CHAPTER – 1

INTRODUCTION

1.1 Introduction

Learning is a process through which child acquire new modes of behavior or change in the existing mode of behavior. Changes in behavior that are brought by physical maturation or growth do not fall under learning. Learning is what we acquire through efforts after birth. We know, we feel and we do and in three domains (cognitive, affective and psychomotor) of behavior, change occur due to learning. In other words we can get new knowledge, form attitude and master in skill through learning. In essence of learning, three basic assumptions are held to be true. First, learning can visualize by a change in behavior. Second, the environment shapes behavior. And third, the cause and reinforcement are central to explaining the learning process.

From these three assumptions it is easy to say that teaching is facilitating learning. It (teaching) is a help given to student to acquire factual knowledge, desirable attitude and required skills. Teaching is a scientific process and its major components are content of the subject presented by the teacher, learning style of the learner and feedback given by the teacher. These three components are related to the teaching. It means content is what we teaching – subject/teacher related factor, learning style is a characteristic that the way student learn, and feedback is a process - part of teaching selected by the teacher.

Thus there is a close relationship between teaching and learning. The goal of teaching is learning. Learning is information processing. The process is facilitating by teaching. Learning involves (1) reception, (2) perception, (3) encoding, (4) storing and (5) retrieving of knowledge as outcomes/effects of teaching. Certain teaching technologies facilitate these five learning events and instruction should be so arranged as to satisfy these conditions.

From the above discussion leads us to the characteristics of learning. (1) Learning as a quantitative increase in knowledge, learning is acquiring information or ‘knowing a lot’. (2) Learning as memorizing, learning is storing information that can
be reproduced. (3) Learning as acquiring facts, skills and methods that can be retained and used as necessary. (4) Learning as making sense or abstracting meaning, learning involves relating parts of the subject matter to each other and to the real world. (5) Learning as interpreting and understanding reality in a different way, learning involves comprehending the world by reinterpreting knowledge.

The educative process consists of the dual activities of learning and teaching. Ideally, teaching should result in increased opportunities for learning.

**How people Learn?** There is no complete agreement among scientists and educators on the nature of human learning. But certain ideas are generally accepted. Learning theories are based largely on findings of modern psychology. Most theories of learning can be divided into four main groups: (1) behavior modification theories, (2) cognitive theories, (3) humanistic theories, and (4) constructivist theories. All groups attempt to explain how people can best achieve the goals of education. Each group stresses a different kind of learning and recommends different methods of achieving it. Most educators make use of all four types of theories, and most people probably learn in all these ways.

Behaviorism is operates on a principle of “stimulus-response. Behavior modification theories work best with problems that have one solution. To find out whether a student has learned the solution, a teacher should be able to observe the results. Behavior modification theories therefore stress types of learning whose results can be measured or tested. Such learning includes the acquiring of factual knowledge and such skills as the ability to solve mathematical problems or speak a foreign language.

Cognitive or problem-solving theories stress the importance of thought processing learning. Such processes include understanding of relationships between things and deciding which solution to a problem is the best one. Those who support this type of theory believe that behavior modification theories cannot explain to help develop the most complex thought processes. They also believe that many problems have more than one correct solution. Some cognitive theories therefore propose a method of learning called the discovery method. In this method, a teacher helps a student select a problem to solve. The teacher guides the students to the necessary
materials and information and asks questions that encourage the student to think. But each student is expected to work out his or her own solution.

Humanistic theories stress the importance of emotion in learning. Supporters of this type of theories believe that behavior modification and cognitive theories neglect a student’s emotional development. Humanistic theories point out that every individual has a personality different from that of all other persons. As a result, each student should be allowed to develop in his or her own way. Humanistic theories consider emotional development important both in itself and as an aid to all other types of learning. According to humanistic theory, a teacher should help students examine their emotional needs and desires and encourage students to acquire the knowledge and skills that are needed.

According to Kothari Commission Report, “In a modern society knowledge increases at terrific pace and social change is very rapid. This needs a radical transformation in the educational system. Education is no longer taken as primarily concerned with the imparting knowledge or the preparation of a finished product, but with the awaking of curiosity, the development of proper interests, attitudes, values and building up of such essential skills as independent study and capacity to think” (Kothari, 1964-66).

We all know and most of the educationists, philosophers and psychologists have accepted that ‘Learning’ is the most important process. We should make the child learn and the whole education system should be self-learning oriented. The Mudaliar Commission has also pointed out that, “The contemporary education system has failed to influence the student” (Pathak, 1976).

Constructivism views learning as a process in which the learner actively constructs or builds new ideas or concepts based upon current and past knowledge. In other words, learning involves constructing one's own knowledge from one's own experience. Constructivist learning, therefore, is a very personal endeavor, whereby internalized concepts, rules, and general principles may consequently be applied in a practical real-world context. The teacher acts as a facilitator who encourages students to discover principles for themselves and to construct knowledge by working to solve realistic problems. This is also known as knowledge construction as a social process.

Teacher can work to clarify and organize their ideas so he can voice them to others. It gives opportunities to elaborate on what students learned. We are exposed to
the views of others. It enables us to discover flaws and inconsistencies by learning we can get good results. Constructivism itself has many variations, such as Generative Learning, Discovery Learning, and Knowledge Building. Regardless of the variety, constructivism promotes a student's free exploration within a given framework or structure.

1.1.1 Constructivist Learning

Constructivist learning has emerged as a prominent approach to teaching during past decade. The work of Dewey, Montessori, Piaget, Bruner, and Vygotsky (quoted by Donga, 2005) among others provides historical precedents to constructivist learning theory. Constructivism represents a paradigm shift from education based on behaviorism to education based on cognitive theory. Fosnot (1996) has provided a recent summary of these theories and describes constructivist teaching practice. Behaviorist epistemology focuses on intelligence, domains of objectives, levels of knowledge, and reinforcement. Constructivist epistemology assumes that learners construct their own knowledge on the basis of interaction with their environment. Four epistemological assumptions are at the heart of what we refer to as "constructivist learning" Fosnot (1996).

1. Knowledge is physically constructed by learners who are involved in active learning.
2. Knowledge is symbolically constructed by learners who are making their own representations of action.
3. Knowledge is socially constructed by learners who convey their meaning making to others.
4. Knowledge is theoretically constructed by learners who try to explain things they don't completely understand.

Constructivism is very simple, it actually says we never learn anything absolutely from a scratch, when we have a new idea we see how it relates to something already we got in our brain and then construct bigger framework. Successful learners are the persons who start up with pool of idea they really understand then come to a new idea then bag the new idea in to old idea and he is going on and on. Constructivism never sees anything objectively and everything is subjective.
With the advancement of science and technology, the world we live in becomes very narrow. Uses of internet and communication devices have broken all the boundaries and geographical limitation. With the rapid development of multimedia, access to information and communication has become very easy. All these and many more contributions by human beings make us feel proud of being human on this universe.

It is observed that our schools have different educational and development objectives distributed in various branches subjects in curricula. Various curricular, co-curricular and extra-curricular activities are carried out in order to meet these objectives. The central organizing force to all these activities is to nurture the creative and critical thinking in the minds of the students so that they become productive and responsible citizen of the future. In the days of technology it should be realized that teaching is not merely imparting the content rather how to think with the content should be the focus of any school activity. Our system of education is been criticized because of undue emphasis on the teaching of content and overemphasis on the rote memory. There is a need shift our practices of teaching and evaluation from memorization of content and recall in examination hours to development of foundation skills of learning and independent thinking.

Constructivism refers to a collection of educational practices that are student-focused, meaning-based, process-oriented, interactive, and responsive to student personal interests and needs. A constructivist perspective views learners as actively engaged in making meaning, and teaching with that approach looks for what students can analyze, investigate, collaborate, share, build and generate based on what they already know, rather than what facts, skills, and processes they can parrot. To do this effectively, a teacher needs to be a learner and a researcher, to strive for greater awareness of the environments and the participants in a given teaching situation in order to continually adjust their actions to engage students in learning, using constructivism as a referent. As said by Goldman et. al. (2009) ICT has the potential for creating powerful learning environments that support distributed, interactive, collaborative and constructive learning and its assessment and since the use of computer technology by youngsters is on the rise. This trend needs to be harnessed for providing education.
New methods and techniques in education are having an increasing effect on the traditional approach to teaching and learning. Among the new approaches and innovations that have gained great acceptance in recent years is constructivist approach.

Hence in the present study the researcher has conducted the experiment to examine the Effectiveness of Constructivist Approach to the Teaching of Animal Classification in Science and Technology of Standard Ninth.

1.2 Statement of the Problem

The title of the present study was verbalized as:

**Effectiveness of Constructivist Approach to the Teaching of Animal Classification in Science and Technology of Standard Ninth**

In the present study, the researcher has developed the constructivist instructional program for teaching “Animal Classification” in Science and Technology of standard ninth. The researcher has implemented the constructivist instructional program on students of 9\(^{th}\) standard in English medium Central Board Secondary Education (CBSE) to examine its effect on academic achievement of science (Animal classification), using an experimental design.

1.3 Operational definition of terms

The researcher has defined the terms used in the study. The operational definitions of the terms used in the present study are given below:

**Constructivist Instructional Program.** A teaching program which involves Constructivist basics of teaching and which is flexible as per students need was considered as Constructivist Instructional Program (CIP)*.

In this program the teaching of the unit Animal Classification is planned through Exploration, Explanation, Expansion and Evaluation (four stages of planning of teaching: 4E) according to constructivist approach.

*In this research report CIP is used for Constructivist Instructional Program.
Traditional Instructional Program. A teaching program which involves Herbart steps of teaching and which is flexible as per teaching competency of teacher was considered as Traditional Instructional Program.

In this program the teaching of the unit Animal Classification is planned through Introduction, Stating the Objective, Content Presentation, Evaluation and Assignment (five stages of planning of teaching) according to traditional instructional program. Traditional word is related to lecturing for teaching using necessary Medias.

Experimental Group. The group, which was given learning experiences through CIP, (Exploration, Explanation, Expansion and Evaluation) was considered as experimental group.

Control group. The group, which was given learning experiences through traditional teaching approach (Herbart plan: Introduction, Stating the Objectives, Content Presentation, Evaluation and Assignment) was considered as control group.

Pre-achievement. The score of science subject of the students of the final examination of 8th standard, which held in March-April 2009 in the sample schools, of the experimental and control group were treated as pre-achievement to know the equalization status of both groups.

Post-achievement. The score of the teacher made test developed by researcher and considered as Post Test, administered after the treatment on experimental and control group was considered as post achievement. The test was based on the content of ‘Animal Classification’ and learning objectives selected by the investigator for the experiment.

Effectiveness. The significant difference between means of post test scores (post achievement) of experimental and control group after the treatment was calculated and the effectiveness of teaching through constructivist approach was decided.

1.4 Objectives of the Study

For the present study, following were the objectives:

1. To develop constructivist instructional program for teaching of “Animal Classification” in Science and Technology of standard ninth.
2. To implement constructivist instructional program for the teaching “Animal Classification” in Science and Technology of standard ninth.

3. To compare the effectiveness of constructivist instructional program and traditional instructional program for teaching of “Animal Classification” in Science and Technology subject of standard ninth on the basis of post achievement score.

4. To get feedback from students on constructivist instructional program for teaching “Animal Classification” in Science and Technology of ninth standard.

1.5 Hypothesis of the Study

The null hypotheses of the present study were as follows:

The following hypotheses specify the nature of the difference to be tested and how it will be measured.

1. There will be no significant deference between means of pre-achievement scores of learners taught through the Constructivist Instructional Program and learners taught through the Traditional Instructional Program.

2. There will be no significant difference between mean achievement scores of the post test of the learners taught through the Constructivist Instructional Program and learners taught through the Traditional Instructional Program.

3. There will be no significant deference between means of post-test scores administered after the experiment and treated as retention test (score) of learners taught through the Traditional Instructional Program.

4. There will be no significant deference between means of post-test scores administered after the experiment and treated as retention test (score) of learners taught through the Constructivist Instructional Program.

5. There will be no significance difference between mean achievement scores of boys taught through the Constructivist Instructional Program and learners taught through the Traditional Instructional program.
6. There will be no significance difference between mean achievement scores of girls taught through the Constructivist Instructional Program and learners taught through the Traditional Instructional Program.

1.6 Question considered for the Study

What are the opinions regarding Constructivist Instruction Program of the students taught through Constructivist Instruction Program?

1.7 Area of the Research

Fifth survey of Educational Research (1988-92) indicates thirty-eight areas of educational research. The classification is based on faculty subject, stages of Education, teaching of the particular school subject, etc.

In the present study, the researcher has developed CIP based on instructional strategy. So the area of study was Teaching Strategies. The present research is having more relevance to certain areas of research: (1) Educational Technology, (2) Secondary Education, and (3) Science Education.

The main aim of the study was to find the effectiveness of CIP in the comparison of the traditional instructional program. The effectiveness of the constructivist instructional program was examined using the experimental research method. The development of constructivist instructional program is a subject of educational technology. Hence, the problem of the study was more related to the area of the Educational Technology. The experiment was carried out on the students of standard nine and the content is “Animal classification” hence the area of research is related to Secondary Education and Science Education too.

1.8 Type of Research

There are many ways to classify Educational Research studies. Classification systems of various degree of complexity have been developed. There are four systems described in this context.

1. Fundamental Researches are performed in laboratories, which follow the physical science system and for the establishment of new principal and especially in science.

2. In applied researches, the new knowledge, principle or theory finds an application to result in a new budget, an instrument a new explanation for an ‘old’ phenomenon in the light of application of a new knowledge.

3. Action Researches are carried out by teacher, which are useful for routine school problems.

In the present study, the experiments were conducted using theoretical knowledge to find its usability in educational practices. So the study was considered as an applied research.

Secondly the researches are classified as: (1) Qualitative Research and (2) Quantitative Research. In the present study, the data in terms of the scores on research tools were collected and numerically analyzed. The result of the study was found out with the help of the proper statistical techniques. Hence, the present study was also classified under the quantitative research.

1.9 Importance of Study

According to Gall, Borg & Gall (1996) the contribution of the research in the field of epistemology is in terms of (1) description, (2) prediction, (3) improvement and (4) explanation.

Description: present study has provided description for application of constructivist approach in day to day classroom teaching. The study can be helpful to authors or writers, in writing the various textbooks. Constructivist instruction program can be useful to future researchers for the development of his model of teaching based on other theory of teaching. Present study will be helpful to prepare a frame work of the content animal classification.

Prediction Present study can be helpful in prediction of a particular learning strategy. The study helps the teacher to become free and capable of guiding and supervising the learning activities of his students. Groups are easier to supervise than the individual students. Present study also guides the researchers to outline his
experimental research methodologically. School personal can predict the results of experimental design.

**Improvement** Present study helps to the teachers in the improvement of classroom interaction for more involvement, motivation and creates willing to learn and achieving the goal by tension free and stimulating environment based on the developed teaching model. School or educational institute can develop and apply CIP for other subject with reference to the teaching model suggested through the present Research. The study will be the guideline to provide information of the constructivist science teaching to the teachers, teacher training centers, departments, DIET, PTC and B.Ed. colleges. The study will be helpful to bring changes in classroom environment and through this in educational systems and will be helpful to develop interest in science education among students.

**Explanations** Animal classification is consider as an important topic in science but very less guideline and explanations are available for its teaching. Present study can provide guidance to the teachers for teaching of the same and similar units. Researchers will get explanation on constructivist instructional program and will be supportive for further researches.

1.10 **Scope of the Study**

The research findings of the study cannot be applicable in all the condition. It becomes necessary to know the scope of the study. Present study covers the scope of the sample, schedule of teaching and the resources. The present study has been delimited to the following aspects

1. The researcher has developed CIP and achievement test for unit animal classification for high school students of class nine.
2. To measure the achievement after the treatment the teacher made test was used as a research tool.
3. It was not possible to make equal groups regarding the IQ, study habits and other psychological variable. So groups were made statistically equal, by using pre-achievement of the students.
4. The researcher conducted the experiment of the study in Rajkot city. The study was carried out particularly in secondary schools.
In short, the present study was performed over the students of the 9th standard of English medium schools: (1) Central School (Kendriya Vidyalaya, Rajkot) and the replication of the study were done in the (2) Rajkumar College (Secondary School Section) of Rajkot city.

1.11 Variables involved in the Study

In the present experimental study the following variables were included:

**Independent Variable.** The independent variables are the conditions or characteristics that the experimenter manipulates or controls in his or her attempt to ascertain their relationship to observed phenomena. In the present study, the independent variable was Method of teaching. Two levels of independent variable were selected (1) CIP and (2) traditional instructional program.

**Dependent Variable.** The dependent variables are the conditions or characteristics that appear, disappear or change as the experimenter introduces removes or change the independent variables. In the present study the dependent variable was achievement of the content Animal Classification of ninth standard students of sample schools on teacher made test.

**Controlled Variable.** In present study two types of control variable were involved. One was subject related control variables and second was student’s personal domain related control variables. The following variables were controlled during the implementation of the treatment. Subject related control variables: (1) Standard, (2) Medium of instruction, (3) Subject and (4) Content. Student’s personal domain related control variable achievement was checked by knowing pre-achievement status (annual result in science of 8th standard). This variable was controlled statistically; because it was not possible to make group equal regarding this variable, before treatment.

**Moderator variable.** It is such a kind of secondary independent variable, which is selected to check whether it affects the relation between main independent variable and dependent variable or not. In the present study, sex of the student and area of the school were selected moderator variables. Levels of the moderator variable sex were determined as boys and girls.
**Intervening Variables.** The variables were not controlled were selected as intervening variables. It was assumed that the following variables might have been affected during the study, they are: (1) interest, intelligence and enthusiasm of the sample towards the subject, (2) novelty (innovative aspect) of the teaching approach and (3) interaction among the group and between the groups.

1.12 **Interrelationship between Variables.**

The diagrammatic presentation of the variables is given in Figure: 1.1.

1.13 **Planning of the Next Chapter**

The report has been presented in six different chapters.

The second chapter consists of the review of the related literature in the form of theoretical aspects and the review of past studies concerned with the present study. The third chapter focuses on the research design of the study. This chapter deals with the population, sample, procedure and techniques of collecting information, the nature of research method, and the method of data analysis employed. The fourth chapter explains the detail of the development and description of CIP and tools of the
research. The fifth chapter consists of the analysis and the interpretation of the data. And finally, the sixth chapter consists of the summary, results of the study and recommendations for the further studies.