

A TIME TO THINK

8.1 Introduction

We often recall what we used to do during our childhood- like playing, meeting friends, going to some fair with our friends or parents. What happens when we recall the past ? We recall about the activity done by us, about our friend and in the same process we recall the face of the person. What have we been doing ? We have been thinking . Thinking on the part of various philosophers and scientists have given the world various discoveries and inventions. In this chapter we are going to study more about thinking and problem solving. So let's start with the chapter.

8.2 Objectives

After reading this chapter you should be able to :

- define what is thinking;
 - describe the role of language and symbols in thinking;
 - know that is reasoning;
 - know the significance of Decision making;
 - find out the process of problem solving and various stages of problem solving;
 - know what is concept and concept formation and role of concept as building blocks of thinking.
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8.3 Thinking

Thinking is a very important activity and to a large extent differentiates us from animals. Thinking is an essential and continuous activity of the mind and is involved in almost all of your activities and behaviour.

The process of thinking involves various other processes like attention, perception, recognition remembering, imagination and sensory images. For example when you think about your friend you think about the days spent- you are giving focussed attention to your relationship, you think about the face and characteristics of the person as a picture in your mind which is a sensory image, when you recall the past days spent you are imagining. In other words you have been using information that was stored and have been mentally acting on it by forming deas, expressing your thoughts and drawing conclusions.

Thinking can be defined as a cognitive process for understanding, knowing or mentally processing information ultimately leading to a conclusion.

In our daily life thinking is applied as the set of cognitive responses or information processing that mediates between the period when the event occurs and the response towards that stimulus.

For example you encounter a coiled piece of rope on a road at night, the object was attended to and perceived by you, this is processed by your mind as a likely dangerous object (snake) and then you react by shrieking in fear and running away from the object. Thinking here has served the purpose of a life saving device. It may be only later in daylight that you found the object to be a harmless piece of rope.

Thinking is a cognitive process of mental information processing, helping you to know, understand and deal the world around you more effectively.

Intext Question 8.1

State whether the following statements are true or false

- (i) Thinking is a cognitive process.
- (ii) Thinking is not at all an important process.
- (iii) Thinking process involves other processes.
- (iv) Associations and connection are not important for the thinking process.

8.4 Basic Units of Thinking

It is essential for you to know as to what are the contents of thinking process? Have you ever thought about what your thoughts are made

up of? Thinking consists of images of sensory and perceptual experience with object or picturization of objects and persons in mind; images of muscular response experience, concepts about meaning and categories of objects, language and symbols, signs, and connections or associations through similarity, contrast, and proximity. Associations and connections are responsible for the continuity of thinking process as they bring about closeness in images, concepts and ideas and give a flow to your thinking. All these basic units of thinking are ways of mentally representing information from the environment.

8.5 What is concepts ?

A concept is understood to be a generalized idea representing a class of objects or events that are related to one another in some way. This relatedness can be based on similarity of attributes and characteristics or common features. The commonness of relevant features then becomes a rule for classifying objects, persons or events under a specific class-category. Once you have classified objects then another rule is that you will, most likely, behave in the same manner for similar object in a class-category, eg. toward human-category in another manner or child-category in same manner and adult-category in different manner. Thus a concept also refers to making the same response to a group of objects having similar characteristics. When a child is able to select her blue clothes from other coloured clothers, you can say she has learnt the concept of 'blue' colour. Concepts help you to organize and classify object and your experience. Thus by organizing the enormous amount of information from the world you are able to manage your behaviour and the world in a more effective manner.

8.6 Concept Formation

Concept are learnt by you in your developmental process while interacting with and experience with objects, events and persons. So much so that you learn more and more about your evenself and your own characteristics along with your life experiences eg. whether you assess your-self as a friendly person or shy person, as a bright person or a dull person, as a fast learner or a slow learner as compared to most of the persons around you. This is called your 'self-concept'. While you are noticing similarities of features among objects you are using a psychological process called generalization and when you are classifying objects on the basis of differences you are using the discrimination process. Concepts can be classified into two types

- simple

- complex

simple concepts are defined by a single characteristic or feature eg. by only colour as red, green or only size as big, small etc.

complex concepts are those that are defined by many common feature e.g. a yellow square or a red triangle.

Intext Questions 8.2

(i) What is concept ?

(ii) What are the two classification of concepts ?

8.6 Role of Language and symbols in thinking

Often people have wondered if language is essential for thinking ? Is thinking possible without language ? Can our language control the thoughts that we have ? One psychologist Watson went to the extent of calling thinking as only 'inner speech'. But people can use sign language and understand each others 'thoughts without knowing each others' language like deaf people can think and communicate in sign language, illiterate people cannot have visual imagery of written words. Language is only auditory and sensory experience for them yet they can think. One can say that language can be an essential tool of thinking but it cannot be said that thinking is not possible without language.

8.7 What is reasoning?

Reasoning means putting all the known facts in a logical order and then drawing out inferences or conclusions from them. It can also be said that, when logical principles are applied to thinking, then reasoning occurs. Thus thinking involves reasoning and reasoning can make thinking even better than before. Reasoning plays a basic role in assisting in the process of decision making, problem solving as well as creative thinking. In day to day you will find that before solving any problem, you try to put all relevant information and facts in a logical order, apply reasoning principles and then deduce a reasonable conclusion. This process is called as 'deductive reasoning'. whenever you are dealing with such thoughts as, 'If thinking happen that way, then what should I do ?' or 'If I do this, then what would happen?' Then you are using deductive reasoning.

8.8 Decision making and significance

Ram has bought a scooter recently. He is working as a marketing executive for which he has to travel long distance if I ask him why did he decide to buy a scooter and not a cycle . He may answer that as he has to travel long distance so he has decided to buy a scooter to reduce his tiredness. He made a decision to solve his problem.

Decision making is a kind of problem solving in which you are faced with several alternatives and you have to choose one of the alternatives

after weighing out the pros and cons of choosing each one of the alternatives. For example, why did you choose to study psychology from among many other disciplines available for study? By taking their decisions most people are trying to minimize their maximum possible loss or maximize their expected gains.

This perceived benefit is the psychological value of a decision. In many cases you cannot be sure of the outcome of a decision in real life situations, so we try to use our guess work this is called 'subjective probability'. The subjective probabilities are also called heuristics or biases in decision making. According to psychologists heuristics influencing judgements can be of representativeness, availability, adjustment and anchoring. Representativeness means similarity between current situation and some past event encountered earlier and you tend to behave in same manner. Availability heuristic means those events which are more frequent and easy to remember, they are more likely to influence your judgement in same direction again in the current situation, and thus lead to misjudgement. Adjustment heuristic means you may make an estimate of your own and then on the basis of circumstances you raise your judgement e.g. bargaining with your own self. Consumer psychology is influenced a lot by this heuristic. Anchoring heuristic is like a personal bias based on your thinking habits or working habits, for example some persons may always begin with much lower estimates to start with than others who may begin with much higher estimates to start with. The decisions of both such persons will be influenced by this initial bias as the anchoring effect to final decision. For every decision a lot of weighing of alternatives is required before hand.

Intext Questions 8.3

(i) What is Reasoning?

(ii) Is decision making a kind of problem solving ?

(iii) What is adjustment heuristic ?

8.9 Problem Solving :

Problem solving includes thinking, reasoning and decision making. Thus, problem solving is an important cognitive activity. A problem signifies a situation in front of you where you wish to proceed ahead from given situation to a goal achievement situation but you do not immediately know the means or the way to reach the goal problem solving is a process of moving from the given state of situation to reach the goal state of problem or solution to the problem. But remember no solution can be reached without certain rules of may be addition, deduction or inter connection of some parts of situation. So a problem has three aspects-

- (i) original state of situation
- (ii) nature of goal state
- (iii) and rules of reaching solution or procedure followed.

Simple problems which you are able to solve are based on recalling similar past experiences and solutions but complex problems are more difficult to solve as they pose a challenge which you may not have earlier and solution may not be readily available in memory. In such cases you have to evolve new techniques or strategies based on your own knowledge and abilities.

8.10 Strategies for problem solving

- (i) Heuristics- These are short cuts rules that help you to reach quick solutions based on your past experiences with similar problems. Heuristics are simple strategies. For example an anagram problem meaning of scrambled words like GITRE (TIGER) or BLALE (LABEL). you do not try out all combinations of letters but look for the familiar meaning. This is heuristic strategy.
- (ii) Algorithms - These are rules of procedure based on mathematical or scientific formulae. These are sure solutions but in a very long manner. Also all problems can not be solved in algorithmic way.
- (iii) Means-End Analysis- In this approach the main problem is divided into many subproblems or main goal is divided into many reachable sub-goal. Thus the problem is solved bit by bit. Many day today problems can be solved with this strategy.
- (iv) Backward Search- For certain problems, it may be necessary to begin from the end product or solution and then move backwards to see as to what factors have contributed to the solution for example identifying the goal and breaking into smaller sub-goals then achieving the sub-goals first can be backward search.

Another example can be the study of personality development. A student may take the example of a well developed famous personality (goal) and then try to study the factors contributing to personality development based on the life histories of famous personalities.

Whatever may be the strategy adopted by the person, certain stages of problem solving still have to be worked out in order to reach a solution to problem. These steps are-

- (a) Understanding the problem
- (b) Devising a plan
- (c) Carrying out the plan
- (d) Re-evaluation or looking back.

8.11 Factors Affecting Problem Solving

Many factors affect problem solving-some of these factors are

(i) Mental Set- mental set means an individual's specific way of looking at or perceiving the problem situation as eg. easy or difficult, simple or complex, interesting or boring.

(ii) Rigidity rigidity means despite facing a new problem a person may try the same plan of problem solving which may have worked in previous situation successfully without realizing that it may not work now.

(iii) Functional Fixedness

Based on past experiences sometimes a person can use objects in situations only for a specific function and not substitute function, this process can block out thinking and make solution difficult.

(iv) Well defined and ill defined problems

Well defined problems are the ones where the process and goal is clear like the problems for your experiments in class. But choosing a career is ill defined problem because neither the goal is very clear nor the process to reach the goal.

(v) Anxiety Higher anxiety level can demotivate a person and have negative affect on problem solving. Research, studies have shown that only moderate level of anxiety can facilitate the process of problem solving.

(vi) Incubation Incubation means temporary rest or withdrawal from problem situation after initial encounter and then finding solution. But it may not always be successful.

(vii) Brainstorming Brainstorming is a process in which a group of persons try to look at every aspect of a situation and then try to suggest alternatives as solutions no matter if they seem to be absurd or non workable initially. This process may help the group to reach some solution in due course of time but the solution may not always be of a good quality or novel or creative solution.

Creative Thinking

Creative thinking involves creativity, insight and the process that helps in finding novel, unique, appropriate, and original solutions. You can well understand that creative thinking is the process which helped in various discoveries, inventions and scientific and technological advancements. Creative thinking develops through specific stages

These stages in Creative Thinking are

1. Preparation
2. Incubation
3. Illumination
4. Evaluation
5. Revision

What you have learnt

- * Thinking is a cognitive process essential for all one mental activity and behaviour.
- * Concepts are basic units and contents of thinking. Concepts are mental representations of class of objects.
- * Language and symbols are helpful to thinking process but not absolutely essential, because deaf persons can think and illiterates also can carry out thinking.
- * Reasoning means logical thinking.
- * Decisions making helps you in choosing one out of many alternatives in order to minimize loss and maximize possible gains in life situation.
- * Problem solving is an important cognitive process which includes many other cognitive processes like thinking, reasoning and decision making in order to reach a meaningful solution to any problem in life situations.
- * Problem solving includes many stages as steps to solve a problem. These stages are- (a) Under standing the problem, (b) devising a plan, (c) carrying out the plan and (d) Re-evaluation or looking back.

For your understanding, here is an example of a "Behavioural Activity" in which you are likely to utilize most of the cognitive processes that you have learnt about.

An Activity

Suppose on a particular day you had been studying for two hours at a stretch and then decided to take a break for resting. The problem for you, then, would be to decide as to how you must spend your leisure time meaningfully. Now your thinking process gets started you think of three possibilities for relaxation. One is _____ you watch Television, second is _____ you go for a walk outside, third is _____ you go off to sleep. Then you decide to judge and 'good' (pro) and 'bad' (con) outcome of each possibility. This judging process can be called 'reasoning'. For watching television, you may reason out, the good aspect would be entertained and the bad part may be strain on the eyes. For going for a walk, the good part may be relaxation in fresh air but the bad part may be fatigue in the legs. You may finally take a decision to go off to sleep for a while, as sleeping will be refreshing, relaxing as well as no strain on eyes or legs will take place. Thus, you have chosen, one out of three alternatives and made your decision. Do you now realize that you have used 'problem solving' behaviour by including other cognitive processes alongwith, as thinking, reasoning and decision making? In this manner, in your day to day life, you keep using these cognitive processes of thinking, reasoning, decision making and problem solving, again and again.

Terminal Exercise

1. State some of the basic units of thinking briefly.
 2. What are concepts ? Explain types of concepts.
 3. State the importance of decision making in life situations.
 4. Explain some of the factors affecting problem solving behaviour.
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Key to Intext Questions

8.1

- (i) True
- (ii) False
- (iii) True
- (iv) False

8.2

- (i) Concept is a generalized idea representing a class of objects/ events that are related to one another in some way.
- (ii) The two classifications are
Simple concepts
Complex concepts

8.3

- (1) Reasoning means putting all the known facts in a logical order and then drawing out inferences or conclusions from them.
- (2) Yes, Decision making is a kind of problem solving.
- (3) Adjustment heuristic means an estimate of own self is made and then on the basis of circumstances the judgement is railed.

Hints to terminal Exercise

- 1. Refers to section 8.4
 - 2. Refers to section 8.5
 - 3. Refers to section 8.6
 - 4. Refers to section 8.11
under " Factors affecting problem solving"
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