: What is the ROMC design approach?

by Daniel J. Power

Editor, DSSResources.com

ROMC is an analysis and design method for user interfaces. Ralph Sprague and Eric Carlson (1982) proposed ROMC as an approach for designing a specialized decision support system. The method is especially useful for creating a DSS user interface. ROMC focuses on analyzing four user-oriented entities: 1) **R**epresentations or images for conveying information, 2) **O**perations for manipulating data displayed as representations, 3) aids for a user's memory (**M**emory aids), and 4) mechanisms for helping users control the system (**C**ontrol aids).

ROMC was intended as a process-independent approach for identifying the necessary capabilities of a specific computerized decision support system. It can also serve as a framework for creating screen designs and for building the user interface of a DSS. Understanding and analyzing the four components for a specific DSS can improve user interface design and screen layout.

Sprague and Carlson suggested the ROMC approach was a method to overcome problems with first generation DSS. The goal of ROMC was designing systems to provide better decision support. With improved capabilities and extensive experience building many diverse specific DSS, the user-oriented entities that we can create and envision are more sophisticated and more powerful. The following discussion attempts to update and explain the four entities.

Representations

A representation is a structured presentation of information and results. Decision-making activities take place in the context of an image or representation of information relevant to the activity. The representation used in a decision support system may be a chart, a map, a table, a text document, a few numbers, or an equation. The representation is a concrete conceptualization that communicates information about the decision situation to the user decision maker and others. Representations shape how a decision maker views the results from using a DSS. Representations of data are especially important -- data visualizations help draw conclusions and understand relationships. A decision maker may use the information representations to communication with others.

Representations provide a context in which users can interpret DSS outputs and select DSS operations. Representations also can be used to supply parameters for DSS operations. For example, a point selected on a graph or a map can be linked to a data value, a document or a database query. Also, the task of prioritizing a list (a representation) of employees may be the

primary input for a personnel scheduling DSS. Managers and DSS analysts need to evaluate and choose appropriate representations for each specific system.

Operations

Operations are specific tasks that a decision-maker can perform with a DSS. For example, a DSS may have operators to gather data, generate a report, retrieve alternatives, rate alternatives, add alternatives, etc. Note that an operation may be used in more than one activity and that there is usually no prespecified ordering of operations. Analysts need to decide how operations will be controlled from the user interface. Will menus be used? Icons? What names will be used for operations?

Memory Aids

Several types of memory aids should be provided in a DSS user interface to support the use of representations and operations. A symbolic link to a data warehouse is a memory aid for decision-makers. Triggers or rules remind a decision-maker that certain operations may need to be performed. A user profile or data filters may make operation of the DSS easier. User established links or command sequences could make the DSS easier for that user to manipulate.

A trigger may invoke an operation automatically or remind the DSS user to invoke the operation. A profile can store initial defaults for using the DSS. Users logs of actions taken and operations invoked are also memory aids, especially if the user can backup and undo actions of replay actions. DSS analysts need to identify needs for memory aids and decide how reminders will be displayed. The help system is an important memory aid that must be designed as part of the user interface. A mouse over label for an icon is also a memory aid.

Control Aids

DSS control aids are intended to help decision makers use representations, operations and memory aids. Control aids help decision makers direct the use of the DSS. One type of control aid focuses on the standard conventions for user-system interaction, which are enforced across representations and operations. This type of control aid uniformly displays menus or defines guidelines for icon design and behavior. Some tasks are more system oriented than decision process oriented and

these operational tasks are also control aids. Edit, Undo, Delete, and Save operations are generic control operations and hence they are also control mechanisms for a DSS. The tools used to create the user interface constrain and often prescribe the control aids.

Conclusions

One can identify representations, operations, memory aids and control mechanisms in any of the five general types of DSS, communications-driven, data-driven, document-driven, knowledge-driven and model-driven. The implementation needs vary and specific, tailored DSS are most often found in the later four categories. Communications-driven DSS are more general purpose and hence a specific off-the-shelf package is much less tailored to the decision process that it is intended to support. User interface design guidelines should also standardize the "look and feel" of the user interface. The user interface is a key factor in determining whether a decision support capability is used once it is built.

The ROMC framework is a useful tool for designing a computerized decision support user interface. Also, the ROMC specification of elements, along with screen layouts, can aid in implementing the actual DSS user interface. Every DSS will have a specific set of representations, operations, memory aids, and control aids. The
generality and usefulness of a DSS will depend on the skill of the designers in
selecting design elements. The focus of decision support user interface design should be on maximizing usability and creating a great user experience.

References

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Author: Daniel Power
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