ORIGINAL RESEARCH PAPER

Education

KEY WORDS: Factors, Learning, Problem solving, Strategy, Structure.

PROBLEM SOLVING: A WAY OF LEARNING

Pratisha Padmasri Deka*

Assistant Professor, Pandu College, Guwahati, Assam. *Corresponding Author

ABSTRACT

Problem solving is thinking directed towards the solving of a specific problem that involves both the formation of responses and the selection among possible responses. As suggested by Polya it includes, understanding the problem, determining a plan of action, carry out plan of action, making out a decision to stop working on the problem and doing a careful analysis of the steps. This way, problem solving leads to increased knowledge and skills. It helps to build up reflective intelligence. When the current strategies fail to yield a solution, the shift yields new strategy for solving a problem. The development of strategies to solve problems accordingly reflects a series of small insights in which constraints are changed as a result of strategic shifts which depends on multiple factors of problem solving.

INTRODUCTION:

How individuals solve problems is very much linked with "shaping" of ideas, behaviour, outlook etc. In other words re-shaping the problems itself to find out solution. For problems that do not have a unique solution and for which individuals cannot develop a simple strategy guaranteeing an error-free solution is influenced by a range of factors. To solve them effectively individuals explore diversified way to develop strategies- finding possible solutions.

Problem solving is present in every corner of human activity and is a common term used in widely disparate fields such as the sciences, law, education, business and problem solving is considered useful as it helps in professional and personal life. Human beings are curious in nature, for survive, they have to seek stimulation and resolve conflict through a lifetime of creative, intelligent problem solving process.

A problem is a situation which is experienced by an agent as different from the situation which the agent ideally would like to be in. A problem is solved by a sequence of actions that reduce the different between the initial situation and the goal. (F.Heylighen, 1998). There are many different ways to represent a problem. A problem can be represented mentally, orally, in writing, on a computer, and so on.

STRATEGIES FOR EFFECTIVE PROBLEM SOLVING:

A strategy can be thought of as a plan, a heuristic, a rule of thumb, a possible way to approach the solving of some type of problem. We encounter an untold number of problems in our daily lives that cause us to form response strategies, to select potential responses, and to test responses in solving a problem.

Every problem-solving domain has its own strategies. They are relatively few strategies that are powerful and applicable across all domains. For example- breaking a big problem into smaller problems is one of these general purpose strategies. Problem solving is a creative process, and we can distinguish three main sorts of strategies for solving problem effectively (Johnson- Laird, 1993).

- First, a ***neo-Darwinian algorithm*** consists of a stage in which ideas are generated and then they are evaluated. Generation and evaluation depends on the use of knowledge. Any ideas that survive can be recycled and repeated till getting a solution.

- Second, in a ***neo-Lamarckian algorithm***, all knowledge acquired from experience constrains the generation of ideas. If alternatives are created, then choice amongst them can be made. When individuals have the requisite knowledge, the algorithm is highly efficient, because there is no need for repetition.

- Third, in a ***multi-stage algorithm***, some knowledge is used to constrain the creation of ideas and some knowledge is used to evaluate the results – with the option of repetition. In sum, according to this account, constraints govern the evaluation of ideas, or their generation, or both.

One can solve a problem by bringing change in environment, for example in a puzzle game, removing a new piece, replacing a piece removed earlier, or moving a piece from one position in the shape to fill the position of a piece that had been removed.

FACTORS AFFECTING PROBLEM SOLVING:

Each type of problem emerges from internal and external causes and is influenced by some of the factors. Sometimes one factor may be more powerful than the other. Factors influencing problem solving are-

- *Knowledge-*

Knowledge of the full variety of tactical steps in solving a problem influences problem solving ways and pace. If the person knows and understands how to solve the problem he can solve it properly and in less time compared to the person who has not knowledge of the same. Optimal use of problem solving methods depends on knowledge of the full variety of steps for solution. Conversely, a limited knowledge of these steps yields limited strategies for coping with the problems.

- ***Experience-***

If a person has experience of solving a problem in past it is obvious that in present situation he will be able to solve same kind of problem effectively. For example students during examination can solve mathematical problems exercised earlier. Similarly, if not experienced before, problem solving becomes difficult.

- ***Previous Learning-***

Previous learning influences learning of new ways of solving a problem. If a student is taught how to scenery, in different situation he will use his learning to draw another scenery. Thus, drawing scenery will be easy for him. Without previous learning or training doing things or finding strategies to solve a problem gets adversely affected.

- ***Problem difficulty-***

Existing factors in the problems can also constrain problem solving. All problems are not of same difficulty. Doing a simple sum is an easy task for a class nine student while the same sum will be difficult to solve for a primary school student. It is because problem difficulty if is equal to ability then problem solving becomes easy and vice versa.

- ***Structure of problem-***

Although well-structured problems may have a clear path to solution, the route to solution may still be difficult to follow. When solving ill-structured problems, the choice of an appropriate problem representation powerfully influences the ease of reaching an accurate solution. Additionally in solving ill-structured problems, people may need to use more than a heuristic strategy; insight may be required.

- ***Transfer of learning-***

Learning is not a limited affair. Learning of one situation can be applied in other similar situation. This phenomenon is known as transfer of learning. In case of solving a problem, if we apply right learning in right place then only attainment of solution becomes easy. Inability of transferring learning hampers problem solving.

- ***Intelligence of problem solver-***

Intelligence is the aggregate general potentiality of an individual to think and act rationally. A genius will solve a problem more precisely in less time than an average student. In personal life situations also people with high intelligence tend to find out solution of problem situations easily than that of people whose intelligence level is not so high.

- ***Other Mental dispositions-***

Research studies have proved that mental dispositions like attention, interest, logical understanding influences problem solving behaviour. It is observed that individuals who pay more attention to skills and strategies in solving a problem learn the skills better. Logical reasoning and understanding influences how we organize mental schemas and interest helps in deciding preference of action.

- ***Motivation-***

Motivation is the cause for which we wish to solve a problem. Until and unless we feel motivated trials for finding a solution will continue. In absence of motivation problem solving may not be possible. Students study to score good in examinations, people seeks employment to earn livelihood, without these motivating factors no actions will be initiated.

l *Creativity-*

Problem solving calls for creativity. It calls for the generation of ideas that are novel (at least for the individual). Creative people can look into issues from diverse point of view.

- ***Goal Focus-***

Their personal goals for the experience influence the problem solving. When people in a group try to solve a problem and goals are shared, possibility is there that some of the people will not co-operate in solving the problem. But, when even in a group situation personal goal is associated people will contribute their best.

- ***Memory-***

We engage in problem solving when we need to overcome obstacle in order to answer a question or to achieve a goal. If we can quickly retrieve an answer from memory, we can solve a problem. If we cannot retrieve an immediate answer, then finding solution becomes difficult.

- ***Social factors-***

Social factors like leadership factors, egocentrism, and social collaboration plays important role in solving problems in group situation. Skilled leaders are efficient in attaining solution of a problem, while people with high ego try to solve problems themselves to impress group members. Similarly, when co-operation and collaboration is there among group members the process becomes easy.

- ***Cognitive factors-***

All factors related with mental development can be included in cognitive factors. Along with intelligence, attention etc., it will also cover, cognitive sense-making perspective, communication ability and ability of decision making.

- ***Ineffective communication-***

While solving problem in a group consisting of misunderstandings, talking past each other and incoherent speech can also hinder the group's ability to interact in a productive way. Productive interactions will not occur when each individual works on his or her own work without sharing or discussing ideas with the others. Several researchers (Cohen, 1994; Goos, 2000; Goos et al., 2002; Lumpe, 1995) have observed interaction characterized by elaborated exchange of ideas, cognitive disagreement, and effective communication is necessary for conceptual learning to occur.

- ***Status Factors-***

One of the benefits of small-group learning is the opportunity for the strengths of individuals to support the weaknesses of others. Good, McCaslin and Reys (1992a) claim subject-matter knowledge is increased when students work together because a student working alone may not know how to approach a problem but when students work together they can pool their understanding, content knowledge, and problem-solving skills to increase the likelihood of obtaining a solution.

- ***Accountability-***

Smith and Waller (1997) noted how important it is for the members of a group to be committed to a common goal and to hold each other personally and individually accountable to the effort in group situation problem solving process.

CONCLUSION:

Behaviorist psychologists suggest that problems can be solved by trial and error and reproducing past responses. In trial and error first we make random movements to solve a problem consequently error rate decreases and we attain a solution. Cognitive psychologists believe that problem-solving strategy involves a series of mental processes and is not random. Problem solving strategy involves mentally working to overcome obstacle that stand in the way of reaching a goal. Another strategy is shaping of problem. Here, individuals use to shape problems depending on their experience. Naďve individuals are likely to tackle their initial problems using a strategy constrained solely by the statement of the problem, the problem shape itself, and their existing perceptual and cognitive processes. As they try out the various possible tactical steps, they learn their consequences and learning occurs whether or not a tactical step turns out to be useful in solving a problem.

REFERENCES:

1) Bower (Ed.), The psychology of learning and motivation (pp. 59–87). New York, NY: Academic Press.
2) Greeno, J. G., & Simon, H. A. (1988). Problem solving and reasoning. In R. C. Atkinson, R. J. Herrnstein, G. Lindzey, & R. D. Luce (Eds.),
3) Greiff, S. (2012). Individualdiagnostik der Problemlösefähigkeit [Diagnostics of problem solving ability on an individual level]. Münster, Germany: Waxmann.
4) Greiff, S., Wüstenberg, S., & Funke, J. (2012). Dynamic problem solving: A new measurement perspective. Applied Psychological Measurement, 36(3), 189–213. doi:10.1177/0146621612439620
5) Stevens' handbook of experimental psychology (2nd ed., Vol. 2, pp. 589–672). Hillsdale, NJ: Erlbaum.