Course No. 405: DECISION SUPPORT SYSTEMS & MANAGEMENT INFORMATION SYSTEM

Discuss the major types of Information System:

a) Formal Information System b) Informal Information System c) Computer Based Information System

Formal Information System : It is based on organizational chart represented by the organization.

Informal Information System : it is an employee based system designedto meet personal and vocational needs and to help in the solution of workrelatedproblems. It also funnels information upward through indirectchannels. It works within the framework of the business and its stated policies.

Computer Based Information System (CBIS) :

- Transaction Processing System (TPS)
- Management Information System(MIS)
- Decision Support System (DSS)
- Office Automation System (OAS)

Management Information System (MIS): Elements, Objectives and Limitations

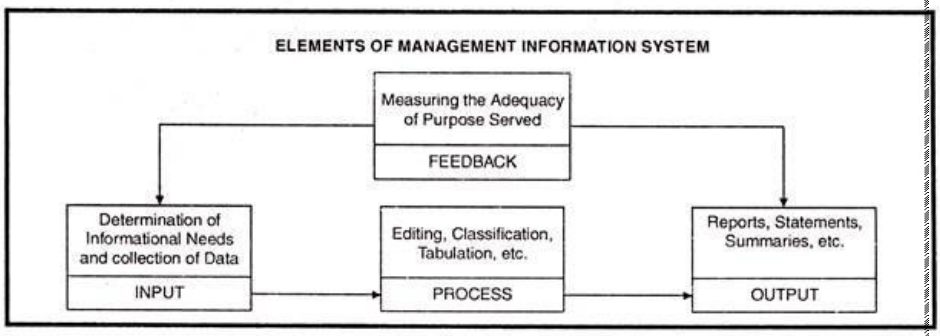
"Management information system is a system of people, equipment, procedures, documents and communications, that collects, validates, operates, transformers, stores, retrieves, and presents data for use in planning, budgeting, accounting, controlling and other management process".

Characteristics: 1. MIS is management oriented 2. MIS is developed under the direction of management 3. MIS is an integrated system 4. Common data flows 5. MIS is based upon future needs of the business 6. MIS is composed of sub-systems 7. MIS requires flexibility 8. Distributed data processing 9. MIS is mostly computerized

Importance of Management Information System :

1. It helps in minimizing risk in decision making.
2. It processes the data and derives information out of them.
3. It provides information about the various aspects of business.
7. It helps in preparing corporate report.
4. It helps the executives to avail the information regarding the functional areas quickly.
5. The database helps in inducting research. The data stored are used as secondary data.
6. It provides sound information regarding the financial health of business organization.
8. It helps the HRD manager in finding out the requirement of the human resource, their wages and salary, performance appraisal, training, promotion, absenteeism and employee's turnover, which is useful in drafting sound HRD polices.
9. The data regarding production helps the production manager in deciding about capacity utilization, number of rejections per batch, frequency of break down, status of shipment of processed order and product, region wise.
10. It provides information regarding inventory position, and ensures that the chances of inventory out of stock may be minimized.
11. It provides information regarding product, price, promotion, segmentation, demand, sale etc. to marketing manager instantly and ensures smooth functioning of that department.

Types of Management Information System: 1. Management Operating System 2. Management Reporting System



Objectives/Goals of MIS:

1. MIS should be designed in such a way that it enhances communication between employees.
2. MIS should deliver complicated and complex materials throughout the enterprise.
3. MIS should provide an objective system for recording, gathering and aggregating the information.
4. MIS should be designed in such a way that it reduces the expenses in connection with labour related and manual activities.
5. MIS should be helpful to the enterprise's goals and directions.

Installing Management Information System 1. Preliminaries 2. Planning 3. Implementation 4. Review

System Approach to Management: Definition, Features and Evaluation

Systems approach is based on the generalization that everything is inter-related and interdependent. A system is composed of related and dependent element which when in interaction, forms a unitary whole. A system is simply an assemblage or combination of things or parts forming a complex whole.

Features of Systems Approach:

(i) A system consists of interacting elements. It is set of inter-related and inter-dependent parts arranged in a manner that produces a unified whole.

(ii) The various sub-systems should be studied in their inter-relationships rather, than in isolation from each other.

(iii) An organisational system has a boundary that determines which parts are internal and which are external.

(iv) A system does not exist in a vacuum. It receives information, material and energy from other systems as inputs.

(v) An organisation is a dynamic system as it is responsive to its environment. It is vulnerable to change in its environment.

Major concepts of the systems approach are: 1. Holism 2.Specialization 3.Non-summational 4.Grouping 5.Coordination 6.Emergent properties

System Views of Management and Organization

System views of management associates with the Management division of the organization and it assumes that all of the organizations are systems, whereas all of the systems are sub-systems of larger systems. Here the the question is how a sub-system adjusts and meets the needs of the larger system. It clearly defines whether the sub-system is going to gain the prosperity or hit the ground. Before talking about the system views of management, lets see the some basic concepts of management and system.

Managing Systems: 1.Closed System 2.Opened System

System Views of Management Theory- The system views of management theory is a technique based upon the idea that the organization are imagined as the systems of correlated parts or subsystems to be operated as a whole for the achievement of common and similar targets and goals.

Systems Theory: 1.Systems Thinking – Applied Systems Theory 2.Systems Thinking Models – Causal Loop Diagramming 3.Systems Thinking and Business Analytics

Synergy: - Synergy is the combined working together of two or more parts of a system so that the combined effect is greater than the sum of the efforts of the parts. In business and technology, the term describes a hoped-for or real effect resulting from different individuals, departments, or companies working together and stimulating new ideas that result in greater productivity.

The process of synergy as a way of originating new ideas or making new discoveries can be contrasted to serendipity , in which ideas and discoveries emerge seemingly by accident.

Conceptual, Logical and Physical Data Models

Conceptual Data Model- A *conceptual data model* is a summary-level data model that is most often used on strategic data projects. It typically describes an entire enterprise. Due to its highly abstract nature, it may be referred to as a *conceptual model*.

Logical Data Model- A *logical data model* is a fully-attributed data model that is independent of DBMS, technology, data storage or organizational constraints. It typically describes data requirements from the business point of view. While common data modeling techniques use a relational model notation, there is no requirement that resulting data implementations must be created using relational technologies.

Physical Data Model - A *physical data model* is a fully-attributed data model that is dependent upon a specific version of a data persistence technology. The target implementation technology may be a relational DBMS, an XML document, a NoSQL data storage component, a spreadsheet or any other data implementation option.

Intro to DBMS and its Models

Database System: The DBMS software together with the data itself. Sometimes, the applications are also included.

DBMS - A DBMS consists of a group of programs that manipulate the database and provide an interface between the database , the user of the database and other application programs.

Database Languages-

- **DDL** – Data Definition Language
- **SDL** – Storage Definition Language
- **VDL** – View Definition Language
- **DML** – Data Manipulation Language

Applications of DBMS

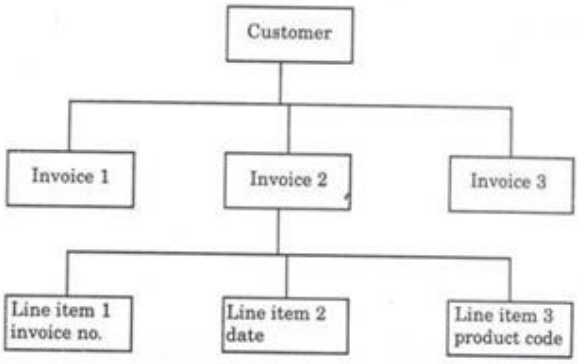


Fig. 9.4 Hierarchical model of data for sales order processing

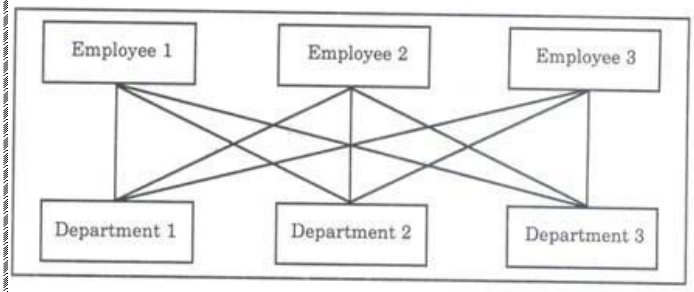


Fig. 9.5 Network model of employee information systems

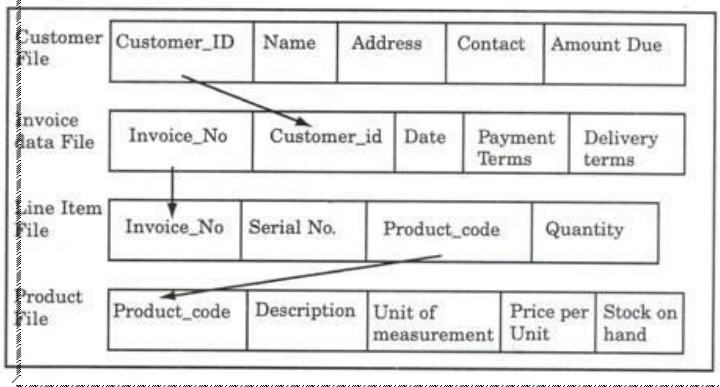


Fig. 9.6 Relational data model for a customer invoicing system

- Various types of data: Images, Text, complex queries, Data Mining, etc.
- Enterprise Resource Planning (ERP)
- Management Resource Planning (MRP)
- Database in Web technologies
- Banking: all transactions
- Airlines: reservations, schedules
- Universities: registration, grades

Current Database trends:

- Multimedia databases
- Interactive video
- Streaming data
- Digital Libraries
- **Databases touch all aspects of our lives**

Advantages of a DBMS: 1.Program 2. Data Independence 3.Efficient Data Access 4.Data Integrity & Security 5.Data Administration 6.Concurrent Access & Crash Recovery 7.Reduced Application Development Time

Models of Database Architecture: Hierarchical, Network and Relational Models

Responsibility in Management: Definition and Features of Responsibility!

Meaning:

Responsibility refers to an obligation to do something.

It is the duty of the subordinate to perform organisational tasks, functions or activities assigned to him. Authority and responsibility go side by side. When authority is delegated then some responsibility for getting the assigned task is also fixed. One can delegate authority but not responsibility.

Features of Responsibility: (i) Responsibility comes from superior-subordinate relationship.(ii) It always flows upward from juniors to seniors.(iii) It arises from duty assigned.(iv) It cannot be delegated. (v) It is the obligation to complete the job as per instructions.

The leadership challenge

The responsibility of top management

Requirements for top management

Roles and responsibilities in a best practice performance management process: 1. Executive and senior leadership responsibilities

2.The managers' responsibilities in the performance management process 3.Employees' responsibilities 4.HR's responsibilities
others role in performance management: 1.Decision-Making 2.Informational Role 3.Interpersonal Role

EDP Basic Concepts

Basic EDP Concepts

Inter-EDP System Communications

In a situation where there are multiple EDP baseboards, each with their own CPU modules in a complete system, I2C can still be used to allow the CPUs to communicate but it is strongly recommended to use CAN. EDP IO signals that are intended to be taken off-board are brought out on a standard DIN414162 64-way connector.

Electronic data processing

Electronic data processing (EDP) can refer to the use of automated methods to process commercial data. Typically, this uses relatively simple, repetitive activities to process large volumes of similar information. For example: stock updates applied to an inventory, banking transactions applied to account and customer master files, booking and ticketing transactions to an airline's reservation system, billing for utility services. The modifier "electronic" or "automatic" was used with "data processing" (DP), especially c. 1960, to distinguish human clerical data processing from that done by computer.

Advantages of Electronic Data Processing: •Speed. •Efficient. •Economic. •Reduced Labor.

Elements of EDP: •Hardware •Software •Procedure •Personnel **EDP Cycle** -:•Input: •Processing: •Output:

EDP Equipment

- Desktop, laptop, tablet computers, terminals or dedicated data input equipment.
- Network equipment, wired or wireless, used to transmit data.
- Servers used to store data.
- Projectors, printers, and any other device used to output processed data.

Types of Information Systems suitable for the different Functional Areas

Human resources:

1) Employee management system
2) Office automation system
3) Management information system

Finance and accounting

1) Payroll system
2) Transaction Process system
3) Billing System
4) Income and Expenditure system
5) Debt and credit system
6) Budgeting system

Administration and IT

- Functions of administration and IT department
- Computerization
  - Make Operations backup system for critical data and get recovered data.
  - Network and security
  - Information needs of the Administration and IT
- Access level
- Organization has different access levels for different users so it keeps access level details
- Hardware and software equipment
- New technologies
- Security levels
- System information
- Troubleshooting
- information

Types of Decisions: Programmed and Non-Programmed

Various types of programmed decisions are:

(1) Organisational decisions
(2) Operational decisions
(3) Research decisions, and

A Summary of Functional Area Information Systems

	Finance & accounting	Manufacturing & Operations	Marketing	Human Resource Management
Strategic Systems		Systems to select new plant site or to design the overall plans for a new production facility	Sales forecasting systems	Long-term workforce planning
	Financial condition analysis (ratios)		Market research systems (these may also be tactical)	Labour negotiation support systems
	Long range forecasting sys			
	Corporate planning systems (contain simulation models)			
Tactical Systems				
	Budgeting system		Sales management systems	Position control systems
	Capital Budgeting		Advertising and promotion systems	Recruiting systems
	Investment Management		Pricing systems	Compensation and benefit systems
	Cash Management			
Operational Systems	*We can consider financially- related systems here –*	*Many of the sys. Below also have some tactical components:*	Sales force automation	Payroll (we covered this in AIS)
	Systems supporting the revenue and expenditure cycles with these systems connecting to the GL (this is the AIS)	MRPII – Manufacturing Resource Planning	Customer contact management systems	Employee information systems
		Inventory Control for 3 types of inv.	Telemarketing systems	Attendance recording systems
		Shop floor control; Quality control	Direct mail advertising systems	Employee scheduling systems
		Capacity Requirements Planning; Detailed Production Schedule	Delivery tracking and routing systems	Performance management systems (can also be tactical)
		Material Requirements		Government reporting systems
		Planning; Master Production Scheduling		(ROE)

(4) Opportunity decisions.

	PROGRAMMED DECISIONS	NON-PROGRAMMED DECISIONS
1	Concerned with relatively routine problems. They are structured and repetitive.	Concerned with unique or unusual problems. They are unstructured, non-repetitive and ill defined.
2	Such decisions are relatively simple and have a small impact.	Such decisions are relatively complex and have a long-term impact.
3	The information related to these problems is readily available and can be processed in a pre-determined manner.	The information related to these problems is not readily available.
4	It takes very little time and effort, as there are pre-determined decision rules and procedures.	They demand a high degree of executive judgment and deliberation.
5	Taken at lower levels of management.	Taken at higher levels in the organization.
6	Eg- Personnel coming in late habitually.	Eg- Expansion of business.

Different types of non-programmed decisions are: (1) Personal decisions (2) Strategic decisions (3) Crisis intuitive decisions, and (4) Problem-solving decisions

	Programmed Decisions	Non-programmed Decisions
1. Nature of Problem	Structured/Routine/Well-defined	Unstructured/Novel/Ill defined
2. Recurrence of Problem	Repetitive	Non-repetitive
3. Method of solving	Policies/Standards/Rules	Managerial Initiative
4. Judgment	Objective	Subjective
5. Probability of outcome	Some degree of certainty is involved	Uncertain
6. Level of management	Middle/Lower-level	Top-level
7. Types	Organisational/Operational/ Research/Opportunity	Personal/Strategic/Crisis Intuitive/Problem-solving

Enterprise wide information systems.

Three Different Types of Enterprise Systems

1,Enterprise System 2.Customer Relationship Management 3.Supply Chain Management 4.Enterprise Resource Planning

Planning for an Information System

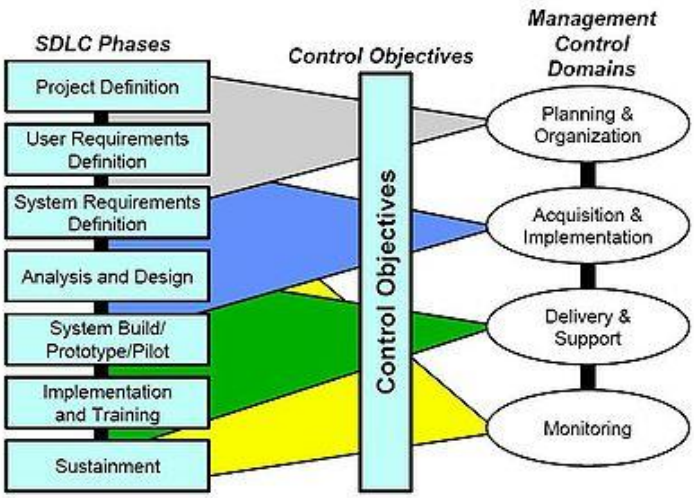
Information System Plans

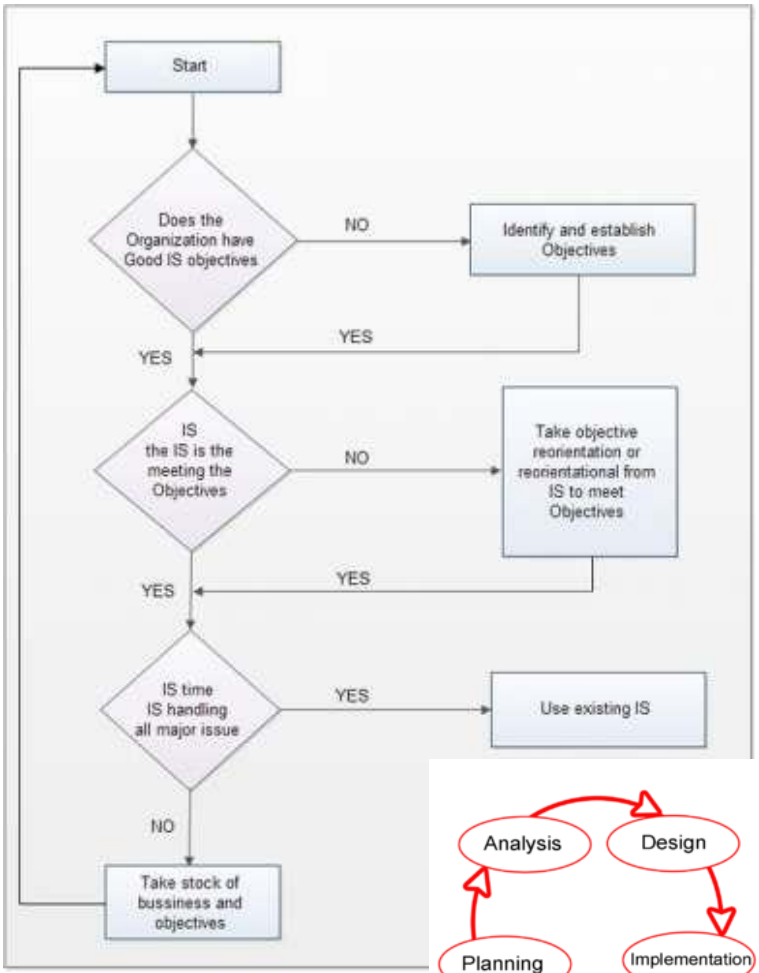
Planning is the key to success in developing a good IS. IS planning brings to focus the reason for existence of the IS and helps the developers to undertake the task of development of IS in a structured manner. Organizations undertake planning for IS for several reasons. Typically IS, plans have a hierarchy with different levels of management handling different plans.

Strategic Information Systems Planning

1.Long Range Information System Planning: 1.Collecting background data 2.Analyzing the broad long-term needs
2.Developing the long-range plan document
3.The medium-range information systems planning
4.The short-range information system planning

Life cycle





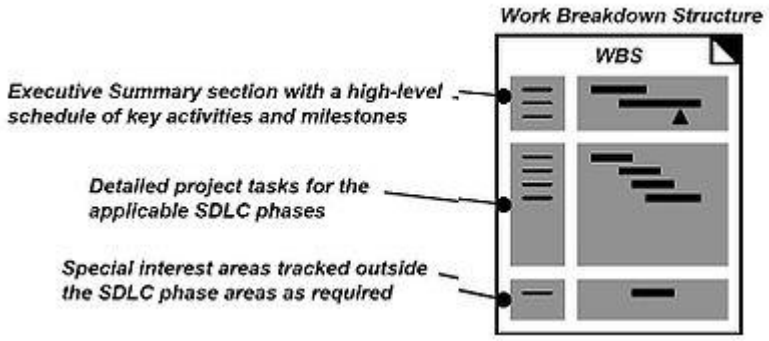
SDLC Phases

Object-oriented analysis types: 1.Conceptual model 2.Use case 3.System Sequence Diagram 4.User interface documentations (if applicable) 5.Relational data model (if applicable)

Strength and Weaknesses of SDLC	
Strengths	**Weaknesses**
Control	Increased development time
Monitor large projects	Increased development cost
Detailed steps	Systems must be defined up front
Evaluate costs and completion targets	Rigidity
Documentation	Hard to estimate costs, project overruns
Well defined user input	User input is sometimes limited
Ease of maintenance	
Development and design standards	

Tolerates changes in MIS staffing	

Work breakdown structured organization



Prototyping in Systems Analysis

What is Prototyping?

As mentioned earlier a prototype is like a model or a simulation of a real thing. In systems analysis a prototype is a model of the system (or subsystem) under analysis. A system can be anything from the food ordering system at a restaurant to the air traffic control system of a major airport. Prototypes of these systems can take many forms. They can be paper-based or computer-based. They can model the entire system with real data or just a few screens with sample data. Prototyping is the process of developing prototypes. It is a methodology in its own right and a technique and supplemental methodology to other methodologies. In this case, we will focus on the ways in which prototyping is used as a technique and a supplemental methodology to the systems development life cycle (SDLC).

A survey of MIS managers in Fortune 1000 firms suggests that there are four prototyping methodologies in use today which supplement the traditional systems development life cycle:

1. Illustrative
2. Simulated
3. Functional
4. Evolutionary

Advantages of Prototyping in Systems Analysis

- Provides a process to perfect the requirements definition.
- Provides a formal specification embodied in an operating replica.
- More enthusiastic and constructive end-user, customer participation in requirements activities.
- Improved morale of end-users, customers, and developers.
- Greater level of user satisfaction with systems development.
- Users better prepared for later stages of development due to familiarity with prototype.
- Delivery of early proof-of-concept.
- Prototype may be easily changed and even discarded.
- Allows productive work to proceed despite initial uncertainties.
- Demonstrates progress at an early stage of development.
- May provide early training for future users of the system.
- May produce some useful deliverables even if the project runs out of time or money.
- Should result in a product that is a better fit for the customer's requirements.
- Systems produced through prototyping may be judged easier to learn and easier to use.

Disadvantages of Prototyping in Systems Analysis

- Can result in unrealistic schedule and budget expectations.
- Iterative nature makes it difficult for management to plan and schedule.
- Can bias the system analysis process. If the prototype is computer-based manual alternatives are unlikely to be considered.
- Working prototypes may lead management and customers to believe that the final product is almost ready for delivery.
- People can begin to think of the prototype as the solution.
- The excellent (or disappointing) performance characteristics of prototypes may mislead the customer.
- Prototypes generally lack security, auditing, and other controls, and data integrity may be difficult to ensure.
- Often inefficient and difficult to maintain.
- Tendency not to document.
- Customers may not be prepared to provide the level or frequency of feedback required for iterative prototyping.

Deciding whether to Prototype or not

Situation	Reason to consider prototyping
Users are uncomfortable with abstract models	Gives user something real to interact with
*The project will have a long development time	Gives user and developers something to work with early on
The requirements are highly uncertain	Allows users to work through the requirements as the prototype develops
*No comparable system has been previously developed - high innovation	Allows for experimentation
Reaching a solution calls for simulation, experimentation, or incremental evaluation	Allows for simulation, experimentation, and incremental evaluation
A critical system is needed quickly	Prototyping tools are generally designed for quick implementation. Can begin requirements gathering quickly.
Users are available	Allows for high user participation

Some suggest considering other options for:

Situation	Reason to consider other options
*an existing system	requirements are well known
algorithm-driven projects that involve heavy calculation	in general prototyping tools are not designed for this type of project
users are not available	many of the advantages of prototyping are lost
large number of users	managing requests for changes is almost impossible
*small, short-lived projects	the prototyping effort cannot be justified

Choosing the Prototyping Approach

Key Points	Solution based on fidelity
Cost and schedule constraints	If budget and schedule are limited, consider low-fidelity prototyping, especially paper mock-up, because they are very cheap and fast to develop. If there are experienced programmers with fast tools to build a computer-based prototype, medium-fidelity prototyping is also a consideration.
Navigation and flow	Medium-fidelity prototyping is good to simulate the system's interaction. In low-fidelity prototyping,

	storyboard can show the system's direction.
User driven or facilitator-driven	If a user-driven prototype is needed, medium to high-fidelity prototyping is recommended because users can directly interact with the prototype. User-driven prototypes are the type primarily discussed in this paper. Otherwise, if a facilitator-driven prototype is needed where, for example, a developer steps through screens while the user looks on, low-fidelity prototyping is the choice.
Look-and-feel the product	Medium and high-fidelity prototyping can help users gain the feeling of how the product works. If using a low-fidelity prototype, the developer must be good at facilitating the prototyping process.
Developer facilitation skill/programming skill	This choice is based on the experience level of the developer(s). If the developer has experience with prototyping using low-fidelity prototyping this may be the appropriate choice. If the developer has experience with medium to high-fidelity prototyping involving programming it may be the most appropriate.

Choosing a Prototyping Tool

- Pencil and paper
- Drawing software
- Demo makers
- Animation and slide-show software such as Microsoft PowerPoint
- Screen painters, menu builders, report generators
- Perl + Motif + Tcl/Tk (UNIX)
- CASE tools such as Oracle Designer
- 4GLs such as FOCUS Six
- UIMSs (User Interface Management Systems) such as WINTERP
- Executable specification languages (VDM variants)
- The tool of the final system.

features to be aware of when selecting a prototyping tool: 1.Ease of use 2.Fast turn-around 3.Extensive control over prototype features 4.Data collection capabilities 5. Executability 6.Lifecycle support 7.Team design 8.Version control

Prototyping within other Methodologies: 1.SDLC, 2.Rapid Application Development (RAD) and 3.Object-Oriented methodologies.

Technology Trends That Will Dominate 2017

1. Iot and Smart Home Tech. 2. AR and VR. 3. Machine Learning. 4. Automation. 5. Humanized Big Data. (visual, empathetic, qualitative) 6. Physical-Digital Integrations. 7. Everything On-Demand.

CASE (computer-aided software engineering)

CASE Tools and its scope: 1. Requirement Analysis Tool 2.Structure Analysis Tool 3.Software Design Tool 4.Code Generation Tool 5.Test Case Generation Tool 6.Document Production Tool 7.Reverse Engineering Tool

Methodologies: 1.Life Cycle 2.Object-oriented Approach 3.Rapid Applications Development (RAD) 4.Prototyping 5.Joint Applications Development (JAD)

CASE Tools future: 1. Horizontal and Vertical Division of AO-groups 2.Knowledge Representation and Processing 3.Visual Integration of CASE Tools 4.Work Flow Model 5.Java Technologies

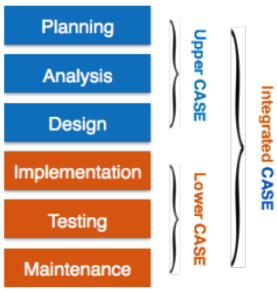
Types of CASE tools : 1. Diagram tools 2.Process Modelling Tools 3.Project Management Tools 4.Documentation Tools 5.Analysis Tools 6.Design Tools 7.Configuration Management Tools 8.Change Control Tools 9.Programming Tools 10.Prototyping Tools 11.Web Development Tools 1.Quality Assurance Tools 13.Maintenance Tools

Case Tools Types

Classic CASE tools - established software development support tools (interactive debuggers, compilers, etc.)

Real CASE tools - can be separated into three different categories, depending on where in the development process they are most involved in:

- Upper - support analysis and design phases
- Lower - support coding phase
- Integrated - also known as I-CASE support analysis, design and coding phases



Decision Support System (DSS): Meaning, Features and Users

A decision support system must generate information in such a form that executives may understand and at a time when such an information is needed and place the information under the direct control of the executives. Thus, the DSS enables the business executives to take the efficient, effective and economic decisions.

Features & characteristics of decision support system are:

a) It is a way to organize information intended for use in decision-making.
(b) A DSS allow the decision-maker to interact in a natural manner due to the careful design of the user interface.
(c) Decision support systems are designed to help support decisions that are formulated as semi structured, complex problem.
(d) A DSS may be constructed to support one-time decision, those that are infrequent;
(e) A decision support system is typically designed for either a particular decision-maker or a group of decision-makers.
(f) Rather than building a specific DSS from scratch, a system analyst can use a package of interrelated hardware and software called a DSS generator. (g) A decision support system is best conceptualized as a process instead of a product.

Elements of Decision Support System: 1. Data 2. Decision rules 3. Mathematical models 4. Managerial knowledge 5. Human judgement.

Users of Decision Support System: 1. Terminal mode 2. Clerk mode 3. Subscription mode 4. Intermediary mode.

MIS - Decision Support System

Decision support systems (DSS) are interactive software-based systems intended to help managers in decision-making by accessing large volumes of information generated from various related information systems involved in organizational business processes, such as office automation system, transaction processing system, etc.

DSS uses the summary information, exceptions, patterns, and trends using the analytical models. A decision support system helps in decision-making but does not necessarily give a decision itself. The decision makers compile useful information from raw data, documents, personal knowledge, and/or business models to identify and solve problems and make decisions.

Attributes of a DSS

- Adaptability and flexibility
- High level of Interactivity
- Ease of use
- Efficiency and effectiveness
- Complete control by decision-makers
- Ease of development
- Extendibility
- Support for modeling and analysis
- Support for data access
- Standalone, integrated, and Web-based

Characteristics of a DSS

- Support for decision-makers in semi-structured and unstructured problems.
- Support for managers at various managerial levels, ranging from top executive to line managers.
- Support for individuals and groups. Less structured problems often requires the involvement of several individuals from different departments and organization level.
- Support for interdependent or sequential decisions.
- Support for intelligence, design, choice, and implementation.
- Support for variety of decision processes and styles.
- DSSs are adaptive over time.

Benefits of DSS

- Improves efficiency and speed of decision-making activities.
- Facilitates interpersonal communication.
- Encourages learning or training.
- Helps automate managerial processes.
- Increases the control, competitiveness and capability of futuristic decision-making of the organization.
- Since it is mostly used in non-programmed decisions, it reveals new approaches and sets up new evidences for an unusual decision.

Components of a DSS •Database Management System (DBMS) •Model Management System

Classification of DSS •Text Oriented DSS •Database Oriented DSS •Spreadsheet Oriented DSS •Solver Oriented DSS •Rules Oriented DSS •Rules Oriented DSS •Compound DSS

Types of DSS: •Status Inquiry System •Data Analysis System •Information Analysis System •Accounting System •Model Based System

Decision Making: 7 Essential Nature of Decision Making

Decision-making is a must for all managerial functions. In other words, decision-making in planning is as important as in organisation, co-ordination and control, because in each of these functions the manager has to choose from among a number of alternative courses of action.

Thus, according to him the former set of acts are decisions, while there are many subsidiary acts in decisions which are themselves automatic and of which the processes are usually unknown to the manager himself.

Deciding is no doubt a form of planning. Planning is concerned with a future course of action and involves choosing among alternatives. As a matter of fact, deciding and planning have related meaning. Planning, as a whole with its component parts like objectives, policies and procedures, is the outcome of decision-making.

Nature of decision-making: 1. Goal-Oriented Process 2. Selection Process 3. Continuous Process 4. Art as Well as Science 5. Responsibilities of Managers 6. Positive as Well as Negative 7. Future Course of Action

Steps Involved in Decision Making: 1. Define the problem 2. Analysing the problem 3. Developing alternative solutions 4. Selecting the best type of alternative 5. Implementation of the decision 6. Follow up 7. Monitoring and feedback

Steps for Effective Problem Solving in the Workplace: 1. Identify the issues 2. Understand everyone's interests 3. List the possible solutions (options) 4. Evaluate the options 5. Select an option or options 6. Document the agreement(s) 7. Agree on contingencies, monitoring, and evaluation.

Define the problem The following specific rules should be followed during brainstorming sessions:

1.Concentrate on the problem at hand. 2. Entertain all ideas. 3.Refrain from allowing members to evaluate others' ideas on the spot.

Technique: 1.Nominal group technique. 2.Delphi technique.

Importance of Management Support Systems for Business Enterprises

Types of management support systems: a) Decision Support Systems b) Executive Information (support) Systems and c) Expert Systems.

B)Executive Information Systems: DSS are designed to cater to the information needs of managers at middle to top levels. They relate to rule-based work doing modelling and analysis of data in order to make it useful in decision making.

Applications of EIS: 1.Executive Briefing 2.Personalised Analysis 3.Exceptions Reporting 4.Model Based Analysis

Benefits of EIS: a) Information support for strategic decisions b) Changing the focus

Critical success factors in EIS implementation: a) Difficulty in system specification b) Large volumes of data c) Resistance from lower levels d) Management styles e) Increased size and cost

C)Expert Systems: The increasing complexities and dynamism in the emerging business environment require greater interaction of functional' managers with the experts so as to get timely advice. These experts would not only sift information from vast pools of diverse information, but also use their expertise to offer advice.

Areas of application of expert system in business include: i. Make or buy decisions ii. New product launch decisions iii. Determining credit limits iv. Product development v. Investment counselling vi. Performance evaluation vii. Incentive systems viii. Customer query ix. Project evaluations x. Production scheduling xi. Routing decisions

Procurement options:

A business expert system is a complex system and requires long term commitment on the part of an enterprise to be able to deliver goods. Due to the dynamics of business, the usefulness of the BESs may be reduced because of changes in the business environment.

Three procurement options for BES: a) Acquire a fully developed system b) Acquire artificial intelligence shell c) Custom built system

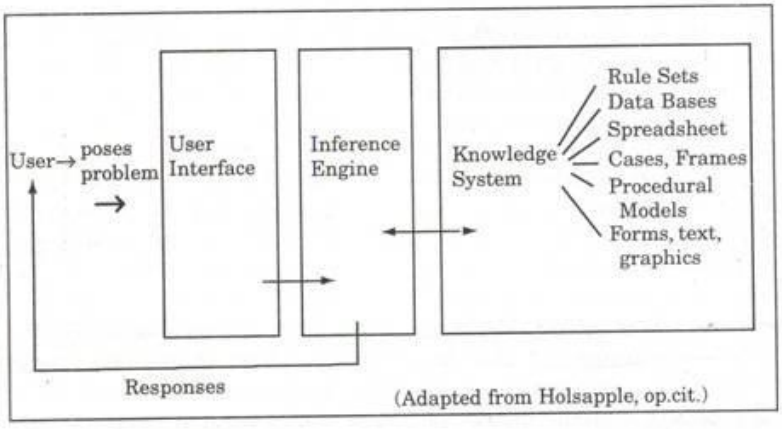


Fig. 10.5 Components of an expert system

Benefits of expert systems: a) Coding of expertise b) Enhanced understanding of business process c) Timely availability of expertise d) Easy replication e) Eliminates routine consultation requests f) Consistency g) Line of logic h) Strategic applications

Critical success factors in implementation of BES:

The critics of BESs provide numerous reasons for the impracticability of BES. The criticism in most of the cases is not unfounded. It is essential that the problems relating to development and implementation are anticipated and necessary precautions are taken to ensure success of BES.

Factors may be kept in view in this connection: a) Cost effectiveness b) Selective in scope c) User friendliness d) Multi-user environment

Intelligent Agents:

Intelligent agents are software components that perform a part of the process using a knowledge base. They work generally with shared information systems and operate in a semi-autonomous manner. a) Detection and alarm systems b) Information search engines c) Desk top applications

New Information Analysis Tools: a) Data mining b) Data mapping c) Data visualisation tools d) Genetic algorithms and neural networks

Decision Making Styles 1.Directive Style 2.Analytic Style 3.Conceptual Style 4.Behavioral Style 5.Group Decision Making Styles 6.Autocratic Group Decision Making Style 7.Democratic Group Decision Making Style 8.Collective Group Decision Making Style 9.Consensus Group Decision Making Style

Group Decision Support Systems

A group decision support system (GDSS) is an interactive computer based system that facilitates a number of decision-makers (working together in a group) in finding solutions to problems that are unstructured in nature. They are designed in such a way that they take input from multiple users interacting simultaneously with the systems to arrive at a decision as a group.

Advantages 1. Better comprehensive consideration of the problems and the various relating issues.
2. Better group understanding of the problem. 3. Less likelihood of quibbling with the help of the 20/20 hindsight.
4. Better group commitment to the decision. 5. Better communication to/with the implementers.

Group Decision Support System according to De Sanctis and Gallupe is "an interactive computer based system, which helps in solving the various un-structured problems with the help of the decision makers working in the groups.

Basic components of the Group Decision Support System

1. Hardware: i.Input / output devices. ii.Audio visual instruments. iii.Electronic display board/ screens. iv.Computer equipments. v.Conferencing infrastructure. vi.Network systems.

2. Software: i. Database and database management system. ii. Modeling capabilities. iii. Dialogue management with multiple user access. iv. Specialized application programmes to facilitate the group access.

3. People and the procedure: i. Trained facilitators. ii. Decision making participants. iii. Support staff. iv. Laid down procedure. v. Modus operandi.

Features of the Group Decision Support System: •Ease of Use: •Better Decision Making: •Emphasis on Semi-structured and Unstructured Decisions: •Specific and General Support: •Supports all Phases of the Decision Making: •Supports Positive Group Behaviour

Group Decision Support System success depends on the following factors

1. Improved pre planning.
2. Increased participation.
3. Open, collaborative meeting atmosphere.
4. Criticism free idea generation.
5. Idea organization and then evaluation.
6. Setting priorities.
7. Making decisions depending on the priorities.
8. Documentation.
9. Record keeping of the meetings.
10. Access to the external information.
11. Preservation of the 'organization memory'.

GDSS Software Tools: •Electronic Questionnaire •Electronic Brainstorming Tools •Idea Organizer •Tools for Setting Priority •Policy Formation Tool

CBIS (computer based information system)

A. Understanding CBIS

Computer Based Information Systems or Computer Based Information System (CBIS) is a data processing system into a high-quality information and can be used as tools that support decision-making, coordination and control as well as visualization and analysis. Some terms related to CBIS include data, information, systems, information systems and computer base.

B. Era of Globalization and High Level of Competition: 1. Mastery of technology to produce goods and services. 2. Improving the quality of human resources. 3. Marketplace appropriate. 4. Establishment of accurate information systems to assist each decision.

C. Sub-System of Computer-Based Information System: 1. Accounting Information System 2. Management Information System 3. Decision Support System 4. Office Automation (Virtual Office) 5. Expert System

ACCOUNTING INFORMATION SYSTEMS (AIS)

SIA is an information system that implements corporate accounting application, ie as data processing companies, the Company can not choose to use the SIA or not, this system is a necessity. All companies basically implement procedures the same. SIA is more oriented to the data than the information, although there was some information generated. SIA provides a consistent database for other information. SIA is the only system responsible for the information needs of information outside the company, providing environmental information to all except the competition.

The main task of this information system are: • Data collection • Manipulation of data • Data storage • Provide documents

Characteristics SIA: • Carry out the necessary tasks. • With a focus on a relatively standard procedure. • Dealing with detailed data. • Focusing on the historical. • Provide a minimum of troubleshooting information.

Role SIA In CBIS: • SIA produces some output information in the form of standard accounting reports. • SIA provides a comprehensive database for use in solving problems.

Enterprise Information System (EntIS) - 1.Mathematical Model 2.Output Model

DECISION SUPPORT SYSTEMS

In an effort to solve a problem solver will be a lot of decision making. Decisions must be taken to avoid or reduce negative impacts or to take advantage of opportunities.

The decision divided into: • Decisions are programmed, and the routine is repeated.

• Decisions are not programmed, is new and not structured, there is no certain method to handle because unprecedented.

Managers do four stages of decision-making, namely: • *Intelligence Activities* • *Designing activities* • *Selecting activities* • *Activity Review*

Types of Decision Support Systems (DSS) •Communication-driven DSS •Data-driven DSS •Document-driven DSS •Knowledge-driven DSS: •Model-driven DSS

Destination DSS: • Assist managers to make decisions for semi-structured problem-solving. • Support the assessment manager is not trying to replace it. • Improve the effectiveness of decision-making on efficiency manager.

EXPERT SYSTEM (ES)

Expert system (Expert System) is an information system that has artificial intelligence (Artificial Intelegent) that resembles human intelligence. Expert system similar to the DSS is aimed at providing support for high-level troubleshooting for users. Differences ES and ES DSS is the ability to explain the flow of his reasoning in reaching a specific solution. Very often explain how to solve the problem proved more valuable than the solution itself.

Characteristics of Expert System

• Have the ability to learn or understand the problem from experience. • Providing rapid response and satisfactory to the new situation.
• Able to handle complex problems (semi-structured). • Solving problems by reasoning. • Using knowledge to menyelasaikan problem.

Expert System Part.

1. There are four methods of input that is • Menu • Commands • Natural Languange • Customized Interfaces
2. Output Expert System, among others: • Explanation of the question • Explanation of solving problems
3. Knowledge Base, is a part that contains the facts that explain the problem areas, and also explains techniques that explain how the problem of those facts fit one another in a logical sequence. The term problem domain is used to describe the problem areas.
4. Interference Engine, is part of expert systems that perform reasoning using the knowledge base content based on a particular order. During the consultation, interference engine testing rules one by one and when the right conditions naka one action is taken.
5. Development Engine is a tool used to create expert systems, in this case the two devices are commonly used programming language and the ES shell.

The relationship between TPS, MIS and ESS

DIMENSION	DSS	MIS	EIS
Focus	Analysis, decision Support	Information processing	Status Access
Typical Users Served	Analysts, professions, managers (via intermediaries)	Middle, lower levels, sometime senior executives	Senior Executives Expediency
Impetus	Effectiveness	Efficiency	
Application	Diversified Areas where Managerial Decisions are made	Production control, sales forecasts, financial analysis, human resource management	Environmental scanning, performance evaluation, identifying problems and opportunities
Database(s)	Special	Corporate	Special
Decision Support Capabilities	Supports semi-structured and unstructured decision making; mainly ad-hoc, but sometimes repetitive decisions	Direct or indirect support, mainly structured routine problems, using standard operations, research and other models	Indirect support, mainly high level and unstructured decisions and policies
Type of Information	Information to support specific situations	Scheduled and demand reports; structured flow, exception reporting mainly internal operations	News items, external information on customers, competitors and the environment
Principal Use	Planning, Organizing, staffing and control	Control	Tracking and control
Adaptability to Individual User	Permits individual judgment, what-if capabilities, some choice of dialogue style	Usually none, standardized	Tailored to the decision making style of each individual executive, offers several options of outputs
Graphics	Integrated part of many DSS	Desirable	A must
User Friendliness	A must where no intermediaries are used	Desirable	A must
Treatment of Information	Information provided by the EIS/or MIS is used as an input to the DSS	Information is provided to a diversified group of users who then manipulate it or summarize it as needed	Filters and compresses the information, tracks critical data and information
Supporting Detailed Information	Can be programmed into DSS	Inflexibility of reports, cannot get the supporting details quickly	Instant access to the supporting details of any summary
Model Base	The Core of the DSS	Standard Models are available but are not managed	Can be added, usually not included or limited in nature
Construction	By users, either alone or with specialists from IS or IC departments	By vendors or IS specialists	By Vendors or IS Specialists
Hardware	Mainframes, micros or distributed	Mainframes, Micros or distributed	Distributed system

Nature of Computing Packages	Large computational capabilities, modelling languages and simulation, applications and DSS generators	Application oriented, performance reports, strong reporting capabilities, standard statistical, financial, accounting and management science models	Interactive, easy to access multiple databases, on-line access, sophisticated DBMS capabilities and complex linkages

Phases of decision-making

The Decision Making Models

1. The Classical Model - On confrontation of a manager with a certain decision making situation, the manager would collect all the critical information and the data that is required for performing a particular activity and also would take the decision that will certainly be for the betterment of the organization.

2. The Administrative Model -a. In such a model, the manager has more concern for himself.

b. On confrontation of a manager with a certain decision making situation, the manager would collect what ever information or the data that will be available and then will take a decision, which may not be in the best interests of the organization but will certainly be good for fulfilling his personal interests.

c. Expediency and the opportunism, both act as the hallmarks of the Administrative Model. **3. The Herbert Simon Model -** a. This model is linked with the decision making process. b. Explains the core of the decision making. c. Used as the base for explaining the decision making process. d. According the Herbert Simon Model, the process of the decision making consists of the following phases –

A. The Intelligence Phase type : I. The Societal Environment II. The Competitive Environment III. The Organizational Environment

B. The Design Phase 1. Support in getting the in depth knowledge of the problem. 2. A correct model of the situation can be made and the assumptions of the model need to be tested. 3. Support for the generation of the solutions can be obtained by – I. Manipulation of the model for the development of the insights. II. Creation of the database retrieval system.

4. Support for testing the feasibility of the solutions. **C. The Choice Phase**

Limitations of the Simon Model

1. This model does not go further than the choice model.

2. Does not include the cognizance of the implementation and also of the feedback aspects.

How does Simon's Model correspond to the Scientific Method and to the Systems Development Life Cycle (SDLC)?

SIMON'S MODEL	SCIENTIFIC APPROACH	SDLC
Intelligence	Define Problem	System Investigation
Design	Develop Alternatives	System Analysis
Choice	Select Solution / Design Solution	System Design
Implementation	Implement Solution	Implementation
Review		Maintenance

Human Nature: From Holistic to Dichotomous Model and Back

the dichotomous model of human nature has been unanimously accepted in the European Christian world. The Greek world "διχοτόμηση" (dichotómisi) means partition, bisection, and bifurcation. In logic, dichotomy means division of the whole into parts that absolutely cannot overlap. Similarly, the human nature has been seen as a composition of two absolutely different entities: the Soul and the Body. The Soul has been considered as an eternal and Divine creature. The body has been seen as a transient and material substance, created from the "dust of the earth" and returning to be the dust after termination of co-habitation with the Soul.

Trans dichotomous model

The **trans dichotomous model** is a variation of the random access machine in which the machine word size is assumed to match the problem size. The model was proposed by Michael Fredman and Dan Willard, who chose its name "because the dichotomy between the machine model and the problem size is crossed in a reasonable matter."

In a problem such as integer sorting in which there are n integers to be sorted, the trans dichotomous model assumes that each integer may be stored in a single word of computer memory, that operations on single words take constant time per operation, and that the number of bits that can be stored in a single word is at least $\log_2 n$. The goal of complexity analysis in this model is to find time bounds that depend only on n and not on the actual size of the input values or the machine words. In modeling integer computation, it is necessary to assume that machine words are limited in size, because models with unlimited precision are unreasonably powerful (able to solve PSPACE-complete problems in polynomial time). The trans-dichotomous model makes a minimal assumption of this type: that there is some limit, and that the limit is large enough to allow random access indexing into the input data.

As well as its application to integer sorting, the trans dichotomous model has also been applied to the design of priority queues and to problems in computational geometry and graph algorithms.

Cognitive/Learning Styles

Cognitive styles refer to the preferred way an individual processes information. Unlike individual differences in abilities which describe peak performance, styles describe a person's typical mode of thinking, remembering or problem solving. Furthermore, styles are usually considered to be bipolar dimensions whereas abilities are unipolar (ranging from zero to a maximum value). Having more of ability is usually considered beneficial while having a particular cognitive style simply denotes a tendency to behave in a certain manner. Cognitive style is a usually described as a personality dimension which influences attitudes, values, and social interaction.

A number of cognitive styles have been identified and studied over the years. Field independence versus field dependence is probably the most well-known style. It refers to a tendency to approach the environment in an analytical, as opposed to global, fashion. At a perceptual level, field independent personalities are able to distinguish figures as discrete from their backgrounds compared to field dependent

individuals who experience events in an undifferentiated way. In addition, field dependent individuals have a greater social orientation relative to field independent personalities. Studies have identified a number connections between this cognitive style and learning . Other cognitive styles that have been identified include: 1.**scanning** 2.**leveling versus sharpening** 3.**reflection versus impulsivity** 4.**conceptual differentiation**

Learning styles specifically deal with characteristic styles of learning. Kolb (1984) proposes a theory of experiential learning that involves four principal stages: concrete experiences (CE), reflective observation (RO), abstract conceptualization (AC), and active experimentation (AE). The CE/AC and AE/RO dimensions are polar opposities as far as learning styles are concerned and Kolb postulates four types of learners (divergers, assimilators, convergers, and accommodators) depending upon their position on these two dimensions. For example, an accommodator prefers concrete experiences and active experimentation (AE, CE).

Heuristic Method of Teaching

Meaning of Heuristic Method of Teaching

A problem is placed before the learners and they are asked to find the solution of the problem through various literacy means, like library, laboratory, and workshops etc. Teacher's role is to initiate the learning and pupils are active throughout the learning process. By using their creative thinking and imaginative power, they try to find out the relevant solutions based on some logic. They learn by selfexperience.

This teaching strategy is focused on:

1. To develop problem solving attitude 2. To develop scientific attitudes towards the problem 3. To develop power of selfexpression

It basic principles are: 1. To each as little as possible at one time 2. To encourage learner to learn himself as much as possible

Advantages of Heuristic Teaching Method

Following are the advantages of this Heuristic teaching strategy

1. It helps in achieving cognitive, affective and psychomotor objectives i.e. it helps in all round development of the child.
2. Students are put into the situation to learn by selfexperience. It certainly develops selfconfidence and selfreliance in the learners.
3. It helps in developing scientific attitude and creativity in the learners.
4. Teacher encourages the learners to explore the environment in search of the solution of the problems.
5. Teacher is always ready to provide individual guidance regarding the solution of the problem.

Disadvantages of Heuristic Teaching Method

1. It cannot be used at primary level of education 2. Higher intelligence and divergent thinking is required in the learners.
3. In true sense, none of the teachers have patience for providing individual guidance to the learners.

Suggestions

1. There can be number of solutions for a problem. So, it is the teacher's duty to provide guidance to the learners to select the most relevant solution of the problem
2. Problem should be related to the course and curriculum and a definite time period should be allotted to the learners to finish their research work.
3. Students' abilities capabilities, interest and choice of the subject should be taken into consideration in allotting the problems.
4. There should be eligibility criteria for providing the problems.

Artificial Intelligence - Expert Systems

The expert systems are the computer applications developed to solve complex problems in a particular domain, at the level of extra-ordinary human intelligence and expertise.

Characteristics of Expert Systems: •High performance •Understandable •Reliable •Highly responsive

Capabilities of Expert Systems: •Advising •Instructing and assisting human in decision making •Demonstrating •Deriving a solution •Diagnosing •Explaining •Interpreting input •Predicting results •Justifying the conclusion •Suggesting alternative options to a problem

They are incapable of: •Substituting human decision makers •Possessing human capabilities •Producing accurate output for inadequate knowledge base •Refining their own knowledge

Components of Expert Systems: •Knowledge Base •Inference Engine •User Interface

A. **Knowledge Base** The data is collection of facts. The information is organized as data and facts about the task domain. Data, information, and past experience combined together are termed as knowledge.

Components of Knowledge Base: •*Factual Knowledge* •*Heuristic Knowledge*

Knowledge Acquisition The success of any expert system majorly depends on the quality, completeness, and accuracy of the information stored in the knowledge base.

B. **Inference Engine** Use of efficient procedures and rules by the Inference Engine is essential in deducting a correct, flawless solution. In case of knowledge-based ES, the Inference Engine acquires and manipulates the knowledge from the knowledge base to arrive at a particular solution.

Strategies – •Forward Chaining •Backward Chaining

C. **User Interface** User interface provides interaction between user of the ES and the ES itself. It is generally Natural Language Processing so as to be used by the user who is well-versed in the task domain. The user of the ES need not be necessarily an expert in Artificial Intelligence.

Forms – •Natural language displayed on screen. •Verbal narrations in natural language. •Listing of rule numbers displayed on the screen.

Requirements of Efficient ES User Interface

- It should help users to accomplish their goals in shortest possible way.
- It should be designed to work for user's existing or desired work practices.
- Its technology should be adaptable to user's requirements; not the other way round.
- It should make efficient use of user input.

Expert Systems Limitations 1) No technology can offer easy and complete solution. 2) Large systems are costly, 3) require significant development time, and computer resources. 4) ESs have their limitations which include –

• Limitations of the technology • Difficult knowledge acquisition • ES are difficult to maintain • High development costs

Expert System Technology – •Expert System Development Environment •Tools •Shells

Development of Expert Systems Steps: 1.Identify Problem Domain 2.Design the System 3.Develop the Prototype 4.Test and Refine the Prototype 5.Develop and Complete the ES 6.Maintain the ES

Benefits of Expert Systems: •Availability •Less Production Cost •Speed •Less Error Rate •Reducing Risk •Steady response