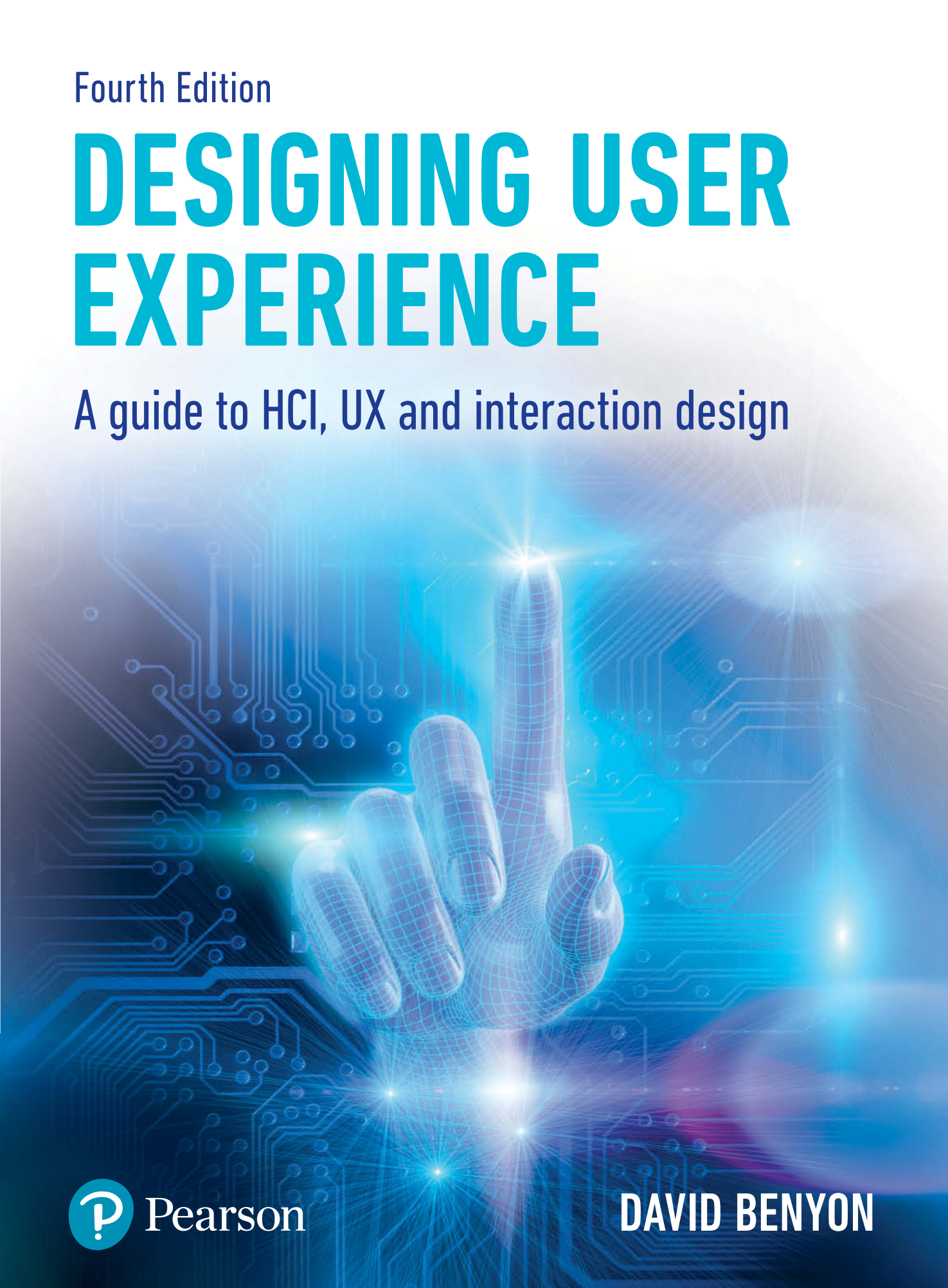
Fourth Edition

DESIGNING USER EXPERIENCE

A guide to HCI, UX and interaction design



Pearson

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3 'Justice refers to the obligation to treat people fairly and equitably. Fairness entails treating all people with equal respect and concern. Equity requires distributing the benefits and burdens of research participation in such a way that no segment of the population is unduly burdened by the harms of research or denied the benefits of the knowledge generated from it. Treating people fairly and equitably does not always mean treating people in the same way. Differences in treatment or distribution are justified when failures to take differences into account may result in the creation or reinforcement of inequities. One important difference that must be considered for fairness and equity is vulnerability. Vulnerability is often caused by limited capacity, or limited access to social goods, such as rights, opportunities and power.' (p. 10)

Challenge 7.5

Practise your observational skills next time you are working in a small group on a joint task, obtaining the agreement of the rest of the group first. Ideally, the task should involve working with papers, online material or some other tangible artefacts. Imagine that you are designing new technology to improve group working. Note how the group members interact with each other and the artefacts. Review your notes afterwards from the point of view of identifying requirements on the new design.

Design ethnography

In the early twentieth century, pioneering ethnographic anthropologists endeavoured to understand an unfamiliar way of life through what has become known as 'participant observation' – learning about language, activities and culture through spending months or years living in the community under study. The anthropologists talked to people, observed day-to-day life in detail, and collected not just physical artefacts but stories, myths and so on. Eventually, the resulting personal experience and field data were analyzed and recorded as an ethnography. Sociologists, notably those from the University of Chicago in the 1930s, employed similar techniques in the study of societies and groups closer to home. In both domains, the basic approach continues to be used, including the core principle that the ethnographer should not interpose his or her own theoretical or cultural frameworks or expectations between the field data and the resulting ethnography.

FURTHER THOUGHTS

Ethnomethodology

Following the work of Suchman (1987), most ethnography for technology design adopts a particular flavour of sociology termed 'ethnomethodology'. In short, ethnomethodologists hold that social rules, norms and practices are not imposed externally on everyday life but that social order is continuously and dynamically constructed from the interactions of individuals. As a corollary of this it is philosophically unsound to generalize beyond the setting where the ethnomethodological ethnography has been undertaken, or to analyze the findings from a theoretical standpoint.

Ethnographic work in human-centred design projects is not always the preserve of specialist 'ethnographers'. As the approach has gained popularity, technologists and HCI practitioners frequently 'do some ethnography' for themselves. Their sometimes casual adoption of the techniques has attracted some adverse comment from those trained in the field (Forsythe, 1999), and more cautious practitioners often refer to their work as 'ethnographically informed'.

Design ethnography is a growing area of research and activity in UX design. It recognizes the difference between undertaking ethnographies from an anthropologist's perspective (where natural understanding is central) and the ethnographies practised by designers (where the aim is to inform design). Specialist degrees are now offered that present the theory and practice of design ethnography.

The objectives for the design ethnographer are very much determined by those of the design project in hand. They often focus on elucidating the role and high-level requirements for a proposed new technology through a deep understanding of work in practice. Dourish and Bell (2014) provide a compelling description of ethnographic and cultural anthropology in the context of the development of ubiquitous computing environments. They map out the terrain of contemporary computing, exploring rich issues such as infrastructure, mobility, privacy and domesticity.

In other projects, the ethnographer's added value to the process of understanding is in the definition of usage stories and scenarios, the identification of practical issues for implementation, and as a focus for a higher degree of stakeholder involvement. The discussion in the final chapter of Heath and Luff (2000) is a particularly clear account of moving from ethnography to requirements using video-based studies of medical consultations.

Design ethnography requires a sensitivity on the part of the designer and a willingness to open up to the issues that people in a particular setting are concerned about. Design ethnographers focus on activities, rules and procedures, the physical layout of place where the activities take place, and the use of artefacts in work or leisure activities. Of course, the Internet and mobile devices will often be a fundamental part of any activity and design ethnographers need to be particularly sensitive to the way these artefacts and the social networks that they enable contribute to people's activities. A set of guiding questions can be useful, such as those outlined in Box 7.6.

Design ethnography can also be undertaken online as opposed to just face to face. Here researchers may monitor social networks, join online communities, follow

BOX 7.6

Rogers and Bellotti's 'reflective framework' for ethnographic studies

- Why is an observation about a work practice or other activity striking?
- What are the pros and cons of the existing ways technologies are used in the setting?
- How have 'workarounds' evolved and how effective are they?
- Why do certain old-fashioned practices, using seemingly antiquated technologies, persist, despite there being available more advanced technologies in the setting?

Envisioning future settings

- What would be gained and lost through changing current ways of working or carrying out an activity by introducing new kinds of technological support?
- What might be the knock-on effects (contingencies arising) for other practices and activities through introducing new technologies?
- How might other settings be enhanced and disrupted through deploying the same kinds of future technologies?

Source: Rogers, Y. and Bellotti, V. (1997) Grounding blue-sky research: how can ethnology help?, *Interactions* 4(3), pp. 58–63. © 1997 ACM, Inc. Reprinted by permission.

discussion groups, watch relevant YouTube videos and search out other online contributions to the domain of study. The term 'netography' has been used to describe online ethnographic research (Kozinets, 2010) where the advice is to follow good ethical and anthropological practice of being involved in the community rather than being a distant observer. Autoethnography (Ellis *et al.*, 2011) is an approach to understanding based on ethnographic study of one's self.

The key to (relatively) economical ethnographic work is to recognize when enough data has been collected. One indication of 'enough' may be that no new details are emerging. Another is being able to identify what has *not* been observed but will not happen within the span of the current work.

Of course, time is required not just to acquire the data but to analyze it. Video is intensely time-consuming to analyze – at least three times the length of the raw sequence and frequently more, depending on the level of detail required. The process can be streamlined by having an observer take notes of significant points in the 'live' action; these notes then act as pointers into the video recording. Software tools such as ATLAS.ti and NVivo help in analyzing pages of text notes (not just of observations but also of transcripts of interviews and group sessions) and, in some cases, audio and video data. For large projects, material can be organized into a multimedia database or web-based repository.

Communicating ethnographic results can be challenging. One approach is to encapsulate the findings in 'vignettes' – short descriptions of typical scenes. A vignette is very similar to a scenario but less structured than the format we have proposed – perhaps more like the text of a scene in a play script, complete with stage directions. The vignettes are usually accompanied by a transcript of the accompanying dialogue. Vignettes are often supplemented by video extracts and sample artefacts. Another possibility is for the ethnographer to act as an evaluator of early concepts or prototype designs, before the requirements are finalized and while the design is too immature to benefit from user feedback. A still closer link between workplace studies and system design has been attempted by Viller and Sommerville (2000). This takes the output from the study and expresses its findings in the UML notation (UML is the Unified Modeling Language). By contrast, Heath and Luff (2000), Dourish (2001) and Dourish and Bell (2011) argue that the purpose of workplace ethnography is to construct a reservoir of experience that allows designers to uncover how people make sense of technology in use and so to design tools which support the improvised, situated and continually reconstructed nature of real-world activity.

7.9 Artefact collection and 'desk work'

Data from interviews, questionnaires and observation will have identified a range of artefacts in the form of things that support an activity. It is often possible to supplement this by collecting artefacts – such as documents, forms or spreadsheets, in office settings – or to video or photograph items that cannot be removed. Systems, apps and services that are somehow similar to the domain under investigation should also be studied.

Figure 7.11 shows the sort of photograph which might be taken and annotated to capture the range of information artefacts used in everyday work in an academic's office. These include:

1 Laptop used for file archiving, calendar, document production, email and Internet.
2 Vertical Screen for document viewing.
3 Horizontal screen for web browsing and media creation.

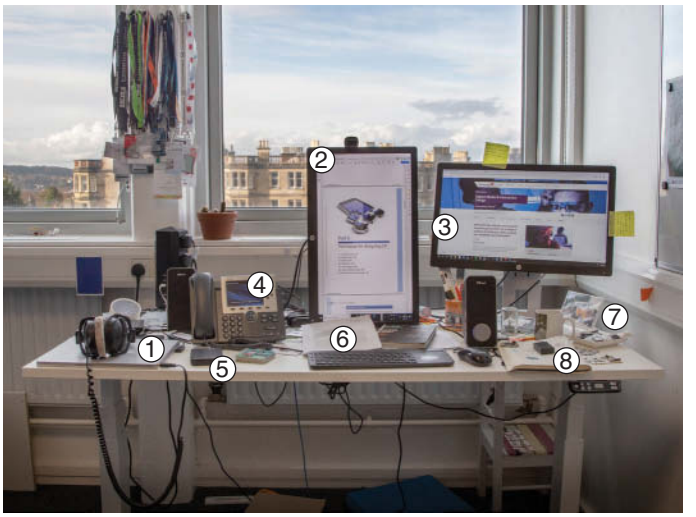

Figure 7.11 Artefacts on and around an office desk
(Source: Tom Flint)

4 Landline telephone for internal and external calls.
5 Hard drive for storage and transport of large size files.
6 Printout of journal articles.
7 USB drives and SD cards for storage and transport of smaller files.
8 Notebook storing current thinking and ideas.

Sometimes it can be helpful to track a document through a system, noting everyone who interacts with it and how the document is amended at each stage – a technique sometimes known as a 'tracer study'.

In a study of a health benefits claim processing system, for example, we collected copies of blank claim forms, standard letters sent to claimants, inter-office memos and the public information leaflet about the benefit. By chance, we also found a copy of an article in a local newsletter that provided a valuable insight into health professionals' views. These artefacts helped to ensure that we had a complete understanding not only of the data processed through the system but also of its relative importance and significance (what information requests are in bold type, what details have to be verified by a medical practitioner or pharmacist, etc.) and how annotations on the original documents were used as notes of progress through the system. In another medical example, this time in a hospital, Symon *et al.* (1996) show how the very appearance and style of a doctor's handwritten notes on patients' records revealed valuable background details to other staff, such as whether the consultation had been carried out in a hurry. All such informal features of the way artefacts are used in practice will make demands on the design of supporting technology.

Understanding activities does not just involve working directly with the people who are doing the activity now or who will be doing so in the future; the designer will need to do plenty of 'desk work' as well. This may include records of requests for help or user support and records of bugs reported, and change requests often reveal gaps in functionality or presentation. Other desk work involves reading procedure manuals and other material about the organization. It involves studying existing software systems to see how they work and what data is kept. Desk work involves collecting and analyzing any documents that exist and documenting the movement of documents and the structure of objects such as filing cabinets and ledger books.

Looking at similar products, services or apps is another way of getting ideas. A market analysis looks at similar products that have been produced or services that are provided. This can be useful because the designer can see the product or service being used *in situ* and can consider the design solutions that others have proposed. This might highlight good and poor solutions for particular design problems. Looking at similar activities complements such an analysis. An activity might be in quite a different setting from the one under scrutiny but might have a similar structure. For example, looking at a video hire shop might provide inspiration for a car hire application, or looking at an automatic coffee machine might help in understanding an ATM activity.

Challenge 7.6

What artefacts might you collect or photograph relating to people's use of communications technologies in the home? (Hint: think about non-electronic media as well.)

7.10 Data analysis

Of course, gathering data on its own is not sufficient to gain an understanding of the domain, any difficulties people are experiencing and the requirements for any new service or system. The data needs to be analyzed, digested, synthesized and presented in a way that other designers and all the stakeholders can understand. This involves designers immersing themselves in the data and taking time to explore the relationships between the data.

→ Many of the issues raised here are explored through concrete examples in Chapters 14–20 where we look at the different contexts of UX design

A key distinction in methods of data analysis is between quantitative analysis and qualitative analysis. Quantitative analysis involves gathering countable measures of some criteria. For example, a quantitative analysis of a questionnaire would focus on the number of people who answered the different questions in particular ways, or the percentage of the people who responded to the different questions. A quantitative analysis might include looking at the average number of people in different categories, the mean or mode of a data set and the size of the standard deviation of the population from the mean. Various statistical tests of the significance of the data that has been gathered can be performed in order to inform the analysis. We cover the design of experiments and the analysis of statistics in Chapter 10.

A qualitative analysis of data relies on the designer building an argument to support a view, making use of the data in a sensitive, user-focused way. For example, following the process of interviewing a number of users, the designer will read over the transcripts and look for recurring themes or issues that people are talking about. This might be backed up by observations that show people having particular problems, and following some desk work looking at similar products or services, the designer might point to some key issue that is currently badly covered by existing designs.

Data analysis is all about understanding themes and categories that are more abstract than the raw data. In Chapter 3 we presented a design method that used stories as the raw data and collected these together into conceptual scenarios. This process of abstraction led to a better understanding of the domain. Earlier in this chapter we discussed gaining a semantic understanding by using semantic differentials to gather data

about the key descriptors of some domain. The scores on the detailed adjectives will be grouped together into larger concepts and themes to inform design.

Different methods will be used in different ways to collect different types of data at different stages in design, so it is likely that the designer will use a range of qualitative and quantitative methods during the understanding process. In this sense the UX designer can be seen as a 'bricoleur'. A bricoleur is a designer who makes use of what is to hand in order to fashion some creative work. A bricoleur engages in bricolage, improvising with different methods and materials in art, literature, architecture or design. In UX bricolage is using a variety of methods for understanding that is pragmatic and appropriate in the current setting.

In order to be sure about the robustness of some data analysis, the UX designer should use some form of triangulation to verify findings. Triangulation refers to the investigation of some phenomenon or some domain from at least two complementary positions. This could be getting two different researchers to analyze some data, aiming to ensure inter-rater reliability of results. Data drawn from two or three different sources can be used to triangulate results. They are stronger results if they can be found in different data sets, or using different data-gathering processes.

A further issue in data analysis is to consider the theoretical position that informs the analysis. For example, grounded theory (Corbin and Strauss, 2014) is a qualitative method suitable for the analysis of the results of an ethnographic study, or an analysis of in-depth interviews. Here, transcripts of video or audio are marked up with tags – metadata that puts the word or phrase into a category. In the open coding approach, the researcher tags statements from the bottom up, grounded in the text, without concern (initially) as to where these concepts have come from. Axial or thematic coding is concerned with developing themes from the data. A common way of approaching this is to start off with a large number of low-level themes (maybe thirty, or fifty in some domains) and then have a second pass through the data to see whether any of the themes can be collected together into larger themes. These larger themes then create the axes within which to undertake further analysis. There is much discussion about grounded theory and the philosophical issues that surround it and ethnomethodological approaches to gathering and understanding data. The original exposition in (Glaser and Strauss, 1967) has led to much heated debate over the years.

← Ethnography is covered in Section 7.8

Researchers and designers may use theoretical positions that are presented in Chapter 23 or Chapter 11 to drive their data collection or analysis. For example, distributed cognition (Chapter 23) is an approach to understanding systems that recognizes the importance of various artefacts and people coming together as a complex system necessary to achieve goals in some domain. Models of the information flows and structures (such as ERMIA, Chapter 11) can be developed to represent the whole system. Perry (2003) provides a good introduction. Another view of human cognition focuses on how activities are decomposed into actions that in turn are broken down into operations. The focus here is on how the system as a whole can achieve the objective of the system and on the use of artefacts to mediate actions. We discuss activity theory in Chapter 23.

More recently, Jeffrey and Shaowen Bardzell have suggested an approach to understanding and design that comes from a humanistic tradition (Bardzell and Bardzell, 2014). They use critical theory and other methods from literature and cultural studies to inform the data gathering and analysis for UX design. Their focus is on critical analysis of the discourse uncovered through qualitative methods of interviews, observations and so on and on the intertextuality of different methods (similar to the ideas of triangulation). Their design approach focuses on aesthetics of UX, on the poetics of UX and on the pragmatics of UX.