

CHAPTER – II

RELATED LITERATURE : A REVIEW

2.1 Introduction

This chapter presents the review of related literature. The review was undertaken to provide an empirical support to the conceptual and theoretical basis of the study and to arrive at a decision on the choice of methodology for the present study.

The review of the related literature was undertaken with respect to research studies related process skills, environmental studies and instruction of process skills. Accordingly, the studies have been presented in three sections. The section 2.2 presents the studies related to process skills. The section 2.3 presents the studies related to Environmental studies. The section 2.4 presents the studies related to Instruction of process skills. In each section the work of various researchers have been presented with reference to objectives, methodology and findings. Each section ends with a summary. The section 2.5 presents the implications of the review to the present study.

2.2 Studies Related to Process Skills

This section focuses on reviewing the studies related to understand the process skill development among students. This section includes the review of nine studies related to process skills. The sub-section 2.2.1 presents the summary of the studies related to process skills.

Disimoni (2002), studied writing as a vehicle to promote and develop scientific concepts and process skills in fourth grade students. The purpose of this descriptive study was to observe the impact of the use of writing as a thinking tool on the promotion and development of scientific concepts and science process skills in elementary students in the discipline of science. The study consisted of 12 fourth grade students each in the experimental and control group. Both groups were administered a standardized test to assess basic process skills prior and after the intervention. The experimental group received a treatment of using learning logs to record their written responses to predesigned prompts related to hands-on science experiences during intervention period. The control group did not receive any such treatment. A pre-test and a post-test were given that involved written responses to the

same prompt. A specially designed rubric was used to evaluate and score the writing. There were no statistical differences found in either group to demonstrate that writing affected the development of process skills.

Krystyniak (2001), studied the effect of participation in an extended inquiry project on general chemistry student laboratory interactions, confidence and process skills. The study explored the effect of participation in an extended open-inquiry participation on their use of science process skills and confidence in performing specific aspect of laboratory investigations. In addition verbal interactions of a student lab team among team members and with their instructor over three open-inquiry laboratory sessions and two non-inquiry sessions were investigated. The sample consisted of 157 second-semester general chemistry students at the two Universities; students at one University participate in open-inquiry activity. The instruments included the Test of Integrated Process Skill (T.I.P.S.) and the Chemistry Laboratory Survey (CLS). ANCOVA was performed to investigate relationships among control and experimental students, TOPS and CLS post-test scores; co-variables were TIPS and CLS pre-test scores and prior high school and college science experience. Welcoxon analysis indicated both groups showed increase in confidence. The experimental group students with below average TIPS pre-test scores showed a significant increase in science process skills. A four-group students focus shared their experiences with open-inquiry activities, indicating that they enjoyed the experience, viewed it as worthwhile. Research results indicate that participation in open inquiry laboratory, increases student confidence and for some students, the ability to use science process skills.

Dawson (1999), studied the effect of explicit instruction in science process skills on conceptual change. The case of photosynthesis.

This study was designed to test the hypothesis that there is a significant positive correlation between science process skills and correct understanding in photosynthesis. The students, who received explicit instruction in science process skills, then used these skills in a laboratory exercise designed to promote conceptual change. The Pre-tests in photosynthesis understanding and science process skills were administered to 211 introductory biology students and 58 upper class biology majors. To determine the effect of treatment, a 2 by 2-factorial design was used. Laboratory sections were given one of four treatments. Students either received explicit

instruction in science process skills or an alternative laboratory and either performed a guided-inquiry laboratory targeting areas of misconception or another laboratory exercise that did not pertain to areas of misconceptions. Treatment was followed by a posttest. Results indicated that there was a significant correlation between science process skills and understanding of photosynthesis. The science process skills of hypothesizing showed the strongest correlation while the prediction had the weakest.

White (1999), studied the development of a content influenced process skill instrument for general biology.

The purpose of this study was to develop a biological process skill test for use in college level freshman biology classes. The study was conducted in two phases. Phase I was the development of the process skills test. Phase II of the study was to administer the study and determine student acquisition of process skills and to determine whether any relationship existed between acquisition of process skills, student attitude towards science and student learning style. Testing was implemented with a sample of 135 students enrolled in general biology in one southeastern University. The process skills test and attitudes towards science test were administered as pretests and posttests. The Data analysis includes tests for dependent samples, multiple regression analysis and an item analysis of the process skill test that concentrated on item difficulty, discriminating power and distractor speed. The majority of the test questions were found to be acceptable. The tests for dependent sample showed significant increase in process skills, student attitude towards science from pretest to posttest. The multiple regression analysis revealed no significant relationship between process skills, student attitude towards science and student learning style.

Tice (1999), studied the integration of science process skills in elementary science, mathematics and language arts. A case study of the effect upon student science achievement. The purpose of this study is to investigate the student science achievement results related to the infusion of an elementary process science programme into a rural/suburban school district, which had already implemented process curricula in language, arts and mathematics. It ascertained trends in student science content and process skills achievement during the four years following the curricular innovations. The investigative method employed a comprehensive quantitative analysis of the New York State elementary science programme evaluation

test administered to all fourth-grade students every academic year. Four consecutive classes were treated as coherent samples with each exposed to increasingly more multidisciplinary process instruction. A test for determining school ability was administered to each coherent sample. The study demonstrated that there was significant increase in student science achievement scored from the onset to the conclusion of the study.

German, Aram and Burke (1996), studied on identifying patterns and relationships among the seventh grade students to the science process skill of designing experiments. The purpose of this study was to develop a research framework for encoding and analyzing student responses within the experimental context to use the research framework. The responder of seventh grade students to the task of designing an experiment were analyzed and classified. A total of 364 students from seven middle level schools participated in the field-testing. Heat, temperature and the science process skills are among Missouri's seventh grade objectives and are tested on a statewide examination using Alternative Assessment of Science Process Skills (AASPS) and Science Process Skill Inventory (SPSI). The SPSI was then used to analyse student efforts at writing experimental designs. The result indicate that explicit incremental development of the science process skills of formulating hypotheses and identifying variables together with model examples may be a means to facilitate students success in designing science experiments.

German (1994), studied and tested a model of science process skills acquisition and interaction with parent's education, preferred language, gender, science attitude, cognitive development, academic ability and biology knowledge. The sample consisted of 67, 9th and 10th grade biology students who lived in a rural Franco-community. Path analysis techniques were used to test a hypothesised structural model of direct and indirect casual effects of student variables on science process skills. The model was tested twice using data collected at the beginning and end of their school year. Each variable was found to have significant effects accounting for approximately 80% of the variance in science process skills achievement. Academic ability, biology knowledge, and language preferences had significant direct effects. There was a significant mediated effect by cognitive development, parent's education and attitude towards science in school. The variables of cognitive development and academic ability had the greatest total effects on science process skills.

McNay and Melville (1993), studied on children's skill in making predictions and their understanding of what predicting means. The purpose of this study was to describe the development of elementary student's skill in making predictions and of their understanding of what predicting means. The study involved observing and assessing the performance of 167 children on the Physical Manipulation Test (PMT), a test involving the manipulation of science materials and equipment. Children were interviewed about what they understand predicting to mean, how they use it at schools and at home and why they think it as important. For each of the seven topics tested, even the youngest children were able to offer predictions. Accuracy varied with the topic increasing between grades 1 and 4 and leveling off after that. The increase in skill involved children's growing ability to attend to patterns discerned through their observations. Children's awareness of their use of predicting at school and at home increased through grade 1 to 6 with spurt at grade four.

Roth and Roychoudhary (1993), studied the development of science process skill in authentic contexts. The intent of this study was to examine the development of integrated process skills in the context of open laboratory sessions. The data was collected from 48 students from grade 11 introductory physics course, 29 students from grade 12 physics course and 60 students from the grade 8 general science courses. The data collection approach was qualitative and included videotapes of laboratory sessions, laboratory report of students and reflective journals. An interpretative research methodology was adopted for construction of meaning from the data. Students worked in collaborative groups during all of the open inquiry laboratory sessions. Findings from the study indicate that students develop higher order process skills through nontraditional laboratory experiences that provided the students with freedom to perform experiments of personal relevance in authentic contexts. Process skills need not be taught separately. Integrated process skills develop gradually and reach a high level of sophistication when experiments are performed in meaningful contexts.

2.2.1 Summary of the Studies on Process Skills

The researchers attempt to understand the process skills (with respect to students) can be seen through the following categories

- 1) Exploring process skills
- 2) Enhancing process skills
- 3) Relating process skills

1) Exploring Process Skills

Researchers have attempted to explore a particular process skill or a set of skills. The focus of these studies is to gain an understanding on how process skills develop in a particular context or how pupils have understood these skills. The studies undertaken by German (1996), Mcnay and Melville (1993) and Roth and Roychoudhary (1993) belong to this category. The studies by German and Mcnay have focused on particular skills where as Roth has considered the skills as a whole. In terms of methodology researchers have used either survey or qualitative research methods. The studies have been summarised below.

Table 2.1 Exploring Process Skills

Sl. No.	Author	Focus	Target group	Research Design	Key/Finding
1	German et al. (1996)	Student responses to identify pattern and relationship while designing experiments	VIII grade students	n = 364 Developmental (survey)	Pupils ability to hypothesize, identify variable and model examples facilitate designing experiments
2	Mcnay and Melville (1993)	Children skill on making prediction and their understanding of predictions	Grade I to Grade VI	n = 167 Developmental	Children ability of predictions increased through Grade 1 to 6 with a spurt at Grade 4.
3	Roth and Roychoudhary (1993)	Development of process skills in authentic context	Grade VII Grade XI and XII	n = 48, 29 and 60 Interpretative	Integrated process skills develop gradually and reach a high level of sophistication

2) Enhancing Process Skills

Researchers have attempted to enhance process skills as a whole. The studies have focused on providing a medium to enhance the process skills. The studies have focused on the issues of what needs to be done to enhance process skills? The study by Disimoni (2002) has explored writing as a medium to promote process skills whereas Kryzniak (2001) has seen pupils' participation in enhancing process skills. The studies have used experimental designs with pre-test and post-tests. The studies have been summarised below in table 2.3.

Table 2.2 Enhancing Process Skills

Sl. No.	Author	Focus	Target group	Research Design	Key/Finding
1	Disimoni (2002)	Writing as a tool to promote process skills	IV std children	n = 12 experimental/control (Pretest – Posttest)	No statistical difference on writing promotes process skills
2	Krystyniak (2001)	Effect of participation in an inquiry project on process skills	Under-graduate chemistry students	n = 157 experimental pre-test and post-test (single group)	Participation enhances some students ability to use process skills

3) Relating Process Skills

Researchers seem to view that process skills does not seem to act alone. It always acts in relation to other variable, so by relating process skills with other variables one can gain the understanding of process skills. The studies by Dawson (1999), White (1999), Tice (1999) and German (1994) fall into these categories.

Dawson (1999) was interested on process skills and conceptual change brought through instruction where as White (1999) prepared process skills instrument to understand the learning styles of students. Tice (1999) tried to integrate the process skills with other subject area for the purpose of enhancing pupil's achievement.

German (1994) developed and tested a model of process skills on select variables. The studies have used the experimental designs except Tice (1999) who employed the case study design. All the studies have been summarised below in table 2.3.

Table 2.3 Relating Process Skills

Sl. No.	Author	Focus	Target group	Research Design	Key/Finding
1	Dawson (1999)	Effect of explicit instruction in science process skills on conceptual change	Under graduate Biology students	n = 211 & 57 2 by 2 factorial design	Significant correlation between process skills and conceptual change
2	White (1999)	Development of a process skill instrument	College level biological students	n = 135 Pre-test and post-test single group	No significant relationship between process skills and student learning style
3	Tice (1999)	Effect of students science achievement on integration of process skills in science, math's, etc.	IV standard Children	Case study for a period of 4 years	Significant increase in student science achievement scores
4	German (1994)	Studied and tested a Model of science process skills on select variables	9 th and 10 th standard Students	n=67 Experimental	Variables of cognitive development & academic ability had the greatest effects.

2.3 Studies Related to Environmental Studies

This section focuses on reviewing the studies related to curriculum of environmental studies (EVS) with respect to teachers and pupils. This section includes the review of five studies related to Environmental studies. The sub-section 2.3.1 presents the summary of the studies related to Environmental studies

Gail (2000), studied the experiences and factors influencing a sample of teachers to focus on their environmental education in their teaching in New York State Public elementary and middle schools. This study focuses on how 14 elementary and middle level teachers in New York choose to teach environmental topics as a part of science curricula. Seven male and seven females teachers representing the grades K through 8th std. volunteered to participate. The data was gathered using questionnaire and structured interview. The data was analysed using conventional qualitative data analysis. The findings of the study were that most teachers made the decision to begin teaching environmental education well after deciding to become teachers. The decision to teach environmental curriculum was influenced by a variety of inservice programme on environmental education, media coverage on environmental issues, encouragement from colleges and school administrators and personal experience in childhood.

Gopalakrishnan (1992), studied the impact of environmental education on primary school children. The purpose of the study was to identify the factors of the environment to assess the impact of environmental education through participatory leaning approaches, environmental education test. 1,415 children studying in std. V were selected randomly from 30 primary schools. 10 each from Madras, Coimbatore and the Nilgiris were given the Environmental Education Test (EET). The questionnaires were prepared to collect feedback from the teachers who were handling the subject.

The mean test scores were compared with different areas. The results reveal that children of Madras scored better as compared to Coimbatore and Nilgiris. The participatory learning approach could bring about a better impact that there was not sufficient time to give importance to learner-centered activities.

Praharaj (1991), studied the environmental knowledge, environmental attitude and perception regarding environmental education among pre-service and in-service secondary school teachers. The intent of the study is to find out the level of

environmental knowledge and attitude of pre-service and in-service secondary school teachers and to study their perception regarding environmental education in the secondary schools.

A stratified sampled consisted of 302 in-service teachers serving in 50 secondary schools and 416 pre-service teachers of three training colleges in Puri district of Orissa. The environmental knowledge inventory, environmental attitude scale and questionnaire were used to collect data. The data were analysed by applying percentages, 't' tests and one-way ANOVA. The study indicated that the level of environmental knowledge was found low among pre-service teachers but moderate among in-service teachers. Both the group differed significantly in their level of environmental knowledge. There was a moderate co-relation between environmental studies and environmental knowledge.

Shahanawaj (1990), studied the environmental awareness and environmental attitude of secondary and higher secondary school teachers and students. The purpose of this study was to determine the extent of awareness about the environment among students and teachers and to find out the attitudes of teachers and students towards the environment. The study was conducted mainly through a survey and the application of a tool developed by the investigator to test attitudes and awareness. It was found that 95% of teachers and 94% of students possessed positive environmental attitude. The environmental trained teachers and untrained teacher did not differ on environmental awareness and in their environmental attitude.

Rane A.J. (1989), studied the evaluation of the environmental studies approach of Parisar Asha in Municipal Schools in greater Bombay. The purpose of the study is to evaluate the organization structure of Parisar Asha and implementation of environmental approach in BMC schools. A stratified random sampling was done in 29 BMC schools to select 429 students from standard I and 292 students from standard II were selected. An interview guide, special achievement tests in Marathi for standard Standard II and I students were used. The finding of study reveals that Parisar Asha has gained momentum within a short period by way of organizing various programmes for implementing EVS approach. The teachers of Std II and I had a favorable opinion on EVS approach.

2.3.1 Summary of Studies Related to Environmental Studies

Research attempt to study the environmental study/education can viewed through three categories:

- 1) Studies related to teachers and pupils
- 2) Studies related to teaching/learning process
- 3) Studies related to impact of EVS approach on children

1) Studies Related to Teachers and Pupils

The researchers have attempted to study the opinions, beliefs, attitudes, and awareness of teacher and pupils with respect to environmental education. The study by Gail (2000) focused on factors that influence teachers to teach environmental education. Praharaj (1991) has studied on teacher attitude, knowledge, and perception about environmental education. Shanaway (1990) has studied on environmental awareness of both pupils and teachers. The researchers have used survey and Gail has used Qualitative Study for conducting research. The studies have been summarised below in the table 2.4.

Table 2.4 Studies Related to Teacher and Pupils

Sl No	Author	Focus	Target group	Research design	Key finding
1	Gail (2000)	Factors influencing teachers to focus on environmental education in their teaching	Grade K to Grade VII	n=14 Qualitative	In-service programme, media, personal experience etc. have influenced teacher to teach environmental education
2	Praharaj (1999)	Teacher attitude with respect to education, knowledge, perception about environmental education	Pre-service and in-service secondary teachers	n=302 and 416 Survey	Environmental knowledge was low with pre-service teacher and moderate with in-service teachers
3	Shahanawaz (1990)	Environmental awareness and environmental attitude of teachers and students	Secondary and Higher secondary teachers & students	Survey	95% of teachers and 94% of students possessed positive environmental attitude

2) Studies Related to Teaching/Learning Process

The researchers have studied the teaching-learning process with respect to other variables. The focus of these studies have been evaluated the environmental studies (EVS) approach in schools (Rane, 1989). Identification of teaching skills and strategies for implementing the EVS approach in Class III and IV. The studies have used, survey or experimental design to collect and analyse data. The summary of the studies has been presented below in the table 2.5.

Table 2.5 Studies Related to Teaching/Learning Process

Sl. No	Author	Focus	Target Group	Research Design	Key/Findings
1	Rane A.J. (1989)	Evaluation of environmental studies approach in school	Std. I and II students from Municipal Schools	n=429 n=292 Survey	Teachers of Std. II and I had favorable opinion on environmental studies.

3) Studies related to impact of EVS approach on children

The researcher has attempted to test the impact of the EVS approach with respect to other variables. The study by Gopalakrishnan (1992) has been summarized below in the table 2.6.

Table 2.6 Studies Related to Impact of EVS Approach on Children

Sl. No	Author	Focus	Target Group	Research Design	Key Finding
1	Gopala-krishnan (1992)	Impact of environment education on primary school children	Students of Grade V	n=1,415 Survey	Children of Madras scored better as compared to Coimbatore and Nilgiris

2.4 Studies Related to Instruction of Process skills

This section focuses on reviewing the studies related to role of instruction in enhancing process skill with respect to science or environmental studies. This section includes the review of six studies. The sub-section 2.4.1 presents the summary of the studies related to instruction of process skills.

Kasinath (2000), studied the effectiveness of Inquiry Method of teaching science in fostering science process skills, creativity and curiosity. The purpose of this study was to compare the Inquiry Training Method (ITM) and Conventional Method (CM) of teaching science in fostering science process skills, creativity and curiosity of the

learners. ITM and CM were taken as independent variables. A sample of 72 students of grade IX were divided into experimental and control groups using intelligence as the control variable. The data was collected using science process skills test, verbal test of creative thinking and curiosity test. The pre-test post-test parallel design was used. The experiment was carried out for a period of three months. Two-way analysis of variance was carried out. T-test was used to study the difference between two groups where necessary. ITM of teaching science was found to be more effective than CM in fostering science process skills, creativity and curiosity of the students.

Christiane (1999), conducted a study on a desire to inquire children experience science as adventure. The purpose of this study is to explore and document the nature of children's participation using an ethnographic approach. The extensive field notes provide the foundation addressing the question "What is the activity of science in an elementary school". Instead of separating process and content this thesis emphasise their co-emergence. The study was conducted in one elementary class at the intermediate level (Grade 6/7) across one school year. Children participated on 3 extensive science adventures with their teachers. The focus was on creating the opportunity for children to participate on teams of four or five and learning as community of inquiry. The data was collected through audiotapes and field notes. The data analysis reveals the importance of context for participating in elementary school science. Children participate in the spaces of inquiry viz-generative spaces, rehearsal spaces and performing spaces.

Thomar (1998), conducted an intervention to improve the quality of instruction in environmental science for primary level school children. The purpose of the study was to prepare and implement the intervention programme in terms of academic achievement of IV std students. The data was collected from a school at Baroda city. The tools used to collect the data were achievement tests, Semi-structural interview schedule for students and teachers. A single group pre-test and post-test design was adopted. The null hypothesis was proposed on mean achievement test scores of students in written, oral and activity tests from VIII units. The findings of the study reveals that difference between pre-test and post-test scores for all the units and all types of tests was significant. Students and teachers felt that intervention programme as a whole was effective.

Sharma (1994), studied the effectiveness of an instructional programme in development of science process skills among elementary school children. The objectives of the study were to experimentally validate an instructional programme specifically designed to foster science process skills and to explore the factors affecting development of process skills. The sample consisted of schools offering NCERT syllabus. The data was delimited to pupils of std III studying in three CBSE schools. The experimental and parallel group design was employed. The data collected was analysed using the analysis of co-variance. The findings of the study were that instructional programme was effective in developing process skills and achievement in science content. The home environment provides higher opportunity to children in acquiring process skills.

Lobo (1990), studied the effect of developing science process skills. Among pre-service secondary teachers on their classroom behaviour. The objectives were to study the effectiveness of a specially designed teaching/training programme on developing process skills and to study the effectiveness of the developed programme at cognitive and performance levels. The sample consisted of 32 pre-service physics teachers in experimental and control groups. Analysis of co-variance was employed the result indicated that the experimental group performer significantly better than the control group in the designed teacher training programme, the experimental treatment was relating more effective than the control treatment in bringing about change in teacher attitudes towards science and science teaching.

Barbara (1989), studied the effect of testing on process skills achievement. The purpose of this study was to examine the effects of testing on the achievement of students using self-instructional materials to learn process skills. The sample consisted of 54 females' students from the population of juniors. A two group post-test only was used in the study. In one section of an under-graduate science method class students were placed through a programmed textbook and were given short quiz in class after each of the process skills lesson was assigned. While in another section students worked at their own pace and were held responsible for completing the lessons by the end of the semester. The result indicates that taking frequent quizzes did not effect the Process skill acquisition.

2.4.1 Summary of the Studies Related to Instruction of Process Skills

In the studies related to Instruction of Process skill/environmental studies have been viewed with respect to two categories

- 1) Teaching-learning process.
- 2) Supporting teaching-learning process.

1) Teaching-learning process

The focus of these studies has been on understanding the children experience during the teaching-learning process. (Christiane, 1999) to conduct the interventions to improve the quality of instruction (Thomar ,1998). Similarly to this study Kasinath (2000) focused on inquiry method to foster the process skills. The studies have been summarised below.

Table 2.7 Teaching-Learning Process

Sl No	Author	Focus	Target Group	Research Design	Key Finding
1	Kasinath (2000)	Effectiveness of inquiry method of teaching science in fostering process skills	Students of Grade IX	n=72 experimental – control group	Inquiry method of teaching science was effective in fostering process skills
2	Christiane (1999)	Explore and document the children experience on science activities	Grade VI and Grade VII	Ethnographic	Context is important for participating in elementary school science
3	Thomar (1998)	Intervention to improve the quality of instruction in environmental science	Grade IV	Experimental (Pre-test – post-test design)	Intervention was significant in bringing desired changes

2) Supporting Teaching-Learning Process

The focus of these studies has been on supporting teaching-learning process by way of instructional programmes/ Instructional materials. Lobo (1990) Sharma (1994) prepared instructional programme for teachers/students, whereas Barhara (1989) prepared instructional materials for students. The studies have been summarised below in the table 2.8.

Table 2.8 Supporting Teaching-Learning Process

Sl No	Author	Focus	Target Group	Research Design	Key Finding
1	Sharma (1994)	Effectiveness of an instructional programme in developing science process skills	Std. III	Experimental parallel group design	Instruction of programme was effective in developing science process skills.
2	Lobo (1990)	Effect of developing process skills among teachers through an instructional programme	pre-service secondary teachers	n=32 experimental and control group	Experimental group performed better than the control group in the instructional programme
3	Barhara (1989)	Effect of testing on process skills achievement using self instructional materials	Under-graduate science students	n=54 two group post-test only	Self-instructional material did not had differential effect on process skill acquisition

2.5 Implications of the Review to the Present Study

The process skills develop as isolated skills (McNay and Melville, 1993), (German 1996). The process skills tend to develop as a whole in authentic contexts (Roth and Choudhury) and context enhances pupil's participation (Christiane, 1999). The process skills ability can be enhanced through children writing and children participation (Ksystynik, 2001 and Disimoni, 2002). Another aspect of enhancing process skill is to modify the instructional procedures from this perspective. Instructional programmes seem to develop process skills among children and teachers (Sharma, 1994 and Lobo, 1990). If inquiry is used during instruction, it seems to foster the process skills among children (Kasinath, 2000). However self-instructional materials did not provide the differential effect on development of process skills (Barhara, 1989).

The process skills among children are related to variables such as conceptual change, cognitive development, academic ability etc. (Dawson 1999 and German, 1994). The process skills and pupils learning style don't seem to have significant relationship (White, 1999). When process skills are integrated with science, maths and arts it tends to increase academic achievement among children (Tice, 1999). The environmental studies being integrated with science and social studies has facilitated

in the acquisition process skills (Sharma, 1994), among children. The instruction quality of in environmental science can be enhanced through intervention programmes (Thomar, 1998)

Teacher's personal experiences, environmental knowledge, in service programmes seem to develop positive environmental attitude, (Paharaj, 1990). The impact of environmental education was found to be higher in urban children than with semi urban children (Gopal Krishan 1992) from the review of above studies following implications can be drawn

- 1) The researchers in the area of process skills have not been able to arrive at an understanding on how process skills tend to develop among primary school children.
- 2) There is a lack of research evidence on how process skills tend to develop through environmental studies.
- 3) The inquiry approaches, instructional programme, explicit instructions helps in fostering the process skill development
- 4) The review has indicated that, very few studies have followed the qualitative methodology. The researchers have used qualitative research in terms of Ethnography (Christiane, 1999), Case studies (Tice, 1999) and Interpretative approaches (Roth and Roychoudhary) to understand process skills.

Thus considering this specific implication, a need to conduct the following study was felt. Therefore, the present study has been titled as

Acquisition of Process Skills by IV Standard Pupils through an Instructional Programme in Environmental Studies.