: Do DSS builders assume their targeted users are rational thinkers?

by Dan Power

Editor, DSSResources.com

Attitudes that we, as DSS builders, have toward potential users of a proposed DSS influences our design choices, but we also need to be realistic about the biases and limitations of our targeted users. Are our targeted users rational?

Rationality is "the quality of being consistent with or based on logic." Some definitions also assert rationality is “the state of having good sense and sound judgment.” So rational thinkers base decisions on logic and have good sense and sound judgment. We would like to think the targeted users of a planned DSS have these qualities, but is it true in all domain of development or in any of them?

In the domain of supporting global sustainability Ekbia and Reynolds (2007) note “Various writers have criticized the classical rational/technical solutions commonly employed in DSS” … but they argue “perceived limitations of rational models in contemporary DSS might be more a consequence of our methods or of how we have chosen to employ them.” Is the problem our methods or the assumptions we make about are targeted users?

Computerized decision support systems serve many purposes and are built using many differing technologies. Each DSS has a targeted user group and DSS builders must make assumptions about the characteristics, behaviors and attitudes of targeted users. As we explore creating innovative DSS to provide knowledge and information to analysts and decision makers who are assessing actions that impact the sustainability of global systems, we must examine our underlying assumptions about DSS users.

Rational thinking and evidence-based decision making seem crucial to effective use of data- and model-driven DSS, but should we assume the politicians and bureaucrats using DSS relevant to sustainability decisions are rational thinkers? If not, can we support political decision making with DSS?

Are people capable of "rational" thought? What is rationality? The Hyperdictionary defines rationality

as "the quality of being consistent with or based on logic." The definition also states rationality is “the state of having good sense and sound judgment.” So rational thinkers base decisions on logic and have good sense and sound judgment. Wouldn’t we all like to think the targeted users of a planned DSS have these qualities? YES.

Rationality has been used in philosophy to characterize a number of theories that presume human kind is seeking truth, is exercising “higher order” reasoning capabilities or that some people are knowledgeable and logical. According to WordIQ, “A logical argument is sometimes described as rational if it is logically valid. However, rationality is a much broader term than logic, as it includes ‘uncertain but sensible’ arguments based on probability, expectation, personal experience and the like, whereas logic deals principally with provable facts and demonstrably valid relations between them. … In economics, sociology, and political science, a decision or situation is often called rational if it is in some sense optimal, and individuals or organizations are often called rational if they tend to act somehow optimally in pursuit of their goals.”

The term “bounded rationality” is used by Herbert Simon and others to described rational choice behavior that takes into account the cognitive limitations of both knowledge and cognitive capacity. Perhaps assuming our target users are rational in a narrow sphere is more appropriate, but does it help make design decisions?

So are we concerned about whether all people have this capability for rational thinking or just whether our targeted users are capable of rational thought? Some argue Nietzsche and Freud demonstrated that all people are incapable of rational thought. Nietzsche argues "In Twilight of the Idols" that human thought is not really based on reason, but that humans can mistake their approaches and incorrectly identify them as rational.

According to Nietzsche, decision-making is rarely rational because it is often influenced adversely by the error of confusing cause and effect; the error of false causality; and the error of imaginary causes.

Also, the research on decision biases should be taken into account when building a DSS ... but knowing how to reduce human bias while using a DSS is still a troubling challenge. For example, Tversky and Kahneman (1974) showed making estimates can be influenced by the value used as a starting point. This has been called the anchoring and adjustment phenomenon. Also, behavioral research has demonstrated that people display overconfidence in most situations. People think they know more than they really do.

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As a DSS builder my working assumption has always been that the serious users of a DSS were interacting with the system to improve the quality of the decision that was made. The DSS users wanted to be rational in their analysis and selection of a course of action. One can argue that the user of a data-driven DSS may use the system to bolster a choice that was previously made with newly found "facts". Perhaps ... it seems plausible that using a data-driven DSS to support rationalizing might alter the previously made decision as well.

One might ask what would we do differently if people weren't rational when we built a DSS? Would one want to cater to whims and biases to encourage use of the system? Or would one want to focus more on decision automation?

At best my conclusion is that many managers and responsible decision makers attempt to be rational, wise and thoughtful in their decision-making. DSS builders should try to reinforce the intended rationality of the targeted user of a specific DSS. When one builds a model-driven DSS the assumptions of the quantitative model should be explicit and understandable. A DSS builder must work to avoid introducing "irrationality" into the modeling process. When simplifications are made in the construction of a DSS, then the builder must make sure the user can understand the trade-off that was made.

A few years ago I chaired a panel on the philosophical foundations of Decision Support Systems at the AMCIS meeting in Boston. Both Jim Courtney and George Widmeyer focused on C. Wes Churchman’s work and that of his mentor Singer. As a Ph.D. student I was heavily influenced by Churchman's book "The Design of Inquiring Systems", but I must admit it is a challenging book to read. Churchman presents a vision of a general inquiring system and various approaches to constructing such a system. My desire in building DSS has never been so sweeping. My thinking about reason and rationality was also strongly influenced by John Dewey's book titled "How we think". So pragmatism has strongly impacted my approach to systems design.

As a technologist I don't often dwell in the depths of the philosophical foundations of DSS. The practice of building DSS is much guided by what works and that is perhaps as it should be given the demands placed upon DSS builders by the users of computerized DSS.

So to those who build DSS I suggest a bit of introspection. What do you assume about your intended users? Are they sophisticated, rational managers? Are your users technology illiterates who are prone to make mistakes when they use a computerized system? Are you trying to "bullet proof" the application to avoid stupid errors? Are your intended users trying to make fact-based decisions?

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This topic is perplexing from a design standpoint. No computerized system can force a person to act in a rational way when that is not the person's goal and no DSS can guarantee a rational solution to a complex problem or guarantee that the correct facts about a situation will be uncovered or that relevant knowledge will be applied to resolve problems. DSS can help us struggle more effectively with the challenge of decision making and planning in a rapidly changing, complex, uncertain, information rich situation that we have had some experience with resolving. People need to grapple with novel, unique decision situations as best they can. Perhaps a general purpose decision structuring program will assist in such a situation, but success in such a situation is lodged in the creative, adaptive mind of the human decision maker.

We know the targeted users of a DSS will differ based upon the specific system that is being built in a specific organization. Some systems may have a goal of increasing rationality in a specific situation. Other systems may only enhance the intended or desired rationality of the targeted decision makers. I build Decision Support Systems because I believe at least some people are capable of "rational" thought. I believe a well-designed Decision Support System can encourage "rational" thinking in a specific decision situation.

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Author: Daniel Power
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