school ecology (learning

environment in the Basic education terminology) had a greater impact on pupil achievements than those related to home ecology; (7) Simultaneous programme of the community education helped reinforce the learning achieved by pupils in school.

Buch and Sudame,. (1990) in their study of achievement of urban primary school children, noted that the achievements of the children in private schools in Gujarati language and mathematics were better than those studying in the municipal schools. Further boys and girls didnot differ in their achievement in these two subjects.

Dave, P.N. et al (1988) conducted a comprehensive evaluation of the project Primary Education Curricular Renewal (PECR), the implementation of which took place during 1975 to 1985 in 30 states and union territories. In the final count, the data of the sample study consisted of 11,343 pupils from classes I-V drawn from 141 project and non project schools scattered on 22 states and Union territories. Noteworthy feature was that the sample comprised 50% of the students form disadvantaged sections of the society, while the girls consisted of 43.63%, which was slightly more than the national sex ratio, i.e. 41.16%. The major conclusions were; (1) The impact of the project was positive as it significantly enhanced the level of pupil achievement in Language was excellent in classes I and II, good in class III and minimum (35% marks) required for promotion to the next class IV (the combined means being 63.75%, 55.22%, 41.31% respectively); (2) The pupil achievement in Environmental Science was excellent in classes I and II (the combined means being 61.25%, 63.75%,

55.22%, 41.27% and 34.65% respectively); (3) The pupil achievement in mathematics was excellent in classes I and II and below minimum in class IV (the combined means being 61.25%, 67.08%, 50.80% and 32.31% respectively); (4) The pupil achievement in Environmental Science was excellent in class IV (the combined means being 73.23% and 68.22% respectively); (5) The pupil achievement in Environmental Science (Social Studies) was average in class III and below minimum in class IV (the combined means being 48.94% and 34.28% respectively and below minimum in class IV (the combined means being 47, 90% and 31.94%, respectively).

Govinda, R and Verghese, N. V. (1991) demonstrated with the help of their study that (1) The performance of schools with one teacher per grade was better than and that of schools having multigrade teaching; (2) The performance of learners taught by generalist teachers was lower that of learners taught by specialist teachers; (3) A high correlation existed between achievement and the time spent on teaching learning; (4) The teaching practice like explanation of concepts with the frequent use of Black Board, motivating students by asking questions, regularity in the classroom, regularity in giving and correcting homework and revision of previous lessons by teachers, were positively related to pupil achievement; (5) Possession of textbooks by children was an important correlate of achievement. Jangira (1994), while synthesising Baseline Assessment studies (BAS) of the eight District Primary Education Programme states, found that students performed low in reading as well as mathematics.

There was a marked difference in achievement across school as well across states.

Researches conducted on academic achievement of students in different subjects at primary education level in India have clearly shown the positive impact of project intervention on learners' achievement. Whereas, those schools where no such conscious deliberate interventions have taken place, reflects adversely on the learners' achievement in various subjects. The interesting feature of the findings is that wherever and whenever project interventions led to improvement in terms of examination scores . These researches have not focused on the affective and psychomotor side of students development. The number of studies carried out to see achievement of language and mathematics are more compared to the studies in Environmental Science.

2.3.0 Studies in the Area of Environmental Science Teaching

Childress (1978) observed that small group projects, class discussions and field trips, visits, community resources were the most frequently used instructional strategies to teach environment. Sibley (1974) compared the effectiveness of simulation games and conventional classroom instruction for the teaching of ecological facts, concepts and problems of pollution and found that simulation games were better in achieving the set objectives. In 1970 American Association for Health , Physical Education and Recreation (AAHPER) produced a book and a film strip to help explain to teachers the new approach to environmental education. It also began to develop models for in-service programmes to train teachers in environmental education. The National

Education Association (NEA) has also been producing materials and holding conferences on environmental education. In 1970, a Public Broadcasting Environment Centre(PBEC) was created to use the unique capabilities of the media to create an innovative system of environmental education to reach large and diversified audiences at the primary, secondary, higher and continuing education levels.

Swan (1971) noted that adequate tools for evaluating the effectiveness of environmental education programmes and material do not exist. It is essential that before the effects of any environmental education programme can be evaluated , one must have valid and reliable outcomes.

Doran (1977) said that very few schools and material developers have been able to construct reliable and valid evaluative tools to study the effects of their programmes and materials.

Herrid and Haier (1970) constructed Ecology test to assess instructional effects. Gardner and Klienke (1972) constructed environmental awareness test. Manuja, Ward and Braucht (1975) constructed environmental attitude inventory to measure ecological attitude. R. Roth prepared a list of concepts for environmental management education which was developed by Bennett (1972). Gupta (1983) investigated the change in the level of awareness of student teachers through environmental education programmes. The level of awareness of women graduates toward environmental problems was studied by Sodhi in (1985), Sibley (1974) determined the attitudes of school students about environment.

Baer (1980) felt that the process of value clarification should be thoroughly researched by environmental educators. Baker Doran and Sarnowski (1978) developed Environmental Value Inventory to produce a profile of an individual's environmental values. They suggest that the Environmental Value Inventory be used as a tool to aid the teacher in determining the dominant values of a class, in monitoring the effects of instructional material and in assessing changes in students values after instruction. In an effort to look at the relationship between environmental knowledge and environmental attitudes, Kinsey and Wheatley (1980) developed the environmental issues of environmental problem. Rewari (1980) investigated the shift of change in attitude of student teachers towards environmental problem. Mann (1983) found that high school students became more aware about the magnitude of environmental problems after they were told about harmful effects of the misuse of environment.

Dhaliwal (1985) and Bains (1982) conducted surveys to find out the level of awareness of different sections of society. The studies are available which have tried to investigate the effect of different variables on the level of awareness of students about environmental problems. Comber and Keeves (1973) examined the factors of socio economic, cultural and educational environment with environmental education programmes. Takayama (1974) of the Institute of child research in Tokyo conducted a survey to find out the extent of living consciousness of school children. Mitryuskin, et al. (1980) have outlined Environmental Education at two levels: (I) education at educational establishments. (ii) education outside the educational establishments. The first

starts from kindergarten, primary, secondary, vocational and technical schools and goes on to higher education bodies, and goes on to higher education bodies, and the second is in the family, on camp holidays, on picnics, in cultural gatherings, public activities, propaganda and information systems, political organisations, scientific societies, press, radio, television, cinema, etc., UNESCO has in co-operation with UNEP started the International Environmental Education Programme (IEEP) and this has made a tremendous impact on Environmental Education all over the world in recent years, IEEP in co-operation with more than two thirds of the UNESCO member countries has played key roles in focusing world attention on different problems, solutions, workshop results, etc.. On Environmental Education, IEEP is conducting over 25 pilot projects in developing countries and building a computerised information system. It brings out Connect in English and Sampark in Hindi (which are distributed free to organisations and individuals) it reports on Environmental Education activities all over the world, and this has helped nations to incorporate suitable environmental dimensions into their educational practice.

Different developing countries have taken massive steps for Environmental Education. In Kenya, the government with the assistance of UNEP and IUCN, and a sub commission of the National Secretariat for Environmental Problems under the President, work out the educational programmes and curricula at all stages of education. The Kenyan experience is utilised by other neighbouring African countries.

Chakraborty (1978) inquired in to the strategies of classroom teaching. Two Strategies were employed. Strategy 1 (lecturing and question answering) strategy 2 (lecturing and question answering) by using instructional material on the development of knowledge, comprehension, applicational ability and total achievement.

The data was collected by administering achievement test. Lecturing and questioning answering and discussion by using instructional materials were more effective than lecturing and question and answering positively and conclusively.

Bhartendu Prakash (1976) studied introduction of the discovery oriented approach in science teaching at the school level on the basis of eight monthly meeting and a teachers' orientation course a workbook comprises curriculum practical work and experimentation involving use of local resources. The contents were related to the needs of village community.

SIE (1975) studied development of an evaluation form and evaluating effectiveness of the experimental textbook "science is doing". Bombay Municipal Corporation studied the effect of child centred teaching practice and corelated play activities on the quality of attainment, attendance and discipline. 91 children of two schools were taken, they were provided with different types of activities in group. The experiment was for two years. After the experiment comparison was made with another group. Children could remember easily when taught through child centred approach. They did all the work in school had no homework. They did not find the present curriculum heavy. The average attendance went upto 90%.

Adinarayan (1984) studied science teaching in primary schools - a training programme. Two units of the syllabus of standard IV and V were selected for teaching. Instructional packages were prepared for teaching through the experimental and customary methods. A comparison of the effectiveness of the method was made through criterion tests for knowledge, comprehension and observation, inquiry and investigatory skills. There was a significant difference in the development of skills among students in the experimental group. Class IV students in nine schools and class V students in seven schools. As regards observational schools, class IV students in nine schools and class V students in 11 schools of the experimental group showed significant improvement. Investigatory skills developed significantly in 11 schools in each of the classes. Performance of the experimental group in inquiry skills of ten schools in class IV and V in class V increased significantly. The experimental group greatly favoured science activities.

Joshi (1981) studied development of science for upper primary classes based on the environmental approach. A normative survey was conducted five percentage of schools were selected randomly. The data was collected through questionnaires and interviews. Group discussion, short discussion seminars and meetings were conducted. Findings of the study were; Environmental education at the upper primary level was essential and vital to develop insight and skills needed to influence not only the environmental attitudes and behaviour in the students, but also to stimulate their reorientation of values regarding the importance of environmental studies. Children at the primary stage were

interested in and learnt from experiences with real things that they could manipulate in some way. The teachers did not identify the objects outside the classroom which might be usually brought inside for study. The environment outside the school was potentially significant for educational purposes. The syllabus was not environmentally oriented, lacked in field studies did not contain information about ecological balances , protection of fauna and flora, did not include topics like conservation of resources, pollution of water and air, and preservation of wild life, was not interesting and motivating, and did not have relevance to real life.

Deopuria (1984) made a comparative study of teaching through environmental approach. There were two groups experimental and traditional group. The curriculum was chosen from the Hoshangabad Science Teaching Programme (Kishore Bharati). Some of the sample topics were root, stem, leaf, crops, earth, soil, animals, personal hygiene health and diseases. Three types of tools were standardised. These were achievement tests for class V, VIII, IX and X, attitude scale for class X and attitude scale for teachers towards the environmental approach. Statistical techniques such as mean, standard deviation and t-test were worked out for testing the hypotheses.

Findings of the study showed that the students of the experimental group of classes V, VIII, IX, X obtained higher achievement scores due to teaching of science through environmental approach. The environmental approach showed greater cognitive gain in knowledge, understanding and application of science related to environmental education at primary, middle and secondary school

level. But it was effective in the teaching of factual recall type items. The students of primary school showed considerable improvement towards environmental awareness. The obtained value of t showed that teachers of the experimental group of schools had a very high positive attitude towards environmental education.

Desai (1985) studied efficacy of different instructional media in the teaching of science of class VIII in relation to certain variables. This was with the objective of comparing achievement of pupils with different media. Two units were selected for the preparation of the instructional material. The programme learning material, slides and laboratory experiment were designed. Criterion test was prepared. Findings experimentation was the most effective instructional media to teach science, followed by slides and discussion. The teacher should be experimental minded and should use different approaches in the light of different objectives. Media are effective in science education.

Rajput et al (1980) studied environmental approach at primary level. Curriculum was redesigned, than Environmental awareness test and finally implementation of the curriculum was done. The collected data was analysed with the help of mean, SD and t- tests. Design pre-test post-test. Only one of the four groups was significantly better than control group.

Sharma (1979) studied teaching of Natural science at primary level with the objective to ascertain the existing position of teaching natural science at the primary level. To compare the effectiveness of different methods of teaching science at the primary level. A survey was done using questionnaire. The design

of the study was pre- test and post-test design. Findings the teachers were not equipped for teaching science at this level. Most of the teachers admitted that activity should be the basis of teaching natural science at the basis of teaching natural science at the primary level.

Pai (1981) prepared and tryout of curriculum in environmental students leading to life long education. The curriculum was developed by studying and analysing. The existing literature on curriculum development. The draft curriculum was modified after the preliminary tryout. The study employed pre-test design. The data were collected using environment achievement test, unit test, environment activity inventory. The data collected were analysed using t-test.

It was found that there was significant difference in the performance of the experimental groups as compared with control group on knowledge scores and attitude scores. Unit wise analysis of the performance of the students in the experimental group showed they had gained in overall knowledge in environment. Problems as a result of instructions for using the curriculum.

Kaushal (1997) made a comparative study of effectiveness of science teaching in large classrooms of primary schools with a objective to study the current practises of teaching Environmental Science to class V. To study the impact of the interventions on the quality of the performance and achievement of the students. There were two groups one control and the other experimental. Selected teachers were trained to carry out the intervention. The results of the studies show that the interventions planned in the form of peer group participative learning, manipulating the science learning material and brief

question answer interlude have improved the performance of students on the tests.

Mahopatra (1997) identified intervention areas for improving teaching , with the objective to develop diagnostic too for identifying the intervention areas for improving teaching efficiency of Environmental Science. To administer the tool on the primary teachers and specify the intervention areas in the global common core format and subject specific format. One hundred thirty one teachers were selected from 31 schools located in urban and the rural area. It was found that about 7% of the teachers are non matriculates. About 97% of the teachers do not have science background. About 64% of the teachers have not attended any orientation\ training programme within the last five years. About 60% of the teachers do not know anything about Minimum Levels of Learning. About 51% of the teachers have not undergone SOPT training with special reference to child centred, Activity based, joyful learning structures. The following concepts were recognised by the teachers at hardspots for the teachers. 1. Class III Health and Hygiene, characteristics of living beings in the context of animals and plants, difference between man made and natural objects, differentiation between roots and stem. 2. Class IV functions of root stem and leaf, rotations of the moon, functions of heart, lungs and brain, season and weather. 3. Class V occurrence of day and night in relation to rotations of celestial bodies, light propagation, uses of water, cloud formation, pollution of water, producers of food, machine and its uses, work, specific gravity and its calculation in simple cases,

maintenance of balance between the % of Oxygen and Carbon Dioxide in the atmosphere.

Lalitha (1997) tried to overcome the hardspots in Environmental Science IIII to using activity based module at the primary stage, with the objective to develop and administer a competency based test in Environmental Science II to the students of class III. To develop and administer a teacher questionnaire to identify hardspots of teachers of class III in Environmental Science II. To develop competency based activity oriented teaching learning modules in Environmental Science II in the classroom. To develop teaching learning strategies using locally available resources to transact Environmental Science II in the classroom. A competency based test and teacher questionnaire were developed to know the hard spots of students in Environmental Science II of class III. They were administered to teachers selected from the districts of Karnataka. Analysis of the answer sheets and the teacher questionnaire indicated that the hardspots for the students were indeed the hardspots for the teachers a stark revelation of the fact that they had percolated down from the teachers to the students. A training package was developed to train the teachers to overcome the hardspots. Design was single group pre test and post test design. Analysis of the tests revealed that the teachers lacked subject competence. The identified hardspots were discussed during the sessions using the modules like quiz, field trips, nature walk, role play, group activities, co-operative learning, project method, etc., to transact Environmental Science II in the classroom. In addition to the discussions held during the sessions teachers were given first hand experience

in the various teaching learning strategies. A post test was also given to study the effectiveness of the training.

The hardspots in Environmental Science II for teachers and students were found to be the same. Teachers gained a through insight into the competencies and became aware of the various innovative teaching learning strategies that could be planned and implemented in their classrooms. They became aware of how to make use of the resources in their immediate environment to make learning of science joyful and the importance of observation through which major part of Environmental Education II can be taught in the primary school teachers the skill of developing activity based modules to handle hardspots and evaluating students continuously during the teaching learning process. The demonstration lessons given by them revealed that they have been enriched and empowered to deal with the hard spots.

Gopalkrishnan, S. (1992) selected 1,451 students of class V from 10 different primary schools of the Nilgiris, Madras and Coimbatore and exposed them to environmental education test and found a very good impact of environmental education; the Madras children scored better than those of the other two places. Rajput, (1988) studied teaching skills and training strategies for implementing the environmental approach at primary level teaching at Bhopal. Rane, (1989) evaluated the environmental study approaches of Parisar Asha in municipal schools of Greater Bombay. His study was on Environmental Study approach (EVS) in the case of students of classes I and II and he found the Environmental Study approach functioning satisfactorily. Praharaj, B. (1991)

explored the level of environmental knowledge, attitude and its perception among 416 pre-service and 302 in service secondary school teachers in Puri district. The pre service teachers distinctly had poor knowledge regarding the environment while inservice teachers moderately knew about it.

Shahnawaj (1990) worked on the environmental awareness and attitudes (towards environmental issues of secondary and higher secondary school teachers and students regarding the environment and this was more in the urban then in the rural groups. As regards environment oriented curriculum. Kidwai, Z. (1991) has developed one for geography for secondary stage students.

Santosh (1996) used observation for studying environment, as a part of the programme, a nature education book series was developed. This was to help systamize the process of developing and using observation as an integral tool for teaching and learning about the environment. One of the two teachers used to go with a group of 20-30 students to a near by farm, pond or woods. Objectives of the book was 1. To stress the importance of observation in the learning process. 2. To develop the confidence of the user in observation. 3. To develop the habit of systematically recording observations. 4. To motivate the motivate the user to learn more about flora and fauna. 5. To draw attention towards interrelationships in the environment. 6. To help the teacher/ guide to initiate a process of environmental education with the students. This book was given to nearly 1500 students in 12 villages situated around in the Sariska tiger reserve. Students were in the age group of 11 to 15 years standard VI to VIII. Evaluation was done by teachers, youth volunteers and ourselves in school and

during club activities. The findings were as follows: 1. Students showed enthusiasm about the activity. This approach of observation was new to them but they were keen to try it. 2. Almost 80 % of students filled up their observations exceeded information found even in standard scientific books. 3. Nearly 60 per cent students carried their books to schools on any particular day. 4. Most of the students carried their books to schools on any particular day. 5. Students' observation power is good. If one asks pointed questions, this fact clearly emerges. But their recording of their observations was not very good. 6. Most of the times, students were able to identify the correct black and white picture after seeing the bird. 7. The understanding of links was good, especially in cases which were linked directly to their own life. 8. Again and again, teachers and youth volunteers told me that the students knew more than them.

Surkar (1996) studied rural children not going to school and taught about the immediate environment. The main objective was to provide a basic education opportunity and infrastructure for children otherwise cannot attend formal school. developing in children a healthy outlook for forest that they interact with. Channelling the creative energies of young children which in an ordinary rural context get otherwise dissipated or suppressed. Building up, in the long run, a resource centre for education and information not only to the children but to the adult as well. Prakriti ke mitron ki phulwari magazine was published as a result of this programme. Dange et al (1993) conducted a clean up campaign at Kodagu a public campaign which had a very good media mix. There were lectures, demonstrations, songs, drama, distribution of educational and

promotional material, and action programmes. 1. The objective of the programme was to create awareness about various environmental issues of Kodagu such as deforestation, pollution and garbage. 2. To create awareness about the waste that occurs when non bio degradables are thrown on the road side instead of being recycled. 3. To motivate people and children into collecting non bio degradable wastes. 4. To create a media focus for Clean up Kodagu (CUK) activities by raising the awareness of government, industries and communities about local environmental issues particularly about recycling and waste management. The programme started with 2 lakh school children of 592 schools in the district. From the experience of the CUK conducted over the last three years, it has been observed that for a campaign to be effective, a right media mix must be applied. Street theatre, folk songs, personal communications and video shows have been the main media of instruction in the campaign.

Quite a good number of studies have taken place in India in this area over last few years. On the whole, they have clearly brought out the fact that whenever the subject of Environmental Science has been taught through Environmental approach it has proved better whenever, this subject has been taught by use of different meidas /methods or activity based approach, it has not only improved the academic achievement of students but has positively affected other aspects of their development too. This shows the importance of teaching this subject through different innovative methods.

2.4.0 Studies on development of various teaching strategies to improve Learning

Research attempts made in the sixties in respect of visuals are mostly on the use of pictures and the utilisation of these in the teaching of language and paired associate learning (Rohwer et al 1968, Paivio et al 1968). Samuels (1967) showed the suitability of using pictures as prompts for the recognition of unfamiliar words but also found that at times pictures may miscue or divert attention from textual material. Reviewing evidence related to the effects of pictures upon sight vocabulary, Samuels (1970) concludes that pictures often interfere with learning how to read by providing distracting stimuli particularly for the poorer students. Allen (1967) and Baker and Popham (1965) found that use of pictures increased the interest and enjoyment in learning only when subject matter content consisted of material can be as effective as other classroom activities.

Gropper (1966) concluded that visual verbal order of presentations is appropriate for concept learning tasks. Comparison of motion pictures with parallel static forms of pictorial materials usually show no difference in learning except when the concept to be learnt deals with motion and change in which case the motion version is superior (Silverman, 1958). Allen and Weintraub (1968) reported the superiority of motion pictures as compared to equivalent still pictures over a range of subject matter content and instructional objectives.

Comparative studies have been made with audio, visual and other forms of presentation. Popham (1960) and Newman and Highland (1956) compared the

effectiveness of tape recorded lectures with conventional lecture discussion method and an instructors teaching respectively. In both the studies appreciable differences were not revealed. Twyford et al (1964) demonstrated that sound films were twice as effective as filmstrips in providing learning in a general science course.

A large number of investigations are available where the auditory and visual channels of communication in instruction have been compared. Schulz and his associates (1969) attempted a large number of comparisons of auditory and visual presentations in a variety of experimental tasks, including serial learning, verbal discrimination, etc., Majority of these studies did not show any significant difference of effectiveness while in certain other studies auditory superiority was found about as frequently as visual superiority. Shulz and Kasschau (1966) reported visual presentation to be superior for items low in meaningfulness while auditory presentation was superior when items were high or medium in meaningfulness. With regard to verbal discrimination tasks Schulz and Hopkins (1968) also reported a similar finding. Several researchers (Craik 1969, Margrain 1967, Murdock 1968)have investigated into the relative effectiveness of auditory and visual presentation of verbal information in short term retention. Reviewing the studies in the area of bichannel versus single channel presentation Travers and his associates (1970) concluded that the two sensory modalities had no advantages over the use of a single modality when both the channels present the same words. When the visual channel consists of pictorial material the effect of two channel communication is more complex.

The generalisations that have been pointed out in the review by Travers (1970) suggest that instructional situations call for the selective use of audio, visual and audio visual media. In order to select the appropriate medium, criteria such as abstraction and complexity of concepts, prior knowledge of the learners, etc., have to be considered. If an audio or a visual presentation alone would suffice, it may conveniently be employed. The usage of audio visual presentation may be justified only when each would supplement and reinforce the other.

Techniques involving group interactions help a participant in strengthening his view point as well as gradually developing in him higher cognitive abilities and affect attributes (Yadav et al 1979, Menon and Bhat 1983). The component of discussion has been used profitably along with other components in various research and development studies (Yadav and Govinda 1977, Sansanwal 1977, Shah 1981, Joseph 1983, Bhat 1983, Ravindranath 1982, Vardhini 1983).

Researches have been more concentrated in foreign countries than India in this field. The findings does show the superiority of pictures, audio visual aids over conventional lecturing method especially when concept formation has to take place for abstract and complex things. Teaching involving group interactions too have been found useful for the participants in strengthening their view points and gradually developing higher cognitive abilities and affect attributes. This has been found out in number of developmental studies conducted in 1970s and 1980,s at CASE, Baroda.

2.5.0 Conclusion

Thus, on the whole, the review made by the researcher of related research studies in India and abroad have brought out some facts in a clear manner.

1) Project interventions of different nature are must for improvement of quality of primary education in India and other Asian countries.

2) Project intervention and other experiments have improved learners achievement for different school subjects at primary level in different states of India.

3) Different teaching strategies making use of audio visual aids and group interactions have been useful for learners with regard to development of higher cognitive abilities, affect attributes and concept formation.

4) Last but not the least the teaching of Environmental Science through environmental approach and use of different instructional medias for transaction of curriculum has helped students for better understanding of the subject, improvement in academic achievement, development of interest, joy etc.,

In light of the findings, when the researcher studied the scenario of teaching of Environmental Science in Baroda, it was found that in absence of any innovative approach the academic achievement of learners at primary education level was poor. Further, the affect attribute were also not found developed properly. All in all, it reflected on poor quality of primary education. Researcher, therefore decided to develop her own intervention programme making use of different instructional medias/ methods to teach unite of Environmental Science at fourth standard level.

Further, the researcher in order to ensure comprehensive evaluation of cognitive, affective, meta cognitive, psychomotor aspects, had also developed her own evaluation tools. Thus, the study was conducted, the details of it are mentioned in subsequent chapters.