Understanding Active Non-Use through the Framework of Complex Design Spaces

ANKE DITTMAR, University of Rostock

JUDY BOWEN, University of Waikato

Interest in studying non-use has increased in the HCI field. However, most approaches which explain non-use are solely based on the notion of the user. This paper suggests understanding non-use in terms of the user and the complementary notion of designer. The framework of complex design spaces is used to revisit non-use and these underlying notions.

1 INTRODUCTION

A pervasive notion in human-computer interaction (HCI) is the notion of user. Cooper and Bowers [10] argue that its construction was crucial for legitimating HCI as a research field: the user is HCI's concern. The understanding of the user and the perception of the human-computer relationship have changed over time, often triggered by new technologies. These changes and corresponding shifts in the objects of study, the objectives and the methods are referred to in the literature as 'HCI waves' or (co-existing) HCI-paradigms. Bødker [5] describes three such waves. In the first wave, the single task-performing user is in need of a usable human-computer interface - the user interface. Then, in the second wave, users are considered as collaborating actors who will have to apply and appropriate the interactive system under development in their working practices. Finally, the third wave is a response to the increased use of computers in private and public spheres which requires more consideration of culture, emotion and (user) experience. In this context, HCI aims at understanding digital technology use as a cultural phenomenon and this also includes a better understanding of people's 'non-use' of digital technology (in the following shortly referred to as non-use) [16].

While early research on non-use tended to see it as a problem to be solved (non-users are potential users), more recent work depict many forms of non-use as an active and meaningful part of social selection processes [17]. Baumer et al. [4] refer to the potential of non-use to serve as an analytical lever for rethinking the user. An understanding of non-use obviously must be based on the notion of user. But perhaps surprisingly, the conceptual relationship to the complementary notion of designer has rarely been examined in the literature and there is only a loose link between non-use and work on 'non-design'.

This paper contributes to the conceptual discussion of non-use by analyzing in particular active forms of non-use and the related notions of user and designer through the lenses of the framework of complex design spaces introduced in

our previous work [8]. The framework supports a less 'end-product oriented' view of the design process of interactive systems. It allows us to dissolve the dualism between user and designer and to understand participants as being engaged in a network of designer-user relationships. Active non-use can now equally well be interpreted as a design activity, a choice between different artifacts to use or to refine. This perspective on non-use helps to reflect on the responsibilities of designers and users, or, more precisely on the individuals' responsibilities in using and designing artifacts. In what follows, we give some more background on non-use, the notion of designer and how it is linked to the notion of user. Then, the framework of complex design spaces is shortly presented which is the basis for the subsequent reconsideration of non-use and its underlying notions, leading again to new ideas for extending the framework.

2 BACKGROUND

2.1 Non-Use

Selwyn [17] shows that non-use is often assumed to be something not desirable and abnormal. Non-use is explained in the literature by economic and material deficiencies, by a lack of skills and knowledge to use technology, by constructs such as 'technophobia' referring to fears related to technology, or as a form of ideological refusal. Diffusion theory with its classification of people into innovators, early adopters, early and late majority, and laggards is used to support an understanding of non-use as a pre-stage of technology use [16, 17]. However, non-use is a more nuanced matter, as rightly pointed out by Selwyn: "people are more than simply 'end users' with no role to play in the technological process beyond accepting ready-made technological artefacts, but exploring the processes underlying how technologies are consumed and used" [17]. As a consequence, individuals are neither exclusively users nor non-users and non-use should rather be understood as continually negotiated practice [4]. The various reasons behind non-use have been explored in a number of empirical studies (a good overview is given in [2]). In the context of HCI, Satchell and Dourish [16] identify six categories of non-use: lagging adoption, active resistance, disenchantment, disenfranchisement, displacement, and disinterest. The authors conclude that "non-use is, often, active, meaningful, motivated, considered structured, specific, nuanced, directed, and productive". This is in line with the argumentation in [17] that the notion of choice is at the heart of the non-user debate and with the distinction between active choice not to use technology and little choice in not using it (e.g., due to economic or cognitive deficiencies). In this paper, we concentrate on forms of active choice (referred to as active non-use).

Baumer et al. [2] warn against fetishizing non-use and recommends using studies on non-use for reflecting on present assumptions about 'the user' in HCI research. The authors further suggest thinking about alternatives for the terms user and non-user [4]. A better understanding of non-use help us to think more deeply about broader implications of design decisions beyond the direct use of interactive systems [1]. Baumer further points out that the terms use and non-use may not be adequate to fully describe the complex nature of people's engagement with technology and adds the term usee to the vocabulary. Satchell and Dourish [16] see implications of non-use research for the ethical and methodological responsibilities of interaction designers. They recommend understanding users as people in the worlds into which our technologies are introduced and to better acknowledge the people's concerns. The present paper suggests we enrich our understanding of active non-use by a more explicit consideration of design and the notion of designer.

2.2 The Designer

The creation of the user who is in need of something leads to the notion of designer taking into account those needs. With the evolution of the notion of user, different but overlapping understandings of the designer and design have developed. In user-centred approaches, design is understood as a complex process requiring multi-disciplinary teams who put an early focus on the users' needs and tasks by iteratively applying methods to understand the context of use (e.g., contextual inquiry), to produce solutions (e.g., prototypes) and to evaluate solutions (with a focus on usability evaluation) [12]. Participatory design approaches understand interactive system design as part of a transformation of (working) practices and the designers need to encourage the active participation of the stakeholders to better negotiate all needs and interests [6]. The notion of designer is perhaps more explicitly visible in interaction design approaches which are based on existing design theories (e.g., from cognitive design research) and provide a richer picture of the nature of the designer's activities [18]. The designer is depicted, for example, as someone who is in a reflective conversation with the design material of the specific design situation (Schön's reflective practitioner cited, e.g., in [18]) and as someone who needs to bring creativity to both the generation of design ideas and to the selection or choice of ideas that work [9].

2.3 Relationship Between User and Designer

We have described how the HCI field employs the notions of use(r) and design(er) to continually position itself in the separate (if interdependent) processes of producing and consuming digital technology. According to Kaptelinin and Bannon [13], users experience extrinsic and intrinsic technology-enabled practice transformations. Extrinsic transformations are triggered by the designers offering digital products while intrinsic ones are triggered by the users themselves making use of available artifacts in their everyday activities.

Of course, there always remains a gap between the practices of designers and users and, as a consequence, between the intended use and the actual use of digital artifacts. The above mentioned user-centred and participatory design approaches reduce the design-use gap but focus on the extrinsic transformation [13]. Related approaches such as meta-design [11] may further blur the boundary between the designer (now meta-designer) and user (now co-designer) but still mainly take a product-centered point of view (e.g., by providing end-user development tools).

2.4 Non-Design

For reasons of space, we only briefly touch upon 'non-design' and related ideas. Baumer and Silberman [3] argue that there is relatively little reflection on where and when digital technological interventions (referred to above as extrinsic transformations [13]) are inappropriate. The authors identify three 'types' of situations: 1) there is an equally viable low-tech or non-tech approach to the situation, 2) the intervention result in more trouble or harm than the situation it's meant to address, and 3) the technology solves a computationally tractable transformation of a problem rather than the problem itself [3]. Pierce [15] describes undesign - a form of technological extravention - "as the ability to understand *that-which-currently-exists*, to make it *disappear* in concrete form as a new, purposeful *subtraction* from the real world".

3 THE FRAMEWORK OF COMPLEX DESIGN SPACES

This section briefly presents those key ideas of our framework of complex design spaces [8] that will serve as a basis to reflect on active non-use and underlying concepts. Central to the framework is the concept of *design space* which we use, similarly to [9], as a tool to understand the designers' activities in a less prescriptive way. A design space has

an entry point and an exit point indicating the underlying user-designer relationship and it is 'populated' by design artifacts (see figure 1b). Every external artifact that has been created or appropriated for an intended use in the design process (e.g., prototypes, scenarios, and the 'final' product) is considered to be a design artifact. Designers 'entering' the design space are provided with some initial artifacts describing, for example, the users' expectations. The designers' intertwined problem setting and solving (e.g., [18]) find expression in the creation, modification, use or discarding of design artifacts within the design space. How designers relate these different artifacts to come up with a solution provided to the user via the exit point is less relevant here. It is described in more detail in [8], together with related concepts of design.
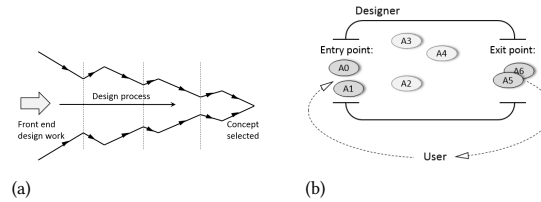

(a)   (b)

Fig. 1. a) A variant of Laseau's overlapping funnels illustrating the step-wise alternation between concept generation and convergence (from [9]), b) Simple design space with design artifacts A0, A1... The iterative design process is indicated by the feedback between the user and the designer.

What is specific to the framework is the idea of complex design spaces and the distinction between alternatives and variants to better acknowledge the multidisciplinary character of design work with the heterogeneous design practices involved. A *complex design space* is a hierarchical composition of sub-spaces (until the level of simple design spaces) which are assigned to design sub-teams working relatively independently on different elements of the design task. Note that this space decomposition is typically not related to a hierarchical decomposition of the design problem. Figure 2 illustrates the 'flow' of design artifacts between the different sub-spaces via their entry and exit points. Although not visualized in the figure, our model takes into account that sub-teams with their design sub-spaces may not necessarily exist over the whole time but can be temporary. Additionally, one participant can be an active member of different sub-teams or groups. As a consequence, (s)he plays the role of user in some design contexts and with respect to some design artifacts but is in the role of designer in other contexts. For example, a user interface designer may develop a prototype of a user interface based on his or her use of scenarios and sketches designed by someone else.

Design space models such as Laseau's overlapping funnels (see figure 1a) show a common view of design as the generation and the convergence of concepts or design options. Decision making in this context is typically understood
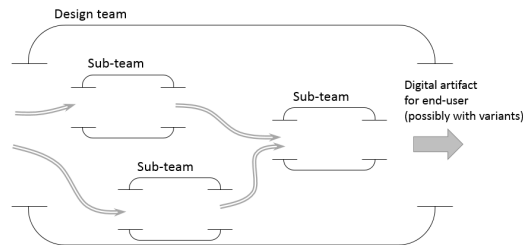

Fig. 2. Complex design space with sub-spaces.

as the selection of one option (the solution that is offered to the user). In our framework, two types of design options are distinguished. *Alternatives* represent 'local' choices within the sub-spaces: only one option leaves the sub-space via the exit point. *Variants* represent 'delayed' or partial decision making: several of the options leave the space and the choice of which one to use has to be made within other sub-spaces.

To summarize, the framework proposes thinking of participants as being engaged in a network of designer-user relationships. Such networks are represented by complex design spaces (which are, in fact, also spaces of use) and their complexity is reflected in the structure of those spaces. Alternatives and variants are important means for distributed and more responsible decision making. Sub-teams must understand when to select design options locally (alternatives) to reasonably reduce design complexity and when to keep options across sub-spaces (variants) to enable the consideration of other viewpoints and interests.

4 REVISITING NON-USE (AND THE FRAMEWORK)

We argued earlier that choice is at the heart of non-use. The above framework portrays participants in the designer role as making choices about their products (design artifacts in the exit points) at least at two levels: choices about what to decide locally (and then make these decisions) and what to leave open to others. Figure 2 shows design spaces from an 'end-product oriented' perspective with the digital artifact finally provided to the end-user. But even here, the 'end-user' might have some choice. If, for example, a user interface supports different ways to perform a task it is the end-user who selects which one is best to use in a specific task situation. In the abstract example in figure 3, however, we take a broader view and consider 'end-product oriented' design spaces of digital artifacts such as *Space 2* (producing *DA3*) in their context of other spaces. It becomes obvious now that active 'non-use' of artifacts (whether digital or non-digital ones) should rather be understood as situated choice of people who act in various designer and user roles. For example, designers in sub-space *Space 3* of figure 3 decide to use *DA3* in some design situations (represented by two sub-spaces of *Space 3*) and the non-digital artifact *NA2* in other situations. Although offered to them, they do not to use *NA1* (see the entry points of *Space 3* and sub-spaces).

Concepts such as active non-use or personal artifact ecologies [7] help designers to overcome the thinking that new design should exclusively replace existing artifacts in the user's environment [5]. From the perspective of users, Krippendorff [14] distinguishes between cooperative, competitive, and independent interactions of two artifact species and refers to the net effects which the numerous personal decisions of artifact (non-)use have on the existence of artifact species. In this paper, individuals are understood as participants in transformation processes who are involved in a network of designer-user relationships. Complex design spaces may help to make the interdependencies of this network transparent and to understand (non-)use and (non-)design of digital artifacts as negotiated individual and group choices in production and consumption processes.

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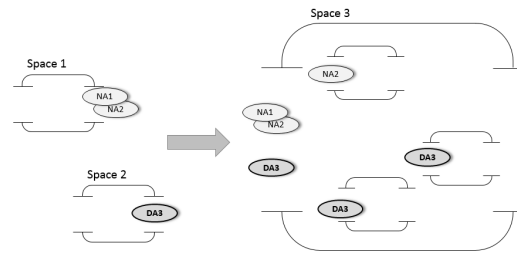
Fig. 3. (Non-)design and (non-)use in a complex space of digital artifacts (DA*x*) and non-digital artifacts (NA*x*).

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