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NAME OF THE DEPARMENT: DEPARTMENT OF MANAGEMENT SCIENCES

SUBJECT :MANAGEMENT INFORMATION SYSTEM

TOPIC :DECISION SUPPORT SYSTEM

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CHAPTER 3

Decision Support Systems:
An Overview

Decision Support Systems

- **Decision Support Methodology**
- **Technology Components**
- **Development**

Decision Support Systems: An Overview

- Capabilities
- Structure
- Classifications

DSS Configurations

- Supports individuals and teams
- Used repeatedly and constantly
- Two major components: data and models
- Web-based
- Uses subjective, personal, and objective data
- Has a simulation model
- Used in public and private sectors
- Has what-if capabilities
- Uses quantitative and qualitative models

DSS Definitions

- **Little (1970)**
  "model-based set of procedures for processing data and judgments to assist a manager in his decision making"
  Assumption: that the system is computer-based and extends the user's capabilities.

- **Alter (1980)**
  Contrasts DSS with traditional EDP systems (Table 3.1)

TABLE 3.1 DSS versus EDP.

Dimension	*DSS*	*EDP*
Use	Active	Passive
User	Line and staff management	Clerical
Goal	Effectiveness	Mechanical efficiency
Time Horizon	Present and future	Past
Objective	Flexibility	Consistency

Source: Alter [1980].

- **Moore and Chang (1980)**

1. Extendible systems
2. Capable of supporting ad hoc data analysis and decision modeling
3. Oriented toward future planning
4. Used at irregular, unplanned intervals

- **Bonczek et al. (1980)**

A computer-based system consisting of

1. A language system -- communication between the user and DSS components
2. A knowledge system
3. A problem-processing system--the link between the other two components

- **Keen (1980)**

  DSS apply "to situations where a 'final' system can be developed only through an adaptive process of learning and evolution"

- **Central Issue in DSS**

  support and improvement of decision making

TABLE 3.2 Concepts Underlying DSS Definitions.

Source	DSS Defined in Terms of
Gorry and Scott Morton [1971]	Problem type, system function (support)
Little [1970]	System function, interface characteristics
Alter [1980]	Usage pattern, system objectives
Moore and Chang [1980]	Usage pattern, system capabilities
Bonczek, et al. [1996]	System components
Keen [1980]	Development process

Working Definition of DSS

- **A DSS is an interactive, flexible, and adaptable CBIS, specially developed for supporting the solution of a non-structured management problem for improved decision making. It utilizes data, it provides easy user interface, and it allows for the decision maker's own insights**

- **DSS may utilize models, is built by an interactive process (frequently by end-users), supports all the phases of the decision making, and may include a knowledge component**

Characteristics and Capabilities of DSS (Figure 3.1)

1. Provide support in semi-structured and unstructured situations, includes human judgment and computerized information
2. Support for various managerial levels
3. Support to individuals and groups
4. Support to interdependent and/or sequential decisions
5. Support all phases of the decision-making process
6. Support a variety of decision-making processes and styles

(more)

7. **Are adaptive**
8. **Have user friendly interfaces**
9. **Goal: improve effectiveness of decision making**
10. **The decision maker controls the decision-making process**
11. **End-users can build simple systems**
12. **Utilizes models for analysis**
13. **Provides access to a variety of data sources, formats, and types**

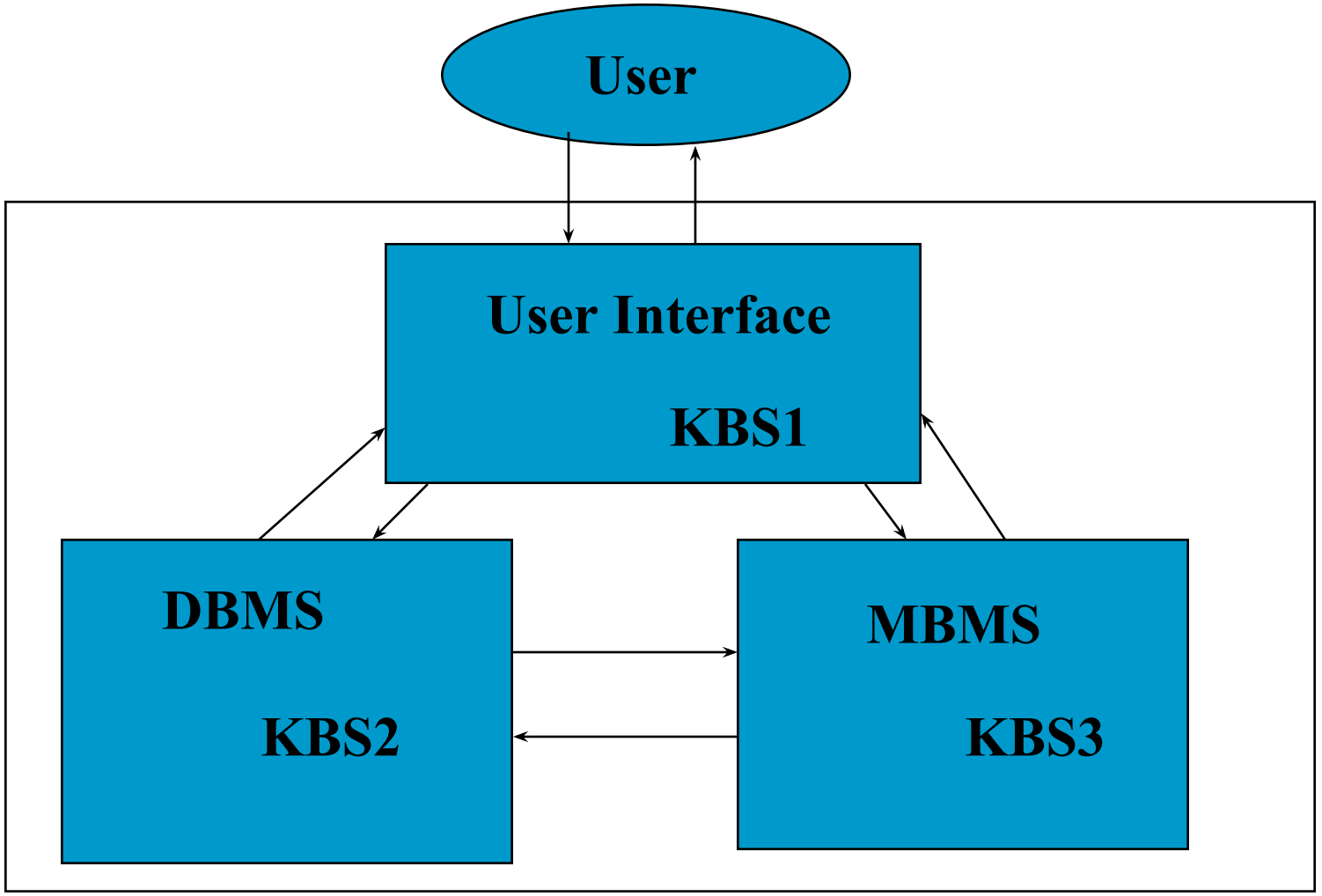
Decision makers can make better, more consistent decisions in a timely manner

DSS Components

1. Data Management Subsystem
2. Model Management Subsystem
3. Knowledge-based (Management) Subsystem
4. User Interface Subsystem
5. The User

(Figure 3.2)

DSS Components



The Data Management Subsystem

- **DSS database**
- **Database management system**
- **Data directory**
- **Query facility**
  (Figure 3.3)

DSS In Focus 3.2: The Capabilities of DBMS in a DSS

- Captures/extracts data for inclusion in a DSS database
- Updates (adds, deletes, edits, changes) data records and files
- Interrelates data from different sources
- Retrieves data from the database for queries and reports
- Provides comprehensive data security (protection from unauthorized access, recovery capabilities, etc.)
- Handles personal and unofficial data so that users can experiment with alternative solutions based on their own judgment
- Performs complex data manipulation tasks based on queries
- Tracks data use within the DSS
- Manages data through a data dictionary

DSS Database Issues

- Data warehouse
- Data mining
- Special independent DSS databases
- Extraction of data from internal, external, and private sources
- Web browser data access
- Web database servers
- Multimedia databases
- Special GSS databases (like Lotus Notes / Domino Server)
- Online Analytical Processing (OLAP)
- Object-oriented databases
- Commercial database management systems (DBMS)

The Model Management Subsystem

- **Analog of the database management subsystem (Figure 3.4)**

- **Model base**
- **Model base management system**
- **Modeling language**
- **Model directory**
- **Model execution, integration, and command processor**

Model Management Issues

- **Model level: Strategic, managerial (tactical), and operational**
- **Modeling languages**
- **Lack of standard MBMS activities. WHY?**
- **Use of AI and fuzzy logic in MBMS**

The Knowledge Based (Management) Subsystem

- **Provides expertise in solving complex unstructured and semi-structured problems**
- **Expertise provided by an expert system or other intelligent system**
- **Advanced DSS have a *knowledge* based (*management)* component**
- **Leads to intelligent DSS**
- **Example: Data mining**

The User Interface (Dialog) Subsystem

- Includes all communication between a user and the MSS
- Graphical user interfaces (GUI)
- Voice recognition and speech synthesis possible

- To most users, the user interface *is* the system

The User

Different usage patterns for the *user*, the *manager*, or the *decision maker*

- **Managers**
- **Staff specialists**
- **Intermediaries**
  1. ***Staff assistant***
  2. ***Expert tool user***
  3. ***Business (system) analyst***
  4. ***GSS Facilitator***

DSS Hardware

Evolved with computer hardware and software technologies

Major Hardware Options

- **Mainframe**
- **Workstation**
- **Personal computer**
- **Web server system**
  - **Internet**
  - **Intranets**
  - **Extranets**

Distinguishing DSS from Management Science and MIS

- DSS is a problem-solving tool and is frequently used to address ad hoc and unexpected problems
- Different than MIS
- DSS evolve as they develop

DSS Classifications

Alter's Output Classification (1980)

- **Degree of action implication of system outputs (supporting decision) (Table 3.3)**

- **Holsapple and Whinston's Classification**
  1. **Text-oriented DSS**
  2. **Database-oriented DSS**
  3. **Spreadsheet-oriented DSS**
  4. **Solver-oriented DSS**
  5. **Rule-oriented DSS**
  6. **Compound DSS**

Intelligent DSS Categories

- **Descriptive**
- **Procedural**
- **Reasoning**
- **Linguistic**
- **Presentation**
- **Assimilative**

Alternate Categories of Intelligent DSS

- Symbiotic
- Expert-system based
- Adaptive
- Holistic

Other Classifications

Institutional DSS vs. Ad Hoc DSS

- **Institutional DSS deals with decisions of a recurring nature**
- **Ad Hoc DSS deals with specific problems that are usually neither anticipated nor recurring**

Other Classifications (cont'd.)

- **Degree of nonprocedurality (Bonczek et al., 1980)**
- **Personal, group, and organizational support (Hackathorn and Keen, 1981)**
- **Individual versus group support systems (GSS)**
- **Custom-made versus ready-made systems**

Summary

- **Fundamentals of DSS**
- **Components of DSS**
- **Major capabilities of the DSS components**
- **Major DSS categories**