User Need – A Fuzzy Link between Design and Use

Turkka Keinonen

University of Art and Design Helsinki, School of Design
turkka.keinonen@taik.fi

Abstract: This paper is a conceptual elaboration on the relationships between design and use, and the roles of artefacts and user needs as mediating concepts between them. It builds on prof. Kuutti's approach to expose the inherent complexity of design through the double role of artefacts in design and use activities. This paper claims that in addition to the artefacts linking design and use, we can regard the idea of user need, having a corresponding kinds of multiple mediating roles. First, user need can be seen, as is the Maslowian tradition, as a characteristic of the subjects in the activity of use motivating their behaviour. Second, in the activity of design, the need can be seen in another role, closer to its moral philosophical interpretation, as an entity that designers apply to justify their behaviour. Third, the need can also become a part of the conceptual tool set designers apply during the design process.

Key words: User Need, User Centred Design, Design theory

1. Introduction

This paper is a conceptual elaboration on the relationships between design and use, and the roles of artefacts and especially user needs as mediating concepts between them. It builds on prof. Kuutti's approach [22] to expose the inherent complexity of design in a simple but robust way through the double role of artefacts. Applying Cultural Historical Activity Theory Kuutti positions artefacts simultaneously as the objects of design and tools of use, which illustrates the dynamic network of dependencies that characteristic to design.

Designers who aim at creating a novel kind of artefact are by default involved in the activity of design, which aims at creating results that meet the requirements and expectations of the various stakeholders of the design activity. Their attempts are mediated by design tool, i.e. material and intangible means and resources. Simultaneously, the designers have to understand the dynamics of the forthcoming consumption, possession and application – 'use' for short – of the artefacts. In the use activity, the artefact takes the role of a tool applied by the users for achieving objectives characteristic to the use activity. Consequently, an artefact becomes the linking element between design and use, but its fundamentally different roles in the two activities lead to tensions and even conflicting interpretations about the meaning and value of its shape and other attributes.

In this paper it will be claimed that in addition to the artefacts linking design and use, we can regard the idea of user need having a corresponding kind of role, but perhaps even somewhat more complicated. First, user need can be seen following the well-known Maslowian [25] tradition as an expression of the subjects' relationship with their environment motivating the users' behaviours. This relationship can be modelled within the use activity framework. Second, in design activity the interpretations of the corresponding needs can be seen in different roles that are closer to providing ethical justification for design or purely instrumental concepts.

The role and weight given to user needs has been an ever acute topic in design discussion causing a conflict between the 'ethical' designers and the more self-confident ones regarding need driven design as less innovative or progressive than approaches building more on insight and the emerging opportunities. The ethical designers sympathize and empathize [e.g.: 19, 41] with the users and/or aim at addressing something that can be called 'real needs' of those users whose needs are more burning and fundamental and which stem from the 'real world' [29, 37], or they may be primarily concerned about the more general sustainable development of the society and ecological system than the immediate benefits of the product to its seller and buyer, or perhaps they are aiming at a more humane [20] and value sensitive approach to design [12, 27]. The ones questioning the value of this kind of design ethics often believe in the power of leading individuals' insight driving the development to something that may turn out to be beneficial to others later on [35], or they position the users'/consumers' freedom to choose artefacts and ways to appropriate those as the highest value [17].

The dilemma between responsible need driven design and the search of novelties trough niche innovations is one of the fundamental value tensions in design that can and perhaps should not be neutralised by conceptual elaboration. However, a part of the misunderstandings between the parties may be a result of the conceptualizations of need that ignore its multiple interpretations in design and use. We will address the multiple roles of user needs in design by first explaining the double role of artefacts in design that has inspired this paper following Kuutti's use of Cultural Historical Activity Theory in section 2. In section 3, we will discuss the main approaches to the concept of need namely needs as motivators, instrumental needs and fundamental needs. In section 4, the different meanings of user needs within the use and design activities will be discussed. Finally, some of the implications of the results will be explored in section 5.

2. Double role of Artefacts in Design and Use

Cultural-Historical Activity Theory (CHAT) is a conceptual approach to model the relationships between human, social and material environment [9, 21]. The main idea of CHAT is its conception of 'object', which is the direction of human activities in circumstances that enable human motivations to turn into meaningful action [22]. Object has a twofold meaning by being both the entity which is worked on in the material world and the future projection of the desirable outcome of the action. The object is not necessarily easily achieved but may resist the change and in a way generating a counterprocess with which the actors have to challenge themselves [31]. The activity towards the objects is always mediated by tools, which may include tangible physical means, but also conceptual and symbolic tools. Language can be seen as a fundamental instrument in mediating group activities. The basic concepts of activity theory are typically presented as a actor-tool-object triangle (figure 1.)
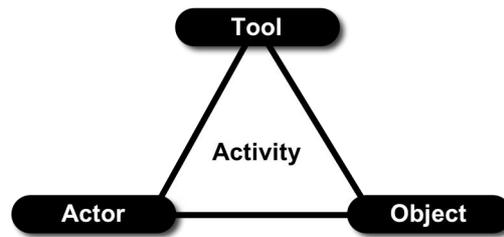
Figure 1. Actor-tool-object triangle of Cultural Historical Activity Theory (CHAT)

Recently, CHAT has been noticed also on certain fields of design [13, 14, 28], but is far a way from design theory mainstream discourse. What Kuutti suggests, however, is a remarkable similarity between the structure of activities as modelled by CHAT and the way contemporary design theory describes design process and design thinking [6, 10, 32]. According him [22] "It is in fact rather amazing, how faithfully the description of the object of an activity, developed within originally a purely psychological research tradition and without any connection to design whatsoever, characterizes some of the central features of design: organizing role of the thing-to-be for the whole enterprise, the unfolding of the object during the course of action, and the always locally limited horizon of possibilities, the existence of a counterprocess, and so on."

Kuutti [22] proposes what he calls 'a minimal model of an object of design' illustrating the linkage between design and use. It links the artefact as an object of design activity with an artefact as the tool in use activity (figure 2). According to Kuutti [22] "An object of design is thus something which is constantly oscillating between something to be created and something to be used, and neither of these views does exist in a vacuum but in a real historical situation, where a multitude of dependencies and relationships is constantly influencing what can be done." Even though the minimal model is simple, due to the richness of the meanings within the CHAT triangles, it is a viable framework for explaining much of the complexity of design. The use of an artefact does not need to be limited to practical operation, but include associating meanings with design making signifying an essential aspect of use. This view is strongly supported by Krippendorf's [20] idea of design becoming essentially more meaning and language dependent discipline. It is possible to extent the minimal model to cover more complicated situations of production and consumption, but the discussion about these is omitted here.
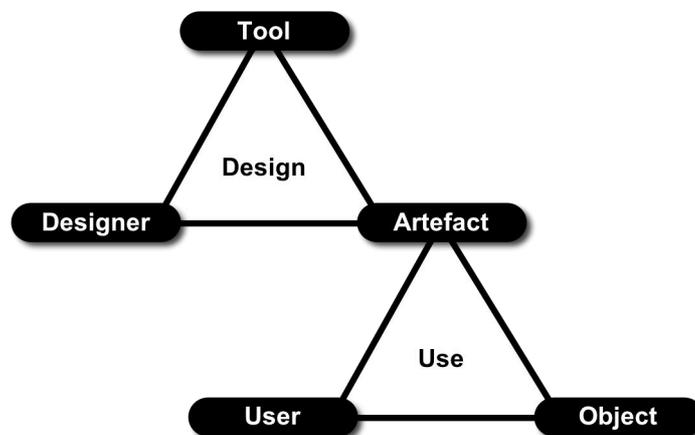

Figure 2: Simplified version of Kuutti's Minimal Model of an Object Design [22]

3. Three conceptions of need

The purpose of this section is to take a look at the different meanings of need and to lay foundations for an adequate understanding of the concept that would allow positioning it into Kuutti's minimal model of an object of design.

The three main interpretations of the concept of need that can be found in need discourse are [33, 34]: 1) needs that drive behaviour often seen equal to desires (later 'motivations'); 2) needs that are considered so essential that claims of getting them satisfied become justified (later 'fundamental needs') and 3) needs that are necessary requisites for achieving something, (later 'instrumental needs').

Need and behaviour are often considered to be linked like in Maslow's [25] famous theory on motivation, which regards an unsatisfied need as the motivator for action. According to Maslow [25] "[t]he perfectly healthy, normal, fortunate man has no sex needs or hunger needs, or needs for safety, or for love, or for prestige, or self-esteem, except in stray moments of quickly passing threat". However, according to others like Max-Neef and colleagues [26] needs should be understand within a broader context and time frame. They are not only immediately felt and occasional lacks of resources, but more permanent drivers for action. Also the perfectly healthy man may understand that acting towards establishing a safe environment makes sense, even though there would be no immediately felt threats. Hence, human action can be seen to be driven both by satisfied and unsatisfied needs at any particular point of time. These kind of needs are subjective and contextual, may vary greatly depending on the choices available, and indeed focus on something that may compromise others' interests making them ethically questionable. Thus, satisfying these kind of needs is not what the responsible designers aim at.

Working for satisfying the 'real needs' instead of just gratifying subjective desires, requires a different kind of definition of user need. The notion of 'fundamental need' [33, 34] is used to refer to these needs that might make design an ethical activity. The essentially similar idea has also been called for example 'morally important need' [11], 'categorical or absolute need' [38], or 'constitutive need' [7]. In 'Basic need' [33] is sometimes used to refer to what is necessary for survival or for minimal subsistence, and as this is not very relevant for most of the products designed for post-industrial societies, the topic is not discussed here. However, it is essential to notice that replacing the idea of 'basic need' with 'fundamental need' excludes the possibility of positive biology and physiology based definitions of needs with essentially more relative and elusive characterizations. What is needed becomes a question of culture, appreciation, values and resources.

Moral philosophical discussion about fundamental needs is typically linked to political decision-making concerning the fair allocation of limited resources in social politics [30], in global economics [4] or ecologically sustainable development [39]. The identification of such needs among a population can be used as an argument for corrective actions taken by another population who has the means to satisfy the needs, and thus, the concept of fundamental need is interpreted as normative [5, 26, 30 , 33]. According to Wiggins' [38] strict principle the fundamental need of A should be given priority over desires of B, even though population B would be much bigger than A. Lowe suggests [24] that needs have "precisely the right sort of 'logical shape' to constitute reasons for [moral] action… They are what make actions good, analogously to the way in which facts make

believes true." A moral actor being in a position to influence on others, works for satisfying fundamental needs before and rather than just gratifying desires. According to Clark Miller [7] "to have need is to require care" but often the responsibilities for fundamental need satisfaction are seen to be limited to providing people fair opportunities to satisfy their own needs themselves [1]. This angle applies well to the ethical designers. Artefacts seldom as such fulfil needs, but ethical designers enable users to take the necessary action to satisfy their needs.

Fundamental needs seen as normative requires that the existence of the need is known by the decision-makers, but not necessarily by the needy themselves. Consequently, relatively objective needs assessments have to be carried out and knowing about needs becomes a domain of experts, or something that can be defined through a dialogue between the experts and the people in need, but not purely subjectively by the needing individuals themselves [30, 40]. The ideas of human-centred design, user-centred design, participatory design, codesign, and so on, share the objective of common sense making between the users and experts [18].

In the realm of political decision-making the focus is on populations rather than on individuals. This, and the logical fact that something replaceable cannot be fundamentally needed, has directed the philosophers' attention to general and universal needs. Thomson [33] says that "harm involves the absence of basic types of primary goods rather than the absence of particular goods which can be forgone because they are replaceable", and that a need can be fundamental only when it is inescapable [34]. 'Sufficient security', for instance, cannot be replaced by anything else and counts for a fundamental need. According to Wiggins [38] "[o]verspecificity in a 'needs' sentence makes it false".

However, specific decisions, whether in social politics or in design, call for attention to the specific context sensitive interpretations of the universal needs. A way to conceptually solve the specificity versus generality dilemma suggested by several scholars [3, 4, 8, 26] is to make a distinction between fundamental needs and satisfiers. Fundamental needs are permanent or slowly changing, and there is a manageable amount of them making it possible to present at least approximate universal need lists. The ways how the needs are satisfied, on the contrary, change from culture to culture, from historical era to another, and between groups of people such as social classes [26]. The specificity of satisfiers can be taken still further to the level of individuals. For this Braybrooke [3] applies the concept of 'minimum standard of provision'. An illiterate person needs more support than a literate one to satisfy the same fundamental need of information access. Satisfiers can also be seen as instrumental needs, i.e. 'necessary conditions' for achieving something rather than distinct needs [33].

4. Need and the minimal model of object of design

In design, fundamental needs, instrumental needs and motivators are often all considered as needs without categorical differences causing confusing on their role in design. For instance according to a mobile phone company "user need is any relationship between a person and her context that may have an influence on the design of products and services. The relationship may be physical, behavioral, motivational or driven by values, interpretations and cultural codes" [23]. Applying the minimal model of an of object of design [22] and the three-fold categorization of needs conceptual clarifications can be made as is presented in Figure 3 and discussed below.
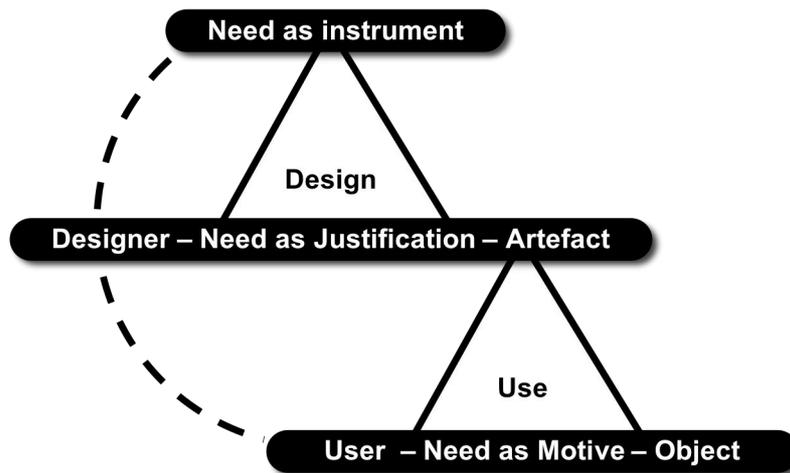
Figure 3. Minimal model of Object of Design and three conceptions of user need

4.1. User need as a motivator in use activity

When we apply Kuutti's idea about the two connected activities of design, design activity and use activity, to position different conceptions of user needs, we notice that the different categories of needs fall into different activities. User need seen as a motivator for users' behaviour, e.g. purchase or use of artefacts, will be positioned into the use activity, where user need drives users' behaviours towards the object of use activity. In figure 3, user need as a motivator is presented as a reciprocal relationship between users and object of use. The environment, its offerings and affordances, physical, logical and cultural restrictions and codes influence on the transformation of users' internal drives into behaviour. The environment is often essentially influenced by previous designs. However, at any given point of time the dynamics of drive and behaviour can be explained without discussing the previous activity of design that has influenced on the environment, though the results of the design activity, i.e. man made environment, and the users' active interpretation and interaction with it is a relevant determinant of the behaviour.

4.2. User need as a justifier in design activity

Designers are actors in design activity and also their behaviour is driven by a range of motivators. If the designers aim at being moral actors, they choose to act on morally sustainable drivers. Users' well-justified fundamental needs are examples of these kinds of drivers. Consequently, we can position the fundamental need kind of interpretation of user needs into the design activity. Fundamental need as a normative concept influences those in power to behave for understanding and satisfying fundamental needs of others. The fundamental type of user needs justify designers effort, even though the corresponding needs might not motivate users' own choices as was discussed above. In figure 3, the fundamental user need is presented as a justifying relationship between the designer and the object of design, i.e. an artefact that enables fundamental need satisfaction. Again, the relationship needs to be understand as a dynamic reciprocal dialogue between the designers' intentions and how the reality unfolds when designers aim at implementing a change.

4.3 User need as conceptual instrument in the design activity

Users and designers being different individuals and the design and use activities taking place in different contexts and circumstances mean that the designers do not have an immediate access to the users' reality they wish to improve. There are some (partial) exceptions to this rule such as the lead users innovating new product variations for their own use [36]. However, typically the users' reality is not immediately experienced by the designer, but can only be mediated to the design activity with a variety of means including empathetic design approaches, more traditional user studies and users' participation. The needs driving users' behaviour are partly internal mental constructs that are not directly perceivable. Indeed, much of the user study methodology in design is based on understanding the implicit nature of motivations. Thus, what is mediated from the use activity to the design activity is not a set of well-explicated unquestionable and relevant needs, but range of data that is interpreted and categorised as needs – or as irrelevant information –within design activity. The use activities take place in highly complex socio-technical systems, which leads to a situation leaving plenty of space for interpretation within the design activity. Some design scholars, indeed, underline the necessity of designers taking a strong stand on interpreting user data rather than trusting on the very questionable objectivity of formal design methods [2, 42]. These interpretations turn the phenomena within use activity to needs that applicable in design activity.

The request for instrumental user needs does not depend on the designers to be motivated by contributing to satisfying users' fundamental needs. Instead the designers behaviour might be driven, for instance, by their drive to be good professionals and follow the rules and methods seen as characterising 'the good design process'. Presently, user centred approach is a well-recognised and standardized approach [16]. A product developer aiming at being a proficient professional follows the process and, consequently has to base his/her design on user needs. Especially, designers among other professionals within the new product developers often assume a human oriented responsibility as, for instance, indicated by the key phase in ICSID [15] definition of industrial design as "creative *humanization* of technology". The request for user need ensure a transformation process from records of phenomena to interpreted needs which can then be used in design activity by designers to achieve their goals of creating something valuable and morally sustainable for use activity, or to become a 'good designer'. These kind of instrumental user needs function as conceptual tools the designers need to achieve their objectives.

5. Discussion

By mapping the three different interpretations of user need on the minimal model of an object of design, we have noticed that the concept user need in design diverts into three essentially different ideas. User needs motivate users' behaviour, they give designers' choices a justification and they work as conceptual instruments required by the design process.

Assuming the needs in all of the different roles to be the same or even faithful interpretations or reflections of each other is not necessary. Design projects that aim at satisfying the temporary and subjective desires of consumers, others addressing sustainable morally sustainable design principles and the third ones being methodologically founded on user centeredness do not necessarily share much in common even though they

would address similar topics and claim to be user need driven. As the advocates of user centred design (UCD) often claim addressing users' needs, the same vagueness of terms travels to describe the practices within UCD as well. User centred design process can be applied for ethically questionable designs and vice versa. Clarifying the terminology by speaking about instrumentally user centred design, ethically user centred design and motivationally user centred design would clarify the design language.

Even though assuming a coherence between the interpretations of needs does not seem necessary to explain their roles in design, it would be comforting to assume certain kind of correspondence between them. The interpretations done in design, for a successful product at least, should reflect something essential about those relationships that drive the users' behaviour. Designers' own aims being aligned with these is perhaps not necessary but at least a beneficial starting point for creating a set of instrumental needs that help to achieve solutions that resonate with users. Thus, correspondingly to Kuutti's idea of the object of design, i.e. the artefact, oscillating between design and use, the conception of user need seems like a cloud of meanings oscillating between three attractors.

6. References

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