

Cognitive anthropology as a basis for studying use quality of IT in the home

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ABSTRACT

This paper describes the theory of quality-in-use of interactive IT-artefacts. It also argues for a multi-perspective view of use quality in the design and study of IT-artefacts for the home. The design community of IT-based consumer products will benefit from studying what users consider being important and meaningful use qualities. For higher transferability of results and theoretical value, an understanding of why the users find these use qualities to be meaningful must be developed. Theory and methods from cognitive anthropology may provide a founding for this. Finally, future research questions and methods are presented.

KEYWORDS

Quality-in-use, cognitive anthropology, metaphor, values, information technology, home

1 INTRODUCTION

Today, information technology (IT) is a natural part of many people's daily life. Interactive IT-artefacts have taken a step into our homes and the connected e-home is becoming a reality. Within the e-Home project, studies are focused on understanding the user and the home, and on advanced user interfaces, interaction technology and user centred design for the e-home.

Most of the human-computer interaction (HCI) research up to this date has focused on computers at work. It's uncertain whether the findings and methods of design for work are fully applicable to design for the e-home. In this novel context of use, other values must be considered. Togetherness, entertainment, ease of use, enchantment, pleasure and seduction are, for example, more important concepts than productivity and effectiveness (Arvola & Holmlid 2000, Jordan 1998, Khaslavsky & Shedroff 1999). These differences between home and work use of IT, are of course related the goals of the use and the socio-technical contexts. This requires a broad model of quality-in-use and further studies into what good use quality is in the home context. In this paper, such studies are suggested. Inquiries of which qualities-in-use that are

highly valued by users must also be founded in theories of human sense making, to increase the transferability and theoretical depth of the study. Cognitive anthropology can provide such theories.

The theories and methodologies of quality-in-use and cognitive anthropology are described on the following pages and some future research questions and methods are presented.

2 QUALITY-IN-USE

How good an IT-artefact is cannot be assessed solely by studying the qualities of the artefact in itself. Traditionally this has been the focus for HCI as well as for software quality. The definition of quality-in-use in the ISO/IEC 14598-1 standard, however, takes one step further (from Bevan 1997):

“**quality in use:** the extent to which a product used by specified users meets their needs to achieve specified goals with effectiveness, productivity and satisfaction in a specified context of use”

In use contexts where nuances of satisfaction are more interesting than effectiveness and productivity, the definition provided by ISO/IEC 14598-1 is too weak. It

is focused on tools of work and do not capture the holistic qualities-in-use of every context. In addition, it is an expression of technical rationality that reflects a belief in the possibility of objective and precise specification of all aspects of a use.

A more promising approach is a multi-perspective view of quality-in-use. When describing the use of IT-artefacts, instead of the IT-artefacts themselves, Ehn and Löwgren (1997), and Ehn, Meggerle, Steen and Svedemar (1997) present a model for assessment of quality-in-use consisting of three quality perspectives. They see quality-in-use as a combination of *constructional*, *functional* or ethical, and *formal* or aesthetical qualities. Ehn and Löwgren write:

“The structure of a system is its material or medial aspects. [...] The functional aspects of a system concerns its actual, contextual purpose and use. [...] the form of a system expresses the experience of using the system.” (Ehn & Löwgren 1997, p.309)

Elaborating on this, Löwgren and Stolterman (1998) use four quality perspectives. The *structure* denotes the construction of an IT-artefact. *Functional* denotes the working of the system for the actual users in the use context. *Ethics* denotes the wider effects of the use and misuse of the system, and finally the *aesthetics*, which denotes the aesthetical experience of the system.

Dahlbom and Mathiasen (1995) describe three different aspects of use quality: *functionality*, *aesthetics*, and *symbolism*. The functionality concerns the practical use, the aesthetics is about the subjective experience, and the symbolism is a matter of what the artefact means and signals to others and us. Löwgren and Stolterman (1998) and Ehn and Löwgren (1997) include the construction of the IT-artefact as a quality perspective that has to be taken into account in the design. Dahlbom and Mathiasen does not, instead they prefer to regard it as a part of the functional aspects of the artefact if they regard it at all.

An inspiration for Dahlbom and Mathiasen (Dahlbom in personal communication) has been the writings of Paulsson and Paulsson (1957). Father and son Paulsson state that it's, in principal, possible to measure the *practical* use-value (functionality) of an artefact even though it sometimes is difficult to quantify, for example, the appropriateness of a chair as a tool for sitting. The *social* use-value (symbolism) of an artefact isn't measurable; it's meaningless to say that a certain artefact is twice as appropriate as another. Social use-value is only valid within a group with similar values. Within a family or other social groups you can, however, say: "We in this group find this car more presentable than that one." The main difference between the practical use-value and the social is by Paulsson and Paulsson considered to be that the former is generally applicable and measurable, while

the latter is immeasurable and only valid within a society with common values and lifestyle. *Aesthetic* quality is difficult to assess since it may be very individual. It is, however, common for a social group to have similar ideas of what is beautiful, due to similar background and experiences. Some universals are also considered to exist: An aesthetic object can only be beautiful if it has a pure gestalt. Deciding what a pure gestalt is, is a skill that can be developed with experience and an open mind.

All of these views on use quality have one thing in common; they are flexible multi-perspective views, which the ISO/IEC 14598-1 standard is not. With IT-artefacts designed for the home it is necessary to use a broad and flexible model of use quality, incorporating the beautiful, the appropriate, the practical and the doable. It is preferred to view quality-in-use as multiple quality perspectives both in the interpretation and in the creation of the artefact. The perspectives are not to be seen as complementary but as perspectives of a whole—the use of a system (Holmlid, 1997); a design decision concerning structure should be considered not only from a structural perspective but also from, e.g., an aesthetical perspective. It's important to consciously alter between different perspectives when approaching an artefact-in-use to capture the whole use and not only fragments of it.

2.1 Studying qualities-in-use

Due to the difficulty of finding relevant quantifications of qualities-in-use, a qualitative research approach is commonly adopted. When studying use qualities of a quiz game on digital television, Arvola and Holmlid (2000) have made an interpretative case study as described by Klein and Mayers (1999). Arvola and Holmlid used semi-structured interviews to gather their empirical material, and so did Holmlid (1997). He, however, used grounded theory (see for example Strauss 1987) as a methodological framework, which Arvola and Holmlid did not. Ehn, Meggerle, Steen and Svedemar (1997) propose that quality-in-use is best assessed by studying artefacts-in-use. That is, the approach of the study is ethnographic and the artefacts are hence studied in their actual context of use. Participative observations as well as semi-structured interviews become important ways of collecting the empirical material in this approach. Observations add to interviews by contextualising the opinions and values of the informants and thereby creating a better understanding of the whole object of study. Another important part of observations is that they address the issue of what people do and not only what they say they do.

3 CULTURAL UNDERSTANDING

Use quality of artefacts for the home is always dependent on the perspective and values of the users. Which qualities-in-use that is considered to be relevant and meaningful is reliant on both how the users understand the home as a socio-technical system, and on their value systems. Some of these perspectives and values are individual and some are shared with others. The shared perspectives have been called cultural understanding, cultural knowledge, folk models, cognitive models and many other things in the somewhat fragmented research area of cognitive anthropology. It's my belief that, in order to fully understand why some use qualities are more highly valued than others are, we have to study these culturally shared understandings. In this part I will elaborate on theories from cognitive anthropology.

3.1 Imposing order on a chaotic world

During our interaction with the world we impose order upon it. What we perceive is dependent on what we expect to find and what our knowledge and skills are. The act of perceiving does not occur at one moment in time. When you read, your understanding of the words you're currently focusing on is dependent on the understanding of what you've read so far. In the words of Ulric Neisser:

“Not only reading but also listening, feeling, and looking are skilful activities that occur over time. All of them depend upon preexisting structures, here called schemata, which direct perceptual activity and are modified as it occurs. Perceiving does not require remembering in the ordinary sense, but it is an activity in which both the immediate past and the remote past are brought to bear upon the present.” (Neisser 1976, p. 14)

It is a cyclic model of human cognition that is expressed by Neisser, where schemata direct action which in turn causes a modification of the schemata.

Almost echoing Neisser, Goodwin (1994) points out that there are coding schemas, as he calls them, used to interpret and understand an event. He states that these schemas are part of a professional vision, a way of viewing the world that exists in a professional culture. As an example he uses an archaeologist who categorises a pile of dirt in a completely different manner compared to a farmer. They see what is important for their profession; they see what they have learned to look for. The archaeologist will find the remnants of a pole while the farmer will see dirt that is fit for a certain crop. The coding schemas function in the same way as Neisser's schemata and together with the use of professional tools, they guide perception and structure the activity. What

Goodwin's perspective adds to that of Neisser's schemata is the fact that they are culturally shared, and this is at the core of cognitive anthropology. The main issue is to interpret the distribution and variability of knowledge, and how shared worlds are situationally co-constructed. How are the schemas, practices and relevant classification systems constituted and articulated within a culture?

3.2 Cultural models

Cognitive anthropology uses the term cultural models, to describe the shared knowledge of a culture. Quinn and Holland defines the term:

“Cultural models are presupposed, taken-for-granted models of the world that are widely shared (although not necessarily to the exclusion of other, alternative models) by the members of a society and that play an enormous role in their understanding of that world and their behavior in it.” (Quinn & Holland 1987, p. 4)

The cultural models frame the experience of a situation and supply interpretations and inferences. When the interpretations and inferences call for action, the cultural understandings also supply goals, and thus motivate behaviour.

Some cultural understandings seem to be more primary than others are. Take for example cultural models of the mind (D'Andrade, 1987) and emotional states (Lakoff & Kövecses 1987). The cultural knowledge in these areas seems to be very compelling and directs us to behave in a certain manner. They allow us to explain the behaviour of others; why we are rightly angry and entitled to berate someone. They may also make us feel a need or an obligation to act.

3.3 Metaphor

One way of examining cultural knowledge is by studying metaphor. Traditionally, metaphor has been considered to be a strictly linguistic phenomenon, an act in poetry and rhetoric. Metaphor has, however, proven to be much more than a surface phenomenon in language. It is a fundamental part of human cognition (see for example Lakoff & Johnson 1981; and Lakoff & Johnson 1999). In contemporary theory, metaphor is viewed as a conceptual mapping between two domains. We know one domain in terms of another. Metaphors are characterised by a large system of such mappings. Fundamental concepts such as time, state, and cause and effect have proven to be metaphorical (Lakoff & Johnson 1999). The linguistic expressions that traditionally were called “metaphors” are in contemporary theory called “metaphoric expressions” which are the surface phenomenon of metaphorical mappings.

3.4 Inquiry into metaphor

When trying to grasp the cultural understanding of a phenomenon, it's extremely helpful to work with a transcribed spoken material gathered during in-depth interviews or group interviews to get a rich linguistic material. The metaphors in that discourse provide a variety of clues to the underlying cultural models.

Quinn (1987), for example, explored the cultural models of American marriage. She identified a very popular metaphor in the talk: *marriage is a manufactured product*. Her informants spoke of marriage as well-made products that "last," "work," and were "strong." The talk also included craftsmanship, durable material and components that function together. This is not a random metaphor, held or made up by one individual. The mapping is conventional in the English language and is a fixed part of the way English-speakers conceptualise marriage. It's part of the American English cultural model of marriage, through which members of that society perceive, interpret and act, when it comes to love relationships. Similar conceptual metaphors can probably be found in users talk about IT in the home.

There are, in particular, two interesting discourse types that can be gathered when a metaphor analysis is to be made (Quinn and Holland, 1987). The first one is the explanation, which can be used to reveal the models that underlies the speakers reasoning. The researcher asks the informant to explain the phenomenon of interest. It's then possible to infer the cultural models from the metaphors the interviewees use in their explanation. Another useful discourse type is the narrative, where the researcher asks the informants to tell a story about an episode. The topic of interest is then traced in the discourse and what the informants highlight, elaborate, leave unsaid, mark with counter-examples and comment on with emotion, is noted.

4 STUDYING USE QUALITY AND METAPHORS OF IT-ARTEFACTS IN THE HOME

When designing consumer products for home use, nuances of user satisfaction are more important than they are in the design of tools for work. Satisfaction is always based on some kind of expectation of what you're going to get. If we are going to learn why some use qualities are favoured and others are not, we need to know how the users understand, conceptualise and value the use of IT-artefacts in the home. I believe that metaphor analysis and cognitive anthropology may provide the tools for developing an understanding of how home users of IT view that context of use.

When re-examining the empirical material presented by Arvola and Holmlid (2000), two metaphors for the

activity of playing a quiz game could be identified. The metaphors were a quiz game is a conflict, and a quiz game is a race. The latter is probably based on a more general metaphor of an *activity with an initial state and a final state is a journey* in combination with the source-domain of conflict. The analysis of the material is not reliable since the interviews weren't recorded and the material is scarce, but it provides an example of what the metaphors in the context of non-work use of IT may be. By knowing that the players of a quiz game view it as a race, we also know that they will expect competition, opponents, a beginning, an end, etc. This can provide advice for design. The main knowledge gained from it is, however, that the qualities-in-use identified as important in quiz games won't transfer to settings that can't be conceptualised in terms of a race.

4.1 Future research

The discussion above provides a hint about what kind of results future research on quality-in-use with a foundation in cognitive anthropology may provide. Within the e-Home project, the following research questions will be addressed:

1. What are important and meaningful use qualities of IT-artefacts in the home, from the perspective of the user?
2. Which metaphors do the users employ in their talk about using IT in the home?
3. How, if at all, can the important and meaningful use qualities be understood in the light of the metaphors used?

Semi-structured interviews or group interviews will be used to gather the empirical material. The informants will be asked to tell events of IT-use in their home and explain how things work in their home regarding IT. The talk is recorded on tape and will be transcribed for narrative and metaphor analysis. Observations will be made in the homes of the informants to gather contextual information. Due to the explorative and open-ended nature of the research, the exact focus of which users, artefacts, and purposes that will be studied will be allowed to evolve and shift as the research goes on. The conditions of the use contexts will emerge as the understanding of the phenomenon of IT-use in the home is developed.

In conclusion, studying what home users of IT consider important and meaningful use qualities is valuable to the design community of IT-based consumer products. For transferability and theoretical depth, it is important to understand why users find these qualities to be meaningful. Cognitive anthropology and metaphor

analysis may provide the tools and theories for that understanding and depth.

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