CHAPTER 1
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1.1 **INTRODUCTION**

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. If we visualize the history, it is observed that new thinkings about educational policies have become inevitable. India has been going through such moments.

Children are curious by nature. As they grow up they ask innumerable questions about the things they observed and the events of nature they experienced. The mind of the children are inventive. If they are provided with opportunities, their ability for solving problems becomes more powerful as they grow up. In the process of development inquiring and inventive mind plays an important role in solving the problems. So it has become necessary to
provide with opportunities to the pupils considering their natural ability of solving problems. They should be provided with opportunities for profound and creative study.

The ability for solving the problems lies in the foundation of the allround development of a man. Ability for facing the challenge of problems and finding their solution are natural matters for mankind.

In the New Education Policy of India-1986, a special Model-7 was implemented with a view of developing the ability of solving problems among the children. Stress has been laid by N.C.E.R.T. favouring the syllabus about the abilities of solving the problems of the learners.

Problem solving approach is a special contribution for the educational field. It has become a challenge to check the effectiveness of this approach for the pupils entering the secondary level. A child is besieged by many problems. At this moment it has become inevitable to develop the skill of solving and understanding the problems. So we must be acquainted with the problem solving approach.

Formerly, intelligence was considered to believe as the specific gift of a man. Now a days that has also could be developed through different programmes. Solving problem is the specific achieved intelligence. Solving problem is human nature itself. Solving problem is
finding the unknown means to a distinctly conceived end. Problem solving is a set of events in which human beings use rules to achieve some goal. This is quite true. Yet it is not the whole story. The results of using rules in problem solving are not confined to achieving goal, satisfying as that may be to the thinkers. When problem solution is achieved something is also learned, in the sense that the individual's capability more or less permanently changed. What emerges from problem solving is a higher-order rule, which thereupon becomes a part of individual's repertory. The same class of situation when encountered again, may be responded to with great facility by means of recall, and is no longer looked on as a "Problem". Problem solving then must definitely be considered a form of learning.

1.2 INDUCTIVE THINKING

Method of reasoning which obtains or discovers general laws from particular facts or specific examples. Production of facts is to prove a general statement.

General inference from particular cases, viz. Copper is a metal. It melts by heat. Gold is also a metal. It also melts by heat. Thus all metals melt by heat. This is a general fact. This type of thinking is inductive thinking.

When a person tries to solve any problem, different
thinking about many surrounding matters take place in his mind. He thinks about the happening of the past and the present and he thinks with these imaginations. He tries to solve the problems by imagination and that is called the inductive thinking. In other words we can say that general inference to particular cases is called the inductive thinking.

1.3 DEDUCTIVE THINKING

Deductive thinking means, According to Advanced Learners Dictionary

"arrive at (a knowledge, theory by reasoning, from facts), reach a conclusion from."

Suppose if you saw a doctor leaving a house, you might deduce (the fact) that some one in the house was ill. In other words we can say that it's a conclusion reached by reasoning from general laws to a particular case.

For this type of thinking we can quote the following example.

All men are mortal.

Mr. 'X' is a man, so he is mortal.

All metals melt by heat.

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Gold is a metal, so it melts by heat.

When a person try to solve the problem from general laws to a particular case, it is called the deductive thinking.

Deductive thinking is most important when a person is solving the problem.

1.4 CREATIVE THINKING

Mathur\(^2\) quotes about creative thinking as under:

"Creative thinking is the process of recombining facts, ideas and observations in such a way the result is something that transcends old knowledge; but in inventions and creative thinking have to build on old foundation."

According to Drever, this type of thinking is superior to imitative thinking. This is a type of thinking in which new combination of ideas take place which is the process of the human race.

Thinking, problem solving and creating such things or thoughts which are novel to the person and some of the

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most complex activities of human beings. A problem cannot be solved without thinking. We find that thinking involving reasoning, problem solving, imagination and creativity are related to one another. Thinking like perceiving and remembering is a cognative process.

Whenever we are confronted with problems, new ways of thought are sought by us. This new way of thinking about things leads us to the production of new ideas and new invention. The motivation for the new ways of thinking is however provided by the dissatisfaction with his present way of doing things. In case one is perfectly satisfied with his present activity and ways of thinking, he will not be motivated to learn any thing new or to reason out new inferences or to create new ways of doing or thinking. It is that individual who is contributing to human progress who finds a problem in every thing and is, thus motivated to learn something different or to reason out some new methods or to imagine some novel inventions. It is to be noted that starting point of creative thinking is similar to that of reasoning and learning.

Creative thinking involves the same mental processes that are utilised in other forms of thinking, i.e. experience, association and expression; "Mental impressions are received, recalled, reflected upon and applied."

The line of demarcation between creative thinking
and reasoning or problem solving is not very clear. Some people have a view point that creative thinking is the same as problem solving. When a person is solving a problem he is creating something new to himself which was unknown to him.

When an inventor is working on his invention he is actually solving a problem which has been arised to him during the process. It is because of this that there is hardly much difference between the steps of problem solving and creative thinking.

H.L.F. Von Helmholtz has listed some steps for creative thinking. They have numbered three and G. Wallas has added the fourth one. These four steps are as below:

1. Preparation
2. Incubation
3. Illumination
4. Verification.

Creative thinking means having power to create, of creation, useful and creative work, (i.e. requiring intelligence and imagination, not merely mechanical skill).

Creative thinking is closely related with convergent, Divergent and lateral thinking. So let us try to understand the meaning and role of these thinking in problem solving approach.

1.4(a) **Convergent and Divergent Thinking**:

1. Convergent thinking
According to Guilford's views regarding thinking, there are five intellectual operations—Cognition, Memory, Convergent Thinking, Divergent Thinking and Evaluation.

(i) **Convergent Thinking** means:

With having a knowledge of (of lines, moving objects, opinions) come, cause to come, towards each other and 'meet at a point', tend to do this, arrives converging on the capital.

According to Guilford\(^3\), convergent thinking may be defined as under:

"Convergent thinking which is the basis of intelligence where there is some sort of cognitive behaviour performed with accuracy and speed."

There are three main abilities of divergent thinking. They are: Fluency, Flexibility and Originality.

(ii) **Divergent Thinking**

Guilford's view about this thinking is as under:

"Divergent thinking is the union of creativity, which forms the basis of creativity where sensitivity, novelty, fluency, flexibility, originality, elaboration, redefinition, etc. are more important."

3. J.P. Guilford, Intelligence, Creativity and their Educational Implications, San Diego, California Uni. 1962. PP. 143-147.
Divergent thinking leads to a broadening of the definition and criteria of the problem so as to generate a wide variety of possible solutions, many of which are acceptable and some of which may be creatively superior. Divergent thinking is free to develop its own idea, raise its own questions of making new direction.

In solving a problem we may use the convergent or divergent thinking. There are at least two directions in which thinking takes place. In one direction the solution is achieved or the problem is solved which has a known or commonly acceptable answer. We call this direction as that of convergent thinking, reasoning or rational thinking. In the other direction a new or an answer which is not commonly acceptable is discovered. This direction is called by Guilford as that of divergent thinking. Others call it creative thinking, imaginative thinking or original thinking.

Thus creative, convergent and divergent thinkings are most important factors to solve any problem. These thinkings are the grass roots for solving a problem. Without these types of thinking there is no solution of any problem.

1.4(b) Lateral Thinking:

Lateral thinking means thinking about of, at, from,
to the sides. In other words, Lateral thinking is the thinking of environments, surroundings, circumstances, happenings and events.

When a person tries to solve any problem, he thinks about the happenings of the surroundings and he is inspired to take the proper decision in solving the problems.

Lateral thinking is closely related to creativity. Edward de Bono suggested in his book *Lateral Thinking* (1973) that at school the emphasis has traditionally always made on vertical thinking which is effective but not complete.

1.5 **PRESENT POSITION OF THE CLASSROOM**

The present position of the classroom is not promising. There is no linking for learning among students. Teachers have failed in bringing newness in classroom. Our classrooms are decomposed and stinking by the present educational system depending on merely memory power and cramming. Attempts have not been made to bring forth the inner abilities of the learners. Ready made material is vomited in front of the pupils. Different types of devices are not observed in the classroom, for the allround development of the pupils.

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The students should cultivate the abilities of facing the future problems during the school days. The present educational system lacks giving and taking process in the classroom. Abilities are not found developed among the students according to the expectations of the society after the education is over. Students can't face many problems in practical life and found failed in day-to-day life. They commit suicide and do unauthorized activities (about which we can't think). In presenting this we feel sadness and regret as we can't bring out pupils who can face individual, social, emotional and several other problems.

According to the recommendation of The Kothari\(^3\) commission for Education, the future of India is built up in classroom but it is not observed happening. By giving importance to the problem Solving Approach, promising civilians might be devoted to the nation.

By observing the present situation of the classroom, it is experienced that teachers should plan the pupils to face the problems of the future. It is very important to develop the understanding and logical thinking among the pupils to face the domestic, school and external affairs.

Dislike and mischief are seen among the pupils. The

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students are not found conscious about their real problems and lacking proper understanding, and it is the main cause behind this. Logical background for the problem solving is not observed. That is why, it is the urgent need of the "Problem Solving Approach" at the secondary level in the classroom.

1.6 STATEMENT OF THE PROBLEM

Much less work has been done in India for the Problem Solving Approach. Especially in Gujarati language there is no any educational research for this area. The effect of problem solving approach on academic performance and creative personality is most important for secondary school pupils. Main base for the progressive life is creative personality. Problem solving approach is most important for mankind. This approach must be known by the pupils at secondary level. The practice of this approach may be useful for the whole life. So it is the aim of the investigator to work in this area, which would ultimately contribute to the vast variety of the pupil's ability unknown and uncovered so far.

The statement of the problem is as follows:

"AN INVESTIGATION INTO THE EFFECTIVENESS OF PROBLEM SOLVING APPROACH ON THE PERFORMANCE AND PERSONALITY OF SECONDARY SCHOOL PUPILS"
1.7 TECHNICAL TERMINOLOGY

The investigator has tried to explain the terminology used in the statement of investigation is as under:
(a) Investigation (b) Problem Solving (c) Approach
(d) Academic performance (e) Creative personality.

(a) Investigation

According to Advanced Learners Dictionary⁴:

"Investigation means a careful and thorough inquiry in the problem on hand. It is an act or process of investigating or the condition of being investigated. A searching inquiry for ascertaining facts: a detailed or careful examination: A systematic examination of some scientific questions whether by experiment or mathematical treatment."

According to Webster Dictionary⁵:

"It is a noun-class world transformed from the verb class work 'Investigate'. It means an act of observation by close and systematic examination."

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(b) **Problem Solving**

According to G. Polya, the meaning of problem solving is as under:

"Solving a problem is finding the unknown means to a distinctly conceived end. If the end by its simple presence does not instantaneously suggest the means, if, therefore, we have to search for the means, reflecting consciously how to attain the end, we have to solve a problem. To solve a problem is to find a way around and obstacle to attain a desired end, that is not immediately attainable by appropriate means."

According to S.R. Laycock and B.C. Munro, problem solving may define as under:

"A problem exists for an individual when he is unable to reach a desirable goal by means of his present patterns of behaviour. Problem solving, then, refers to methods employed by the individual as he attempts to achieve this goal. Problem solving involves some form of restructuring of experience; it involves learning."

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John P. DeCecco's thoughts about problem solving is as under:

"We shall view problem solving as a form of principle learning in which lower-order principles are applied in the learning of higher-order principles. In this view, successful problem solving results in the acquisition of new knowledge just as does the successful learning of concepts and principles. Problem solving as a gain in substantive knowledge, we shall also consider techniques of problem solving which are sometimes called creative thinking, critical thinking and learning by discovery."

(c) **Approach**

According to the Advanced Learners Dictionary: Approach means way, path or road.

For example: All the approaches to the palace were guarded by soldiers.

In this investigation problem-4 is given as under. See the example -

\[(5 + 5 + 5 + 5) \times 5 = 100.\]

Now, use - and x symbols and set figure five, five times and get the result 100.

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There are many approaches to find out the solution, such as \((5 \times 5 \times 5) - (5 \times 5) = 100\).

Every student tries to solve the problem by his own approach. He passes many ways to reach the goal. We can say that the approach means a free thinking way to get the solution of the problem.

(d) **Academic Performance**

Academic performance means academic achievement of the students at the examination time, (at evaluation time). Faithful performance in teaching and studying. Academic performance means the results of annual examination of the students.

(e) **Creative Personality**

Although all of us are different from one another, the creative person is distinctively unique, both because of what he or she does and what he or she is.

Creative personality is characterised by spontaneity, love of complexity, playfulness and so forth.

Creative personality is the set of distinctive characteristics of the individual that he manifests in a variety of situations. Creative personality is a complex phenomenon.

Creative personality means creative person. Creative
personality is vibrant, moody, complex and seemingly a bundle of contradictions.

Paul Torrance reviewed over fifty studies of creative personality. There were sixty two traits to characterise creative personality.

To define ideal creative personality Paul Torrance judged nineteen traits with the help of experts as under:

(A) Courage and independence
   1. Courageous in convictions
   2. Independent in thinking
   3. Independent in judgement
   4. Unwilling to accept say-so

(B) Risk taking
   5. Willing to take risk
   6. Adventurous
   7. A self-starter

(C) Persistence
   8. Persistent
   9. Determined

(D) Self sufficiency
   10. Becomes preoccupied with tasks
   11. Self-confident
   12. Self-assertive

(E) Inquistiveness
13. Curious
14. Always asking questions

(F) Complexity
15. Intuitive
16. Visionary
17. Emotionally sensitive.
18. Strives for distant goals
19. Attempts difficult tasks

1.8 GENERAL OBJECTIVES OF THE STUDY

(1) To prepare sets of problems with respect to the different subjects of the school; such as Mathematics, Science, Languages, Social science for usage in secondary school.

(2) To provide problem solving approach in our climate and culture for usage in secondary school.

(3) To determine the effect of problem solving approach on academic performance on three groups (i) group with discussion (ii) group without discussion (iii) control group.

(4) To determine the effect of problem solving approach on creative personality on the groups (i) group with discussion (ii) group without discussion (iii) Control group.
(5) To study the relationship between socio-economic status and academic performance in the context of problem solving approach.

(6) To study the relationship between socio-economic status and creative personality in the context of problem solving approach.

(7) To study the relationship between the caste and academic performance in the context of problem solving approach.

(8) To study the relationship between the caste and creative personality in the context of problem solving approach.

(9) To study the relationship between caste and socio-economic status when problem solving approach is implemented or not implemented.

1.9 **LIMITATIONS**:

The study was delimited to the following aspects:

(1) This study is limited only for the creative personality and academic performance.

(2) This study is limited only for Gujarati Speaking students.
(3) This study is limited only for ten week training programme for treatment.

(4) The investigator has used only written measuring, creative personality and academic performance.

(5) This study is for only secondary school pupils of Std. IX.

1.10 REPORT FORMAT

The format of Research report or scheme of chapte-
risation is as under:

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