

TEACHING AND LEARNING PROBLEM SOLVING METHOD: A WAY OF SOLVING THE PROBLEM SCIENTIFICALLY

S.Wilson

Assistant Professor,
Government College of Education
Orathanadu, Thanjavur.

Apstract

The scientific environment and its application are influencing modern society. Science has become an integral part of our daily life. Science learning provides to use the problem solving method in developing the scientific attitude of learner. The most important objective of science instruction is to make the pupil aware of the problem solving method of procedure and to inculcate scientific attitude. One of the most important outcomes of the study of science is training in problem solving method or scientific method which is considered as one of the aims of teaching science. Problem solving method refers to a body of techniques for investigating phenomena, acquiring new knowledge, or correcting and integrating previous knowledge. To be termed problem solving, a method of inquiry must be based on gathering empirical and measurable evidence subject to specific principles of reasoning. In this method student is involved in finding out the answer to a given scientific problem and thus actually it is a type of scientific or discovery method. Problem solving method involves reflective thinking; logical reasoning, scientific inquiry and results from the achievement of certain abilities, skills and attitude, present evidence indicate that it needs a continuous training. The present paper emphasizes on the meaning, steps, advantages and disadvantages of problem solving method.

Keywords : *Problem solving method, Steps of problem solving method, Advantages and Disadvantages of problem solving method.*

Introduction

“Problem solving method as an educational device whereby the teacher and the pupils attempt in a conscious, planned, purposeful manner to arrive at an explanation or solution to some educationally significant difficulty” - James Ross.

The role of science and technology in the

rapid progress of a country like ours is bound to be of utmost significance. Scientific knowledge is doubling itself in some fifteen years and this means that a normal individual will soon get out of date in relation to his awareness of the fast changing world around him. We cannot help this but what we must ensure is that the new generation studying in the schools, colleges and the universities is

taught what is reasonably modern and not feed on what is obsolete. The scientific environment and its application are influencing modern society. Science has become an integral part of our daily life. Science learning provides to use the problem solving method in developing the scientific attitude of learner. The most important objective of science instruction is to make the pupil aware of the problem solving method of procedure and to inculcate scientific attitude. The school will not only give the pupil adequate scientific knowledge and requisite skills to meet the problem of existence. As a science teacher should always promote or give an opportunity to discovery new things. An independent and impartial experimentation help the pupils to develop a logical mind; critical judgment and the habit of solving problems independently to find answers to their own questions. The problem solving methods should be inculcated in all individuals in order that they do not accept things on hearsay; propaganda or superstitious traditions but upon conclusions arrived at on the basis of evidences. Problem solving method is essential to enable the students to adjust themselves and live as efficient citizens of scientific society.

Problem Solving Method

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Meaning and Definitions

Problem solving method refers to a body of techniques for investigating phenomena, acquiring new knowledge, or correcting and integrating previous knowledge. To be termed problem solving, a method of inquiry must be based on gathering empirical and measurable

evidence subject to specific principles of reasoning. In this method student is involved in finding out the answer to a given scientific problem and thus actually it is a type of scientific or discovery method. It is also referred to as '*the method of science*' or '*the method of a scientist*'.

The **Oxford English Dictionary** says that problem solving method is: "*a method or procedure that has characterized natural science since the 17th century, consisting in systematic observation, measurement, experiment and the formulation, testing & modification of hypotheses.*"

Risk. T. M. : "*Problem solving may be defined as planned attack upon a difficulty or perplexity for the purpose of finding a satisfactory solution.*"

R. L. Stevenson : "*It is better to travel hopefully than to arrive*"

Abraham Wolf : "*Problem solving methods are of two principle types –technical and logical. The technical methods are very numerous and they are different in the different sciences, but the logical methods of reasoning from the available evidence are not really, numerous and are essentially, the same all the science*".

Steps of Problem Solving Method

The problems solving method is a sequenced and structured way of finding out the results through experiments. The following are the steps of the problem solving method.

- 1. Identifying or sensing the problem :** Teacher should take the students to a situation or problematic area where the students can identify or sense the problem by asking questions. A good science teacher always encourages his students to ask questions and tries to answer them in a simple and understandable manner. Such situation or problematic area will stimulate reflective thinking setting up of arriving at

a rational solution.

2. **Defining the problem :** After identifying or sensing the problem students will define the problem in scientific language and proceed towards a solution. The statement of the problem be such that it clearly defines the scope of the problem as also its limitation.
3. **Analyzing the problem :** In this step, students are allowed to identifying the key words in the problem and these help to pursue in the next step.
4. **Collection of data :** In this step, teacher is allowing and suggesting the students to refer books, periodicals, internet to collect information on key words. Unnecessary data should be discarded by discussing with friends or teachers. The data should be free from the mechanical and personal errors.
5. **Interpreting the data :** In this step, student are allowed to organize the data on the basis of similarity and difference. This phase of problem solving demands a great amount of guidance from the teacher because students may not be able to interpret data in a correct way due to lack of experience. The superfluous data should be discarded.
6. **Formulating hypotheses :** In this step, student will frame the tentative hypotheses to the problem after interpretation of data. A hypothesis is in fact a certain tentative solution to the problem. The hypothesis should be free from bias and self inclination.
7. **Testing the most likely hypothesis:** In this step, students are allowed to select a suitable hypothesis or solution for testing with the help of a discussion and experimentation. The experiment or discussion will show the occurrence or non-occurrence of the expected phenomenon and from this we will be able to accept or reject or modify the hypothesis.

8. **Drawing conclusion and generalization**

: In this step, conclusion are drawn from the selected hypothesis. The results should support the expected solution. Experiments can be repeated to verify the consistency and correctness of the conclusion. After drawing conclusion the teacher will make generalization by arranging a set of experiment in systematic manner.

9. **Its application to new situation :** In this step, the teacher will allowing the student to associate the current problem solution to the different problems or situation. This step will help in minimizing the gap between classroom situation and real life situation.

Role of the Teacher in Problem Solving Method

For the success of problem solving method the role of the teacher is very important. He should act a co-investigator along with students and must also find sufficient time and have patience to attend to students' problems. Under the proper guidance of the teacher the science laboratory should become the hub for implementations of this method.

Advantages of Problem Solving Method

Advantages of the problem solving method are :

1. Students learn science of their own and teacher works only as a guide.
2. It helps students to become real scientist as they learn to identify and formulate scientific problem.
3. It gives enough training to students in techniques of information processing.
4. This method is based on the principle of 'learning by doing'.
5. It develops a habit of logical thinking in the students as they are required to interpret data and observations.
6. It helps to develop intellectual honesty in

students by accepting or rejecting or modifying the hypothesis.

7. It helps the students to find the relationships and pattern among things and variables.
8. It provides the training in the scientific methods and skills of discovering new knowledge in science.
9. It develops scientific attitude of mind as well as interest and appreciation through personal experience and keen observation.
10. It helps to give individual attention to every student.

Disadvantages of Problem Solving Method

Some important disadvantages of the problem solving method are as under :

1. It is a long, drawn out and time consuming method.
2. It can never become a full fledged method of learning science.
3. Due to lack of exposure to this method most of the science teachers fail to implement it successfully. This method requires gifted and trained teachers which have research skills too.
4. This method is suitable only for very bright and creative students.
5. There may be non availability of equipments in the laboratory of schools.

Conclusion

The study of science would remain incomplete if we do not adapt the problem solving method in solving the problem. Problem solving method helps to develop the power of

reasoning, application of scientific knowledge, critical thinking and positive attitude among the learner. Positive attitude towards science is essential for each individual to live a harmonious life in the nature. The attitude developed by the student, therefore, is beneficial for both the individual and to the existence of nature. Science is a process as well as a product. The understanding of this process is possibly only when the individual will get thorough knowledge about the skills involved in each process. Simple science experimentation does not train the learner in scientific method or develop scientific attitude but efforts are needed to facilitate acquisition of scientific method and scientific attitude. The problem solving method give an opportunity to solve the problems raised or faced by the teacher while teaching or learning process.

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