Users, designers and dilemmas of expertise

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Abstract

Studies of user involvement have concentrated on the potential for users to contribute more to the design process. Especially for inclusive design processes, incorporating the expertise of potential users in the design process is a necessity. Designers have, however, their own expertise and it takes years of practice to become an expert designer. To solve this dilemma, insight is needed in how expertise of users relates to expertise of designers and how to make use of both in the design process. This research aims at indicating key factors in the relationship between expertise and inclusion, by confronting literature on design expertise with that on user involvement. We illustrate the dilemmas with an example in the construction industry. We conclude that to deal with the dilemmas of expertise, communication between different levels of expertise should be facilitated. More research is needed to develop support for such communication.

Keywords: users, designers, expertise, communication

1. Introduction

Studies of user involvement have concentrated on the potential for users to contribute more to the design process. Several approaches to user involvement have been developed, from user representation to users as co-designers. For inclusive design, the needs of the widest possible audience must be identified. Incorporating the expertise of potential users in the design process is thus a necessity for inclusive design processes. It is, however, not yet clear which kind of user involvement is most appropriate, given the fact that designers have their own expertise and that it takes years of practice to become an expert designer. To solve this dilemma, insight is needed in how expertise of users relates to expertise of designers and how to make use of both in the design process.

The objective of this research is to indicate key factors in the relationship between expertise and inclusion, by confronting literature on design expertise with that on user involvement, in order to develop support how to deal with the dilemmas of expertise regarding the challenges of inclusivity.

We base our research on a literature study on design expertise and user involvement and confront the results with each other. In the confrontation, in Section 3, we focus on

the dilemmas of expertise and we try to indicate key factors in the relation between design expertise and inclusion. An example in construction industry, the field the first two authors are familiar with, is used to illustrate the dilemmas of expertise (in Section 4). Preliminary recommendations about how to deal with the dilemmas of expertise are given in Section 5.

2. Literature on user involvement and design expertise

2.1 User involvement

Studies of user involvement have concentrated on the potential for users to contribute more to the design process (Alexander, 1977; Cross, 1972; Devereux, 1960; Rittel and Webber, 1984; Sanoff, 1990). Kujala (2003) concludes, based on an review of the benefits and challenges of user involvement, that the literature suggests that user involvement has generally positive effects, especially on user satisfaction, and some evidence exist to suggest that taking users as a primary source is an effective means of requirements capture. Similar conclusions are drawn by Dewulf and van Meel (2003) and Granath et al. (1996).

Involving users in analysis and evaluation is relatively uncontroversial but there is a variation in exactly how much one wants to involve the user, and the way such intentions are expressed (Olson, 2004). Olson identified several degrees of user involvement: from users as designers and co-designers, over user collaboration and user participation, to continuous user access and user contact, and ending with users represented through personas and designers thinking about users. According to Olson (2004), designers must realise that regardless of the kind of user involvement, it does not mean that users will be able to provide upfront, straight answers or requirements on the new system. Designers are the ones who must transform task and domain knowledge, perhaps delivered in narrative form, into requirements.

Especially for inclusive design processes, incorporating the expertise of users in the design process seems a good idea. Luck (2003) shows that the ideology of inclusive design is similar to the ideology of participatory design (one of the approaches to involve users). But which kind of user involvement is most appropriate for inclusive design? To answer this question, we first have to know how the expertise of users relates to the expertise of designers.

2.2 Design expertise

Design expertise got recently much attention in the design research field, given the special issues of Design Studies and The Journal of Design Research on expertise in design that have recently been published. Several studies focussed on characteristics of expert designers (in comparison with novices); for an overview of studies on the nature of expert performance in design see (Cross, 2004a).

According to Ericsson (2001), superior expert performance is primarily acquired. Many thousands of hours of deliberate practice and training are necessary to reach the highest levels of performance. According to Cross (2004a), part of the development of design expertise lies in the accumulation of experience. A main difference between experts and novices is that the experts have been exposed to a large number of examples of the problems and solutions that occur in their domain (Cross, 2004a). It takes thus years to become an expert designer. Dorst and Reymen (2004), proposed a model of design expertise development, based on the work of Dreyfus (2002, 2003a, 2003b). This shows that an individual can have varying levels of expertise in different dimensions of design. By practicing a design skill over an extended period of time the individual enhances their skill, moving from novice to advanced beginner, competent, proficient, expert, master or even visionary.

Shanteau (1992) in his Theory of Expert Competence states that the skills and abilities that emerge (or don't emerge) in experts depend on five factors: domain knowledge, psychological traits, cognitive skills, decision strategies, and task characteristics. He states that expert performance is neither uniformly good nor bad. Rather, their competence depends on the task characteristics. The same expert may behave competently in some settings and not in others. That means experts cannot be described generally. Instead, any conclusions must take task into account. A similar statement is made by Badke-Schaub (2004), when she concludes that experience leads to different patterns of behaviour and to different outcomes in different types of critical situations. She encourages a differentiation of the functions of experience in design. Every designer is thus an expert in certain aspects, which are useful for certain tasks or situations. Designing requires the knowledge and integration of user aspects, but also technical, ergonomic, aesthetic, production, market, and company aspects (Dorst, 2003). Each of the projects' stakeholders has it own demands, which have to be reconciled in the design. Design expertise is thus highly specialised.

To solve complex design tasks, expertise must thus be distributed, in a process of close co-operation between the several actors, as stated in (Béguin, 2003): From a phenomenal viewpoint, design is both an individual and a collective process (Falzon et al., 1996). Two principles lay the groundwork for this individual and collective dimension (Béguin, 1994; Hatchuel, 1994). The first is an actor differentiation principle, made necessary by the fact that the tasks to accomplish are complex. No matter what object is to be designed, it is too complex for a single person to be able to represent all of its inherent problems and possess all of the skills to solve them. Distribution serves to reduce this complexity by distributing tasks among the members of a team. The second principle is interdependence. These two principles are potentially contradictory. Differentiation reduces complexity at the task level; but interdependence increases it at the collective level: individuals perceive the object being designed from different or even divergent 'points of view', which must be articulated. Given this contradiction, design can be achieved by separate actors, engaged in an interdependent process, during which mutual learning is achieved on the basis of the differing qualifications and expertise of the actors (proposed by Béguin (2003) as artefact-based learning approach). Several experts have thus to collaborate to accomplish complex design tasks.

3. Dilemma's of expertise

Key factors in the relationship between design expertise and inclusion can now be indicated. Designers and users have their own expertise on specific domains. The expertise of designers lays in being specialist/expert in some design domains and in having competencies in obtaining overview of the design process to relate several domains to each other and in coordinating and integrating all relevant aspects into a design. The user is often specific for a certain design project and knowledge of that specific user is needed by the designer. The expertise of users lays in knowledge of product use and user aspects; users may lack crucial skills and knowledge offered by specialist designers. The expertise that comes from use is only a small part of the expertise needed for design. Furthermore, designers are a subset of users and users can be designers (usually at a novice level). Users and designers have thus differing levels of expertise for different aspects of the design process. The question that arises is how to make use of the expertise of both designers and users?

Given the several types of user involvement, designers thinking about users on the one hand, and users as designers on the other hand seem to be extremes, not taking into account the expertise of each group. Approaches like user collaboration and user participation seem to be a compromise since they strengthen the capabilities of both. Most important is that the approaches support **communication between different levels of expertise**, such that knowledge exchange can take place.

The literature shows that, in that respect, several problems have to be solved: first of all, Olson (2004) states that the user is often the most poorly equipped to articulate her concern in a team with representatives from different disciplines because the designers control the discussions. Designers exercise power: they have the right to question user aspects and explain what is proper and what is possible to design. Second, designers have a common domain-specific vocabulary and this occupational vocabulary enables them to communicate with each other in a brief and efficient manner. The users who are not familiar with the jargon easily become bystanders (Olson, 2004). A similar issue is raised by Luck (2003). He found, based on analysing architect-user conversations, that in some situations, such as discussing the appearance of the building, language use was limited and the absence of a common vocabulary or architectural language limited the discussion to very basic constructs.

To solve these problems, Olson (2004) proposes giving users a head start to encourage them to reflect work procedures before they come entangled in systems development and the vocabulary of designers. Béguin (2003) proposes to set up a mutual learning process performing several 'activity changes'- first from users to designers and then from designers to users- during which intermediary versions of the artefact being designed serve as a vector of learning. It is, however, still unclear what are exactly the expertise levels of designers and users for several aspects. It is at this moment even unclear how to measure them precisely. This knowledge is a prerequisite for supporting exchange of knowledge and making use of the skills of both designers and users.

4. An illustration in construction industry

We use a simplified practical example in the construction sector to illustrate the dilemmas of expertise.. In this we look at how design and use are inter-related over the building life cycle but the expertise from these different processes is required in the design phase.

Traditionally, a construction process consists of the following phases: programming, design, realisation, use, and maintenance. Knowledge of the whole building lifecycle in the design process is needed to become a final product that fulfils the demands and that can be realised, used and maintained properly. The needed knowledge is known by the designers, users, and other stakeholders in the construction process, in differing levels of expertise. In Table 1, an illustration is given of a possible distribution of knowledge and skills over different levels of expertise of designers and users for each of the important aspects of the construction process. The model of Dorst and Reymen (2004) is used to discern the expertise levels. We only use the first 5 levels, which relate to concrete knowledge and skills. The table shows that users and designers can complement each other in knowledge of certain aspects given their differing levels of expertise. Knowledge exchange should go in both directions.

Table 1. Possible distribution of knowledge and skills over different levels of expertise of designers and users for each of the important aspects of the construction process (N=novice; A=advanced beginner; C=competent; P=proficient; E=expert)

	designers					users				
	N	**A**	**C**	**P**	**E**	**N**	**A**	**C**	**P**	**E**
programming										
design										
realisation										
use										
maintenance										

5. Conclusions and recommendations

We draw a number of conclusions. First, individuals have differing levels of expertise with regard to aspects of the use of the required product and its design process. Second, expertise has two sides – it enables individuals to reach a high level of performance, but it is time consuming to develop, involves a lot of practice and implies a high degree of specialisation.

To deal with the dilemmas of expertise regarding the challenges of inclusivity, communication between different levels of expertise should be facilitated. This can enable users to understand the potential choices available to them, to be reflective and to benefit from the differing contributions of design specialists. It can also enable designers to incorporate the expertise of the users and to understand what users want from designers.

More research is needed to develop support for such communication between people with differing expertise levels for several aspects. Therefore, empirical material about the expertise levels of designers, users and other stakeholders concerning several aspects should first be collected, in construction industry and in other fields. Opportunities for support may lie in using information and communication technology for involving users. ICT creates excellent possibilities to provide direct, two-way communication of visual, dynamic ideas about designs (Dewulf and van Meel, 2002; Reich et al., 1996). The design quality indicator (DQI) (Gann et al., 2003) is a tool that makes use of ICT and that potentially may facilitate communication between different levels of expertise.

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