

Design Methodology is not Design Science

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ABSTRACT

This paper argues that design methodology cannot become the science of design. A method does not constitute a science. Moreover, in the same way that biology is not a science of how biologists work, design science cannot be a science of how designers work.

Author Keywords

Design, science, methodology

ACM Classification Keywords

H5.0. Information interfaces and presentation (e.g., HCI): General.

INTRODUCTION

It is custom to submit papers to workshops that support the fundamental ideas of the workshop. When I read about the "Converging on a Science of Design through the Synthesis of Design Methodologies" workshop I felt obliged to do the opposite. In this paper I will challenge the goal of this workshop to converge on a science of the design through converging of design methodologies. This will probably raise the eyebrows of the organizers and maybe also of the workshop participants. However, it is the nature of science that truth remains truth, independently of what people think of it. This quest for truth is fueled through dialectic discussion and I hope that this manuscript will spark an open dialogue about the goal and status of design in the HCI community.

DISCUSSION

Besides the workshop title, the description also states that the workshop will focus on design methodology and that it will "make a contribution to the establishment of design as a science." While the definition of a design science is a noble goal, the method chosen appears flawed. Science consists of a method to observe and abstract reality into models that are then used to explain and predict reality (see Figure 1). Newton's law of gravity, for example, explains why an apple hit Isaac Newton and it also helps us to predict the position of the planets in the future. The various sciences claim certain parts of reality as their phenomena under investigation.



Figure 1: scientific process

The method of science is to some degree universal and is often referred to as the 'scientific method'. The scientific method is a body of techniques for investigating phenomena and acquiring new knowledge, as well as for correcting and integrating previous knowledge. It is based on gathering observable, empirical, measurable evidence, subject to the principles of reasoning. Chalmer (1999) provides a fair discussion of the scientific method. However, a methodology in itself can never constitute a science. Lets take the example of the dissection method. Biologists may use dissection to analyze animals, but also butchers use it to cut steaks. The method is the same, but one results in scientific knowledge, while the other in a delicious meal. Moreover, in the same way that biology is not a science of how biologists work, design science cannot be a science of how designers work. Even converging on a specific design method cannot overcome this conceptual limitation. Again: a method does not constitute a science and design methodology cannot be the phenomena of design science. The goal of the workshop to create a design science cannot be achieved by converging on a design method.

The sciences distinguish themselves not through their methods, but through the phenomena they investigate. Biology, for example, is the science of living organisms. What a design science is primarily missing is a phenomenon. The problem becomes clearer when we consider that design's prime objective lays in the intersection between artifacts and users (see Figure 2). Designers contribute to the creation of artifacts that interact with humans.

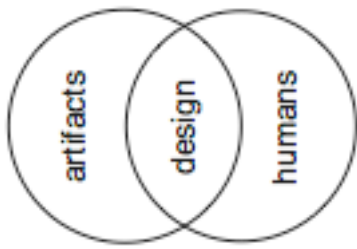


Figure 2: Framework of Design

Everything there is to know about the artifact (left side Figure 2) is available from its manufacturer. All its dimensions, material properties and functions are known. The artifacts are therefore not good phenomena to investigate. The creation of new materials and operational principles has also already been claimed by engineering and physics. Engineers also discussed rational design methodology that heavily relies on mathematics (Alexander, 1964; Simon, 1996; Vincenti, 1990). Interestingly, these rational design methodologies have not been included in the description of the workshop even though they have one fundamental characteristic that brings them closer to science: the results produced through these methods are objective. This means that the results are independent of the designer who applies them. This independence is a major step forward into the direction of generalizability.

On the other side (right side Figure 2), understanding humans is the prime objective of medicine, anthropology and psychology. Design science would have difficulties competing. Even "Design methodology", or to be more general, "human problem solving", has already been treated as a phenomena investigated by psychologist (Dorfman, Shames, & Kihlstrom, 1996; Feist, 1994).

As we can see, both, artifacts and humans have been claimed as phenomena by physics, engineering, psychology and medicine. The definition of a design phenomenon is possibly the most urgent step in the development of a design science.

When we take a look at the body of scientific knowledge, it has been engineers again that attempted to create a consistent and logical body of knowledge (Hubka & Eder, 1996; Vincenti, 1990). As we can see, the arena of design science is filled with actors and it is one may ask then why the designers in the HCI community are so keen on turning design into a science? Design has been criticized by the academic section of the HCI community to be non-scientific. An example of this conflict occurred at the 2005 SIGCHI membership meeting. The organization of the CHI2006 was discussed, which ignited a shouting match between academics and practitioners (Arnowitz & Dykstra-Erickson, 2005). Both groups defended their access to the conference through the different publication formats, such as papers, sessions, panels, and case studies. At the conference itself the conflict reoccurred in the "Design:

Creative and Historical Perspectives" session. Paul Dourish took the role of defending the science of ethnography against its degradation to a service provided to designers (Dourish, 2006). Next, Tracee Verring Wolf and Jennifer Rode defended creative design against the scientific criticism by referring to design rigor (Wolf, Rode, Sussman, & Kellogg, 2006). Both groups felt the need to defend themselves, which indicated that both had the feeling of being under attack. Trying to defend design by claiming that it is scientific may appear to be a good response to the academic criticism, and designers are naturally attracted by the quality label of science. Chalmer (1999) pointed out that:

Science is highly esteemed. Apparently it is a widely held belief that there is something special about science and its methods. The naming of some claim or line of reasoning or piece of research "scientific" is done in a way that is intended to imply some kind of merit or special kind of reliability.

It is a noble goal to create good and reliable design, but this may not be achieved by using the scientific method and neither may the claim of a design science be a good response to the academic criticism. Not everything has to be scientific and designers are playing an important role in the creation of artifacts. They should be proud of the role they play in the HCI community. Discussions on design methodology are a good step forward to further improve design practice. A CHI workshop is a good forum for such a discussion. However, for reasons explained above, it may not be wise to claim that this would lead to a design science. A possible better name for the workshop might have been "Converging on Good Design through the Synthesis of Design Methodologies".

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