Part I: Decision Support Systems

MBA 8473

Cognitive Objectives

43. Identify information processing as the foundation of managerial work.
44. Identify which media are more suitable for supporting managerial work.
45. Describe decision making/problem solving systems in Organizations.
46. Discuss models of decision making; Describe decision making process.
48. Discuss different categories/taxonomies of DSS
   – Based on support: Data, Model, & Expert System
   – Based on degree of direct influence on the decision at hand (See comment box below.)
49. Examine how user’s psychological types impact DSS Design, and explain the use this relationship to increase DSS effectiveness.
50. Describe benefits of DSS; Examine what can reduce DSS effectiveness.

(Study Figure 1-1 p147, Alter’s Classification of DSS components; Study Figure 1-6, p164 also to understand a higher order classification of the same).
How can information processing help managerial work? (C.O. 43-C.O. 44)

• What do managers do?
  – Functions: Plan, organize, command, coordinate, control.
  – Roles: interpersonal, informational, decisional

• Information processing foundations of Informational and Decisional work
  – Information handling, decision making, communication
  – The purpose of Information processing:
    • reducing uncertainty and resolving equivocalness

Manager should have Decision Information and Communication Media Richness suitable for handling uncertainty and equivocalness

Information Characteristics for Different Types of Decision Context (C.O. 43-C.O. 44)

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Operational</th>
<th>Managerial</th>
<th>Strategic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accuracy</td>
<td>High</td>
<td></td>
<td>Low</td>
</tr>
<tr>
<td>Level of detail</td>
<td>Detailed</td>
<td></td>
<td>Aggregate</td>
</tr>
<tr>
<td>Time horizon</td>
<td>Present</td>
<td></td>
<td>Future</td>
</tr>
<tr>
<td>Use</td>
<td>Frequent</td>
<td></td>
<td>Infrequent</td>
</tr>
<tr>
<td>Source</td>
<td>Internal</td>
<td></td>
<td>External</td>
</tr>
<tr>
<td>Scope</td>
<td>Narrow</td>
<td></td>
<td>Wide</td>
</tr>
<tr>
<td>Nature</td>
<td>Quantitative</td>
<td></td>
<td>Qualitative</td>
</tr>
<tr>
<td>Age</td>
<td>Current</td>
<td></td>
<td>Current/old</td>
</tr>
</tbody>
</table>
Varying Relevance of Communication Media Richness to support managerial work (consequently, different information systems) (C.O. 43-C.O. 44)

Media Richness

Rules & regulations  MIS  special reports  DSS  Direct contact  Group meetings

Equivocalness reduction (clarify, reach agreements decide which questions to ask)

Uncertainty reduction (obtain additional data seek answers to explicit questions)

Less Rich  More Rich

Models of Decision Making (C.O. 46)

1. Rational model
   - Economic rational actor - obtains all the facts, weighs likelihood of all the alternative outcomes, and chooses the one with the highest probable value. (expected value)
   - Expected monetary value

   $100M
   $10M
   $200M
   -$20M

   * Bounded rationality (source criticism of rational model)
Models of Decision Making  
(C.O. 46)

2. Satisficing
   – Less than optimization
   – More realistic
   – Limited number of alternatives

3. Political
   – Sub-units or members with own “goals” and “resources”
   – Power struggle
   – Bargaining and negotiation

Decision Making Process  
(C.O. 46)

Three phases in decision making process
• Intelligence
   – Sensing, finding, identifying, and defining problem/opportunity
• Design
   – Diagnosing the problem/opportunity
   – Generating alternatives
• Choice
   – Choosing the best alternative
Decision Support Systems
(C.O. 47)

- an information system
- purpose is to provide information for making informed decisions
- interactive (needed for experimenting and prospecting)

Description of DSS Components
(C.O. 47)
**Historical and definitional description of DSS**  
(C.O. 47)

- **Keen and Scott-Morton (1978):** Decision support systems couple the intellectual resources of individuals with the capabilities of the computer to improve the quality of decisions. It is a computer-based support system for management decision makers who deal with semi-structured problems.

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**Different ways to characterize or categorize DSS’s**  
(C.O. 48)

- Category 1 - Support based DSS (Figure 1-1, p. 147)
  - Data-based DSS
  - Model-based DSS

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Category 2: Basis: the degree to which the system determines the decision (this slide and Appendix).

The DSS Hierarchy (also study Figure 1-6, p164)

- Suggestion systems
- Optimization systems
- Representational models
- Accounting models
- Analysis information systems
- Data analysis systems
- File drawer systems

DSS: The Impact of User’s Psychological Types

(C.O. 49) To take a test of your personality, go to http://www.davideck.com (optional)

- Four dichotomies of personalities and their impact:
  1. Introversion vs. Extraversion
     - less vs. more immediate interaction
     - delayed electronic discussion vs. on line chat
  2. Sensing vs. iNtuition
     - large number of facts vs. less data more ‘hunches’
     - data-oriented DSS vs. less exhaustive DSS
DSS: The Impact of User’s Psychological Types
(C.O. 49)

3. Thinking vs. Feeling
   – more use of logic vs. more human/ eclectic
   – Optimization or suggestion models vs. “group ware”

4. Judgment vs. Perception
   – quick to decide vs. slow to decide
   – model-oriented DSS vs. data-oriented DSS

DSS: Some frequently found user temperament patterns (C.O. 49)

<table>
<thead>
<tr>
<th>Temperament</th>
<th>Needs assistance in ...</th>
</tr>
</thead>
<tbody>
<tr>
<td>SP (Sensing &amp; Perceptive)</td>
<td>• Coherence of plan</td>
</tr>
<tr>
<td></td>
<td>• Following selected solution</td>
</tr>
<tr>
<td>SJ (Sensing &amp; Judging)</td>
<td>• Categorizing, classifying</td>
</tr>
<tr>
<td></td>
<td>• Generating creative alternatives</td>
</tr>
<tr>
<td>NT (iNtuition &amp; Thinking)</td>
<td>• Attending to facts &amp; details</td>
</tr>
<tr>
<td></td>
<td>• Looking at impact on people</td>
</tr>
<tr>
<td>NF (iNtuition &amp; Feeling)</td>
<td>• Attending to facts &amp; details</td>
</tr>
<tr>
<td></td>
<td>• Developing realistic alternatives</td>
</tr>
<tr>
<td></td>
<td>• Implementation</td>
</tr>
</tbody>
</table>
**DSS Benefits**

(C.O. 50)

- Improving Personal Efficiency
- Expediting Problem Solving
- Facilitating Interpersonal Communications
- Promoting Learning or Training
- Increasing Organizational Control

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**Detrimental DSS Effects**

(C.O. 50)

- Design flaws
- Inadequate understanding of task or user
- Inadequate modeling of “reality”
- Inadequate understanding of human information processing constraints
- Can promote cognitive biases!
Part I DSS: Summary/ Review Questions

- What is a DSS and its various components? How does it work?
- What are the different classifications (or taxonomies) of DSS based on various criteria?
- What are the three models of decision making? What are their differences, if any?
- What considerations are necessary to improve effectiveness of DSS in the context of organizational decision making?
- What are the various types of user personalities we discussed? To design and build effective DSS how should we exploit what we know about potential users’ personalities?
- What are the detrimental effects of a DSS? How can we prevent them?

Part II: Multi-participant Decision Making and Collaboration Systems

MBA8473
Learning Objectives

- L.O. 51 Explain what is multi-participant Decision Making
- L.O. 51.1 Explain Motivation for MDM
- L.O. 51.2 Compare four coordination methods for MDM
- L.O. 51.3 Identify MDM Support Technologies, their levels, and classification
- L.O. 51.4 Design technology support for collaborative systems
- L.O. 51.5 Identify relationships between task characteristics and media richness
- L.O.52 Provide examples of Collaboration Systems in Use
- L.O.53 Explain the effect of group size on MDM

Multi-participant Decision Making (MDM)

(L.O.51)

- Decision making activity conducted by a collective of at least two individuals
- Types of MDM structures (Textbook, Marakas Chapter 8: Section 6.1 pp232-239; also Figures 6-1, 6-2, p234)
  
  Group
  Team
  Committee
When is MDM appropriate?
(L.O.51.1)

- Need for consensus
- Expertise is distributed among individuals
- Organizational commitment to decision is desired

“Decision making is more of a Process than an Event. It is more of an Inquiry than Advocacy.” MDM very suitable for the process (inquiry) view! (Garvin and Roberto, 2001)

Bottom line: Better decision making process should allow for: (1) Multiple Alternatives (2) Assumption Testing (3) Well-Defined Criteria (4) Dissent and Debate, and (5) Perceived Fairness (measured by level of continued participation).


Four Coordination Methods of Multi-participant Decision Making (Section 6.4) (Self reading L.O.51.2)

- Interactive group
  - Free for all
- Nominal Group Technique
  - Brainstorming
  - List of alternatives
  - Discussion on the alternatives
  - Preference selection
- Delphi Technique
- Arbitration
MDM Support Technologies: GDSS and Groupware

(L.O.51.3)

- Groupware: Computer-based systems that provides an interface to a shared environment to a group of people engaged in a common task.

Fundamental Support Levels for MDM (Table 6.7, p250)

(L.O.51.3)

- (Level 1) reduce communication barriers
- (Level 2) reduce uncertainty
- (Level 3) regulate decision processes
### Classification of MDM Technology

(Self reading L.O.51.3)

<table>
<thead>
<tr>
<th>Technology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electronic boardroom</td>
</tr>
<tr>
<td>Teleconference room</td>
</tr>
<tr>
<td>Group network</td>
</tr>
<tr>
<td>Information center</td>
</tr>
<tr>
<td>Collaboration laboratory</td>
</tr>
<tr>
<td>Decision room</td>
</tr>
</tbody>
</table>

### Technology Support for Collaboration Systems

(Self reading L.O.51.4)

<table>
<thead>
<tr>
<th>Technology</th>
</tr>
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<tbody>
<tr>
<td>Messaging systems</td>
</tr>
<tr>
<td>Conferencing systems</td>
</tr>
<tr>
<td>Coordination systems</td>
</tr>
<tr>
<td>Intelligent agent systems</td>
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</table>
Repeated from Part I: Varying Relevance of Communication Media Richness to support managerial work (consequently, different information systems) (C.O. 43-C.O. 44)

**Media Richness**

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- Equivocalness reduction (clarify, reach agreements; decide which questions to ask)
- Uncertainty reduction (obtain additional data; seek answers to explicit questions)

**Increasing potential richness of information**

<table>
<thead>
<tr>
<th>Task types(s)</th>
<th>Media for Group Communication System</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increasing potential richness required for task success</td>
<td>Computer systems</td>
</tr>
<tr>
<td>Generating ideas and plans</td>
<td>Good fit</td>
</tr>
<tr>
<td>Choosing correct answer: intellective tasks</td>
<td>Marginal fit Medium too constrained</td>
</tr>
<tr>
<td>Choosing preferred answer: judgment tasks</td>
<td>Poor fit Medium too constrained</td>
</tr>
<tr>
<td>Negotiating conflicts of interests</td>
<td>Poor fit Medium too constrained</td>
</tr>
</tbody>
</table>

L.O.51.5. The task characteristics and media richness fit for MDM
Effects Related to MDM Group Size
(L.O.53)

- Participant interaction tends to decrease with increase in size
- Affective or emotional relationships tend to decrease with increase in size
- Central, dominant leadership tends to increase with size
- Conflict is resolved with political rather than analytical solutions as size increases

Focus question - How can DSS/MDM’s help managerial work?

- Suitability of DSS/MDM in terms of task structure, decision context, and user. How is DSS/MDM adapted to fit the requirements of task, context, and user?
- Examine a decision situation of your choice and discuss desired DSS/MDM features. Form into your groups and based on your readings and what we've learned in class, list specific DSS & MDM components and what corresponding managerial impacts each may have. (For example: look at the structure of decision tasks, management level, user type, etc. Is DSS/MDM helpful? Why? Or Why not?)
- Identify detrimental effects of DSS/MDM. Can DSS/MDM contribute to making a bad decision and even to the downfall of an organization?
Part II – MDM Summary/ Review Questions

• When is Multi-participant Decision Making appropriate? Why?
• What are various MDM co-ordination methods? Compare. What are the three levels of MDM support technology? Examples?
• What is the task and media fitness matrix? What does it tell us?
• What are the effects of group size on MDM?

• (Part I + Part II) How can DSS/MDM help managerial decision making?

Part I: Appendix

• Further details of category 4 or a taxonomy of DSS (C.O. 48)
**File Drawer Systems**

- They are the simplest type of DSS
- Can provide access to data items
- Data is used to make a decision
- ATM Machine
- Use the balance to make transfer of funds decisions

**Data Analysis Systems**

- Provide access to data
- Allows data manipulation capabilities
- Airline Reservation system
- No more seats available
- Provide alternative flights you can use
- Use the info to make flight plans
Analysis Information Systems

- Provide access to multiple data sources
- Combines data from different sources
- Allows data analysis capabilities
- Compare growth in revenues to industry average - requires access to many sources
- The characteristic of the recent “datawarehouse” is similar

Accounting Models

- Use internal accounting data
- Provide accounting modeling capabilities
- Can not handle uncertainty
- Use s Bill of Material
- calculate production cost
- make pricing decisions
Representational Model

- Can incorporate uncertainty
- Uses models to solve decision problem using forecasts
- Can be used to augment the capabilities of Accounting models
- Use the demand data to forecast next year's demand
- Use the results to make inventory decisions.

Optimization Systems

- Used to estimate the effects of different decision alternative
- Based on optimization models
- Can incorporate uncertainty
- Assign sales force to territory
- Provide the best assignment schedule
Suggestion Systems

• A descriptive model used to suggest to the decision maker the best action
• A prescriptive model used to suggest to the decision maker the best action
• May incorporate an Expert System
• Applicant applies for personal loan
• use the system to recommend a decision

Part II: Appendix

• Example Collaborations Systems in Use and Groupware
Collaboration Systems in Use  
*(L.O.52)*

- **ForComment (Access Technologies)**  
  - Helps a group of writers and reviewers agree on the content of a document
- **Instant Update (ON Technologies)**  
  - Allows several user to write a document jointly
- **Lotus Notes (IBM)**  
  - Allows information distribution and scheduling
- **FlowPATH (Groupe Bull)**  
  - A work flow management system.

Groupware Products  
*(L.O.52)*

- Lotus Notes
- Microsoft Exchange
- GroupWise - Novell
- Oracle Office
- Team Office - ILC. Inc.
- Collabra - Netscape
Lotus NOTES

(L.O.52)

- A “groupware” that allows workgroups to create, store, distribute, replicate and share information and databases.
- Is built around four core technologies:
  - Security
  - Compound documents
  - Replications
  - Development Tools

Lotus NOTES

(L.O.52)

- Notes is built on three major functions:
  - Information Management
  - Document Formatting
  - Wide Area Communications
- Architecturally, NOTES has two parts
  - The Server Piece: Runs on the network
  - The Client Piece: Runs on Individual PC