

: What is the relation between Design Science and building DSS?

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For many years, there has been an interest in transferring the concepts and techniques from the broad field of Design Science to designing, building and implementing decision support capabilities and systems. Decision support systems (DSS) should be systematically designed and implemented. Decision support researchers have been conducting and publishing design science research for many years, but the increased credibility of designing software artifacts and studying them using scientific methods has encouraged software development and testing by academic researchers. So what does advocating more decision support design science research mean? Overall, it means we need to better understand design science and determine what constitutes "good" design science research.

According to Hevner and March (2004), "The goal of design-science research is the development and evaluation of technologies that extend the boundaries of human and organizational information-processing capabilities demonstrating the utility of such technologies to address problems or tasks not previously thought to be amenable to IT support (p. 109)." Design science research is about building **innovative** technology systems including Decision Support Systems and then evaluating them.

Decision science attempts to impact outcomes and improve performance of artifacts like a software package or a physical device. Design science is much more than software usability testing. Design science is about the entire development process. The methods of usability testing like user satisfaction questionnaires, eye tracking and observation are used in design science research. Expert reviews are another general method of usability testing. Defining the experts can however be challenging. Other methods developed for academic empirical research like controlled experiments or mixed quantitative and qualitative methods can potentially improve usability testing. Design science involves building and testing artifacts that solve a novel or previously unsolved problem or provide a more effective solution to a routine "solved" problem. One hopes that more design science research will lead to improved IT systems and methods in practice.

Based on a Google search it seems that R. Buckminster Fuller is the intellectual father of design science. So the roots of design science are in the disciplines of architecture and engineering. At the Buckminster Fuller Institute web site (<http://www.bfi.org/designsc.htm>), one finds an answer to the question "What is design science?" The FAQ page states "Design Science is a problem solving approach which entails a rigorous, systematic study of the deliberate ordering of the components in our Universe. Fuller believed that this study needs to be comprehensive in order to gain a global perspective when pursuing solutions to problems humanity is facing."

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At the site, Fuller is quoted "The function of what I call design science is to solve problems by introducing into the environment new artifacts, the availability of which will induce their spontaneous employment by humans and thus, coincidentally, cause humans to abandon their previous problem-producing behaviors and devices."

Fuller was a technologist who encouraged invention and innovation. For many years engineering science has focused on the creation of "artifacts" and some ITS researchers need to follow that path. The term "artifact" is perhaps the way anthropologists in a 1000 years will describe our DSS, but in the present we need to focus on inventing innovative systems and technologies for supporting decision makers. An artifact is a general term for something made by people.

"Good" decision support design science begins with identifying a purpose for creating a decision support artifact, then exploring current artifact solutions, then building a specific artifact, then testing the new artifact for usability, and finally and most importantly determining how well the new artifact accomplishes the intended purpose.

Decision support and analytics practitioners and researchers need to distinguish between accident and design when building systems. Decision support artifacts **should be** consciously designed! In the years ahead, we must promote both the science and art of effective decision support design. Both information systems practitioners and academic researchers must work together to explore innovative ways of using technology to support decision makers and enhance decision processes. Design science can improve the design, building and implementation of computerized decision support.

References

Buckminster Fuller Institute web site, <http://www.bfi.org/designsc.htm> .

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