M.A PSYCHOLOGY SEMESTER-2
COGNITIVE PSYCHOLOGY (CC5)
TOPIC: PROBLEM SOLVING

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PROBLEM SOLVING

- **Problem solving:** People face problems every day. Sometimes these problems are straightforward. Sometimes, however, the problems are more complex. Problem solving refers to active efforts to discover what must be done to achieve a goal that is not readily attainable. It the main functions of directed thinking.

- **Types of Problems:** According to **Jim Greeno (1978)**, there are three types of problems-

1. **Problems of inducing structure** require people to discover the relations among numbers, words, symbols, or ideas. The series completion problems and the analogy problems are examples of problems of inducing structure.

2. **Problems of arrangement** require people to arrange the parts of a problem in a way that satisfies some criterion. The parts can usually be arranged in many ways, but only one or a few of the arrangements form a solution.

3. **Problems of transformation** require people to carry out a sequence of transformations in order to reach a specific goal.

- **Garnham (1988)** said about two problems-

1. **Adversary problems-** Adversary problems involve two or more people pitting their wits against each other, as in chess. Game-playing is a special kind of Problem Solving, in which the problem is to find a winning strategy or the best current move.

2. **Non-adversary problems-** Most problems fall into the non-adversary category, in which another person is only involved as the problem setter.

- **Aspects of A problem:** There are three aspects of a problem-

1. **Original State-** It is the initial stage where a person faces a problem.

2. **Goal State-** It is the stage where the person wants to reach but it is tough to reach there.

3. **Rules-** Rules are those strategies or procedures through which a person can reach from original stage to goal stage.

○ **Stages of effective Problem Solving:** There are four stages of effective problem solving-

1.   **Representational process-** In the first stage, a person identifies a problem and tries to understand it.

2.   **Potential Solutions-** In the second stage, the best probable solutions of a problem are prepared.

3.   **Evaluation-** The third stage evaluates all the probable solutions of a problem.

4.   **Implementation-** In the fourth stage, the solution of the problem is implemented.

o **Strategies in Problem Solving:** A problem-solving strategy is a plan of action used to find a solution. Some strategies are as follows-

1. Trial and Error- Trial and error involves trying possible solutions and discarding those that are in error until one works. Example, Restarting phone, turning off Wi-Fi, turning off blue-tooth in order to determine the mobile phone's malfunctioning.

2. Algorithms- An algorithm is a fixed set of procedures that, will lead to a solution. It is a methodical, step-by-step procedure for trying all possible alternatives in searching for a solution to a problem. Mathematical and scientific formulas are algorithms. Algorithms are used frequently in our everyday lives. Example, Instruction manual for installing new software on our mobile phones.

Algorithms can be effective when there are relatively few possible solutions to be tried out. However, algorithms do not exist for many problems, and they can become impractical when the problem space is large.

3. Heuristics- A heuristic is a guiding principle or "rule of thumb" used in solving problems or making decisions. While an algorithm must be followed exactly to produce a correct result, a **heuristic** is a general problem-solving framework. In other words, Heuristics are mental shortcuts that are used to solve problems. While not guaranteeing a solution to a problem, heuristics can result in solutions being reached more quickly. These procedures are based on intuition, past experience, and any other relevant information. Helpful heuristics in problem solving include forming sub-goals, working backward, searching for analogies, and changing the representation of a problem.

Different types of heuristics are used in different types of situations, but the impulse to use a heuristic occurs when one of five conditions is met (Pratkanis, 1989):

- • When one is faced with too much information
- • When the time to make a decision is limited
- • When the decision to be made is unimportant
- • When there is access to very little information to use in making the decision
- • When an appropriate heuristic happens to come to mind in the same moment

- **Heuristics Approaches:**

(a) Availability Heuristic- We usually tend to depend on information that is more prominent or easily recalled and overlook information that is available but less prominent. Example, a person sees someone winning money in Kaun Banega Crorepati and thinks he can also be a millionaire.

(b) Representative Heuristic: We tend to assume that if an item is similar to members of a particular category, it is probably a member of that category, too.

(c) Anchoring Heuristic: We make decisions based on certain ideas, or standards that are important to us. Example, a person wakes up early in the morning and believes that people who wake up late are lazy persons.

(d) Means End Analysis- A means-end analysis is characterized by identifying a goal and then finding a way in which the goal can be obtained.

(e) Working Backwards- Working backwards is a useful heuristic in which solving the problem begin by focusing on the end result.

(f) Searching for Analogies- If a person can spot an analogy between two problems, he may be able to use the solution to a previous problem to solve a current one. Using this strategy depends on recognizing the similarity between two problems, which is a tough process. People have difficulty recognizing analogies between different problems because they often focus on superficial, surface features of problems rather than their underlying structure.

(g) Breaking a task into steps- Another useful heuristic is the practice of accomplishing a large goal or task by breaking it into a series of smaller steps. School students use this method in writing essay.

(h) Changing the Representation of the Problem- Many problems can be represented in a variety of ways, such as verbally, mathematically, or spatially. Problems can be represented with a list, a table, an equation, a graph, a matrix of facts or numbers, a hierarchical tree diagram, or a sequential flowchart. Then it will be easy to solve the problem.

(i) Forming Sub-goals- It is a useful strategy for solving problems. It includes intermediate steps toward a solution. Dividing the problem into sub-goals facilitates a solution.

(j) Flexibility- A good problem solver is able to recognize that a particular strategy is unlikely to yield a solution and knows to switch to a different approach. Sometimes, the reality is that a problem may not have a single best solution.

(k) Insight- An insight can involve the sudden realization that an object can be used in a novel way. Insights rarely occur through the conscious manipulation of concepts or information.

(l) Intuition- Intuition means coming to a conclusion or making a judgment without conscious awareness of the thought processes involved. One influential model of intuition is the two-stage model. In the first stage, called the **guiding stage,** a person perceives a pattern in the information he is considering, but not consciously. The perception of such patterns is based on his expertise in a given area and his memories of related information. In the second stage, the **integrative stage**, a representation of the pattern becomes conscious, usually in the form of a hypothesis. At this point, conscious analytic thought processes take over. An intuitive hypothesis is a new idea that integrates new information with existing knowledge stored in long-term memory.