Defining the crucial users - An activity theoretical approach for finding the missing voices

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ABSTRACT

We are presenting a historical analysis of a design process of a diabetes database. Particularly, we study which user groups of the database have affected the design work and which have remained absent from the design process. The theoretical framework of our study is based on activity theory, and a three-level model consisting of a local design, particular technology, and societal domain is introduced as a conceptual tool for the historical analysis. A working hypothesis concerning the future direction of the design process is proposed on the basis of the analysis. We shall also discuss the practical use of this hypothesis in the design process.

Keywords

Medical databases, activity theory, historical analysis, professional user groups

INTRODUCTION

One of the important insights of participatory design has been the engaging of the end users directly into design process [1, 6]. However, modern information technologies pose serious questions for democratic participation in designing. These applications often have multiple user groups in various vocations and institutions. Even finding the representatives of all the central user groups may prove difficult, not to mention how the needs of all the relevant groups can be incorporated into the emerging design [12]. Methods, such as relying on the advanced users, so-called "lead users", have been introduced as viable alternatives [5].

These methods, however, tend to ignore those users who do not stand in the frontline of development but are nevertheless strongly affected by the new technology. This is also a real and practical problem for commercially oriented product development, for missing the needs of these invisible users may significantly restrict and even disable applications, such

as groupware. We shall introduce a historical analysis based on activity theory that may help in delineating the relevant participants and revealing the missing but crucial voices of the design process.

This presentation is based on the research carried out on the Prowellness Diabetes Management System (PDMS) developed in Finland between 1996 and 2000. The PDMS is an Internet- and Intranet-based database that stores health information, such as the level of blood glucose of a diabetic. The health care personnel of health centers and hospitals use this information in various ways in diabetes treatment. We have studied the designing and user-collaboration of the PDMS since the beginning of 1999, after which the PDMS has been introduced into several health care organizations in Finland. Simultaneously, the question concerning the appropriate user groups of the database has risen, as we shall show in the following. The data used in this preliminary analysis is historical and consists of documents, program versions, and interviews related to the PDMS.

ACTIVITY THEORETICAL POINT OF VIEW ON DESIGN PROCESSES

Activity theory is a meta-theory derived from the dialectical theoretical tradition [13, 7]. During the 1990s, applications of activity theory have appeared in science and technology studies and human-computer interaction [e.g. 3, 11, 8, 4]. The basic tenets used in these applications can be summarized in a following way: A technological project is analyzed as a network, in which the resources and know-how of the participants are complementary in regard to the product that is being jointly developed. The product is called, in activity theoretical terms, a shared object of an innovation network. Emphasis lies in the analysis of the contributions of the participants in different phases. The history of each institutional participant is analyzed in order to illuminate its interest in contributing to the design work. [9]

In the case studies employing the theoretical framework of activity theory, the user activities have played an important role [3, 4]. In activity-theoretical terms, the artifact under

development is understood as a tool or means for a specific user activity. It solves the problems confronted in the user activity or expands the user activity. User activities have been studied ethnographically, and interventions taking a form of seminars, have been arranged to reflect the problems confronted by the users of the artifact back to its producers [10]. In the following section, we shall present a historical analysis of the design work of the PDMS and consider especially how the different user groups have influenced on design work.

HISTORICAL ANALYSIS OF THE DESIGN WORK OF THE PDMS

To understand the development and challenges of the PDMS, we traced the history of its development. Our research has led us to analyze the history of design and the use of the program on three levels, namely, the level of local design work, the level of the particular technology, and the societal domain of the user activities.

The level of local design

As we desired to study user collaboration in a design process, we traced historically the user participants and their contributions in the design process of the PDMS. We noticed that during the early phases, the design work was conducted by the company, Prowellness Inc., in close collaboration with the personnel of the public diabetic clinic in the city of Oulu, Finland, the hometown of Prowellness Inc.. During the later phases, some physicians working in special health care in two different Finnish hospitals joined in the design work. All these user participants were specialized in diabetes care and many of them did also medical research on the topic. Some of them were computer enthusiasts that had previously been involved in developing diabetes databases.

Two things aroused our interest at this stage. First, what were the consequences of the fact that all the users involved in the early development work were specialized professionals? Furthermore, if the very same people had been previously developing databases for diabetes care, what had happened to these databases? Second, we planned to observe the use of the PDMS but had hard time choosing which hospitals or receptions to turn our attention to. The PDMS was used in six locations and quite diversely in different institutions. We also wished to compare the use of the database in the public diabetic clinic of Oulu, which was considered an advanced user, to its use in some other locations. These research intentions turned out to be, however, far too demanding to be carried out extensively during our research project.

Level of the particular technology

After a short round of interviews with diabetes specialists we learned that there had been numerous attempts to develop diabetes databases in Finland as well as abroad since the early 1980s. In Finland, these programs were usually initiated by medical researchers who wished to gain statistical data about diabetes and the effects of its treatment. Most of these projects had managed to produce a working program, but it was exceptional that these programs were used for a long period of time or expanded to wider use. Eventually, they became isolated and devoid of the original purpose of gathering and uniting wide and multifaceted data in health care districts, and were quietly withdrawn. When we inquired the reasons for this "graveyard of diabetes databases" our informants saw the role of general practitioners (GPs) as central. The systems remained dysfunctional if the GPs did not use them. Some informants were of the opinion that the researchers who had been active in the development of the databases had loaded them with information requirements irrelevant to the GPs, and thus made it hard for them to use during the appointments. The programs were of any particular service to those nurses and assistant nurses either with whom the GPs worked in close collaboration. For us, these considerations were interesting, as we started to see a certain pattern in the way that this particular technology had been developed and how the applications had failed in the long run. The next step was to take a look at the general development of diabetes care in Finland in to find out how the role of the GPs and health centers had changed by the present day.

The level of societal domain

During the 1980s and 1990s, the public diabetes care has been allocated to three sectors in Finland. First, special nursery, available in central hospitals for complicated cases, such as acute juvenile-onset diabetes. Second, communal diabetic clinics conducting guidance and treatment of acute adult-onset diabetes; and third, health centers handling the treatment of non-complicated, chronic patients. Citizens sought treatment from the instance specialized to their specific type of diabetes. By the turn of the millennium, this public health care structure had started to change. The GPs working in health centers were given "population responsibility" that meant that they had to deal with all the illnesses of a certain population in their district. As a consequence, many routine tasks formerly conducted in diabetic clinics were now dealt with in health centers. This indicated that in the treatment of diabetes - and especially in recording the facts - the role of non-specialized physicians and nurses in health centers was decisively increasing.

FROM HISTORICAL ANALYSIS TO WORKING HYPOTHESIS

In activity-theoretical studies, a historical analysis is conducted to understand the development of events that had led to the present situation of the activity under study [2,9]. Based on the understanding of this development, a working hypothesis may be proposed of the future directions of the activity. At the same time, this hypothesis may be used in researcher-driven interventions in which the hypothesis is considered in a dialogue with the representatives from the research sites. These interventions, usually taking a form of a seminar, may pragmatically validate the working hypothesis. [9]

Our historical analysis suggested a following hypothesis as regards the utility and design of the PDMS. The diabetes

researchers and specialists will probably use and be satisfied with the PDMS. They have been actively involved in the development work, and they have also shown keen interest and need for this kind of applications. For instance, they have previously made their own versions of diabetes databases. Other participants of diabetes care, including diabetics themselves, have not been actively involved in the design of the PDMS. Similar absence of participants other than the researchers and specialists is noticeable in the case of the previous, abandoned diabetes databases programmed in Finland. Our hypothesis is, thus, that in order to bring genuine utility to diabetes treatment, the PDMS must be actively used by the GPs and other personnel of health centers.

The hypothesis implies that, concerning the design process, the missing voices of health center personnel is a potential threat to the success of the program. We found it relevant that we, as researchers, bring this finding into discussion with both the user participants and designers involved in the development of the PDMS. We deemed it also necessary that when selecting a site for the ethnography of the use of PDMS we should aim at studying how the PDMS functions in the use of the GPs and nurses of health centers. By comparing these findings to the use of PDMS in diabetic clinic of Oulu, which is a specialized user site, we hope to illuminate the different needs of specialized and non-specialized diabetes care.

THE CHALLENGE OF RESEARCHER-DRIVEN INTERVENTIONS

In the autumn 2000, we shall organize jointly with Prowellness Inc. a seminar where our working hypothesis will be discussed with the user participants of the PDMS. The user participants are also arranging, without Prowellness Inc., a meeting of their own where we also hope to discuss our hypothesis. There are, however, some difficulties that may hinder a constructive discussion on the subject. The collaboration between Prowellness Inc. and the personnel of specialized diabetes care has become so close and well established that it will be difficult to alter anything or present them the perspectives of other user groups. Although specialized personnel is aware of the importance of the role of the GPs and other personnel of health centers for diabetes care, their primary interest lies in obtaining a tool for their own specialized use. We intend to overcome these difficulties by involving the GPs in the seminars organized for autumn 2000. In the future, we shall also endeavor to gather ethnographic data about the health-center personnel's use of the PDMS, and, possibly, present the results in a similar seminar. This way, we hope to strengthen the voice of the personnel of health centers that has been missing but is still crucial for the design of the PDMS and other diabetes databases.

DISCUSSION

We presented here some preliminary results of an on-going research project. We suggested that the historical analysis of the PDMS, based on the theoretical framework of activity theory, may reveal the missing but crucial user voices of the design process. We formulated a three-level model for a conceptual tool of analysis: the levels of local design, particular technology, and societal domain. We formed these levels as a pragmatic conceptualization for our research work having noticed that the local design practice had earlier counterparts in other places in Finland. The level of societal domain became relevant as soon as it dawned on us that all the diabetes databases had the disadvantage of neglecting the GPs, whose societal role was even increasing in importance after the changes in public health care system of Finland. The three levels were produced in a practical manner, but, we hope, they will reveal and convince that micro- and macroscale phenomena can be productively connected in a historical analysis. We see this kind of a historical analysis and the hypothesis based on it as a complementary method to the methods of participatory design. The future task is to elaborate on the theoretical basis of the different levels of historical analysis.

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