

COGNITIVE ERGONOMICS

**DR. ANKUR GUPTA
IIT BHUBANESWAR**

SUMMARY OF PREVIOUS LECTURES

- 1. SRK model**
- 2. Common cognitive tasks**

PLANNING

Mental process of devising a detailed method for doing or making something

- So many human endeavors must be planned:
 - Vacations, careers, weddings, meetings, projects
- Related cognitive activities:
 - Scheduling, designing, scheming, plotting

COGNITIVE PROCESSES USED IN PLANNING

1. Scripts - planning based on previous plans and experience for similar activities, making adjustments to account for differences in the present situation
 - Example: professional wedding planners
2. Mental simulation - mental development of the steps and imagining what would happen if those steps were followed
 - Used when planning situation cannot be reduced to a script
 - Example: Planning next move in chess



PROBLEM SOLVING

PROBLEM SOLVING

Mental process in which a question or issue is considered and analyzed to determine an appropriate answer or solution

- Arriving at a solution may require:
 - Mathematical calculations
 - Brainstorming
 - Analysis and diagnosis
 - Evaluation of alternatives
 - Creative design work
 - Combinations of these cognitive activities

MORE ABOUT PROBLEM SOLVING

- Problems have a technical context - a field of expertise needed to solve the problem
 - Chemical engineering problems are different from accounting problems
- Problems possess a degree of difficulty:
 - Uniqueness of the problem
 - Number of steps required to solve the problem
 - Technical complexity, e.g., a product with 1000 parts is more complex than a product with 100 parts

APPROACHES IN PROBLEM SOLVING

- Skill-based problem solving - recalling from long-term memory a solution for an identical or similar problem
- Rule-based problem solving - following a step-by-step procedure (e.g., a mathematical algorithm) that leads to the solution
- Knowledge-based problem solving - the problem is unfamiliar, and the person must rely on his or her expertise and understanding of the technical context, combined with a general problem-solving approach

PROBLEMS IN PROBLEM SOLVING

- Cognitive tunneling - when a problem solver seeks out evidence to confirm a chosen hypothesis but overlooks or ignore clues that might disprove it
- One solution fixation - when a problem solver sticks to a chosen solution even though it is not succeeding
- Stuck in a loop - when a problem solver repeats a sequence of actions that do nothing but lead back to the starting point
- Inability to think ahead more than a few steps



**LECTURE
CLOSING**

A BRIEF HISTORY OF COGNITIVE PSYCHOLOGY & ERGONOMICS

REEMERGENCE OF COGNITIVE PSYCHOLOGY

David Rumelhart & James McClelland

- Rumelhart and McClelland are prime examples of modern cognitive psychologists. Their names are associated with Parallel Distributed Processing (PDP). This model stresses that information processing happens simultaneously (parallel) as opposed to serially (one at a time). Their theory suggests that many simple processing units are responsible for sending excitatory and inhibitory signals to other units. By understanding these basic features, they believe that the complex system can be explained. The idea that processing involves interconnected elements and the reference to neural models, makes up their Connectionist Theory.



THANK YOU



PLEASE READ FROM RECOMMENDED
REFERENCE BOOKS FOR A BETTER
UNDERSTANDING OF NEXT LECTURE