

Artefacts as Research

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ABSTRACT

This paper contributes to the discussion about the role of design in HCI research. The word Design is described both as a process, a practice and a product. It is argued that design is important to HCI research all these ways. A case study about an interdisciplinary project, called Brainball, is presented to exemplify the discussion. It is argued that design practitioners are important when it comes to materializing abstract ideas and that this embodiment of knowledge is important to fully understand a new artefact. Design is also needed in a research context to change and challenge prevailing norms. Finally it is argued that knowledge always is situated and exists in a certain context of use. To communicate knowledge, it needs to take a physical shape, to be designed, into an artefact. Challenging the dichotomy between theory and practice might be the most important contribution by design to research.

Author Keywords

Design, Research, Artefacts, Theory/Practice

INTRODUCTION

Design is a word with many meanings and uses, but the central meaning is to decide *how things ought to be*. While history studies things that have taken place and natural sciences studies what is actually the case – design explores what might become. [2,5] In that sense design is central to every discipline that creates artefacts for human use and that will affect the way we live. As long as HCI researchers only concern themselves with studies and evaluations of things that already exist, then design is not central, it is just one of many parameters. But when these researchers work with how the future ought to be: homes, workplaces, education, transport and so on, then design becomes “skill one” in Normans words.

The meaning of design

To clarify the discussion I would like to distinguish between three main meanings of design: a) process, b) profession, c) product.

- a) The *design process* refers to construction and problem-solving in general. This is what Herbert Simon refers to in his very broad definition: “*Everyone designs who devices a course of action aimed at changing existing situations into preferred ones.*” [5] Design as process refers to the general, inherent human ability to conceive, create and change the future - something we all share. In this respect everything created by human beings as part of a planning process is design, including an academic paper, a piece of music or a service.
- b) The second aspect, the *Design practice* [6] refers to an activity, which is to decide the properties and shape of a physical artefact. People trained in this practice are experts in solving complex problems and to visualise and materialise the result aimed at a certain end user in a technical and economical context. Their main competence is in the field of *practical aesthetics*. They have the knowledge to give form to abstract ideas, to find appropriate metaphors and to make artefacts attractive and usable.
- c) The *Design as product* is the third aspect and refers to the *physical form* of an artefact, that is; the end result and object of the design process or design profession. Judy Attfield [1] describes design as ‘things with an attitude’ - created with a specific end in view – “*Whether to fulfil a particular task, to make a statement, to objectify moral values, to express individual or group identity, to denote status or demonstrate technological prowess, to exercise social control or to flaunt political power.*”

All these aspects are important to HCI but on different levels. Design as process is central to anybody that works with how things ought to be. Design as practice is one of the many competencies that are needed to create a good IT

artefact. The end result, the product, should have a design that is suitable to its target group and use.

What is the role of design in research?

Firstly I would argue that design, as process is central for all research that is concerned with creating the future. But that is not enough. Dahlbom [2] criticises Simon's definition of design because it makes design synonymous with planning, decision making and problem solving in general. *"An interest in the process of design rather than in its products will turn the sciences of the artificial into methodological disciplines, rather than substantive sciences of our artificial world."* A science of the artificial, claims Dahlbom, is a normative, design oriented study of the qualities of the artefacts in use. Besides general problem solving, we need the ability to give form, to realize an idea to a concrete artefact and this is professional designers come in.

To exemplify I will give a short account of a research project where design was central.

The making of Brainball

Brainball was the result of a one-week workshop in the Smart studio at Interactive Institute. The objective was to have a short project where all studio members would work together, technicians, designers, artists and HCI researchers. After a Brainstorming session we decided to work with biosensors and build a game where you compete in relaxation. [4]

Brainball is a game where the two players are seated opposite each other. (See figure one) A headband with electrodes reads the player's brain activity using an electroencephalogram (EEG). On the table between the players a small ball is rolling towards the person who is least relaxed, you score goal when the ball reaches the opposite player. Next to the table is a display of the players' brain activity and the current state of the game. Brainball can best be described as an anti-game. In most games success is achieved as a result of activity, decision-making, and physical coordination. In Brainball none of these capabilities counts. Here the goal of the players is to achieve—nothing. It has come to embody issues about stress and burnout and the complex task in contemporary life of having to be able to simultaneously relax and compete.

Brainball has received honorary mention at Ars Electronica 2000 and was ranked the 4th most interesting attraction at the world exhibition in Hanover 2000. It has been showed at BBC's Tomorrow's World as well as a hundred other occasions in Television, fairs and exhibitions. Brainball has been played by over 300 000 people, including Brian Eno, Yoga Gurus and the prime minister of Sweden.



Figure 1. Brainball

The Dutch IT Journalist Robert van Weperen called Brainball "The best invention since Internet".

We are confident that Brainball owes its value to the multidisciplinary team that stood behind it. The project is a mixture of technical courage, conceptual sharpness, and prototype-building efficiency that is not found in only one profession. Software designers alone would not have had the knowledge and the persistence to go through the difficulties of translating a two-dimensional interface to a three-dimensional one. After all, an image of a ball moving on a screen would not have been as fascinating as a real ball rolling on a real table. Designers and artists are used to work from the materials at hand and come up with solutions that have a certain quality of experience.

Materialising ideas

There are a number of conclusions to be drawn from this study. One is that design practitioners are useful for materialising abstract ideas and that it is important to have a competence for practical aesthetics in a research project. Something important happens when an idea is transformed to a concrete artefact that can be experienced. The experience and use gives a dimension to the research issue that is beyond merely observation and reflection. Some issues need a material embodiment to be raised and discussed. Brainball does in itself embody well-known issues about competition, stress and relaxation but with a totally new and inexperienced angle. It also demonstrated that IT-games do not have to be a lot of lights, sounds and violence to be captivating. There are numerous opportunities in exploring games for relaxation, biofeedback and self-knowledge that incorporated more than hand to eye interaction.

The case demonstrated that there is need for design practice in more areas than commercial product development. In a commercial context the strong reality forming ability

becomes a way to maintain norms, in a research context it may be a way to change and challenge them.

Designers usually start from a vague idea that is realised in a dialogue with the situation and the material at hand, while conventional research (ideally) start from an explicit plan that is subsequently implemented. In conventional research the final result of the work is not an artefact but the paper presented at a conference. Therefore they have a need to make the project explicit during the work it. For conventional art and design there are no such requirements of a post-product reflection. The artefact itself and how it is received by the users/audience is the main goal. But when designers become researchers and researchers designers these habits, ambitions and conventions are destabilized. Designers are forced to reflect about their practice and researchers to be more materially concrete. The Brainball case also shows some of the difficulties in combining a typical design practice with a reflective approach. Reflecting - *on* - action is not possible while acting; it needs distance, analogues and concepts that can be used on the practice. To develop tools for such a reflection is part of an agenda in design oriented or design based research. Donald Schön remarks that you have to *do* something before you can *understand* it [6]. This is a good argument for professional designers to get involved in research and for HCI researchers to get involved in design.

Theory versus practice

I would therefore argue against Fallmans [3] view that the goal for *HCI inspired design* is to produce *artefacts* whereas the goal for *Design inspired HCI* is to produce *knowledge*. Fallman is creating a dichotomy between knowledge and matter which is old, but still very unfortunate. Knowledge is not something immaterial floating around in space. It needs to take a concrete form to be understood by us humans, usually in the form of a report or a conference paper - which are artefacts. Knowledge is always situated and exists in a certain context of use. The goal of design is not to create “any” product but achieve a certain goal with this product. The product is thus informed by knowledge and embodies knowledge (in ergonomic, aesthetics, technology) just as much as a conference paper

does. The knowledge embedded in the artefact, the paper or the product, are however not readily available to anybody. It requires a certain pre-knowledge of the subject and knowledge about how to “read” and interpret the artefact. Understanding is facilitated by certain common rules and norms about how to materialise the content that is shared by everybody in the area. The CHI formatting rules is such a shared form. Like the Graphic User Interface it creates a common norm for how information is presented and structured. “Knowledge” is therefore just as designed as any other product.

Theory/practice are one of the dichotomies that have left deep imprints in modern society. Like other dichotomies such as man/woman, culture/nature, they form our way to understand reality and are aligned with a cluster of symbolic attributes. Introducing designers to research might change this relation. Perhaps it will be the most important contribution by design to HCI research.

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