

The Interaction Between Organizational Subcultures and User-Centered Design - A Case Study of an Implementation Effort

Netta Iivari and Pekka Abrahamsson

University of Oulu

Department of Information Processing Science

P.O. Box 3000, FIN-90014 Oulun yliopisto, Finland

Netta.Iivari@oulu.fi, Pekka.Abrahamsson@oulu.fi

Abstract

Usability is a quality characteristic of a software product or system. User-centered design (UCD) is an approach focusing on making systems usable. However, improving the position of UCD is widely recognized as a challenge. This paper reports results from a case study, in which a small software development company was introduced with UCD principles and activities, and was thus expected to change their current practice. The paper takes a culture-oriented approach in the analysis. The focus is on the interaction between organizational culture and UCD, organizational culture being conceived as a set of subcultures. The results indicate that there exist differences 1) in the views of the nature of UCD; 2) in the motives for implementing it; and 3) in the experiences gained and interpretations made of the use of it in relation to each subculture. The implications for the prospective research and practice will be discussed.

1. Introduction

Usability is a quality characteristic of a software product or system. User-centered design (UCD) is an approach focusing on making systems usable. UCD principles include multidisciplinary design, active user involvement and iteration of design solutions. The defined activities are: (1) plan the user-centered design process; (2) understand and specify the context of use; (3) specify the user and organizational requirements; (4) produce design solutions; and (5) evaluate designs against requirements. [18]. However, the position of UCD in the software development organizations is often ineffective. There exist only few organizations that continuously and systematically apply UCD in their development. In addition, the improvement of the position of UCD has been widely recognized as a challenge [4], [9], [28].

This paper is based on material gathered within a KESSU-research project, which aims at implementing UCD in software development organizations. The company described in this paper develops software intensive products and systems for public transportation for international markets. The company is small (60 employees). In the beginning of the improvement the company established an internal improvement project Usability. Personnel from several functional units of the company (systems, projects, technology, after sales units) joined the Usability-project team. KESSU-project's role is to support the Usability-project in the improvement. Usability-project has experimented with different UCD activities during the improvement effort. KESSU-project has offered consultation and training. The improvement was initiated with a UCD process assessment conducted by the KESSU-project team.

The focus of this paper is on the role of organizational culture in the implementation of UCD. How does organizational culture affect and interact with the implementation effort? The role of organizational culture has achieved increasing attention in recent years. Both in information systems (IS) research and organizational studies organizational culture has been recognized as an important object of study. The effects of organizational culture on IS implementation have been studied. Organizational culture has also been a popular focus of analysis in studies on organizational change and development. Recently studies have been concerned with the part culture plays in achieving total quality through total quality management. [1], [2], [3], [12], [16], [20], [22], [23], [26], [27], [33].

There does not exist studies on organizational culture in relation to the implementation of UCD. Undoubtedly studies of this kind are needed, considering the challenges encountered while improving the position of it. This paper takes a step towards that direction. However, organizational culture is not conceived as a fixed set of shared beliefs, but as a set of subcultures each interacting

with UCD in their own distinct way. The subcultures are those of the (1) usability specialists; (2) software engineers; and (3) managers. The results of the study indicate that there exist clear subcultural differences 1) in the views of the nature of UCD; 2) in the motives for implementing it; and 3) in the experiences gained and interpretations made of use of it.

The paper is organized as follows. Next section presents the theoretical background of the research. The central concepts with which to analyze both organizational culture and subcultures are presented. Culture is a complex concept, and thus, within both organizational theory and IS literature there exist many controversies in defining and applying it. [2], [3], [16], [22], [23], [33]. Due to this a review of existing approaches and conceptions is important. Third section presents the research material and the methods through which it was acquired and analyzed. In the following section the results of the analysis are presented. First, each subculture is presented and the interaction with UCD is illustrated. Second, a summary is offered, highlighting the 1) views of the nature of UCD; 2) motives for implementing it; and 3) experiences gained and interpretations made of use of it in relation to each subculture. Final section presents the central themes and observations of the paper, and outlines new research objects with which the approach presented could be utilized further.

2. Theoretical frames of reference

Edgar Schein's definition of organizational culture has been widely accepted and used by researchers in the fields both of IS research and organizational studies [3], [11], [16], [20], [22], [23]. Schein conceives culture as "a pattern of basic assumptions - invented, discovered, or developed by a given group as it learns to cope with its problems of external adaptation and integral integration - that has worked well enough to be considered valid and, therefore, to be taught to new members as the correct way to perceive, think, and feel in relation to those problems" [29: 9]. Schein defines culture to consist of three levels: of artifacts, values and basic assumptions. Schein highlights especially the role of basic assumptions, which form a core of a culture. [29].

However, this kind of conception has been criticized in recent years, especially in cultural anthropology. [3], [8], [10], [14], [15], [20], [35]. Since the concept is derived from anthropology, in which the concept and studies on cultures are a traditional focus of study, an understanding of anthropological approaches is important. Especially certain schools in anthropology: functionalist, structural-functional, cognitive and symbolic, have offered widely used starting points also for the analysts of organizational culture. [2], [3], [11], [33]. Next studies on organizational

culture are presented in relation to the anthropological schools. The studies can be divided into two areas; organizations have been regarded as cultures ('is' approach) or organizations have a culture ('has' approach). [33].

Within the 'has' approach culture is a feature belonging to an organization, like structure or techno-economic system. It is closely related to functionalism and structural-functionalism in anthropology. In functionalism culture is an instrument satisfying certain needs. Culture in structural-functional approach is seen as an adaptive and regulative mechanism connecting individuals and social structures. Cultural dimension is seen as contributing to the overall systemic balance and effectiveness of an organization. It is seen as social or normative glue holding organization together. This approach has also been called instrumental or utilitarian. [2], [3], [11], [16], [33], [34].

The 'is' approach relies on cognitive or symbolic schools in anthropology. In these studies culture is used as a root metaphor in the analysis. According to cognitive perspective culture is a system of shared knowledge and cognitions. Analysis is componential: components of cultural categories represent how culture structures its field of cognition. Symbolic anthropology, on the other hand, sees culture as a system of shared symbols and meanings. The focus is on how individuals interpret and understand their experience. The researchers seek out local interpretations in order to reveal cultural meanings 'from the native's point of view'. [2], [3], [11], [13], [16], [20], [24], [33], [34].

However, poststructuralist and postmodern approaches in anthropology have pointed out shortcomings in all approaches presented above. They maintain that cultures are always interpreted through subjective realities. Cultures cannot be viewed as fixed sets of shared beliefs, but instead as fragmented, pluralistic phenomena. Cultures are constantly interpreted and reinterpreted, produced and reproduced in social relations. [5], [10], [16], [20], [32], [35]. Similarly organizational cultures should be characterized by differentiation and diversity. Researchers should pay attention to the inconsistencies and lack of consensus in the cultural content. [7], [16], [24], [34].

In addition, in anthropology definitions of culture have moved away from specifying the content or properties of culture (e.g. artifacts, values, basic assumptions), towards a view of culture as an emergent process of reality creation [5], [21]. Culture then includes socially transmitted patterns for behavior characteristic of a particular group or community. Culture denotes to collective social identity, to mutual engagement, to shared experiences and memories, and to the common frames of reference for interpreting and negotiating meanings. [8], [10], [13], [14], [19], [21], [35], [36].

This paper analyzes the organization within the 'is' approach; culture is used as a root metaphor. It is conceived as a system of shared symbols and meanings, which are interpreted. The focus is on how individuals interpret their experience - UCD and its implementation. Local interpretations are explored in order to reveal the meanings 'from the native's point of view'. However, organizational culture is not conceived as a fixed set of shared beliefs, but as fragmented, pluralistic phenomenon constantly interpreted and reinterpreted, produced and reproduced in social relations. This occurs while divergent organizational subcultures interact with UCD.

Organizational culture can be conceived as a secondary phenomenon derived from the commonalities and interactions among the subcultures. [24]. Subcultures may be distinguished on the basis of horizontal or vertical dimensions. Functional departments are obvious segregators. [7], [16], [30], [31]. Occupational communities and especially professional subcultures have also been conceived influential within the organizational context. [6], [11], [31]. An identification of the subcultures from the case organization necessitated existence of the following aspects. Subculture consists of individuals identifying themselves as a group - a collective identity has evolved. There exists a feeling of solidarity among the members, and construction of boundaries against outsiders. Subcultures have developed their own, distinct sets of shared understandings, interpretations and assumptions. Language is also in a central position; subcultures define themselves and set boundaries by developing a specialized language - a jargon - of their own. Use of the language expresses membership and status, and thus provides a basis for identification. [6], [7], [14], [17], [24], [36].

The subcultures identified include the cultures of:

- The usability specialists, who are actively involved in the improvement by carrying out the UCD activities in the organization. The researchers supporting the improvement effort also belong to this subculture.
- The software engineers, who represent the viewpoint of the software development. They are a significant target of the improvement, since the implementation of UCD should diffuse also into their working practices.
- The (senior) managers, who represent the viewpoints of after sales, sales and marketing. One of them is a sponsor of the improvement effort; and many of them are members of the steering group of Usability-project and/or that of the company.

Schein defines a typology of occupational subcultures typically encountered in organizations including the cultures of operators, engineers and executives. The operators' culture is a set of assumptions held by workers and immediate operative management, who deliver the products and services fulfilling organizations basic mission. The engineers share a technocrat culture, including systems, machines, routines and processes, not people. From their point of view organizations should be made totally reliable and automatic by seeking technical solutions. The executives' culture is influenced by the fact that they are financially responsible. People are seen mainly as human resources and cost factors. [30], [31]. The subcultures identified in this paper resemble those identified by Schein. The cultures of engineers and executives resemble the cultures of software engineers and managers. However, the culture of software engineers can also be seen as the culture of operators defined by Schein, in relation to the improvement effort. Software engineers are the ones fulfilling organizations basic mission. Operators are typically the target of change programs and learning efforts (Schein 1996a). Usability specialists are implementing UCD into the working practices of members of another culture. Therefore it is extremely important to get acquainted also with the culture of the operators - the software engineers.

3. Methodology

The research material has been gathered within the KESSU-project during one year's time. The material has been collected while conducting an UCD process assessment in the organization, and while supporting the organization's improvement project Usability in the implementation of UCD. The UCD process assessment conducted consisted of interviews of 20 people working in different units of the company. The assessment produced a large amount of research material, including assessment reports and research diaries kept by the researchers.

In addition to this material, KESSU-project team has regularly had meetings with the Usability-project team, and also with personnel of certain functional units of the company. Memos from the meetings, and e-mail correspondence with the personnel of the organization have been saved for the purposes of the research. Research team has also continued writing diaries after joint events. Furthermore, after one year's joint effort, the key personnel of the improvement effort were interviewed, including two senior managers, who are members of the steering group of the Usability-project, and the project manager of the Usability-project.

While analyzing the research material it became obvious that there exist several different key player groups within the organization. This led the focus on

differentiation and diversity in the cultural content. The subcultures were identified by using the criteria presented above. Focus was on the active creation of meanings, on expressions of collective identity, on distinct ways of language use, and on the construction of collective frames of reference for sense making. The analysis was context-sensitive and concentrated on local, specific meanings. The analysis can be located within the paradigm of interpretivism in organizational culture studies. [11], [32].

Since the focus of the research effort is on the implementation of UCD, it is important to analyze especially the local, specific interpretations of UCD and the improvement effort. A study by Orlowski and Gash [25] provided a useful framework for categorizing the data after the analysis. They have examined technological frames of different groups. Technological frames denote to assumptions, expectations, knowledge, values and cognitions that people have about technology. They have defined the a) nature of technology (what the technology is); b) technology strategy (why it was introduced); and c) technology-in-use (how is it used) as relevant domains characterizing the interpretations of technology. [25] They were used also in capturing the interpretations of UCD and its implementation. The

- Views of the nature of UCD;
- Motives for implementing it;
- Interpretations made of use of it

will be summarized in section 4.4. Before that some themes in the interaction between each subculture and UCD are briefly illustrated.

4. Subcultures interacting with UCD

4.1. The usability specialists

The implementation effort was launched into the organization by the KESSU research team aiming at improving the position of UCD in the organization. The team has through educating the personnel tried to make them to acknowledge the activities and principles of UCD. However, the only UCD activities carried out before the improvement effort were some usability tests and heuristic evaluations done as student work. It can be assumed that there did not exist such a culture as that of the usability specialists prior to the improvement effort.

However, a potential person becoming a member of the culture is Kate, a project manager of the Usability-project. Kate has actively participated in the improvement effort thorough the year. Kate shows clear interest in the issues related to usability and UCD:

"Well, I was very interested in usability and design of user-interface. Then Eric (a senior manager) told me that we would participate in this kind of a project. I told immediately that I am very willing to participate in the project." [38]

Kate has attended some university courses, but has no actual work experience of usability specialist's job. She nevertheless is conceived as the usability specialist of the organization. Usability-project is an important point also in her career:

"Along with Usability-project she became a project manager. She told that she is the only usability specialist in the company. This title is not officially stated anywhere, "because we are not that enthusiastic about titles". In spring 2000 Kate had nevertheless requested that the title trainee should be removed from her working agreement." [37]

Kate was also selected to be a team leader of a user-interface team, established alongside with 9 other technology teams aiming at improving the skills and knowledge of the personnel of the company.

Kate works really hard in behalf of the Usability-project:

"Kate told that she was extremely enthusiastic and motivated with her work. She told that she would do all by herself, if anyone else did not." [37]

The UCD process assessment was conducted as a first concrete step in the improvement project. However, certain problems appeared as early as at this stage:

"It (presentation made by KESSU-project team) contained a lot of unfamiliar terms both to me (Kate) and to the rest of the audience. So we did not understand much about the presentation. --- I told them (personnel of the organization) that of course there exists own terminology and stuff related to usability. Some kind of crash exists between the ways of thinking in the academia and in the software development organizations. Here we aim at developing concrete products, this is not a research institution. --- Some of our personnel asked me that how can you understand what are they (KESSU-project team) talking about? They use so weird language, how can you co-operate with them?" [38]

Even Kate had had some trouble in understanding the terminology and the models presented. The existence of the specialized jargon related to UCD had become apparent. Kate, however, has gained a lot of knowledge and understanding related to the terminology used during the year. She has been socialized into the use of this kind of specialized language.

Kate mentions also another kind of problems in addition to the language used. The UCD activities carried out were always not that successful. Knowing what to do and when to stop was sometimes problematic to decide. Also the motivation of the project team is problematic:

"Now I should start to have discussions about who actually has time to participate and who really is interested in this subject. Those who do not, those can leave this project. We can replace them with people who have time. Then the project would start to function better and not a few people would have to do nearly everything." [38]

Kate is eagerly entering the subculture of the usability specialists. She is internalising the skills, language and knowledge needed. There exist also a couple of other interested and motivated persons in the Usability-project team, who have regularly attended the meetings and participated in the training courses provided so far. It is the rest of the personnel, who clearly separate themselves from the culture of usability specialists. They do not understand the terminology related to UCD, and they are not that willing to participate in the joint events. Time constraints and the lack of motivation are brought up as the problematic factors.

4.2. The software engineers

The software engineers play an important role from the viewpoint of the implementation effort since the software development is where the implementation of the UCD processes should finally occur. The software engineers have traditionally designed the user-interfaces by themselves:

"The designers mainly trust their own logic and check out the older systems, and use them as a basis. They have purchased a Microsoft style guide, but nobody uses it." [39]

"Mary and Rick did not consider user-interface to be very important part of the system because the system has few users and it is not used that frequently. Besides everybody knows that this kind of a system is difficult to use and people have adapted to that. New is always based on the old one. Usability problems come from the distant past." [39]

The designers complain having such a hurry that usability issues are just set aside:

"According to Paul prototypes are not developed. Designers just try to design the system and the user-interface as fast as possible and then pass it on straight to the system tests." [39]

"Susan tests the system. She has noticed some usability problems during the tests and communicated them to the development. In the tests one is not supposed to evaluate usability. And noticed usability problems may still be ignored, if the system functions the way described in the specification. The customer has already said yes." [39]

In the development the main concern was to get the customers to approve the design so that the development could continue without participation of the customers.

In relation to the implementation of UCD, the software engineers have defined it to be a theoretical, complicated and unpractical approach. The whole improvement effort is connected indirectly to Kate's person:

"Kate told that she is a kind of data bank in the organization, related to UCD but also other kind of issues. Other people (personnel of the company) consider her to be quite a theoretical person, as an opposite to others practicality." [37]

Furthermore, the software engineers have questioned the practicality of certain UCD methods. For instance Rick, a senior designer of a new system, criticizes:

"According to Rick it needs to be acknowledged that it is totally different to design stuff on large paper than to fit it on small screen." [37]

"Rick suspects whether the specification produced by the user-interface team through paper prototyping is finished. He doubts whether the exceptions and all the requirements are taken into account. He supposes that the specification is yet not completed." [37]

Afterwards, while talking about this incident, Kate becomes angry and threatens she will 'show him in the review!' She defines Rick to be a 'skeptical' in the organization. However, other designers have as well also showed some skepticism and unwillingness to participate in the events organized by the Usability-project. Usually continuous hurry is the excuse for not participating.

The culture of the software engineers is a culture appreciating practicality and rationality [30], [31], which have been seen to be somewhat opposing the appreciations of the culture of the usability specialists. Therefore, the software engineers have clearly separated themselves from that subculture. The language related to usability and UCD is condemned to be incomprehensible, and the methods used are seen as inefficient and time-consuming. The software engineers highlight deadlines, continual hurry and customers as causes of problems, due to which UCD processes are conceived as hard to apply.

4.3. The managers

"ISO standard (13407) aroused unexpected enthusiasm. Ed (a project manager) figures out appropriate slogans (dealing with usability) and t-shirts (with the slogans) for the company. He was delighted of the possibility to slash the demands of customers with the help of this authoritative standard. It is a good tool in the sales and marketing." [39]

"Eric noticed that if the company can appeal to the standard (13407) and affirm the customer that the usability capability of the organization is on a high level, the company could prove that the customer is the one who is wrong. --- "We design our products according to the principles of this standard, so we are the ones who are right"." [39]

The project managers were longing for a weapon against customers.

"According to Ed usability is a nice slogan in the marketing and helpful when too demanding customer must be tamed. Usability is still not everything. Ed says that they really do not need any more new wishes or opinions from the users. Too much user-centered design and user involvement with several differing users' voices does not sound very inspiring." [39]

The company needs UCD for keeping the customers away from the development process.

"Eric told the basic reasons why we would participate. We need to be more convincing in the eyes of the customer. That way we could dictate some things, for example UI-issues. The project would offer facts, which could enable us to do that. --- Improvement of the image of our company, it is one of the main reasons why we participate in this project." [38]

While UCD is considered as a tool in the sales and marketing, it's actual content is not in the focus. Nevertheless, we have provided training and brief lectures also for the managers. They have, however, judged them to be too theoretical:

"The theoretical parts that researchers from the university present, are considered to be unnecessary. According to Tim (a senior manager), they are the 'compulsory part', which you have to listen before you can gain something useful. --- Tim proposed that it would be good, if it could beforehand be specified how much time will be spent on theoretical issues in the meetings. That way they could respond to it accordingly." [37]

"According to Tim the improvement initiative started as a university-project. For the first 6 months it was thought that it was only university's and Kate's thing. -- - Tim felt that the terminology used was too complicated. --- Complicated terminology also contributed to the labeling of the improvement project as a university-project." [37]

However, the improvement effort has gained high expectations attached to it. Usability thinking should be spread organization wide. Nevertheless, the improvement effort had been labeled as Kate's personal mission, and quite aggressive claims have appeared from the managers about getting their 'piece of the cake':

"When we were preparing for that KESSU-workshop he (Tim) attacked me (Kate). He asked me to explain what concrete things Usability-project has achieved during this year and what is it going to achieve? In which ways is the project going to be visible (in the company)?" [38]

Tim was nevertheless very willing for co-operation when he got the chance:

"He got back to me and asked if Usability-project could co-operate with customer support. In December we (Usability-project team) and the After Sales Unit had a first co-operation meeting. --- I (Kate) was very pleased that he contacted me. We did not have to promote the things we do and force us into something; they were the ones who asked for help." [38]

Within the culture of management the main concern is to maintain the financial health of the organization:

"The company is expecting some concrete advantages (from the improvement effort) to appear. --- The product should be more usable, and there should appear clear savings in money and increase in sales." [38]

This culture resembles that of the executives defined by Schein: the culture is influenced by the fact that the members are financially responsible. The continuous contacts with customers and the focus on sales and marketing direct the viewpoints of the management. They approach UCD as a tool for taming the customers and as an imago factor. The managers have, however, high expectations concerning the improvement effort. They are willing to participate in the Usability-project in order to derive equally benefits from it. UCD and the improvement effort have however been labeled to be somewhat theoretical and complicated in nature. The managers dislike 'the compulsory theoretical parts' offered.

4.4. Summary

Organizational culture was defined as comprising of a set of subcultures: the (1) usability specialists; (2) software engineers; and (3) managers. Each subculture has own distinct ways interpreting UCD and the improvement effort. The interpretations were categorized by using a framework defined by [25]. The results of the analysis – the 1) nature of UCD; 2) motives for implementing it, and 3) experiences while using it - are presented in Table 1.

Table 1. Subcultures interacting with UCD

	The nature of UCD
Software Engineers	Not that useful usability engineering methodology: difficult to understand, theoretical in nature, terminology complicated
Managers	Theoretical in nature, complicated terminology. Can be used as a tool for taming the customers and for improving the image of company
Usability Specialists	Important and useful usability engineering methodology. Theoretical in nature, complicated terminology
	Motivation and criteria for success
Software Engineers	Attitude skeptical. More efficient co-operation between the units. Assistance in requirements specification. Helps to keep customers out of the development
Managers	Attitude enthusiastic. Improves the image of the company, helps to tame the customers and to keep them out of the development. Organization wide improvement
Usability Specialists	Attitude enthusiastic. Personal interests and ambitions. Organization wide improvement
	Use of UCD
Software Engineers	Suspicious about the usefulness of UCD methods. Unwillingness to participate in the joint events: too time consuming
Managers	Enthusiastic participation in the joint meetings. Criticism towards too theoretical nature of training. Suspicious whether the project exists only for preparation of one masters thesis. Criticism that the project operates in isolation
Usability Specialists	Training, skills and experience gained in relation to UCD. Some of the UCD activities recognized to be difficult to understand profoundly and to apply sensibly

5. Concluding remarks

This paper focused on organizational culture of a small software development company and on the implementation of UCD within that context. Organizational culture was defined as comprising of a set of subcultures. First the subcultures were identified. The identification necessitated existence of the following aspects. A subculture consists of individuals interacting with each other, and identifying themselves as a group. A collective identity and certain types of boundaries against outsiders have been constructed. There exist shared understandings and interpretations based on distinct sets of beliefs, values and assumptions. Use of language, especially specialized jargon, is in a central position; through it the cultural members express their belonging to the culture, set boundaries to other groups and represent their status. The subcultures identified were those of the (1) usability specialists; (2) software engineers; and (3) managers.

A special attention was paid to the interpretations and understandings related to UCD and the implementation effort. The interpretations related to these issues were categorized by using a framework defined by [25]. The results of the analysis showed that there existed differences 1) in the views of the nature of UCD; 2) in the motives for implementing it; and 3) in the experiences gained and interpretations made of the use of it, in relation to each subculture. The results demonstrated that the subcultures: the usability specialists, the software engineers and the managers, have – and continuously gain and produce – differing attitudes, expectations, knowledge and assumptions in relation to UCD. They play an important role while considering the implementation and the prospective use of UCD.

This analysis was not systematically conducted until after one year's joint effort. During the year, however, certain setbacks have occurred, for example: 1) a senior manager accusing the project manager of the Usability-project for operating in isolation, which eventually lead to a questioning of the whole improvement effort; 2) a senior designer questioning the usefulness of certain UCD methods; 3) both the software engineers and the managers judging UCD for being too theoretical in nature and for containing terminology too complicated; and 4) even the usability specialist of the company finding certain UCD methods difficult to apply sensibly.

It has been argued that it is of essential importance to concentrate on controversies between different subcultures, especially on the lack of alignment, since there still exists severe problems in understanding why so many change programs fail or do not diffuse into the organizations. To create alignment enough mutual understanding and cross-cultural dialogue needs to be

created. [30], [31]. Schein suggests that this could be accomplished in a workshop in which the members of divergent subcultures sit down and strive towards a cross-cultural dialogue. [30], [31]. Orlikowski and Gash emphasize congruence between the technological frames of different groups. When incongruence exists, there is likelihood to exist problems both in the development, implementation and use of the technology. Initial assessment should be done in order to prevent misaligned expectations, contradictory actions and unanticipated organizational consequences. [25].

Based on the results of this paper we similarly emphasize the importance of early identification of incongruence in views of UCD and in expectations concerning its implementation. It is of essential importance to seek for alignment and mutual understanding between the subcultures. This can be carried out for instance in a stakeholder meeting, in which all groups that will affect or be affected by the improvement are present. Not only those responsible for the concrete actions of the improvement, but also the highly influential managers, and the members of different occupational subcultures whose ways of working or modes of thinking are to be altered, should to be present. In the meeting, the a) assumed nature of the technology/methodology to be implemented; b) expectations and motivations concerning the implementation; and c) current skills, knowledge and assumptions of the use of the methodology/technology in question should all be addressed.

As for the implications for research, the implications of the use of the concept of subculture as a unit of analysis needs to be explored further. The benefits but also the disadvantages of approaching organizational culture as a secondary phenomenon derived from the commonalities and interactions among the subcultures, is to be analyzed. In addition, the advantages this kind of interpretive, context-sensitive approach concentrating on the meanings created by the cultural members is to be evaluated. By means of the approach presented in this paper, quite a comprehensive understanding of the organization, of its divergent subcultures, and of their ways of interacting with UCD and the implementation effort has been achieved. Nevertheless, other kinds of approaches are also available. Approach used in this paper is positioned within the paradigm of 'interpretivism', but also the contributions of the paradigm of 'functionalism' could be considered. It provides also a widely used point of departure for the analysts of culture. It relies on analytical framework defined prior to entering the organization. The analysis consists of filling in predefined variables and mapping the causal relationships between them. It aims at comparative analyses and generalizations. [32].

Furthermore, from the point of view of the interpretive, context-sensitive perspective, the interaction between organizational culture and UCD needs to be explored further. Cultures are constantly interpreted and reinterpreted, produced and reproduced through the interaction of the cultural members. An early assessment reveals only the initial meanings and interpretations produced. Since the interaction continues, the future interpretations occurring, and the implications of them need also to be explored. Follow-up analyses will be performed in order to gain a more thorough understanding of the object of study. In addition, this paper is based on one case study only. Due to this, the interaction between different cultures of an organization and the methodology implemented should be studied more profoundly within several organizational contexts. Future step will be to conduct such an analyses also in other companies participating in KESSU-research project.

References

- [1] Aaltio-Marjosola, Iiris (1991): Cultural Change in a Business Enterprise. Studying a Major Organizational Change and Its Impact on Culture. Helsinki: Acta Academiae Oeconomicae Helsingiensis. Series A: 80.
- [2] Allaire, Yvan – Firsirotu, Mihaela E. (1984): Theories of Organizational Culture. *Organization Studies*: 5/3.
- [3] Avison, David E. – Myers, Michael D. (1995): Information systems and anthropology: an anthropological perspective on IT and organizational culture. *Information Technology & People* Vol. 8 No. 3.
- [4] Axtell, C. M. – Waterson, P. E. – Clegg, C. W. (1997): Problems integrating user participation into software development. *International Journal of Human-Computer Studies*: 47.
- [5] Berger, Peter L. – Luckmann, Thomas (1967): The social construction of reality: a treatise in the sociology of knowledge. New York: Doubleday.
- [6] Bloor, Geoffrey – Dawson, Patrick (1994): Understanding Professional Culture in Organizational Context. *Organization Studies* 15/2.
- [7] Bolon, Douglas S. – Bolon, Donald S. (1994): A Reconceptualization and Analysis of Organizational Culture. The Influence of Groups and Their Idiocultures. *Journal of Managerial Psychology* Vol. 9 No. 5.
- [8] Borofsky, Robert (1994) Assessing Cultural Anthropology. New York: McGraw-Hill, Inc.
- [9] Buckingham Shum, S (1995) Practice What We Preach: Making HCI Design Techniques Usable. Invited Address, STIMDI'95.

[10] Clifford, James – Marcus, George E. (1986): *Writing culture: the poetics and politics of ethnography*. Berkeley: University of California Press.

[11] Czarniawska-Joerges, Barbara (1992): *Exploring Complex Organizations. A Cultural Perspective*. Newbury Park: Sage Publications.

[12] Detert, James R. – Schroeder, Roger G. – Mauriel, John J. (2000): *A Framework for Linking Culture and Improvement Initiatives in Organizations*. *Academy of Management Review* Vol. 25 No.4.

[13] Geertz, Clifford (1973): *The interpretation of cultures: selected essays*. New York: Basic Books.

[14] Goodenough, Ward H. (1994): *Toward a Working Theory of Culture*. In Robert Borofsky (ed.). *Assessing Cultural Anthropology*. New York: McGraw-Hill, Inc.

[15] Goody, Jack (1994) *Culture and Its Boundaries: A European View*. In Robert Borofsky (ed.). *Assessing Cultural Anthropology*. New York: McGraw-Hill, Inc.

[16] Hatch, Mary Jo (1997): *Organization Theory. Modern, Symbolic, and Postmodern Perspectives*. New York: Oxford University Press.

[17] Hofstede, Geert (1998): *Identifying organizational subcultures: an empirical approach*. *Journal of Management Studies* Vol 35 No 1.

[18] ISO 13407 (1999): *Human-centered design processes for interactive systems*. International Standard.

[19] Keesing, Roger M. – Strathern, Andrew J. (1998): *Cultural Anthropology. A Contemporary Perspective*. Third edition. Fort Worth: Harcourt Brace College Publishers.

[20] Kekäle, Tauno (1998): *The Effects of Organizational Culture on Successes and Failures in Implementation of Some Total Quality Management Approaches. Towards a Theory of Selecting a Culturally Matching Quality Approach*. *Vaasa: Acta Wasaensia* No. 65. *Industrial Management* 1.

[21] Kroeber, A. L. – Kluckhoh, C. (1952): *Culture: a critical review of the concepts and definitions*. Cambridge: Harvard University Press.

[22] Lewis, Dianne (1996a): *The organizational culture saga – from OD to TQM: a critical review of the literature. Part 1 – concepts and early trends*. *Leadership and Organization Development Journal* 17/1.

[23] Lewis, Dianne (1996b): *The organizational culture saga – from OD to TQM: a critical review of the literature. Part 2 – applications*. *Leadership and Organization Development Journal* 17/1.

[24] Lucas, Rob (1987): *Political-Cultural Analysis of Organizations*. *Academy of Management Review* Vol. 12 No. 1.

[25] Orlikowski, Wanda J. – Gash, Debra C. (1994): *Technological Frames: Making Sense of Information*

Technology in Organizations. *ACM Transactions on Information Systems* Vol. 12 No. 2.

[26] Pliskin, N. – Romm, T. – Lee, A. S. – Weber, Y. (1993): *Presumed Versus Actual Organizational Culture: Managerial Implications for Implementation of Information Systems*. *The Computer Journal* Vol. 36 No.2.

[27] Robey, Daniel – Azevedo, Ana (1994): *Cultural Analysis of the Organizational Consequences of Information Technology*. *Accounting, Management & Information Technology* Vol. 4 No. 1

[28] Rosenbaum, S. (1999): *What Makes Strategic Usability Fail? Lessons Learned from the Field*. In CHI '99. Pittsburgh, USA.

[29] Schein, Edgar (1985): *Organizational culture and leadership* (2. ed.). San Francisco: Jossey-Bass.

[30] Schein, Edgar (1996a): *Culture: The Missing Concept in Organization Studies*. *Administrative Science Quarterly*: 41.

[31] Schein, Edgar (1996b): *Three Cultures of Management: The Key to Organizational Learning*. *Sloan Management Review* Fall 1996.

[32] Schultz, Majken – Hatch, Mary Jo (1996): *Living with Multiple Paradigms: the Case of Paradigm Interplay in Organizational Culture Studies*. *Academy of Management Review* Vol 21 No 2.

[33] Smircich, Linda (1983): *Concepts of Culture and Organizational Analysis*. *Administrative Science Quarterly*: 28.

[34] Walsham, G. (1993): *Reading the organization: metaphors and information management*. *Journal of Information Systems*: 3.

[35] Vayda, Andrew P. (1994): *Actions, Variations, and Change: The Emerging Anti-Essentialist View in Anthropology*. In Robert Borofsky (ed.). *Assessing Cultural Anthropology*. New York: McGraw-Hill, Inc.

[36] Wenger, Etienne (1998): *Communities of Practice. Learning, Meaning, and Identity*. Cambridge: Cambridge University Press.

Unpublished research material:

[37] Research diaries wrote by the KESSU-research team after joint events with personnel of the company during February 2000 – February 2001.

[38] Interview transcripts. Interviews done in January 2001 – February 2001 by KESSU-research team.

[39] Research diaries/assessment observation reports produced during the UCD process assessment in May 2000 by KESSU-research team.