

: What is Alter's DSS taxonomy?

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In the mid-1970s, the first wave of computerized decision support systems (DSS) became practical. Steven L. Alter, while a Ph.D. student at Massachusetts Institute of Technology, studied and classified these first wave DSS. Then in 1980, Alter published his taxonomy of computerized DSS in an influential scholarly professional book. Alter's first wave DSS taxonomy is based on the degree to which DSS output can directly determine a decision. Also, the taxonomy is related to a spectrum of generic operations that can be performed by decision support systems. So what is Alter's DSS taxonomy?

Alter's taxonomy is a simple classification of the DSS found in his research (cf., Alter, 1975). His taxonomy is anchored by generic decision support operations that extend along a single dimension, ranging from extremely data-oriented to extremely model-oriented. Alter's idea was that a decision support system could be categorized in terms of the generic operations it performs, independent of type of problem, functional area or decision perspective.

First wave DSS may involve retrieving a single item of information, providing a mechanism for ad hoc data analysis, providing pre-specified aggregations of data in the form of reports or "screens". DSS may also include estimating the consequences of proposed decisions and proposing decisions. Alter (1975) classified 56 DSS into seven distinct categories or types of DSS. His seven types include:

- **File drawer systems** that provide access to data items. Examples include real-time equipment monitoring, inventory reorder and monitoring systems. Simple query and reporting tools that access OLTP or a data mart fall into this category.
- **Data analysis systems** that support the manipulation of data by computerized tools tailored to a specific task and setting or by more general tools and operators. Examples include budget analysis and variance monitoring and analysis of investment opportunities. Most data warehouse applications would be categorized as data analysis systems.

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- **Analysis information systems** that provide access to a series of decision-oriented databases and small models. Examples include sales forecasting based on a marketing database, competitor analyses, product planning and analysis. Online Analytical Processing (OLAP) and Business Intelligence (BI) systems generally are in this category.
- **Accounting and financial model-based DSS** that calculate the consequences of possible actions. Examples include estimating profitability of a new product; analysis of operational plans using a goal-seeking capability, break-even analysis, and generating estimates of income statements and balance sheets. These types of models should be used with "What if?" or sensitivity analysis.
- **Representational model-based DSS** that estimate the consequences of actions on the basis of simulation models that include relationships that are causal as well as accounting definitions. Examples include a market response model, risk analysis models, and equipment and production simulations.
- **Optimization model-based DSS** that provide an optimal solution consistent with a series of constraints that can guide decision making. Examples include scheduling systems, resource allocation, and material usage optimization.
- **Suggestion DSS based on logic models** that perform the logical processing leading to a specific suggested decision for a fairly structured or well-understood task. Examples include insurance renewal rate calculation, an optimal bond-bidding model, a log cutting DSS, and credit scoring.

An understandable taxonomy or typology like Steven Alter's helps reduce the confusion for managers who are investigating and discussing decision support systems. The taxonomy also helps users and developers communicate their experiences with and expectations for DSS.

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Subsequent technology innovations have resulted in development of communications-driven and document-driven DSS and in major improvements in data-driven and knowledge-driven DSS (cf., Power, 2002, 2004). The expanded DSS framework (Power, 2001) combines the first three of Alter's seven types of DSS as data-driven DSS, and the second three as model-driven DSS, renames suggestion DSS as knowledge-driven DSS and adds two new categories, communications-driven and document-driven DSS.

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Last update: 2018-06-18 06:53