

: *How important is flexibility for a DSS?*

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In the early years of computerized decision support, Keen (1980) and Sprague and Carlson (1982) argued there was a need for building flexibility into the design of a decision support system. DSS was viewed as an adaptive design process. In Turban's influential DSS textbook (cf., fourth edition in 1995, p. 280), he abridged Sprague and Carlson's comments and ignored the nuances in their original analysis. Students in many DSS classes beginning in 1988 likely memorized that flexibility is very important and needed for a DSS. So is DSS flexibility important and a requirement for modern DSS? If so, what does flexibility mean?

Traditionally, the term flexibility refers to the range of movement of various parts of the human body. The term is also used to describe the ability to easily bend an object. In some contexts flexibility refers to a person or an organization's ability to adapt to different circumstances. The notion of adaptation of a DSS to changing circumstances and to a capability in a specific DSS to perform a wide range of tasks all seem part of what has become the flexibility goal for DSS developers.

If we look at a continuum from extremely flexible to extremely rigid DSS design, we would all think a system somewhere in the middle is best; using a dichotomy of flexible versus rigid would lead most people to choose a flexible DSS. So how we phrase the issue biases the response about system design.

Sprague and Carlson (1982) claimed "it is widely recognized that DSS must be flexible because the environment, the tasks, and users of DSS are subject to frequent change (p. 130)." They didn't really know what this meant for building DSS. My sense is that macro environmental change is more turbulent and rapid today, but that change for specific, operational DSS

is much slower. Sprague and Carlson listed four questions that needed to be resolved: 1) What does flexibility mean?

2) How much flexibility is good? Is it possible to have too much? 3) Are there any prescribed ways to accomplish flexibility? and 4) What technological capabilities are required? The questions remain relevant, but perhaps closer to resolution.

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According to Keen, flexibility is needed in DSS for six reasons:

First, "neither the user nor the builder is able to specify functional requirements in advance". Perhaps this was true 30 years ago, but this is much less of a problem for modern DSS. We have had enough experience that we usually can specify at least minimum requirements.

Second, "users do not know, or cannot articulate, what they want and need. Therefore they need an initial system to react to and improve upon". Again much has changed in 30 years, our DSS users are more sophisticated and vendors have case studies, off-the-shelf products and examples to illustrate possibilities. Potential users can choose a "set menu" or order a DSS "a la carte". I think today's managers have a much better idea of what they want and with expert consultation they can articulate their decision support needs.

Third, "the users' concept of the task, and perception of the nature of the problem, changes as the system is used". This does happen, but greater familiarity with DSS and information technologies lessens the magnitude of perceptual change. Many manager's have used various DSS during their careers even if called something else.

Fourth, "actual uses of DSS are almost always different from those originally intended". While this may have been true in the early days of DSS and information technology and while unanticipated uses can occur, the reality is that most well-designed modern DSS are primarily used as they were intended. We can build effective DSS.

Fifth, "solutions derived through a DSS are subjective". This is true for some DSS, notably model-driven and knowledge-driven DSS. So in those systems we include capabilities like sensitivity analysis and explanation capabilities. This designed flexibility is still important in such systems.

Sixth, "there are wide variations among individuals in how they use DSS". This issue has been debated and research on individual difference and the impact on DSS usage has been inconclusive. My sense is the impact of individual differences is more on the amount of use, the impact of use on decisions and the willingness to use a computerized system, rather than on "how they use DSS". So some flexibility in choosing charts versus graphs for information display may be useful, but most managers are too

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busy to customize the user interface or to make major changes in the defaults for a DSS.

Originally Sprague and Carlson defined a taxonomy of DSS flexibility with four levels. The four levels are: 1) user flexibility to solve issues, 2) user/builder flexibility to modify the specific DSS, 3) builder flexibility to modify and adapt and build new specific DSS, and 4) ability of the DSS to evolve. Flexibility remains a complex, multi-faceted concept.

So is each level of flexibility still important? Providing some flexibility to users is especially important for model-driven DSS. Modifying a DSS is sometimes needed and incremental design remains a common approach. Today, flexibility for user/builders is common. Builders have sophisticated, flexible development tools on many platforms. Most DSS development tools for any type of DSS help builders create, customize and modify a DSS. Finally, builders do "evolve" DSS and have for 30 years. Our knowledge has evolved much more than any DSS we might have built at any time in the past 30 years. We know much more about computerized decision support.

In conclusion, modern DSS are more technologically sophisticated, more powerful and definitely better than the systems of the late 1970s. We still need some flexibility in specific systems, but flexibility is not the ultimate design goal for a specific DSS or for a DSS generator. Modern DSS are much more sophisticated than first generation DSS and today it is much easier to add flexibility for users of modern DSS when that is desirable.

References

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