Man is the only animal that is endowed with unique ability to think. The thinking man showed that the round stone moves faster than the square stone and invented the wheel. Thus the story of civilization is the story of discoveries and inventions of great minds. These great minds must have been as gifted, creative and talented students in their schoolhood. In no way, they might have cultivated the habit of thinking in their life.

- Edward de Bono -
CHAPTER I

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CHAPTER - I

INTRODUCTION

1.0 INTRODUCTION:

Education is a process of manpower generation. It aims at the all round development of the individuals. In this process, teachers shoulder the responsibility for the development of the cognitive, affective and psychomotor domains of the students. The teaching activity, therefore, should be so designed and performed that it can create a spectrum of learning environments capable of meeting various requirements of individual learners. Through years, therefore, teachers have used a variety of methods for individualisation of instruction. In the recent years, Models of Teaching have come out as one of the most exciting new approaches towards this end. It is said that models of teaching make a definite contribution to education in achieving all-round development of the students by guiding teachers in designing, organising and evaluating the instructional activities and environments which involve every student at every step of his learning in such a way that he becomes an effective and productive learner.
Each model of teaching claims to accomplish specific instructional objectives. No educational programme can stand on a hypothetical pivot. For the reproduction of any programme or instructional strategy in the country, it is always essential to have sufficient empirical evidence for it. Educationists and researchers, therefore, have made efforts to study different models of teaching in fulfilling their prescribed objectives. This piece of study has made a small contribution to research in the area of class room teaching. It is an attempt to try out Concept Attainment Model in the actual class room situation to determine its effectiveness for teaching concepts of the science.

The top-most priority is given to the researchers on the teaching strategies in the class room because of its utility and immediate results in the education system. Therefore the ways of teaching through proper strategies or models evolved by the educationalists are studied through its historical development.

1.1. TOWARDS INSTRUCTIONAL MODELS:

Education has been developing, changing and progressing since the origin of the history of mankind. Education policies have been developing to face the challenges of time in respect to social and cultural matters. It has been done to develop the geniuses. It is observed that new thinkers
about educational policies have become inevitable. India has been going through such movements to keep in pace with the world.

In the year 1960, the Academic Reform Movement led by scholars from the traditional academic disciplines, pointed out the importance of concepts. Scholars in many fields emphasized the importance of teaching the structure of discipline and its mode of inquiry. Throughout the country, elementary and secondary school curricula in each of the subject areas were redesigned around sets of core concepts. The so-called Maths, Physical, Science Study Committee (P.S.S.C.) Physics, New Social Studies and Biological Sciences, study committee (BSSC) biology are some of the results of the effort as are linguistic approaches to reading and structural approaches to art, music and physical education. Text-book publishers revised their series shifting to a 'conceptual approach'. Hence it is worthwhile to undertake research work in the field of science to bridge the gap.

Games, films, and concrete aids were invented to accompany the text-books, although these curriculum projects varied in design the learning of major concepts from their respective disciplines.

Unfortunately, many of these attempts to change curricula took place without a simultaneous effort to expose
educators to research on the nature of concepts and the process of concept learning, nor was training provided to help teachers use that research to implement the new curriculum. In fact, this area is a very well developed portion of educational psychology. What concepts are, how people acquire them and what conditions impede or facilitate concepts learning are all issues that researchers have explored. From these sources, a number of instructional models for teaching concepts have been generated.

In Models of Teaching Hinda Taba's Inductive Thinking Model David Ausubel's Advance Organizer Model and Jerome Bruner's Concept Attainment Model are explained at length. Jerome Bruner, Jacqueline Goodnow and George Austin have focussed on the development of concepts through the concept Attainment Model. Their work, a study of Thinking, culminated many years of research into the process by which people acquire concepts. To examine the learning of concepts, Bruner and his associates had to deal with a prior question. They have worked for many years and finally concluded:

1. What is concept?
2. What is meant by knowing a concept?
3. What is the difference between the learning of concepts and other types of teaching?

Concepts are taught in the class-rooms in almost the same way as other types of content-facts and generalisations
are taught. Teachers are hardly aware that the learning of concepts is different from other types of learning. As a result, children experience difficulties in attaining concepts. These difficulties often result in complete formation of concepts on the part of pupils.

Today, pupils gather information from the world around them through different processes. They store this information in their brains, it is known as knowledge. The knowledge, when they consider from a teaching perspective, is known as content.

Facts of the content are acquired through the process of observation. They are singular in occurrence which either occurred in the past or exist in the present and which have no predictive value.

So the educationalists had done the basic researches on the teaching strategies and given the model of teaching in a systematic and scientific way.

1.2. MODELS OF TEACHING:

A model of teaching is a plan, an instructional design to provide experiences to students to facilitate learning. It can be used for effective teaching, development of instructional material and development of curriculum. B. Joyce and M. Weil² (1978) define a model as a plan which "consists of
guidelines for designing educational activities and environments. It is a specific way of teaching and learning that are intended to achieve certain kinds of goals."

Eggen et al (1979) call models "prescriptive teaching strategies" in the sense that the teacher's responsibilities during the planning, implementing and evaluating stages are clearly defined. Models of teaching have the following characteristics:

1. Models of teaching are based on some empirically proved principles.
2. In each model of teaching, there are defined steps arranged in a sequence. These steps can be repeated for times.
3. Each model has well-defined instructional effects.
4. The activities and responsibilities of teachers and students are spelt out.
5. Models of teaching are learner-centred.

Keeping in view the characteristics of models of teaching Sansanwal and Singh define a model as "a systematically developed outline wherein the activities for teachers and students are spelt out, arranged in a particular sequence and carried out in an appropriate environment for achieving well-defined objectives". Following the guidelines of the models of teaching a teacher can create such teaching-learning
situation as to cause the students to interact in such a way that specific changes occur in their behaviours.

Joyce and Weil (1988) have designed several models on the basis of the research efforts of different educationists and psychologists.

1.3. **CLASSIFICATION OF MODELS:**

Keeping in view the educational objectives achieved through various models of teaching, Joyce and Weil\(^4\) (1985) have classified these models into the following four categories which they call "families":

1. **Information Processing Models:**

Models in this family are directed towards dealing with cognitive skills. They emphasize the active involvement of the student in learning through investigating environment and analysing data rather than a passive reception of stimuli and rewards. Eggen et al (1979) define information processing as the intellectual skills required to analyse information which "include the ability to make observations and through the use of inference to generalise to predict and to explain events." Here the learner processes information through stimulus - response link. To turn information processing into effective learning the following points must be kept in mind while presenting information or content:

1. The attention of the students must be focussed on the
2. The level of the data must be in accordance with the mental level of the students.

3. Familiar and simple content must precede unfamiliar and complex content.

4. The medium used for presenting the content must be suitable to the level of the students.

Information processing models aim at intellectual growth. They help students not only in acquiring content but also in developing thinking skills which will allow them to learn on their own.

II. Social Interaction Models:

These models emphasize the development of capabilities for interpersonal relationships. They focus on the social issues being resolved through academic inquiry and logical reasoning. They lay stress on the development of skills which help individuals engage in democratic and to work productively in the society.

III. Personal Models:

Personal models are designed to develop the capacity for personal development in terms of creativity, self-concept, self-understanding and creative problem-solving. They also focus the emotional development of learners.
IV. Behaviour Modification Models:

Models of this family have evolved from attempts to develop efficient systems for sequencing learning tasks and shaping behaviour by manipulating reinforcement. The behaviour modification theorists emphasize changing external behaviour of the learners and describe them in terms of visible rather than underlying behaviours.

A model of teaching is not a substitute for teaching skills. It is rather a complementary. It has to become a flexible instrument that is modified to fit different types of subject matter, and which responds to the students who are different from one another. A teacher can use different models to teach different instructional goals (Concept Attainment Model (CAM) can be used for teaching concepts).

1.4. NEED FOR THE PRESENT STUDY:

It is a common experience of teachers that traditional methods and techniques have failed to produce effective learning of concepts on the part of the students. One reason for this may be that, generally, concepts related to different subjects are taught through the lecture method. In the lecture method, the teacher dictates the definition of a concept with a few illustrations and sometimes asks students to reproduce the definition and thinks that concept learning has taken place.
What happens in reality is that students associate the given example with labels and cram definitions without being aware of the essential attributes of the concept. Such rote learning mostly leads the students to acquire incomplete or wrong concepts. They do not have proper and exact control over the learnt concepts. Sometimes they do not know even the contexts of terminology. As a result, students fail to use the learnt concepts in a new situation. They also fail to understand other concepts and information based on these concepts.

The problem of incomplete or wrong understanding of concepts becomes worse for the students in learning science wherein they do not have much opportunity to learn and to use the science outside the classroom. In day-to-day learning this problem retards the speed and progress of the students because they have to re-learn concepts each time. On the other hand, the teacher does not have enough time to spend for teaching the same concepts. Therefore, the teacher proceeds further without bothering about those concepts. If the basic concepts of science are acquired thoroughly by the students, they may understand instruction and learn science easily. This may develop their interest in science, which may, in turn, result into better achievement in science. Teachers, therefore, need to use efficient and effective strategies of teaching concepts. The most important question at this state is: Which instructional strategy is efficient
and effective for teaching concepts of Science. Concept Attainment Model (CAM) developed by B. Joyce and M. Weil (1978) claims to help students learn concepts efficiently. But it is undesirable to accept the model as suitable to the Indian situation. Researchers therefore, have endeavoured to adopt Concept Attainment Model for teaching concepts in the Indian situation.

1.5. **STATEMENT OF THE PROBLEM:**

The title of the present investigation was worded as: "A Study of the effectiveness of the Concept Attainment Model in acquiring the concept of Science for Class VIII."

1.6. **DEFINITION OF TERMS:**

The following words used in the title are defined with a view to clarifying the connotation in which they are used in the present investigation:

(i) **Study:** Longman, Dictionary of Contemporary English gives the meaning of study as under:

An investigation: A thorough enquiry into especially including a piece of writing on a particular subject.

To examine thoroughly so as to understand, interpret, select data from population.

A study is an act or process of acquainting by enels own efforts, knowledge of a subject.
Dictionary of Education\textsuperscript{6,1} gives the meaning of study as under:

(1) Application of the mind to a problem or subject,
(2) A branch of learning,
(3) An investigation of a particular subject, or the published findings of such an investigation.

(ii) Effectiveness\textsuperscript{7}: An ability to make improvement in students' scores on a criterion test.

(iii) Concept\textsuperscript{8}: It is found from Webster's Dictionary that a concept is a mental image of thing formed by generalization from particulars, also an idea of what a thing in general is to be.

A concept is basically a system of learned responses the purpose of which is to organize and interpret the data provided by sense perception.

From the Encyclopaedia of Dictionary\textsuperscript{9}: "a concept is an idea or abstract principle which relates to particular view of that subject. There are three kinds of concepts: Conjuctive, Disconjuctive and Relational."

The definitions of concept given by Russell and Dorald, and quoted by Sangeeta Malhotra in her Ph.D. Thesis are as follows:

"A concept is a generalization about related data. It is a more or less stable percept."

"A concept is a classification of stimuli that have common characteristics." For this study, the investigator
accepted the meaning of concept as follows:

Concept means a set of specific characteristics and necessary sufficient qualities associated with the matter or events under observations or study.

Attainment: According to Webster's New Collegiate Dictionary, attainment means An Act of attaining knowledge or power of doing particular thing. An act of reaching one's goal with full satisfaction.

Concept Attainment Model (CAM): Accordingly a model of teaching developed by Joyce and Weil (1978), C.A.M. means helping students to attain concepts by analysing the attributes of the given positive and negative examples and framing and testing hypotheses about the concept.

1.7. OBJECTIVES OF THE STUDY:

The purpose of the study is to know the relative effectiveness of Concept Attainment. The objectives of present study are as follows:

(i) To find out concepts from some of the units in Science Text-book of class VIII.

(ii) To develop the teaching strategies of the concepts of Science Std. VIII keeping in view CAM.

(iii) To investigate the effectiveness of Concept Attainment Model on the development of concept in Science.
(iv) To study the effectiveness of CAM used as a teaching technique in the classroom.
(v) To study whether S.E.S. play any role in the achievement of science.
(vi) To check whether there exists any sex difference acting on the science concept.
(vii) To study the interactive effect of Treatment, S.E.S. and sex on the achievement in science.
(viii) To suggest the findings and conclusions to the educational implications.

1.8. ITS LIMITATIONS:

The study was delimited to the following aspects:
1. The present investigation was carried out for the students of class VIII.
2. The investigation was limited to the students of Gujarati medium schools in Petlad Taluka.
3. Only the selected concepts of science of Std. VIII were taken up for the experimentation.
4. From three variations of CAM only the reception strategy was undertaken for the study.
5. The study is only for the secondary school pupils of the rural areas as one finds no proper environment of learning there.
1.9. FORMAT OF THE STUDY:

A brief description of the chapters to follow is given below:

Chapter one: Concept Attainment, its theoretical perspective. Chapter second deals with meaning of concepts, elements of concepts, Types of concepts, Concept Attainment, Thinking Strategy used for concept Attainment, Concept Attainment Model (CAM) and its strategies explained in detail in this chapter.

The Third chapter deals with the past studies in this field. The layout of the related research Abroad and in India is briefed systematically. The researchers about various teaching of models are also reviewed in brief and its specific studies about the CAM is also reviewed in details.

In Chapter Four, it describes the planning and procedure of the study. It includes the development of teaching strategies through CAM and its implication. The selection of the sample, tools and statistical techniques and methods used to test built hypothesis are described in this chapter.

Chapter Five determines the data analysis of the obtained data. To test the hypothesis built in Chapter six, The ANOVA Technique is used. The Factorial Design Treatment x SES x SEX was applied to study their effect on the Science Achievement.
On the basis of observations and analysis of the data, some conclusions have been drawn. The suggestions based on the conclusions are given in the six chapters that serves as a beacon light to research at work.

References


7. Ibid., p. 61.


10. Ibid., p. 57.