

Exploring Design as a Research Activity

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ABSTRACT

Design research is a knowledge generating activity, yielding a valuable resource for a science of design. It extrapolates this knowledge in the form of design criteria, criteria weighting, design alternatives, and general rules for choosing between alternatives and deciding on criteria. Unlike the disciplines that have traditionally informed design research, design research as a field of its own has no agreed upon methods for evaluating its own work. Taken a step further, the criteria for what is and is not design research itself is vague at best.

Author Keywords

Design research, design activity, science of design

ACM Classification Keywords

H.0. Information Systems: General.

INTRODUCTION

Design activity consists of bringing together the organized components of the machine and interfacing them in a particular way with the outer environment (Simon, 1996). Recently, the NSF CISE program on Science of Design highlighted the importance of design in the development of interactive systems <http://ncl.cgu.edu/designconference/>. However, a shared conceptualization of what constitutes design research and how it can contribute to design process is still unclear. This workshop seeks to conceptualize design research and how it should be conducted.

Possible topics of discussion include but are not limited to:

- What are the characteristics and qualities of design research?
- How should we evaluate design research?
- Who has a stake in the outcome of design research?
- What knowledge results from design research?
- Are new research methods needed to improve design studies?
- The role of theory in design research?
- Are designs theories?
- Design research and the academic.

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SCIENCE OF THE ARTIFICIAL

Simon (1996) set about to define design as a science of the artificial. He contrasts it with *natural science*—a body of knowledge regarding objects or phenomena that explain how they interact with each other—by describing it as a body of knowledge about *artificial* objects and phenomena designed to meet particular goals. Simon makes a distinction between inner environment and outer environment with respect to designed artifacts. The outer environment consists of all the external forces that act on the artifact. The inner environment consists of the organized components that make up the artifact, including the relationships between the components. Both inner and outer environments constrain the artifact. Design activity consists of bringing together the organized, inner environment components and interfacing them in a particular way with the artifact's outer environment.

SCIENCE OF DESIGN

The interest in furthering our understanding of design has been made apparent by both the introduction of a Science of Design program within the National Science Foundation's funding opportunities, as well as the First International Conference on Design Science Research in Information Systems and Technology (DSRIST). Both call for research on the scientific study of the design of systems that perform computing, communication, or information processing tasks. While the NSF's Science of Design solicitation has prompted an outpouring of work devoted to the methods, processes, and systems that inform or contribute to design; the field has not yet formalized a conception of what constitutes design that can allow researchers to meaningfully share work and knowledge.

As the Science of Design program has made clear, this research effort requires a foundation of “theoretical and empirical knowledge on design, computational methods and tools for design, and new design curriculum for the next generation of designers” (National Science Foundation, n.d002E). DSRIST brought together researchers from disciplines ranging from computer science to social ethnography, demonstrating that this space can be informed by the foundations of many established disciplines, but as yet, the discipline of Design itself has had no boundaries drawn.

IMPETUS FOR WORKSHOP

The focus of DSRIST was to discuss solutions to emerging problems in information systems, running a gamut from business intelligence and peer-to-peer systems to systems

design, demonstrating the breadth of topics in the space of design. Researchers also discussed the space of design science, in regard to both its borders with action science and its future in information systems.

Design research presents major epistemological questions. What is design, what is the nature of design, and can it be researched? Answering those questions would help us to understand the nature and value of knowledge generated by design research; however, it is unlikely that such questions can be answered directly. Through researching the relationship between the design process and the technologies that emerge from it, we can reverse engineer answers to those fundamental questions.

FUSION OF HORIZONS

The goal of this workshop is not to develop a single definition or conceptualization of design as a research activity. At the same time, we don't want to create an anarchistic conceptualization of design, where anything goes and researchers find their conceptualizations to be incommensurable.

We will draw upon Gadamer's hermeneutics and the concept of play as a framework for facilitating the notion of design as a research activity in this workshop. The structure of play absorbs the player into itself, releasing him from the burden of initiative as the to-and-fro movement of the play follows itself (Gadamer, 1960). In this workshop, play consists of the playful discourse engaged in by the participants, whose role is to engage in the to-and-fro motion of ideas, not as a competitive act but as a means of expanding their horizons of understanding.

The concept of play is a construct that leads to a fusion of horizons. A fusion of horizons consists of interfacing with others to extend our understanding of a particular subject through the incorporation of others' conceptualizations and experience into our own. It requires that we stretch beyond our own historical circumstances that have led to our current understanding, and engage in a playful discourse that facilitates the expansion of our conceptual horizons. This fusion accomplishes two fundamental things: it facilitates an awareness of our individual limitations through the recognition of our own horizons, and it provides us a metaphor through which we can integrate others' ideas and concepts into our own.

The concepts of play and fusing of horizons is the frame through which we will explore design as a research activity. By adopting a Gadamerian hermeneutic, participants will be able to enrich their own understanding of design and develop a 'playing field' in which they can continue to expand their horizons with other 'players.'

WORKSHOP PLAN

The first half of the day will entail the participants giving presentations on their position papers. As the position papers

are presented we will create a concept map of terms and criteria presented.

The second half of the day will be a hermeneutic discourse regarding the morning's presentations and the development of a fused concept map that the participants will be able to use as a tool for communication and exchange of knowledge regarding their design research activity. Participants are encouraged to bring examples of design research to inform our discussion and concept map.

ORGANIZERS' BACKGROUNDS

Blaine Hoffman is a PhD student in the College of Information Sciences and Technology at the Pennsylvania State University. He received a B.S. at Denison University majoring in both computer science and communication.

Helena Mentis is a PhD student in Information Sciences and Technology at Penn State University and a systems engineer at Lockheed Martin-MS2. Her research area is emotion in human-computer interaction.

Matthew Peters is a PhD student in Information Sciences & Technology at the Pennsylvania State University; focusing on human-computer interaction, specifically design of instructional technologies to support informal and extra-curricular learning.

David Saab is a PhD student in Information Sciences and Technology at Penn State. He has over 15 years experience in facilitating classes and workshops in process improvement; intercultural communication, interaction, and technology transfer; and research methods.

Steve Schweitzer is a Major in the US Army and a PhD student in Information Sciences and Technology at Penn State. He has a Master's in Aerospace Engineering and taught Computer Aided Design and Experimental Aeronautics at the United States Military Academy for 4 years.

James Spielvogel is a first-year graduate student in the Masters program in the College of Information Sciences and Technology. He received a B.S. in Information Sciences and Technology at Penn State.

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