

The machineries of user knowledge production

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A multiple case study was conducted to investigate the machineries of designers' user knowledge production at six design consultancies in the Northwestern USA in domains of architecture, industrial design, and interaction design. Karin Knorr Cetina's theory of epistemic cultures was utilised as the theoretical lens. The findings indicate that the user is not a given; instead, the user is a constructed phenomenon in design. The design process is characterised by the deconstruction and reconstruction of the user information and of experiential information, implemented to meet the epistemic needs of designers. User representations are used as the liminal knowledge. Designers manipulated this knowledge in order to narrow down the artefact to be designed.

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The user has always been a prominent factor in design. However, lately, user and user experience have increasingly become 'the subject of design' (Redström, 2006, p. 124) and increased attention is being paid to the user within design practice and academia. The design community has explored ways to design for pleasant user experiences (e.g., Bruseberg & McDonagh-Philp, 2001; Chamorro-Koc, Popovic, & Emmison, 2008; Sleswijk Visser, Lugt, & Stappers, 2007), to implement user involvement methods within the design process (e.g., Sanders & Stappers, 2012; Squires, 2002; Wasson, 2000), to better understand technologic developments in relation to user's actions, needs, and wants (e.g., Akrich, 1992; Grint & Woolgar, 1997; Hyysalo, 2006a, 2006b; Oudshoorn & Pinch, 2003) and to flawlessly transfer user information to designers to allow them to better utilise the information while designing (e.g., Kumar, 2004; Suri, 2011; Wilkinson & De Angeli, 2014). Although the efforts have been extensive, their impact on designers' problem solving is relatively small, and progress toward the true integration of user information and user involvement methods in the design process has been slow (Boztepe, 2007; Melican, 2004; Mitchell, 1993; Sleswijk Visser, 2009) – partly because the lack of a holistic understanding of *how designers process user information*. This study focuses on this omission and offers a better understanding of what happens to user information in the

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design process. The focus is on designers and their utilisation of the user and user information as design factors while solving design problems. More specifically, I studied the user knowledge production of designers with a focus on its machineries. Karin Knorr Cetina's (1999) concept of 'epistemic cultures' served as my theoretical lens in this process. Knorr Cetina provides an analytic framework for studying 'designerly ways of knowing' (Cross, 2001) on users with a focus on 'how we know what we know' (Knorr Cetina, 1999, p. 1). Using this perspective, this study opens a discussion on *the epistemic cultures of user in design as a discipline* with a specific focus on the machineries of user knowledge production.

1 User and the design process

Designing is known to be an iterative process that involves 'moving-seeing-moving' (Cross, 2011, p. 25). Schön (1983) defines this 'moving-seeing-moving' as a reflective practice that involves cycles based on solution proposal, problem identification, and new solution proposal. This practice does not always take place in isolation because designing is a social activity/process that requires collaborative work (Bowers & Pycocock, 1994; Bucciarelli, 1988, 2002; Cuff, 1992). Designers are believed to utilise abductive reasoning while handling design problems (Dorst, 2011; Groat & Wang, 2013; Rowe, 1987). Explicit (easy-to-articulate) knowledge and tacit knowledge (a term coined by Polanyi in 1967 to mean the knowledge that we have but cannot articulate easily) characterise this abductive problem-solving process (Friedman, 2000). As a result, part of framing 'designerly ways of knowing' (Cross, 2001) requires an analysis of designers' knowledge.

The literature differentiates between information and knowledge (Ackoff, 1989; Blackmer, 2005; Sanders & Stappers, 2012). Information can be considered knowledge without purpose. It can help people answer only 'who, what, when, where, and how' questions, whereas through knowledge, people can reply to 'how-to' questions (Ackoff, 1989). In other words, knowledge 'is the understanding of how information can be used to come to conclusions or take action' (Blackmer, 2005: p. viii). Thus, knowledge is constructed from information through a learning process (Bednar, Cunningham, Duffy, & Perry, 1992; Merrill, 1991; Resnick, 1989).

Design literature also provides evidence for the constructivist character of knowledge, especially in relation to user. User, as a design factor, is a fundamental part of design reasoning (Redström, 2006; Sharrock & Anderson, 1994). Designers are expected to be knowledgeable about the user. However, the situation is complicated because there is no such thing as 'THE user' (Krippendorff, 2006, p. 63). Instead, user is a creation/construction of designers in the design process¹ (Akrich, 1992, 1995; Grint & Woolgar, 1997; Oudshoorn, 2003; Oudshoorn & Pinch, 2003; Oudshoorn, Rommes, &

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