Research Paper   **Education**

Role of Problem Solving Ability on Enhancing Students' Achievement

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ABSTRACT

How can a teacher help the students in problem solving? This is an important question which faces every class room teacher. No universal law can be formulated for solving each and every type of problem solving in an individualized process which requires various strategies to tackle. The classroom teacher can develop a scientific approach to solve problem which the students are expected to face in social life. Tentative suggestions are being given for teachers which can prove useful in developing right attitude to approach a problem. Problem solving is the highest level of learning in the hierarchy proposed by Gagne which depends on the mastery of next lower type of learning. It involves the application of principles and facts to explain and solve new phenomena or predict consequences from known conditions. The tank of problem solving requires prediction, analysis of facts and principles to develop cause effect relationship in physical phenomena of the environment. Generally, our daily life activities are followed in routine and we do not face any problem to perform our routine duties. But it is not always so, sometimes we are confronted with a problem situation where we have to think and find out solution to reach the goal. Problem situation occurs when there is an obstacle to reach the goal.

KEYWORDS | Problem Solving, Students' Achievement, Approach

INTRODUCTION

Great changes have taken place in the country and the education system must also be in keeping with them. The entire basis or education must be revolutionized. These words of India's late Prime Minister Pundit Jawaharlal Nehru, although uttered as back as in 1948, still hold true of the spirit of the time. Luckily, the educational experts of the country designed a replacement for the system of education which India inherited with the attainment of Independence. It was suggested as the major change in the structural organization of education in the country.

For the first stage, the education commission strongly recommended an undifferentiated course of general education for all without any diversification of studies, to promote harmonious development of the students. The commission was of the view that by the end of first 10 years of schooling the special interest, abilities of the student would have been generally discovered. It therefore, recommended a diversified education coupled with vocational education for the subsequent classes.

PROBLEM SOLVING AND ROLE OF THE TEACHER

How can a teacher help the students in problem solving? This is an important question which faces every class room teacher. No universal law can be formulated for solving each and every type of problem solving in an individualized process which requires various strategies to tackle. The classroom teacher can develop a scientific approach to solve problem which the students are expected to face in social life. Tentative suggestions are being given for teachers which can prove useful in developing right attitude to approach a problem.

Moderate Motivation

It has been pointed out by experimental studies that extreme motivation or excessive emotional involvement in a problem hinders productive thinking. The teacher should create moderate motivation in his students. If he finds that students show high motivation, he should drop the problem and return to it. When he finds students in calmer state but on the other hand motivation should be sufficient to sustain the interest of class. The teacher can create motivation by utilizing various techniques.

Encourage divergent thinking:

The teacher should not emphasize confirmatory behaviour in his/her students. He/she should encourage divergent thinking in his/her students. Students should be encouraged to tackle problems in a variety of ways. He/she should allow flexibility and original approach to problems. Reasoning should be developed through guided discussions in the class.

a. Problem should be presented as a whole

The teacher should present problems in the class as a whole so that students may have the perception of the total situation for the solution.

b. Level of difficulty

The teacher should see that the problems are not too difficult for the class. He/she should keep in mind the maturation level and the level of developmental task to create motivation in the students. The problem should neither be too difficult nor too easy. The problem should create moderate level of anxiety among the students.

c. Active manipulation

The teacher should present a problem in a planned way. He should get the active involvement of the class in the process of solving a problem. Use of diagrams, figures, and manipulation of concrete material should be made to conceptualize the abstract problems. The teacher can shift the functional properties of objects by verbalizing. The characteristic feature of verbalizing is providing words, objects, plan or act and then evaluate environment in the terms.

d. Practice

Teacher should give practice on problem of great variety to develop proper mental set in his/her students to solve similar types of problem in future.

It has been proved that incomplete tasks are retained more than complete. The implication of this is that teacher should never provide solution to all problems. Some unanswered questions should be left for the students for solution. The teacher can develop the spirit of formulating tentative conclusions of the problem. He/she should make an effort to develop scientific attitude of students.

APPROACH TO PROBLEM SOLVING

Traditionally two different approaches have been mentioned by psychologists adhering to two families of learning theories.

Cognitive field theory   b. Stimulus – response theory

a.Cognitive Field Theory

Emphasizes the importance of perception of total situation and relationship among its components and restructuring the cognitive field. Kohler conducted his classical experiments on sultan to study the process of problem solving in animals from his study on problem solving, proposed that solution of a problem is arrived at, all of a sudden after some initial efforts by the individual. Many studies have been conducted on children and adults which confirm that solution of a problem is reached, all of a sudden through insight into the situation.

b. Stimulus – Response Theory

The second point of view has been advanced by Stimulus Response theorists who emphasize the importance of trial and error. They hold that a problem is solved through gradual process of elimination of errors and putting together correct responses. There has been considerable controversy as regards the superiority of one approach over the other as an interpretation of problem solving. Some psychologists are of the opinion that cognitive field theorists approach is most effective for problem solving which required higher mental processes and stimulus response approach is effective for solving simple problem.

PHASES OF PROBLEM SOLVING

Psychologists and educationists who worked on problem solving have distinguished several phases in the process of problem solving. It is not necessary to pass through all the phases in every problem.

EXPLANATION OF PHASES:

1. Confrontation by a problem: The process of problem solution is initiated by the felt-need or problem in the environment which calls for a solution. The confrontation of problem may be due to two reasons – one is that some else has created a problem for the individual or individual himself has experienced a problem situation.
2. Search for the solution: When the individual feels motivated to solve a problem in definite terms, he/she   formulates certain hypotheses that guide him/her to reach the goal. He/she collects relevant information from different sources that have bearing on the problem. Appropriate tools are gathered, books and magazines are collected. After collecting information from various sources, the individual analyses the data and attempts to find out the solution of the problem.
3. Solution of the Problem: Finally, endeavor is crowned with success, that is the obstacle is removed or satisfaction is attained. Sometimes it has been with advancement in socio-economic and technological fields the life of the individual is becoming more complex fraught with a number of problems which the individual and the society have to face in near future. The responsibility of school becomes increasingly important to develop scientific altitudes in students so that they may solve their problems independently for better adjustment in the future complex society.

Problem solving is the highest level of learning in the hierarchy proposed by Gagne which depends on the mastery of next lower type of learning. It involves the application of principles and facts to explain and solve new phenomena or predict consequences from known conditions. The tank of problem solving requires prediction, analysis of facts and principles to develop cause effect relationship in physical phenomena of the environment. Generally, our daily life activities are followed in routine and we do not face any problem to perform our routine duties. But it is not always so, sometimes we are confronted with a problem situation where we have to think and find out solution to reach the goal. Problem situation occurs when there is an obstacle to reach the goal.

SCIENTIFIC METHOD OF PROBLEM SOLVING

There are various methods of solving problems which are adopted by an individual depending upon the level of difficulty of his problem as well as his own ability and experience to deal with it. Usually simple problems are solved through the fixed pattern of our behavior that may be instinctive or habitual for the difficult problem trial and error or insightful approach is adopted. There is one more method which is exclusively employed by the human beings in solving their problems. It is known as scientific method of problem solving. It follows the following important steps.

Awareness of problem of realization of the felt difficulty:

It is the realization of his difficulty that makes the child conscious of a problem. Therefore children should get specific training for problem consciousness.

Understanding the problem

For thorough understanding, the problem should be carefully analysed, status defined in clear words as to what it means and what it requires for its solution should be known clearly.

Collecting relevant information data:

Now the information related to the problem is collected through all possible sources and the individual concerned is required to widen the span of his/her knowledge relevant to the problem.

Formulation of hypotheses or possible solutions:

One tries to think of the various possibilities for the solutions of ones problem in the light of the collected information and his own experiences.

The intelligence and his other cognitive abilities also help in the formation of appropriate hypotheses.

Evaluation of the hypotheses or possible solutions:

All the tentative solutions should be closely analyzed and evaluated. Gates and others have suggested the following three steps in the evaluation of hypotheses.

1. One should determine the conclusion that completely satisfies the demands of the problem.
2. One should find out whether the solution is consistent with other facts and principles which have been well established.
3. One should make a deliberate search for negative instances which might throw doubt upon the conclusions.

In the light of these three steps we should try to reach definite conclusions by rejecting or accepting hypotheses.

Application of the accepted conclusion

The validity of the derived conclusions is tested by employing them in the solution of the various likewise problems. If they are found suitable in solving these problems, They are accepted as correct solution or conclusions.

To do away with the controversy of cognitive and stimulus response theorists approach, Harlow (1959) proposed a third explanation. His approach is more realistic and Rational in nature. He conducted a series of experiments on monkeys and human Subjects of low mental abilities. He presented the human subjects with simple problems of discrimination. He observed that in the beginning his subjects showed trial and error behavior to solve a series of problems. But he noticed that when similar problems were presented to the subjects in future for the first time they made correct discrimination. The later stage appears to be insightful bearing, that is suddenly getting the problem solved. According to Harlow, the underlying assumption is that in previous trial and error learning, the subjects have learned 'How to learn. They acquired what he called a learned set. They acquired a method of learning that transferred positively to other problem situation of similar type.

Generalizing broadly to human behaviors, we hold that original learning within an area is difficult and frustrating, but after

mastery, learning within the same becomes simple and effortless. Experienced that final solution occurs in a flash of inspiration, yet the foregoing trials, though not immediately successful must have paved the way for it.

Verification

The routine checking of hypothesis is search for the solution. In many cases, however the need arises for final testing of the solution, or for the elaboration of detail, as for instances, in the case of designs for new machinery, the final testing may sometimes lead to the introduction of certain changes in the original device. The process of problem solving in each case depends upon the type of the problem, the circumstances of the research for the solution and on the individuals personality.

CONCLUSION

Academic is the outcome of education — the extent to which a student, teacher or institution has achieved their educational goals. Academic achievement is commonly measured by examinations or continuous assessment but there is no general agreement on how it is best tested or which aspects are most mental curiosity (as measured by typical intellectual engagement) has an important influence on academic achievement in addition to intelligence and conscientiousness.

Children's semi-structured home learning environment transitions into a more structured learning environment when children start first grade. Early academic achievement enhances later academic achievement.

Parent's academic socialization is a term describing the way parents influence students' academic achievement by shaping students' skills, behaviors and attitudes towards school. Parent influence students through the environment and discourse parents have with their children. Academic socialization can be influenced by parents' socio-economic status. Highly educated parents tend to have more stimulating learning environments.

Children's first few years of life are crucial to the development of language and social skills. School preparedness in these areas help students adjust to academic expectancies.

Another very important enhancer of academic achievement is the presence of physical activity. Studies have shown that physical activity can increase neural activity in the brain. Exercise specifically increases executive brain functions such as attention span and working memory

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