

Towards Future Methods to Take into Account Cross-Cultural Differences in Design: An Example with the "Expert Community Staff" (ECS)

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Abstract. Nowadays, ergonomics tries to imagine and to create new methods based on social situations to understand users' needs when these end-users are issued from different cultures. Because these needs are socially and culturally determined, new technology cannot be designed without understanding how it is embedded in its socio-cultural context. The aim of this paper is to present the Expert Community Staff (ECS) method, an innovative participatory method to enlarge real users' needs. First, we present the theoretical background of this method. Second, we present the methodological implications for the design. Finally, the advantages and disadvantages of this new participatory method are discussed.

Keywords: participatory method, users' needs, socio-constructivist design, community of users.

1 Introduction

This article proposes an innovative participatory method to take into account cross-cultural differences in design of new technology, to complement the traditional methods used in ergonomics.

We argue that it is essential to create innovative methods to include users issued from different cultures, with different histories, knowledge and with levels of perceptual, cognitive and social skills because new questions appear for the designers such as: "How to represent end-users who do not exist yet, because the technology has not been developed?" "What kinds of method exist to enlarge the representation of end-users who are scattered around the world?".

To answer these questions, most research in ergonomics has concentrated on a single dimension—either psychological or social—although a few researchers have considered both in a single study. The psychological approach focuses fundamentally upon attributes of the individual and examines psychological motivations for information behaviour that cut across several contexts or is independent of context [10, 27, 32]. The social approach studies the effects of the social context on information behaviour, regardless of an individual's psychological attributes [9, 30]. This article aims to consider an alternative to these two conventional approaches (either the psychological or the social) by adopting a constructivist perspective: the "Expert Community Staff" (ECS).

2 Theoretical Background of the ECS Method

2.1 From Psychological and Social Approaches

As Allard, Levine & Tenopir [1] said, researchers in the domain of human behavior have traditionally elected to conduct their work within either the psychological or the social approach. The psychological approach focuses primarily on a study of psychological states and processes in relation to information behavior. Central to this approach is the concept of information needs [17, 19, 33]. Based on the studies conducted by Taylor [31], the first approximation of the concept of information needs was proposed [3, 12, 13].

A lot of studies employed these approaches to examine information behavior at various cognitive levels, such as stages in solving a problem [7, 21], the level of familiarity with a topic [23], the level of task complexity [8], and along individual cognitive factors [18]. Nevertheless, the majority of creators of theoretical frameworks and models in the psychological tradition would probably agree that additional factors, which are not necessarily psychological (such as the physical environment, socio-cultural background, and goals of a search), also affect information behavior. For instance, Dervin [12, 13] emphasized that information behavior is also determined by situational elements in the environment in which a person operates. In the same way, Brown [6] examined other “external” factors affecting information behavior, such as organizational structure and the physical environment. Recognizing the existence of other factors, however, does not contradict the psychological approach. Although not explicitly stated, the implicit assumption is that psychological states and processes determine the course of an information-behavior event, but these states and processes can be affected by factors from other dimensions, such as social and environmental ones. The role of the psychological approach is not to investigate what affects cognition, but to focus on how cognition affects information behavior.

In contrast to the psychological approach, the social approach [9] focuses primarily on the study of social, organizational, and political states and processes as an impetus for information behavior. This social approach assumes that the study of information behavior cannot be considered in terms of isolated individuals, or outside a specific context, but should rather focus on the social context and conditions, interaction, and discourse through which human-information interaction occurs. In other words, this social approach views the user as a person who lives and acts within a certain context, rather than a “simple” user of information systems and services such as a consumer. Most studies that adhered to this approach employed theories and frameworks from the social sciences (e.g., diffusion theory, alienation theory, etc.) and studied different communities of end-users (e.g., seniors, experts in a specific domain, engineers, etc.). But, because the social approach assigns prime importance to the socio-cultural context, the results of these studies cannot be generalized across all contexts.

In accordance with Wang, Hawk & Tenopir [33], even if research using the social approach gives a lot of interesting information about the behavior of a community [9, 25, 25, 35], it offers very few descriptive generalizations about information need.

2.2 To Multidimensional Approach

Unlike the other approaches, which focus on one dimension (psychological or social) and thus reduce the complexity, the underlying assumption of our ECS method is that the better this complexity is understood and analyzed, the more relevant the outcomes of the research will be to the design of information systems and services.

Because end-users issued from different cultures do not interact with a system or a product in the same way, cross-cultural differences may cause difficulties in using the product to retrieve information. Taking a holistic approach, Wang, Hawk & Tenopir [33] propose a multidimensional model, which identifies three components: the user, the interface/product/system, and the problem space. Taking a user-centred point of view, the user is the first and the most important element in their model. The problem space is what the user interacts with to obtain wanted information. Between the user and the problem space, there is an interface/product/system, which has been designed to mediate communication between the two. Findings analysis based on this model can provide direct implications for Web design in terms of interfaces and objects and their organization in Web spaces, as well as Web user assistance and training. Other components existing in the Web world such as telecommunication links and programming languages (html, Java, etc.) are omitted from this model because it matters less whether users know about these components in information retrieval or not.

2.3 From the End-Users to Cultural Communities of Users

The user dimension is influenced by dynamic situational factors, such as the particular task, the information need, the culture, and the level of knowledge of the user. In addition, certain individual characteristics influence the human domain, including an individual's cognitive style and affective/emotional state before and throughout the interaction process.

User goals and needs are essential in defining user behavior so that they can be incorporated into a system/product design. User goals and intentions have been theoretically identified as important factors in defining behavior. User intentions are either used as the synonyms of user goals, or as sub-goals that a user has to achieve in the process of accomplishing his or her current search goal. For instance, research in the area of the design of electronic devices related to information retrieval, explores user goals, user information needs, and user information problems [e.g., 2, 15, 16, 13]. These studies suggest that understanding the real goals and needs of the end-users could provide an insight into behavior and strategies and thus system design. Simultaneously, research and studies verify that user goals and intentions should be incorporated into system design to guide effective behavior. For instance, Belkin [2] designed four information system user interface projects in progress. Each project demonstrates a somewhat different approach to interface design, but all have response to user goals, tasks and characteristics in common. They suggested that the design of information systems, including their interfaces, should be based on a multi-level analysis of user goals, tasks and domain views. Later, studies adopted the same point of view in similar ways [22] in order to integrate user goals and needs into system design.

Today, a product and/or a system are created for a large variety end-users who are not always well identified. So even if the user dimension (from an individual point of view) is very important, the identification of these end-users is often difficult. These days now, a community of users constitutes a “group of users who share the same culture, values, interest, and objectives, and product-related knowledge” [28]. When considering that users share opinions about products and services, and evaluate opinions of peer users, it is important to consider that the organization also reduces the overheads associated with handling users’ enquiries, which result in various organizational benefits, such as time saving and cost avoidance [28].

2.4 The Participatory Point of View to Capture the Influence of Culture

How to obtain a representative evaluation of end-users’ needs issued from different cultures? From a methodological point of view, three types of responses are usually given: (1) some authors seek to transform the verbalizations of users’ needs directly, which implies that the user has the means and skills to formulate such an expression, (2) other authors consider that needs can be deduced for analytical purposes and that by using data interpretation, needs can be inferred, (3) lastly, some authors maintain that need cannot exist as such, outside the bounds of human, historical and societal contexts.

A lot of participatory techniques can be identified: brainstorming, focus groups, participatory design workshops, storytelling, consensus conferences, etc. In all these techniques, the users are invited to speak as freely as possible about software needs, product dissatisfactions, and small technological misfortunes during a session of several hours. The aim is to discover verbally how users exchange information on their interfaces, or to provide interfaces and wait for their collective responses. It should identify the current opinions, preferences or aversions conveyed by these people and could be used to define new specifications. As Salazar-Orvig and Grossen [29] demonstrated, the production of discourse is fairly close to everyday conversation, thus allowing the study of social representations.

However, analysis of verbalizations of these groups requires that, not only the contents of statements by the people are noted, but also relies on the discursive activity of the users to understand how the negotiation of meaning takes place. Indeed, the analysis carried out suggested that people “operate a major activity within a framework to give meaning to the research situation and problems facing them and, according to the framework and interactive work, the subjects’ responses vary within a problem, but also to the next problem” [29].

3 Methodological Approach of the ECS

3.1 Main Principles

The ECS method focuses on both the theory of the social construction of technology and on methods to understand users’ requirements and needs [4]. According to the model of Pinch & Bijker [26], the socio-cultural construction of technology is a theory that argues that technology does not determine human action but rather that human action shapes technology. So, the best way to appreciate and design

technology is to refer to the socio-cultural context of the technological use. A new technology cannot be designed without understanding how this technology is embedded in its social environment. Comprehension of the social context depends on the methods used to construct and analyze the user's needs.

From a methodological point of view, Brangier [3] and Brangier and Bastien [4] highlighted that user-need cannot exist as such outside humankind, history and the society that generates it. Users' needs are social constructions. Needs are the consequences of complex dealings between users, designers and environments where imitation, learning, co-construction of knowledge and sharing of representations play a crucial function; they involve reciprocal process validations. Need emerges from and through community interactions and through the mediation of language. When designing an artifact, if the user and the designer are not able to resolve their own problems, they will have more opportunity of achieving their objectives by means of collaboration and social interactions. For that reason, needs emerge from collaborative interactions where designers and users reciprocally enrich their understanding by being confronted with the knowledge of others. This knowledge, which finally shapes the representation of needs, can be obtained by using participatory and creative methods. The target of these methods is to explore the creative works constructed by pertinent communities. With participatory methods, verbalizations are produced relating to new forms of cognition that might be useful for users. Briefly, the benefits expected by implementing participatory and creative methods are the development of technologies that are useful and usable for the communities of future users.

3.2 Implications for the Design

Our approach focuses on the social construction of users' needs and it involves the different aspects that designers have to take into account in order to appreciate users' requirements. More precisely, our approach draws on the following ideas:

- An artifact is a social reality before to become a technological reality;
- This reality is not a predetermined construction. It is based on social interactions and is shared (or not) within culture;
- In social contexts, individuals share and disseminate their representations. Each socio-cultural community will develop a flexible interpretation of the technology, its functionality, its aesthetics and its overall use;
- The design of an artifact must be considered from the cultural viewpoint of each relevant community, even if and because, these perspectives are different;
- Because language is the most important way to construct, share and disseminate representations about future technological functions and attributes, analysis of verbalizations produced by different communities must be fundamental.

3.3 Organization of the Expert Community Staff (ECS)

The ECS method takes the form of several groups of experts representing different communities involved in a project and speaking together on the project topic, coordinated by a facilitator [20, 34]. This facilitator uses various media (paperboard, screens, computers, models, storyboards, mock-ups, etc.) to solicit verbalizations and

discussions. The expert staff method aims to confront the inter-subjectivity of the group members in order to generate, as much as possible, ideas, needs, goals, and representations of the systems. The overall process of gathering information that lies within the staff method is based on five stages [5]:

- **Stage 1: Defining the communities of practices involved in the project** [11]. Rather than form groups of people representing the general population, the expert community staff method begins with a map of communities potentially targeted by the project. The aim is to gather as much information as possible about people who may be involved by the technology and to determine users' profiles. A community of practice is defined as (a) a community of interest (i.e., a group of individuals sharing a common use which is, more specifically, the users targeted by the product design) and (b) a community of domain knowledge (i.e., users who have knowledge about the uses targeted by the product design).
- **Stage 2: Identifying communities' experts.** The determination of the communities of different practices helps to find the experts of each community. These experts must be recognized as such by members of the community. It means that we need to set up a panel of experts who are representatives of the possible community, who are legitimate and/or recognized. An expert is a valid representative of the community, who could share representations of the future of his community.
- **Stage 3: Organizing and leading each group of staff.** From the panel of experts, each target community is represented by at least one group comprising 4 to 6 people who are filmed for 3 hours to 3 hours 30 minutes. Discussion groups are organized into three phases: (1) Participants are encouraged to speak freely on all the topics related to the project, (2) participants are asked to discuss some media presentations: screens, layouts, or storyboards, (3) individuals are involved in organizing knowledge about the project by doing a kind of card sorting activity together.
- **Stage 4: Analysis of results.** The videos are then analyzed to identify new ideas that will provide recommendations relevant to future product features, systems or services. All the comments made by the experts are transcribed and ideas are extracted from the transcriptions. Obviously, these ideas are numerous, rich and supplied without restriction. The interest of these ideas related to the creation of new features is variable and depends on the project objectives. The content analysis is used to identify the options for the features and is deduced from the uttered needs. These needs are discussed and shared with the stakeholders.
- **Stage 5: Negotiating the consensus.** During a "workshop or consensus meeting", the main objective is to develop consensus with and within the stakeholders, by presenting the viewpoints of each community. The results are discussed and reinterpreted to enhance the objectivity of users' requirements.

4 Discussion

The ECS method involves a variety of pointers to communicate and construct meanings around a project that relates directly to communities of practice. A characteristic of staff is that new ideas are not only born from systems to collect data, but appeared as production of interactions between people, as a co-construction phase

involving people, products, as results of communities' exchanges, and as imagined representations of future uses. Thus, the method, using expert staff, really shares the idea that needs are not facts but constructions, not constant or definitive but the result of a long process of collaboration. Need does not exist as such, outside humans, history, or the society that generates it. Need is constructed by social interactions. The ECS method is used to produce data based on the social construction of needs for each community of practice. In other words, our ECS method is a technique of mediation between the socially constructed needs and the stakeholder: the demand, needs, wishes and desires expressed by the staff must be transmitted and the expertise must be mobilized to negotiate with stakeholder.

According to us, the Expert Community Staff can be a new paradigm methodology to help designers to identify the real and effective users' needs, because these needs are socio-cultural constructions that can be extracted from relevant conversations with users. Be that as it may, the discussion on the vast problem of defining "information need" and how "information" can satisfy the end-user is still open [14].

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