Protect and Appreciate – *Notes on the Justification of User-Centered Design*

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This article discusses whether User-Centered Design (UCD) can earn its ethical justification by satisfying users' fundamental needs. At face value, UCD is the advocate of the user in product development, but do its practices and values address what is fundamentally important for the user? The question will be studied by first characterizing the concept of fundamental need. Next, two dimensions are formulated to describe the orientation of UCD practices towards need satisfaction. Protection dimension examines whether the practice of UCD defends users from harm. Appreciation dimension describes designers' tendencies to appreciate users' autonomous agency. The discussion shows that the development of UCD from a limited usability engineering paradigm towards more socially focused and interventionist user experience (UX) approaches is related to its need satisfying orientation. Finally, the two dimensions are combined to create a representation of designers' choices with reference to user need satisfaction. The resulting *Protection-appreciation space* can be used as an aid for design ethical decision-making.

Keywords – User Centred Design, User Need, Usability, User Experience, Design Ethics.

Relevance to Design Practice – The proposed design approach mapping, *Protection-appreciation space*, can be used as a reminder of a design team's choices when dealing with fundamental user needs and thus serves as a framework for discussing the ethical justifications of user-centred design.

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Introduction

"We have a process to use users…"
– Anonymous employee of a global ICT company

The design community's lack of attention and commitment to genuine human and ecological needs has been repeatedly recognised and criticized (e.g. Papanek, 2006; Whiteley, 1993; Chapman, 2005; Thackara, 2005; Valtonen, 2006). In the middle of this ignorance, however, there are pockets of design whose foundations lie in respecting users' needs and which seriously aim at increasing sustainable value for individuals and/or society. One of the candidates for this role is *User-Centered Design* (UCD). The phrase and its definitions (see below) promise a fast commitment to delivering something valuable for users and satisfying their needs, but can we take the promise as real? Perhaps UCD practitioners, like the anonymous one quoted above, are just using users to achieve the aims of their organizations? In this article I question and discuss the commitment of UCD to satisfying user populations' needs. The discussion focuses on UCD community's aims and conceptions of its work and the people with whom it collaborates. The idea of *fundamental need* is applied as a vehicle to discuss the fairness of the user-designer relationship.

Donald Norman and Stephen Draper introduced the term user-centered design in the title of their 1986 book *User-Centered System Design: New Perspectives on Human-Computer Interaction*. Gould and Lewis' (1985) article "Design for usability" is also an often-mentioned early reference to UCD principles, discussing early and continuous contact with users, quantitative usability criteria and evaluations, and iterative design. The Usability Professionals' Association [UPA] (2008) defines UCD as "an approach to design that grounds the process in information about the people who will use the product. UCD processes focus on users through the planning, design and development of a product." In this article, UCD is regarded as a broad umbrella covering several approaches that are perhaps partly conflicting in their foundations and beliefs, but which follow the generic UPA principles. These include human factors and ergonomics, participatory design (Greenbaum & Kyng, 1991; Schuler & Namioka, 1993; Sundblad 2009), human-centered design processes (Beyer & Holtzblatt, 1998; ISO 13407, 1999), usability measurements and inspections, i.e., usability engineering (ISO 9241-11, 1998; Nielsen, 1993), and design for user experience (Khalid, 2006; Koskinen, Battarbee, & Mattelmäki, 2003; Norman, 2003; Jordan, 2002). More recently, approaches such as service design, transformation design (Burns, Cottam, Vanstone, & Winhall, 2006), lead user innovation (von Hippel, 2005) and worth-centered design (Cockton, 2006, 2008a) are expanding the umbrella even further. The core of early UCD approaches, i.e., usability engineering, were built on relatively strong and rigid

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methodological foundations, leaving little room for participants' initiative and proactive contribution. This approach has been criticized for its inability to address the subjective and case dependent worth of designs and to create the excellence needed for market success and users' well being (e.g., Cockton, 2008b; Norman, 2003, 2005). More recent branches of UCD often reject a priori frames and fixed criteria, and trust in proactive user contributions and designers' informed and situation specific interpretations (Boehner, Vertesi, Sneger, & Dourish, 2007).

In this article, the ethical sustainability of UCD is approached by addressing the UCD community's conception of users and its commitment to respecting their fundamental needs. The level of discussion is the practices and values of the UCD community and their reflection on the way the community interacts with users. There are also other routes to approach the justification of design. These include, for instance, focusing on ethically sustainable design challenges following Papanek's (2006) examples and addressing the needs of the developing world, but these are not covered in this article. Neither do I discuss the capability of the results of design, i.e. products and other types of artefacts and capacity to satisfy users' needs. The discussion begins by approaching user need by consulting moral philosophical stances (in the next section – **Need**). This section includes the conceptual isolation of users' fundamental needs from other types of needs. Next, user protection and appreciation are identified as features that can be applied to categorize a need as a fundamental one (in the section – **Identification**). The rationale is that if a UCD practice addresses these kinds of goals, it would be, within this limited framework of analysis, ethically sustainable. The discussion below (in the **Protection** and **Appreciation** section) will, however, reveal that in both respects the history of UCD from the 1980s to 2000s has included practices ranging from strong commitment to fundamental need satisfaction to those where other types of values drive the action. The article concludes by sketching a framework, *Protection-appreciation space*, for mapping the need satisfying orientations of UCD practices (in the section – **Integration**). The ethical sustainability of a design, in general and in a branch of design as heterogeneous as UCD, cannot obviously be completely explained from a single angle within a single article. Thus, the conclusion about UCD's ethical justification only suggests a framework for stimulating and perhaps supporting further discussions.

Need

Need is such a loaded concept in everyday language, design, product development, consumer behaviour, behavioural sciences and philosophy that defining it becomes difficult. However, common threads in the different meanings of need seem to be, firstly, their reference to relationships between individuals, their goals, and the means of achieving these. Secondly, these relationships are characterised by a certain degree of necessity or urgency. According to Thomson (1987, 2005) needs can be understood in three main ways:

(1) A need can refer to a subjective mental construct that drives the behaviour of the needy and is often seen as equal to a desire.

(2) A need can refer to a necessary element of an activity, mediating between subjects and their goals. Without the specific type of activity and goals there would be no need for the element. These can be called 'instrumental needs'.

(3) A need can refer to an unsatisfactory state of affairs that is so essential that claims of getting it satisfied become justified. These will be called 'fundamental needs'.

Needs of type (1) are identified, explicitly or implicitly, by the individuals in need and they lead to behaviour or a tendency to behave to satisfy the need. An example of a sentence within this category would be "We save money, because we need a bigger apartment." The individuals themselves feel the need and this has an influence on their behaviour or at least creates a behavioural intention. Another family in a corresponding situation might not feel the need, or an expert in housing might not necessarily regard it as well justified, but it is real to the individuals themselves. Another sentence where the necessity might seem even more subjective might be a pop fan's expression "I must listen to this track over and over again". The need drives her behaviour without any obvious external pressure or practical necessity. Maslow's (1943) famous theory on motivation describes these kinds of needs. According to Maslow, "[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" (p. 393). According to Max-Neef and colleagues (1991), needs are not only conscious and occasional lacks of something, but more permanent drivers for action. Hence, they argue that human action is driven both by satisfied and unsatisfied needs.

Instrumental needs (of type 2 above) can be identified through logical reasoning without value related priorities. An example would be a sentence about the home savers above such as "They need one bedroom more to provide a private space for both of their daughters." The listener knows that the family includes parents and two daughters, and is living in a two-bedroom apartment. The need can be calculated based on a formula At - Ap = N, where At is the target state of affairs, Ap the present state, and N the need. In the example sentence the apartment fulfilling the privacy condition has (at least) three bedrooms, the present apartment has two, which arithmetically gives one more bedrooms as the need. Another example might be the sentence, "I need to find the track to let you hear it!" Accessing the song is an instrumental need required to be able to share the experience of listening to it with a friend, hear her opinion and perhaps get her hooked on the same artist. According to Thomson (1987), these kinds of instrumental needs can be understood as 'necessary conditions' for achieving something rather than distinct needs.

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Finally, there is a category of non-instrumental needs (of type 3 above) that is different from action driving desires. I adopt the notion of 'fundamental need' to refer to these from Thomson (1987, 2005). The same idea has also been called, for example, 'morally important need' (Frankfurt 1998), 'categorical or absolute need' (Wiggins, 1998), 'basic need' (Brock, 2005), or 'constitutive need' (Miller, 2005). In Thomson's terminology (1987), 'basic need' refers to what is necessary for survival or for minimal subsistence and is not discussed here. This angle replaces the possibility of positive definitions of fundamental needs with essentially more relative and elusive characterizations. What is needed becomes a question of appreciation, values and resources. The necessity with type 3 fundamental needs is defined by those who have the opportunity, power and/or responsibility to make decisions on the behalf of others, including for example political decision-makers, authorities and designers. An employee of a city's social welfare division might tell our family that "Your need for an extra room is not well justified. Your housing benefit application is disapproved". A real estate developer may consider, "These type of families cannot afford big apartments, but still they need privacy. We will design apartments with smaller, but more bedrooms than before, even if they become somewhat cramped." Both of these decision-makers position the family's need into systems of appreciation and resource consideration, and decide between the priorities that need to be satisfied. Perhaps the parents of the pop fan might even see a fundamental need related to music players; "Nicole should have an MP3 player too, because her sister has." The fundamental need here is the equality between siblings, but it justifies the parents' actions with respect to spending on entertainment electronics.

Thomson (1987, 2005) considers the distinction between fundamental needs and drives essential, drives giving reason for behaviour and fundamental needs providing the justification. Lowe (2005) agrees, saying 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 beliefs true."

Much of the moral philosophical discussion about fundamental needs is linked to political decision-making concerning the fair allocation of limited resources in social politics (Percy-Smith 1995), in global economics (Brock, 2005) or ecologically sustainable development (Wiggins, 2005). 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 becomes normative (Brock, 1998; Max-Neef, 1991; Percy-Smith, 1995; Reader, 2005; Thomson, 1987). According to Miller (2005) "to have a need is to require care" (p. 142), but often the responsibilities for fundamental need satisfaction are seen to be limited to providing people fair opportunities to satisfy their own needs (Baker & Jones, 1998). This angle applies to designers. Artefacts seldom fulfil needs, but allow and enable people to take the necessary action to satisfy their needs. In design, or more specifically in UCD, fundamental needs, instrumental needs and users' desires are often all considered needs as far as they drive the designers' decision-making (Keinonen, 2007; Lindholm, Keinonen, & Kiljander, 2003). In this article, I focus on the fundamental needs that set moral responsibilities for the UCD community, and, if followed, may justify its design approach.

When seen as normative, fundamental needs require that the decision-makers know the existence of the need. Consequently, needs assessments that aim for objectivity 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 (Percy-Smith, 1995; Witkin & Altschuld, 1995). Even though fundamental needs do not necessarily lead to corrective behaviour for a variety of reasons, they define moral priorities. A moral actor being in a position to exercise influence on others works for satisfying fundamental needs rather than gratifying desires. According to Wiggins' (1998) very strict principle, the fundamental need of A should be given priority over the desires of B, even though population B would be much bigger than A. Thomson (1987) says that "[t]he main feature of the concept of a [fundamental] need is that it makes a virtue of necessity by cutting down options and thereby simplifying choice" (p. 123).

According to Thomson (1987) "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" (p. 127). A need can be fundamental only when it is inescapable (Thomson 2005). For instance, sufficient protection and privacy cannot be replaced by anything else and counts for a fundamental need. Wiggins (1998) writes that "[o]verspecificity in a 'needs' sentence makes it false" (p. 40). However, specific decisions, whether in social politics or in design, call for attention to the specific, context sensitive interpretations of the universal needs. Sufficient protection and privacy need to be turned into concrete housing solutions. A way to conceptually solve the specificity versus generality dilemma suggested by several scholars (Braybrooke, 1998; Brock, 2005; Doyal, 1998; Max-Neef et al., 1991) is to make a distinction between fundamental needs and satisfiers. Fundamental needs are permanent or slowly changing and there is a manageable number of them, making it possible to present at least an approximate universal needs lists. Conversely, the way that needs are satisfied changes from culture to culture, from one historical era to another and between groups of people such as social classes (Max-Neef et al., 1991). The specificity of satisfiers can also be taken to the level of individuals. For this, Braybrooke (1998) applies the concept of 'minimum standard of provision'.

In the UCD community, the conception of fundamental need has not been addressed, but there is a corresponding discussion about the concept of value. A distinction is needed between the ethically relevant values and the ones that drive action, the corresponding research approaches being Value Sensitive Design (VSD) and Worth Centered Design (WCD). Moral issues with human-computer interaction are addressed by the theory of Value Sensitive Design (VSD), which "is a theoretically grounded approach to the design of technology that accounts for human values in a principled and comprehensive manner throughout

the design process" (Friedman, Kahn, & Borning, 2006, p. 349; see also: Friedman & Freier, 2005; Miller, Friedman, Jancke, & Gill, 2007). Worth Centered Design (WCD) aims at designing end user worth by "designing things that will motivate people to buy, learn, use or recommend an interactive product, and ideally most or all of these" (Cockton, 2006, p. 168; see also: Cockton, 2008a). Worth and desire drive user behaviour, while value and need justify choices.

Identification

Next I will identify attributes that make a need fundamental. This is done by consulting few recent elaborations on need ethics (Wiggins, 1998; Thomson, 1987, 2005; Frankfurt, 1998; Brock, 2005; Braybrooke, 1987, 1998; Doyal, 1998). The sample is limited, but considered enough to arm us with two rather robust concepts: the protection and appreciation of users.

To identify fundamental needs, I focus first on the harmful consequences of failing to satisfy them. Wiggins (1998) presents a strong connection between harm and fundamental need: "… I need to have x if I am to avoid being harmed, if and only if, it is necessary, things being what they actually are, that if I avoid being harmed then I have x" (p. 35). Thomson (1987) expresses the need-harm link by stating that, "A needs X if and only if A needs X in order to f and f-ing is vitally important" (p. 6). To define 'vital importance' he specifies that it emerges when "he cannot do without it, when his life will be blighted or seriously harmed without it" (p. 8). Later, Thomson (2005) defines harm as a person's deprivation of "engaging in non-instrumentally valuable experiences and activities as well of the possibility of appreciating them" (p. 178). Frankfurt (1998) is explicit in linking fundamental need with harm by saying that "[m]aking things better, from a moral point of view, is less important than keeping them from getting worse" (p. 24). Fundamental needs lead to harm if the need is not satisfied and the harm is outside of the person's voluntary control (ibid.). A looser link between harm and need recognizes that there are things we need permanently and having them does not make the need disappear, rather the lack or the threat of a lack of something makes needs claims relevant (Thomson, 1987).

Fundamental need satisfaction is related to fixing problems. Improving things for fundamental need satisfaction is necessary when the state of affairs is continuously unacceptable, for example, when there is no change towards the worse, but more of the same misery makes the totality of issues worse (Thomson, 1987; Frankfurt, 1998). A family in substandard living conditions suffers more each day, even though the apartment is not getting any worse. Not getting what one desires can lead to frustrations and consequently to harm. This, however, does not count for the craving to turn into a fundamental need, because people can get rid of their desires and thus the frustrations. A true need is one that exists independent of a want for the same object. If an object is only needed when it is wanted, the need is false (Frankfurt, 1998).

Summing up, the link between harm and fundamental need turns attention to avoiding harm and solving problems. These, according to the discussion above, are a better justification for design than designing for improving the present acceptable state of affairs. Based on this, it is possible to formulate the first heuristic to identify a fundamental need. I will call it *protection dimension* and define it as designers' inclination towards protecting prospective users from harm. Along this dimension, designers, when capable of deciding between explicit or implicit alternatives, increasingly choose courses of action that aim at reducing users' existing harm and avoiding causing them new harm. Designers reduce harm rather than give priority to working for alternative design objectives and criteria, these possibly including goals such as increasing users' pleasure, providing new kinds of experiences, improving the profitability of the business, or penetrating new markets to name a few. 'Users' include the primary users, that is, the persons operating the products or services, and secondary users, including other stakeholders for whom the product and its use has or may have an influence.

In addition to avoiding harm, it is possible to establish another heuristic for identifying a fundamental need, as already hinted in Thomson's definition of harm. According to Brock (2005), "a need is basic [fundamental] if satisfying it is a necessary condition for human agency" (p. 62). According to Braybrooke (1987) it is essential to satisfy fundamental needs to function normally. To clarify what functioning normally means, Braybrooke (1987, 1998) gives our roles as citizen, worker, parent and householder as examples of the references for normality. We need to be able to meet the (fair) expectations that the relevant others set on us in the range of roles we have adopted. Individuals in a parent's role need means for bringing up children in a way that is accepted and considered 'normal' by society, if that is what they consider suitable. For example, in societies with a high standard of living, children at school age are assumed to have a private room and parents required to provide that to meet the condition of normality. However, it should be the parents' choice to decide whether they obey this rule. Doyal (1998) links need with a person's way of being normal, as not trying to satisfy needs is abnormal or unnatural. He argues that "the search for objective basic needs [i.e. fundamental needs] becomes that for universalizable preconditions that enable nonimpaired participation both in the form of life in which individuals find themselves and in any other form of life that they might subsequently choose if they get the chance" (p. 158). According to Penz (1986), "[n]eeds are identified as what is required for what is quintessentially human and as that without which harm will occur to the individual". Being able to listen to some particular type of music might, under some conditions, be perhaps considered as nonimpaired participation in the form of life where a teen pop fan finds herself.

The definitions of fundamental need above are rather open to interpretations, conservative in leaning to normality, and may appear circular. However, what we can learn from them is that the authors agree on fundamental needs being based on people's capabilities to behave autonomously in choosing what is best for them, while at the same time constrained and directed by the roles that the environment has placed on them. Harm, that is, deviation from 'normal', 'essential' or 'non-impaired' nature, is defined by the particular traits of an individual and the expectations related

to the roles that the individual takes or is assumed to take in society. Thus, on the one hand, constraining users' behaviour by limiting their liberties more than a just social value system requires would violate the individual's fundamental needs. On the other hand, isolating the user from their contextual and situational means would inhibit the users' normal behaviour, decrease their capabilities and compromise their fundamental need satisfaction.

Understanding users' fundamental needs in UCD seems to require taking up a holistic non-reducing view of users and allowing them to behave autonomously in the roles and situations that they have assumed. Based on this, I can formulate a heuristic that describes designers' tendency to satisfy fundamental needs from the point of view of respecting the users' agency: the *appreciation dimension* refers to designers' inclination towards appreciating the non-reduced agency of the users.

Next I discuss the commitment of UCD practices to protecting and appreciating users. The sections below are constructed in a form of a historical review from 1980s to 2000s.

Protection

The protection condition puts design into a defensive problem-solving mode. Although this might prompt aversion in the design community in general, much of UCD has worked in this mode. An example might be a usability engineer not trying to improve interaction, but rather defending the achieved level of user-friendliness against 'creeping featurism' (Norman, 1988) as fellow developers keep on pushing new features into a product. The methodological and conceptual tools developed for usability engineering provide means for defending users against harm (Lewis, 2006; Nielsen, 1993; Rubin, 1994; ISO 9241-11). According to Nielsen (1993) "…utility is the question of whether the functionality of the system in principle can do what is needed, and usability is the question of how well users can use that functionality" (p. 25). Eason (1984) argues that, "[u]sability … can limit the degree to which a user can realize the potential utility of a computer system". The value comes from the 'system' and UCD, in the form of usability engineering, removes the harm involved in interaction. Some early references (Chapanis, 1991) have even suggested that the rate of errors alone provides a good and reliable approximation of usability, representing usability engineering as essentially being rooting out errors and thus focusing on harm reduction. Correspondingly to the usability engineering tradition, other branches of ergonomics, such as measuring workloads and avoiding accidents and occupational trauma, aim at maintaining the performance level and psychophysical condition of the user. The employee is supposed to leave the shift in no worse physical and mental shape than that in which she arrived, but not necessarily in any better.

Although the older usability engineering tradition of UCD follows the defensive tendency of protection dimension, the more recent approach known as design for user experience (UX), affective, pleasurable, and emotional design (Desmet, 2002; Helander & Khalid, 2006; Jordan, 2002; Khalid, 2006; Koskinen et al., 2003; Norman, 2003) have taken more initiative to change the users' reality. User experience designers create novel kinds of experiences and values under the UCD umbrella. The emphasis on UX has been a response to the changes in the ICT business environment from industrial and commercial applications to home and leisure products. Along with the change of contexts, UCD has evolved from a focused, but limited human-machine paradigm into one that considers broader social ecologies, networked technologies and ubiquitous applications.

The shift can also be linked to developments in theories of innovation. The identification of two kinds of quality factors, 'must-have' and 'delighting' qualities, can explain users' satisfaction and gratification with products. 'Must-have' quality features cause dissatisfaction when absent, but do not increase satisfaction beyond a certain limit, while 'delighters' increase pleasure when present, but their absence does not turn into users' dissatisfaction (Kano in Helander & Khalid, 2006). The similarity between fundamental needs and must-have quality is obvious. In matured markets no competitive advantage can be achieved with 'must-have' features, because they are well enough provided by all competitors. That is why companies, user-centered design scholars and practitioners have directed attention towards 'delighters' and 'desires'. UCD has turned towards UX to create delighters, being integrated into corporate innovation functions. The design innovation literature underlines the business importance of positioning to completely new markets by creating novel kinds of products, experiences and user value (Cagan & Vogel, 2002; Kelley, 2001; Kim & Mauborgne, 2005). Consequently, a link has been forged between user-centered design's, innovation capabilities, creating new kinds of experiences and entering new market domains.

Several designers have compromised the idea of user protection, even though that of user-centeredness would still be appreciated. Prominent academic figures like Donald Norman and Martin Helander switched their interests during the 1990s (Helander, 1988, Helander & Tham, 2003; Helander & Khalid, 2006; Norman & Draper, 1986; Norman, 1988, 2003, 2005) from cognitive ergonomics and problem-based design towards emotions, experiences and opportunity-based design. Norman (2005) has criticized the innovation potential of traditional user-centered design by saying that it creates good designs, but what is requested is great design, which only "comes from breaking the rules, by ignoring the generally accepted [usability engineering] practices" (p. 19).

The UX shift has made the 'D' in UCD more capital. According to Cockton (2006), the 2000s was the decade of design for human-computer interaction, after the dominance of technology, psychology and context. Design is an activity that cannot be reduced to solving well-defined problems. In a design project, the goals, which may appear fuzzy in the beginning (and if they are not fuzzy they are blurred by the designers (Cross, 2007)), are questioned and reformulated, and the process of generating solutions is intertwined with the processes of understanding, focusing and defining goals. Design becomes a focusing and negotiating process where the interpretation of earlier experiences and precedents, emerging solutions and developing understanding of objectives evolve as a dialogue (Cross, 2007; Lawson, 1997; Schön 1983). The non-negotiable design target relevant to 'must-

have' quality and fundamental needs do not easily match this model. By defining goals and solutions together as an intertwined entity, design activity effectively creates needs. The needs that become ultimately satisfied by design are formulated by design, only more or less closely guided by the users' reality.

The UX approach has liberated UCD to look for any new worth that technology can bring to users. It is focused on finding *what* could be designed instead of answering *how* questions. This positions UCD and UX in a much fuzzier landscape of values than which protection conditions suggests; consequently, the present practice of user-centered design includes both harm protecting orientations and those where the priority is in creating new kinds of value. The development trend from 1980s to 2000s has been towards catering for a wider range of goals rather than just advancements on the protection dimension.

Appreciation

The conception of 'user' represents people in a way that can be seen as alien to the non-reduced nature of humanity. Consequently, 'user' has increasingly been replaced by the more expansive and humanizing 'human', as in the name of the ISO13407 standard for *Human-centered design process for interactive systems*. Hanington (2003) explains his preference for 'human', saying that design "is recognized as an activity inherently tied to human needs and concerns. For this reason, I would argue for … humanizing of the phrase by calling it human-centered design" (p. 10). The author continues to apply 'user' and 'user-centered design', because 'user' specifies the role of a person among designers, purchasing agents and other stakeholders. In addition to the wording, the methods and the ways in which expertise, responsibility and initiative are shared between users and designers have been changing in UCD towards a position in which users' non-reduced human nature is better respected.

Jääskö and Keinonen (2006) have described these changes through a series of user-designer relationships. Their metaphor of *Engineer designer and component user* refers to designers applying documents describing users in a mechanistic manner and regarding people as just another type of component in a technical system. Reducing users to anthropometric distributions or generic principles of perception are examples of these. According to Darses and Wolff (2006) this kind of design attitude, that is, seeing users as subsystems in a technical environment, is still the most common way for designers to refer to users. *Doctor designer and patient user* is a relationship based on an individual level of interaction between a designer and a user. The allocation of responsibilities and possession of design expertise is clear and rigid: the control and expertise belong to the designers and the users contribute by indicating the problems to be solved in a way similar to how patients consult their doctors on health concerns. *Student designer and master user* describes the interaction where users' expertise is respected and brought into the product development context by a designer in a student role. The user is not reduced to numbers or isolated in a usability laboratory, which is detached from her natural habitat. The relationship is based on situated action and observations in the context where users typically work. *Coach designer and athlete user* is a metaphor for designers supporting the users' creativity in collaborative design. Like coaches train athletes to top performances through the correct methods and tactics, designers enable users to design better than they could spontaneously. Users are invited to apply their capability to create and develop their environments; designers augment their spontaneous skills with participatory and co-design techniques.

Von Hippel's concept of 'lead user' (2005) can be seen as the next step in the range of user-designer relationships towards more autonomic users. Lead users adopt the kind of product development initiative that has traditionally belonged to professional designers. This is possible because they "… are currently experiencing needs that will later be experienced by many users in the market. They anticipate relatively high benefits from obtaining a [new innovative] solution to their needs, and so may innovate" (p. 22). In addition to the practical benefits the lead users get by improving products, von Hippel recognizes the internal motivation, the gratification of being able to create leading-edge solutions and the recognition within a user community as important reasons to innovate. These are clear signs of autonomous human agency and participation in worthwhile activities. The application of advanced design tools and networking are essential for the innovation, and thus, we can consider the lead users 'augmented humans' utilizing these means while the component-users are bare naked 'reduced humans' exactly as printed in anthropometric manuals. By ending the continuum with lead users, the author does not suggest lead user innovation to be the most advanced or appropriate design approach in other respects, apart from recognizing and trusting users' autonomy. The approach may, for instance, put excessive weight on minority segments' marginal needs, which can be avoided by applying the previously introduced design strategies. Corresponding user conception transformations with different terminology have been presented by Sanders (2005), Fischer (2003), Fischer, Giaccardi, Ye, Sutcliffe, and Mehandjiev (2004) and Keinonen (2009).

As with the protection dimension, a development trend can also be seen here. Early UCD methods considered users anthropometrical or cognitive simplifications, while the more recent approaches underline the holistic conception of users. An exception to the chronological sequence is the Scandinavian participatory design (PD) movement, which pioneered trusting in users' competence, initiative and decisions several decades earlier than the UCD mainstream (e.g., Greenbaum & Kyng, 1991; Schuler & Namioka, 1993; Sundblad, 2009). It is also worth mentioning that lead user innovation, understood as people improving their tools and environments, has a long tradition. The novel aspect is considering it as a valuable input for commercial high-tech innovation.

The discussion above has dealt with users participating in product development, not ordinary users interacting with the manufactured and commercialized artefact. It is difficult to claim that those design approaches that utilize reduced conceptions of the user would necessarily produce artefacts that would compromise human autonomy in their use, or, correspondingly, that the inclusion of 'augmented users' would lead to designs fulfilling and exceeding the essence of human nature. However,

reduced conceptions of users in design cannot model, and thus, justly enable design for a holistic user. If we understand the journey from Dreyfuss' (2003) anthropometric models Joe and Josephine staring at a radar display to von Hippel's lead users creating innovative open source software as an accumulative development of UCD, we can probably agree that the possibilities of the discipline to satisfy the fundamental needs of being human have improved.

User-centered design practices now include the whole range of variations from reduced to enhanced user conceptions. Consequently, the whole range of ethical conclusions seem to be possible from well justified to questionable. The 'component user' is reduced to numbers on anthropometric tables, generalized to averages, represented in reference manuals and design guidelines, decontextualized from culture, environment and the work itself. The reduced 'component user' is non-social, passive with reference to design, not wanting or suggesting improvements and reactive in practice. An 'augmented lead user' is a highly competent individual, alive and present, situated in environments and practices, social and networked, active in learning, criticizing, communicating interpretations and ideas, and creative in design.

Integration

The discussion on protection and appreciation of users in UCD leads to the conclusion that depending on the particular UCD approaches the commitment to satisfying users' fundamental needs might be fast or compromised. There also seems to be a trend that user protection as a UCD driver is fading into the background as appreciating users' agency becomes more prominent. One possible way to see this development is to regard the two dimensions, protection and appreciation, as two ends of a single trend from the 1980s to the 2000s combining transformation of UCD values from rigor to relevance, from control to negotiation, from problem to opportunity-based design and from valuation of performance to the versatility of values. However, if we assume that protection and appreciation are independent dimensions characterizing the UCD community's conception of its objectives and the users it serves and collaborates with, we can apply them to construct a two-dimensional *protection-appreciation space* (see Figure 1). This space would allow us to deal with a wider range of need satisfying orientations rather than seeing the dimensions as opposite to each other.

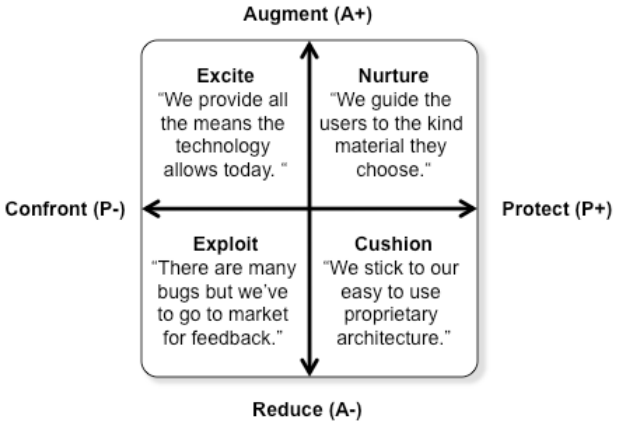

Figure 1. Protection-appreciation Space.
Design approaches for meeting users' needs.

Let us position protection dimension horizontally and appreciation dimension vertically. In the *protection* (P+) end of the protection dimension, designers commit themselves to safeguarding the users from harm caused directly or indirectly as a consequence of interacting with an artefact. A logical opposite to protecting users would be harming or abusing the users, but in normal design practice we do not assume that designers purposefully seek to hurt users. However, it is easy to imagine a design project that leaves the users to cope with artefacts and their consequences without much thought or effort to protect them. Designers may give priority to other design requirements leading to neglect of the possibility of designing for harmless use. Depending on the type of challenge and the users' capabilities, the resulting human-technology *confrontation* (P-) may be stimulating, motivating and give positive experiences, but also the opposite is possible and even likely. At the *reduction* (A-) end of appreciation dimension users are considered components of socio-technical systems, mechanically responding to the techno-oriented demands as discussed above. They are transferred to the design process as simplified representations presenting a fraction of what a human being is. The users are not considered capable of influencing the way human-technology relationships are composed. At the opposite *augmentation* (A+) end, users are regarded as empowered competent actors creating what they regard to be worthwhile. The acknowledged competence of users and trust of their judgment allows the design community to allocate them initiative and responsibility to reinnovate practices and develop artefacts. The appreciation-protection space cuts conceptions of users and strategies for collaboration into quadrants with essentially different value profiles.

The most casual value set, the one in the lower left corner of Figure 1, confronts and reduces (P-, A-) the users. The design process compromises the satisfaction of users' fundamental needs. The designers take advantage of the users' ignorance, flexibility, tolerance and the lack of choice. This kind of user *exploitation* may lead to users' dissatisfaction, low efficiency and malfunctions. However, the response is not always very obvious because of users' substantial compensating efforts, investments in education and tolerance of frustration due to, for example, self-attribution (Norman, 1988). Fundamental need is not a driver for customer and user behaviour. Consequently, no direct link between exploiting users and users' aversion to the resulting artefacts necessarily exists. However, the design lacks moral, user-based justification. The designers of a new music player would exploit the users in the following manner. "The design is still rudimentary and there are several bugs, but we have to go to market and start getting some early user feedback. Otherwise we will never learn what they want."[1] This kind of exploitation through the launching of immature products is not a hypothetical example, but an aggressive innovation strategy suggested by several authors for companies competing in a turbulent market place (Lynn, Morone, & Paulson, 1996; Hamel & Prahalad, 1991; Leonard-Barton, 1995).

In the protection-reduction (P+, A-) corner of the protection-appreciation space, designers take action to protect the users from harm, but do it only in those respects that the reduced conception of the users is capable of covering. Not trusting users isolates the design insiders responsible for the products from the outsiders. The outsiders are protected from the pain of facing the complexity, because the hard technology is *cushioned* to appear as soft, human and harmless. For several product categories, cushioning may be the preferred solution. When the designers' limited and reduced conception of users fails to reflect the real application of the products, the strategy stops working. Designers aiming at cushioning users from the complexity of downloading music might say, "We decided to stick to a proprietary system as we found the open architecture too complicated in usability tests. In addition, we'll preload the player with some popular western music, so that the users get easily started." The design team neglects the requirements of different cultures and individual preferences just for beginners' convenience and limits the users' freedom with a vendor proprietary architecture.

When users are simultaneously appreciated and confronted (P-, A+) in the top left corner of Figure 1, they are regarded as competent and initiative taking agents capable of joining the project of developing practices, skills and new technologies. This user need satisfying approach *excites* the users, stimulates exploration, modifications and reinnovation. However, the unfinished technology requires adjustments and modifications that may lead to undesirable consequences for which the designers do not assume responsibility. Here, the user is facing the complexity of the technology without cushioning layers and is herself responsible for making what seems relevant and desirable. The user is also responsible for the safety, social, financial and others risks involved in the technology and its use and may fail in meeting the challenges. The conception of technology compatible with these values is an open platform rather than a well-specified product. The music system designers adopting this value set might think, "Because music taste is so individual, we cannot limit the access to any sites by any way – on the contrary we provide all the means that the technology allows today. For those whom our basic interface is not good enough we provide application development kits to experiment."

Finally, the most user need oriented conception combines the commitment to appreciating and protecting users (P+, A+). The resulting designs build on the recognition of a variety of users' strengths, social and individual aspirations, and the designers take serious responsibility for guiding the users into a direction that protects them from harm. The technology is transparent and approachable, allowing the users to fundamentally influence their environment and the ways technology supports their practices. The technology is designed so that the exploration and modifications do not lead to harmful results any more serious than what is acceptable and necessary to support learning. The safety encourages exploration. The design aims at *nurturing* the users to create individual and social well-being. The music service developers would, for example, realize "… no-one is interested in all the possible music on-line. We need to develop systems that guide the users to the kind of material they are interested in based on their own previous choices and social filtering. Their willingness to share recommendations needs to be rewarded." It is not suggested that social filtering and open innovation type of collaborative design would always lead to the best results. Instead, the example aims at underlining how appreciating users recognizes them as social actors in addition to cognitive and emotional individuals.

Discussion

I have discussed the inclination of user-centered design (UCD) towards satisfying users' fundamental needs. Two main dimensions have been identified. Protection dimension refers to the tendency of the design community to protect users from harm, and appreciation dimension to the respect given to users' non-reduced agency. Both of the dimensions are derived from moral philosophical discussion about the nature of fundamental needs. UCD practice covers both fundamental need satisfying practices and ones where they are ignored. When we pay attention to the historical development and the changes in UCD foci from the 1980s to the 2000s, we can notice that the user conception has shifted from cushioning towards exciting users. The focus on protecting users from harm with usability engineering has been diluted with the more versatile range of design objectives, along with the emergence of design for user experience (UX). Avoiding harmful errors, waste of time and frustrations have become just a few of the objectives of user-centered design among others, these including new experiences, pleasures and excitement with technology. At the same time, the human being who used to be reduced to an operator restricted by her role as a part of an information processing system has been replaced by a more holistic and active contributor.

The two dimensions were used to construct a protection-appreciation space, allowing a mapping of UCD agendas including designs that exploit, cushion, nurture and excite users. Even though the protection-appreciation space suggests certain design ethical priorities, it is not claimed that these would be unconditional. Depending on several domain and contextually specific issues, other need satisfying orientations in addition to nurturing users may be appropriate compromises or even the optimal ways to proceed. Even exploiting users may be – perhaps temporarily – a tolerable direction for reasons more important than covered within the present limited frame of reference. These might include, for example, loyalty to the needs of a group of people another than users. Discussion to address broader design ethical issues is not covered here other than to note that the protection and appreciation dimensions can be seen as linked to the generic discussion about the ethics of design. This discussion is characterised by a dialogue between the 'ethical design' taking responsibility of peoples' well-being and global justice, for instance, and the 'commercial design' regarding users' autonomy and freedom of choice as the main values (Valtonen, 2002; Whitely, 2003; Margolin, 2002). The contribution of this article to the more generic design ethics discussion might be to suggest replacing the ethical and commercial polarity by a model where protecting users and appreciating their freedom of choice are seen as independent dimensions.

The protection-appreciation space may help us to reveal and analyze the implicit values inscribed in artefacts, design practices and attitudes. Especially, it provides a framework for discussing the justification of usability engineering and design for user experience, sometimes seen as conflicting or competing drivers.

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EndNotes

1. The quotations in this section are imaginary examples of designers' attitudes.

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