The Image of the Human Being in Information Systems Development:

Some Reflections by Systems Designers'

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Abstract

This paper describes the qualitatively different views of users that Finnish IS designers have. This view is a basis for the IS-user relationship. A method of empirical research for investigating human beings' views of the surrounding world, phenomenography, is presented. The preliminary results of the analysis indicate that IS designers tend to give meaning to users through the intentions of the situation in question rather than connecting characteristics typical of a human being to the user. A Human being is understood, on the one hand, in terms of information technology, business or organisational work processes and, on the other hand, with the aid of self-reflection. The meanings that the designers connect directly to the users describe and sustain the traditional IS-user relationship in IS literature and also bring forth emotional characteristics of a human being.

Keywords: Human-centred design, IS-user relationship, reflectivity, human needs, phenomenography

BRT Keywords: FA08, AA01, GB05

Introduction

A central topic at the turn of this century is the relationship between information systems (IS) and human beings. For example, Gill (1996) claims that the key question of the twenty-first century is how to design systems which serve the needs and aspirations of people in society. Iivari (1997) states that user satisfaction is an increasing concern of both information systems practitioners and researchers. Moreover, user-friendly information society is one of the main aims that the European commission has appointed to research and development actions in the near future (Anon. 1999). In this new situation, an essential professional qualification of IS designers is the ability to understand and analyse human needs and behaviour (Kling 1996). This means applying a human-centred approach to information systems development (ISD).

A human-centred approach in ISD implies that the emphasis of the development process is on design environments which help the IS experts to analyse the users' social and cognitive needs. The focus is then on the aesthetic, practical, social and cognitive fit between the user and the properties of the application. In order to build a system that meets the needs of the user, the IS experts have to make sense of the users by forming a view of them. This view - an image of the human being - is a basis for the concrete design solutions that an information system is built on. (Winograd 1995). An essential question then with respect to information systems that serve human needs and aspirations is what the IS designers' view of a human being is.

This study builds on research suggesting that IS professionals' views or frames of reference significantly influence the characteristics of the systems that they develop and the user-designer relationship (e.g. Bostrom & Heinen 1977; Orlikowski & Gash 1994). In the previous studies concerning IS designers' view of a human being the focus has been on the structure of the views: the designers' views of a human being are either individual or organisational, operational or theoretical (Hedberg & Mumford 1975; Dagwell & Weber 1983). Moreover, often the systems designers' conceptualisations of the user are defined as a matter of value choice made during the ISD process rather than a necessary condition of design (e.g. Kumar and Welke 1983; Kumar and Bjørn-Andersen 1990). Methodologically these earlier studies concerning IS designers' view of the user are quite consistent: the preceding studies were all surveys. Data collection was carried out primarily by questionnaires but some interviews were also used. In most cases the theory involved was Theory X - Theory Y (McGregor 1960).

This study aims at describing the qualitatively different views of a human being that Finnish IS designers have concerning the people for whom they build systems. The presence of formal knowledge, different beliefs and values in the way that a human being is depicted is considered. In addition, the different views of human needs are of particular interest. The premise of the study is that, despite the numerous hindrances in user-involvement (cf. Beath & Orlikowski 1994), the user is an indispensable part of the ISD process (cf. Bjerknes & Bratteteig 1995). The clarification of the current view of a human being of the IS experts serves as a basis for understanding how users are seen during the ISD process and this in turn may help in understanding the user-designer relationship during ISD projects as well as what kind of design solutions are made in order to meet human needs.

In this paper I will first briefly describe the role of the view of a human being in the activities of IS experts. Then I am depicting the methodology of this study and, finally, present and discuss the categories of descriptions of the IS designers' views of a human being, based on a preliminary analysis of the data.

'View' in reflective action

A view forms the basis for the process in which a human being gives meaning to a phenomenon (Uljens 1991), i.e. a view is formed in a process, in which the existing structures of knowledge are elaborated, completed, and re-structured by unifying new information with the previous structures (Resnick 1989). This kind of knowledge creation occurs in reflective action, which involves constant contemplation of one's knowledge, beliefs and values with respect to the object of thought and action (Schön 1983, 1987). Essential in reflective action is to be aware and question the previous view, a perspective which will then serve as a basis for a new understanding (Mezirow 1995).

Because the IS designers' work is reflective by nature (Tourunen 1992; Winograd 1995; Heiskanen & Newman 1997), this means that when present in the interactive situations in the ISD process the designers are bringing with them a previously formed view concerning the situation and the people in it. In order to make sense of the new user in a new ISD process, IS professionals should be both aware and questioning their previous view of the user. To sum up, the IS designers' view of the user is a basis for their understanding of the user during every new IS project. This previously formed view influences the interaction between users and IS experts during the ISD project as well as the design solutions during ISD projects. In order to understand the users in new projects, the IS

designers should be aware of their previously formed assumptions of the user.

Methodology

This study merges with the principles of phenomenography, which is a qualitatively oriented method of empirical research for investigating human beings' different views of the surrounding world (Marton 1981; Järvinen & Järvinen 1996, 59). The first central principle of phenomenography is the so-called second-order perspective. Then the investigation is oriented towards human beings' views of the surrounding world, whereas the first-order perspective is focused on the surrounding world. Forming a view requires understanding the object of thought, which in turn means giving meaning to this phenomenon. In this sense phenomenography is also interpretative: the aspects of reality are not seen as objective facts that the researcher is able to describe but need to be given meaning by the human beings investigated. In this way a view also forms a fundamental relation between the individual and his or her environment.

The second principle of phenomenographic research is the inspection of the essence of the phenomenon. This means that in a phenomenon there is a third level between the general intersubjective level and the individual's own level. This level is of utmost interest in phenomenographic research. It is the level of experiential habits and thought forms. Due to this principle, the categorisations made on the basis of the data cover the whole variation of the answers. The categorisations are made from those expressions by which human beings describe their perceptions, experiences and concepts.

The third principle of phenomenography separates two intertwined aspects: the what- and the how-aspects. The what-aspect directs the thought to the object, which can be physical or mental by nature (in this study it is both). The how-aspect refers to the thought processes by which an object of thought is delimited from the surrounding situation. Hence, the context where the phenomenon is seen contributes to the meaning of the phenomenon in question (cf. Svensson 1979).

Some phenomenologically oriented phenomenographists also claim that the researchers should put aside their previous knowledge and experiences concerning the historical, social, cultural and psychological aspects of the phenomenon investigated in order to reach the genuine essence of that phenomenon through their experience (Uljens 1993). This claim reflects the principle of phenomenological reduction which refers to the study of the world as it appears to individuals when they place themselves in a state of consciousness that mirrors an effort to be free of everyday biases and beliefs (Gall et al. 1996, 600). This feature is in contrast with the phenomenographical assumption that a previously formed view serves as a basis for a new comprehension of a certain phenomenon.

I think it is a matter of course that the researcher's subjectivity, earlier knowledge and experiences affect the process of investigation. Even when a researcher gets interested in a certain topic and starts to develop a research plan he or she is inevitably involved with particular assumptions concerning the topic. Pure phenomenological reduction is also contradictory to the principle of phenomenography which assumes that at the same time when a phenomenon becomes an object of thought (the what-aspect) there also exists a thought process that delimits this phenomenon from the reality (the how-aspect). This means that the phenomenon during the process of comprehension is already being proportioned to the assumptions that the person in question has before he or she completes the forming of the new comprehension. Thus, I base this study on an assumption that it is not possible to carry out a pure phenomenological reduction (cf. Järvinen & Järvinen 1996, 114). Instead, the researcher should be aware of his or her previous knowledge and

experiences concerning the historical, social, cultural and psychological aspects of the phenomenon investigated and should concentrate on being open to other kinds of knowledge and experiences.

Data collection

In order to find a relevant way to carry out data collection I carried out a pilot interview. The interviewee was an IS professional with a university background and five years of work experience. The pilot interview consisted of two parts. The first part was a non-standardised interview (Fielding 1993). The questions concerned the people for whom the respondent was building systems. The second part of the pilot interview was a design task involving a think-aloud method (Wood 1997). The respondent was asked to depict his own actions while building a system and to describe how he conceptualises the user of the system.

All the questions in the first part of the interview were so-called opening questions or probes intended to get the respondent to express his assumptions of the user with those words and terms that are relevant to him. I anticipated that in follow-up questions it would be possible to probe for more information in a way that is adapted to the expressions of the respondent. However, during the pilot interview I did not perceive any expressions or meanings that would have been elaborated to a discussion about the essence of a human being. I had expected the respondent to narrate views of human beings that he had formed during his formal training and work experience. My subjective expectations were not fulfilled. The respondent used different euphemisms: for example, he considered a human being as being in some way equivalent to a firm:

> (Researcher) "Would you describe those human beings for whom you're making software?"
>
> (Respondent) "Well, human beings are very different, there are different firms and organisations, there are very big factories as clients and there are people in the departments and, on the other hand, there are quite small firms, which practically are a person, so that there is a lot of variation ... "

Not even the general "rule of thumb" that expresses a characteristic of human information processing - "the capacity of human short term memory is 7+/-2 units of information" (cf. von Wright 1979; Robillard 1999) - came out during the interview. The design task with the think-aloud method resulted in data in which the focus of reflection was even further away from human-related issues.

The data resulting from the pilot interview raised several questions: Was the interview appropriately carried out and is the data valid? Could it be true that a human being is seen as a firm? Is it not realistic to assume that IS professionals possess knowledge, beliefs and values concerning a human being and his or her needs as an user of an information system? Does this knowledge exist, but did not come out in the pilot interview? I searched for answers to these questions and attempted to solve them with respect to further data collection through considering first the object of research (experts' knowledge), second the theoretical support offered by the research method and, third the interview technique.

Data collection in relation to expert knowledge

According to Tynjälä (1998) expert knowledge consists of three aspects of intertwined knowledge: theoretical knowledge, practical knowledge and self-regulation. Theoretical knowledge is universal and formal by nature and it is very explicit. An expert's theoretical knowledge basis is usually formed during formal training. Practical knowledge concerns single cases and it is often intuitive and tacit by nature. Skills (or so-called procedural knowledge) are the core of practical knowledge. Deep practical knowledge develops along work experience. Self-regulation refers to both metacognitive and reflective knowledge and skills: in other words, critical and perceptive examination of one's thought, learning and action. The development of expertise is a long process during which these different domains of expert knowledge become merged. However, essential in this process is self-regulation (Vosnidiaou 1994; Mezirow 1995). From the point of view of the data collection in this study this means that the IS designers' views of the user can be revealed by means of reflection. Then the respondents should be asked questions which guide them to examine their own thought and action while developing systems (for example, ”When you're making a system, for whom do you think you're doing it? ”).

Data collection in relation to the research method

One prerequisite of the validity of research is that the methodological solutions of a study must be in harmony with the ontological and epistemological assumptions of the research method (Denzin 1978). In this case the methods should be in accordance with the principles of phenomenography.

First, the method of inquiry was scrutinised by the aid of the two intertwined aspects of a view: the what- and how-aspects. While the what-aspect directs the thought to the object, the how-aspect delimits an object of thought from the surrounding situation. Because this means that the context where the phenomenon is seen contributes to the meaning of the phenomenon in question (Svensson 1979), a human being should be viewed in the context of the process of ISD. Then a human being should be discussed with respect to the different roles that a human being is addressed in the context of ISD, for example a user, an end-user, a client or a customer (Friedman & Cornford 1989, 184). In addition, a human being should be discussed in the context of different phases of the ISD process: planning, design, implementation and use & maintenance (cf. Friedman & Cornford 1989, 178). This procedure may also broaden the range of answers and in that way result in a richer picture of the user. A part of this procedure is also to carry out data collection in the IS designers' work places.

Second, phenomenography is interested in experiential habits and thought forms concerning a particular phenomenon. Experiencing a phenomenon refers to individuals who are reflecting on the phenomenon in question. Since reflection involves examination of one's thought, action, values and emotions (Mezirow 1981), the data collection should evoke both intellectual and emotional aspects of the respondents' views. Consequently, the data collection should include both descriptive and factual questions as well as affective questions, which mirror attitudes, emotions and values. This kind of classification is also often made in so-called depth-interviews (Banaka 1971).

Interview technique

An interview is considered a suitable method for data collection when the object of inquiry is human consciousness (Järvinen & Järvinen 1996). Interviews were also used in the previous studies concerning the view of human being (Hedberg & Mumford 1975; Patrikainen 1997). Since phenomenography assumes that the researcher enters into interaction - a dialogue - with the subjects of research, an interview better serves the data collection of this study than, for example, a think-aloud method. In addition, important interviewing techniques, probing and prompting, also require the possibility of interaction.

Based on the experiences and results of the pilot interview, the interview method for further data collection was planned as a semi-structured interview (Fielding 1993). The framework for the interviews was planned as a matrix, where the columns represented different phases of the ISD process (context) and the rows represented different question types (factual questions, descriptive questions and affective questions). The framework included some questions planned before the interviews, but the question schedule was fixed only in its meaning, not in its wording (Denzin 1978). The aim of the interviews was to proceed on the interviewees' own terms. The purpose of the planned questions was to evoke and support the respondents' reflection, maintain the appropriate context and offer the researcher a possibility to redirect the respondents' thoughts into human-related issues in case the conversation needed that kind of guidance. This procedure is in accordance with the style of a phenomenographic interview which is non-directive except with respect to 'leading' the interviewee to focus on pre-determined content in certain contexts (Bowden et al. 1992; Francis 1993).

Since interviews involve interaction, the interviewer should be careful not to influence the respondents' answers before and during interviews. Järvinen & Järvinen (1996) forewarn of giving distorted information to the respondent before an interview. This was to some extent unavoidable in this study because the term "human being" consists of certain degree of value judgement. One of the most fundamental values in western societies is the sacredness of human life (e.g. Hirsjärvi 1984, 65). In other words, a human being should be more important to human beings than, for example, information technology or other artifacts. Consequently, when I told the respondents that I was interested in their views of a human being as a user of an information system, my message included an intimation that I wanted to hear "user-friendly" answers. For this reason, I included so-called indirect questions in the interview framework (Fielding 1993). For example, questions that have both a human-related and other meanings (e.g. "What is usability in your opinion?"). Despite this, some interviewees showed a slight tendency to answer in a way that they supposed would please me. To control these effects, I made notes of the appearance of these "Hawthorne-effects" in my research diary.

The Interviews

A human being is said to be more than the sum of its parts. This is illustrated well by Galperin's model of the different segments of the development of a human being (Järvinen 1991). The model forms a circle which consists of six segments. One of the segments is left open so that the reader can add his or her subjective view to complete the model. Thus, the view of a human being is of a very multifaceted phenomenon and the range of these views may vary a lot. Since the aim of the study is to find as many of the IS designers' views of a human being as possible the interviewees were selected with this in mind. In this application of theoretical sampling (Yin 1989) the aim was to get information systems designers as respondents whose age, educational background, work domain, work place,

working experience and geographical location varied. The unavoidable common factor of the respondents was profession. Yet, this may homogenise the variation of the views of a human being: the meanings of different phenomena are learned in certain communities of practice and these meanings are often shared in a work place (Brown & Duguid 1991). In addition, the educational background influences the comprehended meanings (Aittola 1992; Ylijoki 1998).

I began the interviews in April 1998. Because the interviews concerned the respondents' work tasks before the interviews I asked each respondents name, age, work domain, position in the firm, work history, employment and educational background by e-mail (cf. Järvinen & Järvinen 1996, 103). Before the actual interview I aimed at chatting with the interviewees. A good topic for conversation proved to be the tape recorder. It was a technical device and most of the respondents were interested in getting it ready to record. By taking the interviewee along in this installing procedure I often managed to create a natural and smooth situation for interaction.

Particular themes emerged in the respondents' views after about eight interviews. To make sure of this I continued the interviews and interviewed altogether 20 designers before I was convinced that interviewing still more "ordinary" IS professionals would not bring anything new to the data collected. Since phenomenographical research is interested in the manners of thought, it is sufficient to aim at revealing a common way of thinking within a certain field. Exceptional cases are not the point.

The conversation continued with some of the respondents after the actual interview and if something important emerged in these conversations I made notes of them in my research diary. These and other notes important with respect to the study support the analysis of the data.

The respondents

The respondents of the study consisted of 20 Finnish information system designers from seven enterprises. Fourteen of the designers were male and six were female, and their age varied from 24 to 52 years. Eleven of them had an academic background, six had a polytechnic background and three designers were trained on-the-job. All except two of the interviewees had experience in several tasks of ISD, most generally in planning, designing, programming and implementation. Some also had experience concerning project management and management of customer services. The remaining two interviewees were graduating students. One of the students was developing efficient new ways of representing information on the screen in order to facilitate the user's work. The students were included in the sample because they represent the state-of-the-art of higher education in the field in Finland. In addition, three of the respondents had working experience both from industry and academia. They had previously been working at the departments of computer science and/or information systems at three different Finnish universities.

The domains of the enterprises in which the respondents worked were telecommunications, local network services, groupware technologies, accounting systems, office systems, health care systems, insurance systems, multimedia and Internet-applications. At the time of the interviews the respondents were developing systems for users, not, for example, embedded or EDI applications. The location of the enterprises or the units where the respondents worked were Espoo (2), Oulu (1), Jyväskylä (2) and Tampere (2). Two of the firms were operating both in national and international markets and five in national markets. The sizes of the enterprises in terms of personnel varied from 3 to 20.000. Several companies claimed that their systems were services for the users.

Data analysis

In phenomenography, the categorisations are made from those expressions by which human beings describe their perceptions, experiences and concepts. The expressions result from a process by which an individual gives meaning to a certain phenomenon. Meaning is then created with the aid of the two aspects of phenomenography: the what- and the how-aspects. These aspects express the intentionality of phenomenography: human thought is always directed to something in a certain way (Uljens 1991). Thus, an individual may give meaning to a certain phenomenon through the intention of the situation where the phenomenon in question is experienced and understood. For this reason, phenomenographical analysis is context dependent.

This also means that the categorisations are created on the basis of the data, i.e. the categories exist in the data and are constitutive of the data. Thus, the analysis of the data is a discovery process which tries to incorporate all aspects of the data, attempting a holistic account of the ways of understanding the phenomenon. In this kind of analysis the conceptions that come to light may cut across what content experts would agree are appropriate ways of viewing the phenomenon. However, the focus is on the way that the interviewees see a certain phenomenon and it is not necessary to try to assign these meanings into some pre-determined framework. (Walsh 1994).

From the perspective of phenomenographic analysis as a discovery process the emphasis is on the similarities and differences within the data. The similarities among the data classified together against a certain category develop the detail within that category, whereas the differences between sets of data where each set is classified against a different category elaborate the differences between those categories. (Walsh 1994). These categories of descriptions express the qualitatively different ways of viewing the phenomenon in question.

In practice, the analysis procedure is quite similar to Strauss & Corbin's (1990) descriptions of qualitative analysis. First, the respondents' concrete expressions are investigated and, based on the differences and similarities of the meanings in the respondents' expressions, certain concepts are identified. These concepts are expressions which refer to the meaning that the interviewees give to the phenomenon investigated. Second, the concepts are compared and categories, which include concepts that refer to similar phenomenon, are created. Third, the categories are linked together by examining different factors that may be common to the categories. In this case, the premise for linking the categories was the source of the meaning, e.g. the situated intentions of the professional practice of ISD, the IS designers' self-reflections and the IS designers' perceptions of the users.

Preliminary results

The preliminary results of the analysis indicate that IS experts tend to give meaning to users through the intentions of the situation in question rather than connecting characteristics typical of a human being to the user. For example, a human being is seen in terms of business, information systems and work processes.

> (Researcher) "have you formed any idea if there is some particular features in an application that makes it suitable for the user?"
>
> (Respondent) "...those features take form according to the work in question"

A few experts reflect on their work in human terms but think of the user through themselves.

(Researcher) “When you are building an application, to whom do you think you’re doing it?”

(Respondent) “ ...I’m making it so that I myself would like to use it...”.

Some experts connect meanings directly to users. In these descriptions the user is usually seen as being ignorant concerning information systems and the systems built for the users should be simple. The most general distinctive feature in human beings is their attitude towards computers, either positive or negative.

(Researcher) “How in your opinion people react towards new systems?”

(Respondent) “Timidly and with prejudice.”

Categories resulting from the preliminary analysis of the data at the end of March 1999 are presented in Figure 1.

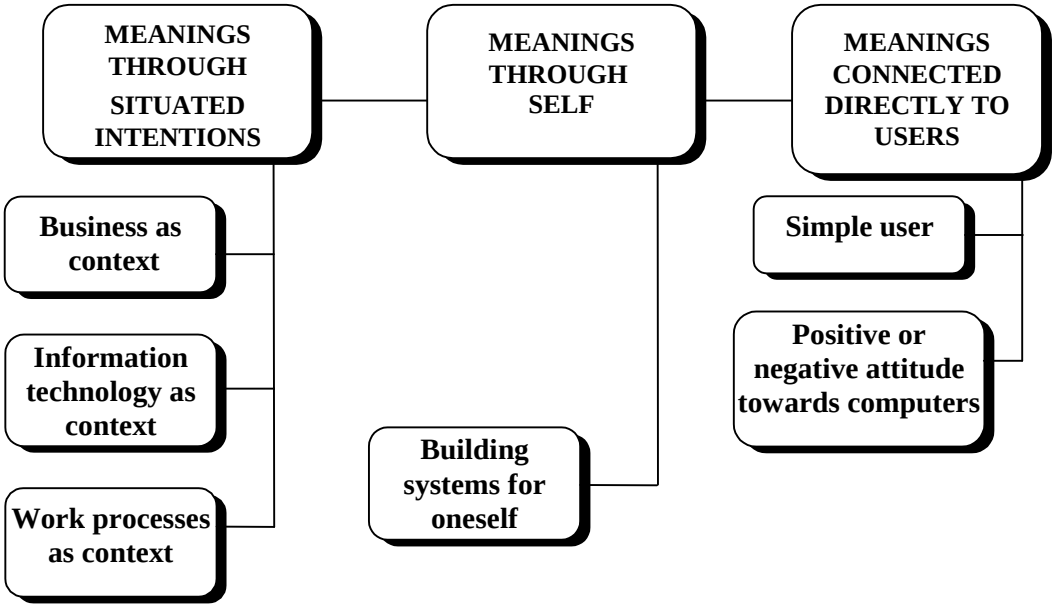

Figure 1. Categories of descriptions based on the preliminary analysis

Meanings through situated intentions

The IS designers tend to give meaning to a human being in terms of their intentions relating to their work. These meanings emerge from the way that a human being is narrated in the contexts of business, information technology and work processes.

Business as context

In the expressions that are included in the category of business the focus of reflection is on enterprises and business action. A human being is seen as equivalent to an enterprise, which determines a human being. Human beings are different because they belong to different kinds of firms, not because of different kinds of characteristics essential to human beings. The term that renders this possible is 'client': a client can be either a firm or a human being. In this category, client means an enterprise. Accordingly, the needs of a client are fixed in terms of business:

> (Researcher) "I would like to check again, what exactly do you mean with the needs?)
>
> (Respondent) "the client's needs are at this moment for very cost-effective information technology which serves the end-users. Especially in big companies a lot of calculations are made in order to clarify how much information technology costs, and a clear trend is to create models based on which this basic information technology can be made more cost-efficient....and attention must then be paid to the point of view of the end-user, because it is the most potential area for achieving savings..."

Central is the need for achieving savings: "always when we make these systems so beside us there are the calculations that show how much saving this will cause in personnel resources...". The user is interesting only because savings are best attained by automating his or her work. The needs of the user - a human being - are thus being determined as becoming automated and the central role of the user is to be a potential target for savings.

Information technology as context

In the expressions that are included in the category of information technology the focus of reflection is on hardware, software, telecommunication networks or ISD methodologies. A human being is clearly a secondary subject and often is not discussed at all. The terms that have multiple meanings are understood only in technical terms:

> "... just this usability, response times and load percentages, or in a way, how it [a telecommunications network] sort of behaves, what there happens when the customer is using the service..."

The boundary between a human being and information technology is vague and the concept 'user' may be interpreted as a technical term. For example, in a respondent's opinion the term 'user' concerns information technology and the use of that term directed the interview to technical matters: "Why did you ask about a user if you wanted to know something about a human being: the term user refers to electronic data processing and directed the interview to technical matters". This is interesting because the concept 'user' was first developed during the 1980's to distinguish computer system builders from others associated with the system once it had been created (Friedman & Cornford 1989, 183). In other words, the general meaning - at least in the literature of information systems - of the concept 'user' refers to human beings for whom the system is built. Why, at the end of the 1990's, does this term not mean a human being to an IS expert? In the light of recent studies concerning work place learning (Brown & Duguid 1991; Lave & Wenger 1991) it seems that the cultural practice of ISD has changed to being more technology-centred and the term 'user' does not necessarily in the current communities of practice refer to a human being.

The category of information technology is reminiscent of the system theoretical point of view of Nurminen (1986, 61), in which there is no special place for a human being. An information system is understood so that it either ignores a human being or a human being is combined with the system as a unit of the system. In the expressions of the category

of information technology a human being is being ignored totally, seen as an (technical) unit of the system or is lost during a reductionist design process:

> (Researcher) ”If we think of the situation when you’re making a system, so for whom do you think you’re doing it? ”
>
> (Respondent) “Now, if we speak about realisation, making a program, so it is made to a certain specification, or in a way I am doing it as commercial work, so that the specification is the one I am comparing it [a system] to, if there is a mistake made, so the designer is not going to correct it....this structured phase model is just based on the idea that you cannot go back to your roots but some matters must be finally fixed in certain phase in order to get this process going ...”

Simultaneously when the human being is ignored or lost, the needs of the users are not seen as important: “now the client has his own needs which they of course try to express but this is more like a sort of product development”. Attention is not paid to the needs of the users because it is appropriate and sufficient to develop products only in terms of information technology.

Work processes as context

In the expressions that are included in the category of work processes a human being is described through organisational work processes. The focus of reflection is on work processes, not on the human being that is performing the work tasks in question. A human being is not a central actor but a process built within a system: “Usability means that the machine is not the point but the system is so simple and clear and, sort of, simplified model of the reality that it supports the process of actions so that the machine is the one which makes all the activities turn”.

Essential matters are the guidance and control of the work processes and the information that is included in the process. Characteristics essential to a human being are displaced by the features of the work process: “...we made it [a system] so that we went through the types of actions and the information that was needed in the situations in question and how the patient is moving according to our models...”. The work processes are usually seen as objectivist, as “simplified reality”, which assumes that there is one ideal model of working and the human being should adapt to that manner. A central concern then is the guidance and control of work processes: “ a starting point in the making of helps [the helpfiles] was that we aimed at guiding the way how the process is carried out there, and I think it is the right way of doing them...”. It seems that information systems are built for people whose interest is to guide and control the organisational work processes and not for the people who use the systems. Accordingly, the productivity and efficiency of those processes is based only on guidance and control.

The expressions of this category emphasise the tradition of ISD based on system theoretical thinking. The process of ISD is then a process of breaking problems down into manageable and controllable descriptions. In this way systems grow up as abstract models of reality. The world viewed as a system is a way of reducing hardware, software and human beings to components which contribute to the overall system. This kind of procedure turns human beings into things. (Bødker & Greenbaum 1993).

Meanings through self

Some IS experts consider their work in relation to the user as a human being. In the expressions that are included in this category the type of reflection is self-reflection: the designers think of the user through themselves:

(Researcher) ”So, when you’re making a system, so to whom do you think you’re doing it? ”

(Respondent) ”I am in a way thinking myself as an employee in that client firm and begin that way to design the system…”

In these expressions, the starting point to design systems is that the designer is trying to conceptualise the user’s behavior in relation to the system by assuming him- or herself as taking an active part in the task in question. With respect to the three intertwined types of expert knowledge (Tynjälä 1998), this is an inventive turn of mind. It seems that the designers do not possess theoretical knowledge of the users’ behavior to utilise in their work. Instead, the reflective practitioners are compensating for this lack of knowledge by using self-regulation and reflect on their own actions as a user as a basis of their designs.

A few designers also try to understand the users’ behavior through their own behavior: ”so that really is a good question that why don’t they read them [the helpfiles], though one must confess that I also myself try first just to do something before reading…”. However, equating themselves with the users did not always appear without being patronizing towards the users.

Meanings directly connected to users

The IS experts connect meanings directly to the users. In these descriptions the user is usually seen as being ignorant concerning information systems and so the systems built for the users should be simple.

(Researcher) ” what kind of problems do you mean they have?”

(Respondent) ” they [users] usually have the problem situation already in that they do not know even the basics of computing...”

Many of the respondents depict users by contrasting their own technological knowledge and skills with the users’ : ”when you’re a technical person from head to toes and do applications and programming so that is so rewarding to get a process modelled and the program code into the machine, but then when you have to make the text [a helpfile] to the end-user who tells what button to press in certain situation so that is so unrewarding to myself because I know those things so clearly…”. The expressions in this category also create and sustain a strict dichotomy between the users and the IS designers. The IS designers are superior in knowledge and skills to the users. These expressions are similar to the findings of the nature of the IS-user relationship that the Information Engineering -methodology holds and that is evident in much IS literature (Beath & Orlikowski 1994).

The most general distinctive human feature in human beings is their attitude towards computers, either positive or negative. Quite often the user is perceived to be afraid of computers which supports the claims that computerphobia is nowadays an usual phenomenon (Brosnan & Davidson 1994).

(Researcher) ”do you think that somebody could be afraid of new software?”

(Respondent) ” yes, surely if one has that kind of negative attitude in general towards computers, so the learning of new software can evoke such fear- and anger states…”

Enthusiastic attitudes towards computers are something that the IS designers would sincerely like to share with the users: ”in general that is a good feeling when you get these fifty-year-old persons too to get enthusiastic about the matter [a Lotus Notes application] that yeah, this is handy…”. In addition to the strict expertise-based dichotomy between IS designers and users the expressions in this category also reveal a dichotomy between affairs that the IS designers are willing to share with the users and what they want to keep to themselves. The IS designers obviously prefer to sustain the expertise-based separation between them and the users, but they are willing to equate themselves with the users in sharing positive attitudes, especially enthusiasm towards computers, with the users. Knowledge and skills are not often a common factor between the IS experts and the users but positive attitudes sometimes are. These positive attitudes should be utilised as a starting point in developing new, more human-centered approaches (e.g. Greenbaum & Kyng 1991; Pain et al. 1993; Avison et al. 1998) for contemporary information systems development.

Discussion

The preliminary results of the analysis indicate that IS designers' image of a human being is in general field-dependent: a human being can be explained completely through the external influences, e.g. guidance and control, operating on him or her (Nash 1968, 427). A human being is usually depicted either through the boundary conditions of ISD such as economic and business processes, or the substance of ISD is seen only in terms of information technology or modelling the information that the systems require. In these views, there is no space for characteristics typical to a human being, for example self-actualisation, self-control, personal responsibility or other human needs (e.g. Maslow 1970; Alderfer 1972). Consequently, there is no need for an intellectual and moral struggle concerning understanding a human being.

Some IS designers consider the user in terms of a human being but base their designs on self-reflection. This indicates both a lack of formal knowledge concerning human beings and also a non-existent possibility of interacting with the real users. However, this kind of action is highly reflective and also implies moral sensitivity. This way of designing systems is in accordance with Suchman's (1987) notion that human actions are not always guided by pre-determined and clear plans, but are based on actions within specific situations. It shows a particular inventive power and also an empathy to try to grasp the user's situation specific actions by the aid of self-reflection. Unfortunately, the average user is probably interacting differently with computers than an IS expert.

The views depicted by the categories of "Meanings through situated intentions" and "Meanings connected directly to users" indicate a non-reflective way of action. Habermas (1976, 16) defines what is typical of a non-reflective action as the manner in which the implicitly emerging theoretical and practical assumptions of professional qualifications are naively taken for granted and are accepted or rejected without discursive reflection (Mezirow 1995). This kind of model of working also sustains the traditional technical rational way of thinking, which leads to abstract models of information systems, or "simplified reality" as some of the respondents defined it.

Bødker & Greenbaum (1993) criticise this traditional structured approach of system development by arguing that it prevents a separation of people from things through incorporating formal sets of procedures for examining the things it identifies as data. This statement also gives sense to the confusing way that the IS designers understand a human being in the context of ISD: in terms of a formal set of procedures. The boundary between a

human being and an information system is blurred and a human being is ignored, since in this traditional way all the components of the system are identified as data. In this kind of design the IS designers only take into account things which can be defined as data. As a rule this kind of things concern the information that the users need in the system, whereas the human factors in the system, e.g. the aesthetic, social as well as cognitive fit between the user and the properties of the application, are omitted. If the IS designers follow the traditional procedures as a non-reflective practice and take for granted the emerging assumptions, the systems that are built probably are suboptimal for the users because the human properties of the system are ignored. In addition, it seems that the traditional technical rational way of building information systems allows the IS designers to become alienated from the actual reality by preventing the designers from becoming involved in open interaction - discursive reflection - with the actual planning situation and the human beings within it.

The different views of human needs included in the views of a human being are also slightly confused. The needs of a user are to gain monetary savings by automating other people's work, or their needs are not paid attention to because it is sufficient to develop IS products only in terms of information technology. It is also assumed that the only need that human beings may have in their work is the need for information, or the needs of the user are similar to those experienced by the builder of the system, who is not actually responsible for the tasks performed with the system that has been created. These views, with the exception of the view based on the IS designer's self-reflection, assume that a need refers to something that is needed in order to attain a particular purpose. Hence, although money, information technology and information are very useful in contemporary society and are necessities in ISD, they represent only the instrumental needs of a human being.

In order to understand and analyse human behaviour it is indispensable to also embrace another aspect of the concept need, i.e. the needs that are inherent in human beings and without which fulfilment people do not feel well as human beings (von Wright 1984). Essential to such needs are the deficiency needs and growth needs (Maslow 1970; Alderfer 1972). The deficiency needs include physiological, safety and social needs whereas the growth needs include esteem needs and self-actualisation needs. These needs form a basis for the image of a human being of current interest: an active creator of his or her own thought world and environment (Bannon 1991).

In any ISD action that aims at meeting the needs of a human being, the fulfilment of both aspects of the concept need should be pursued. This means aiming at meeting both the instrumental and the inherent needs of a human being. The instrumental needs usually are easily expressed by the users when they describe to the IS designers the purpose of the system that they need. For the fulfilment of the instrumental needs the IS designers just have to collaborate and listen the users. Meeting the inherent needs of a human being preconceives additional procedures for analysing the user requirements. These procedures should employ methods for defining the aesthetic, socio-emotional as well as cognitive fit between the user and the properties of the application (cf. e.g. Jordan 1996; Norman 1998).

References

Aittola, T. 1992. Uuden opiskelijatyypin synty. Opiskelijoiden elämänvaiheet ja tieteenalaspesifien habitusten muovautuminen 1980-luvun yliopistossa. Jyväskylä studies in education, psychology and social research 91. Jyväskylä: Jyväskylän yliopisto.

Alderfer, C.P. 1972. Existence, relatedness, and growth. Free Press: New York.

Anon. 1999. Euroopan unionin viidennen puiteohjelman sisältö ja tavoitteet. http://www.tekes.fi/eu/ist/index.html
Avison, D.E., A.T. Wood-Harper, R.T. Vidgen & J.R.G. Wood. 1998. A further exploration into information systems development: the evolution of Multiview2. Information, Technology and People 11 (2), 124-139.
Banaka, W.H. 1971. Training in depth interviewing. Harper & Row: New York.
Bannon, L. 1991. From human factors to human actors: the role of psychology and human-computer interaction studies in systems design. In J. Greenbaum & M. Kyng (Eds.) Design at work: cooperative design of computer systems. Lawrence Erlbaum Assoc.: Hillsdale, N.J.
Beath, C.M. & Orlikowski, W. 1994. The contradictory structure of systems development methodologies: deconstructing the IS-user relationship in Information Engineering. Information Systems Research 5 (4), 350-377.
Bjerknes, G. & Bratteteig, T. 1995. User participation and democracy: a discussion of Scandinavian research on system development. Scandinavian Journal of Information Systems 7 (1), 73-98.
Bostrom, R.P. & Heinen, J.S. 1977. MIS Problems and failures: A socio-technical perspective. Part I: the causes. MIS Quarterly 1 (3), pp. 17-32.
Bowden, J.A., Dall'Alba, G., Laurillard, D., Martin, E., Marton, F., Masters, G., Ramsden, P., Stephanou, A. & Walsh, E. 1992. Displacement, velocity and frames of reference: phenomenographic studies of students' understanding and some implications for teaching. American Journal of Physics 60, 262-9.
Brosnan, M. & Davidson, M. 1994. Computerphobia: is it a particularly female phenomenon? The Psychologist 7 (2), 73-78.
Brown, J.S. & Duguid, P. 1991. Organizational Learning and Communities of practice: Toward a unified view of working, learning and innovation. Organizational Science 2 (1), pp. 40-56.
Bødker, S. & Greenbaum, J. 1993. Design of Information Systems: Things versus People. Teoksessa E. Green, J. Owen & D. Pain (eds.) Gendered by design? Information Technology and office systems. Taylor & Francis: London.
Dagwell, R. & Weber, R. 1983. System Designers' User Models: A comparative study and methodological critique. Communications of the ACM, 26 (11), pp. 987-997.
Denzin, N.K. 1978. The Research Act. A theoretical introduction to sociological methods. McGraw-Hill: New York.
Fielding, N. 1993. Qualitative interviewing. In Gilbert, N. (ed.) Researching Social Life. SAGE Publications: London.
Francis, H. 1993. Advancing phenomenography: questions of method. Nordisk Pedagogik 2, 68-75.
Friedman, A.L. & Cornford, D.S. 1989. Computer systems development. History, organization and implementation. John Wiley & Sons: Chichester.
Gall, M., Borg, W.R. & Gall, J.P. 1996. Educational Research. White Plains, NY: Longman.
Gill, K.S. 1996 (ed.). Human machine symbiosis. The foundations of human-centred systems design. Springer-Verlag: London, v - x.
Greenbaum, J. & Kyng, M. 1991. Design at work: cooperative design of computer systems. Lawrence Erlbaum Associates: Hillsdale, N.J.
Habermas, J. 1976. Legitimation crisis. Heinemann: London.
Hedberg, B. & Mumford, E. 1975. The design of computer systems: Man's vision of man as an integral part of the system design process. In Mumford, E. and Sackman, H. (eds.) Human Choice and Computers. North Holland: Amsterdam, 31-59.

Heiskanen, A. & Newman, M. 1997. Bridging the gap between information systems research and practice: The reflective practitioner as a researcher. In Kumar, K. and DeGross, G. (eds.) Proceedings of the 18th ICIS conference, ACM, New York. 121-131.
Hirsjärvi, S. (ed.) 1982. Kasvatustieteen käsitteistö. Otava: Keuruu.
Hirsjärvi, S. 1984. Kasvatusfilosofia ja ihmiskäsitys. Jyväskylän yliopiston kasvatustieteen laitoksen julkaisuja B 5. Jyväskylän yliopisto: Jyväskylä.
Iivari, J. 1997. User information satisfaction: a critical review. Encyclopedia of Library and Information Science, , 341-364.
Jordan, P.W. 1996. Displeasure and how to avoid it. In S. Robertson (Ed.) Contemporary Ergonomics 1996. Proceedings of the Annual Conference of the Ergonomic Society, 56-61.
Järvinen, P. & Järvinen, A. 1996. Tutkimustyön metodeista. Opinpaja Oy: Tampere.
Järvinen, P. 1991. Oman työn analyysi ja kehittäminen. Suomen atk-kustannus: Espoo.
Kling, R. 1996 (ed.). Computerization and controversy: value conflicts and social choices. 2nd ed., Academic Press: San Diego, CA., 32-37.
Kumar, K. & Bjørn-Andersen, N. 1990. A cross-cultural comparison of IS designer values. Communications of the ACM, 33 (5), 528-538.
Kumar, K. & Welke, J. 1984. Implementation failure and system developer values: assumptions, truisms and empirical evidence. Proceedings of the fifth international conference on information systems, Tucson, Ariz. 1984, 1-12.
Lave, J. & Wenger, E. 1991. Situated learning: Legitimate peripheral participation. Cambridge University Press: Cambridge.
Maslow, A.H. 1970. Motivation and personality (2nd ed.). Harper & Row: New York.
McGregor, D. The Human side of Enterprise. McGraw-Hill: New York.
Marton, F. 1981. Phenomenography - describing conceptions of the world around us. Instructional Science 10, 177-200.
Mezirow, J. 1981. A critical theory of adult learning and education. Adult Education 32 (1), 3-24.
Mezirow, J. 1995. Uudistava oppiminen. Kriittinen reflektio aikuiskoulutuksessa (suom. Leevi Lehto). Helsingin yliopisto. Lahden tutkimus- ja koulutuskeskus.
Nash, P. 1968. Models of Man. John Wiley & Sons: New York.
Norman, D.A. 1998. The invisible computer. The MIT Press: Cambridge, MA.
Nurminen, M. 1986. Kolme näkökulmaa tietotekniikkaan. WSOY: Juva.
Orlikowski, W.J. & Gash, D.C. 1994. Technological frames: Making sense of information technology in organizations. ACM Transactions on Information Systems 12 (2), 174-207.
Pain, D., Owen, J., Franklin, I. & Green, E. 1993. Human-Centred systems design: A review of trends within the broader systems development context. In E. Green, J. Owen & D. Pain (Eds.) Gendered by Design? Information Technology and Office Systems. Taylor & Francis: London.
Patrikainen, R. 1997. Ihmiskäsitys, tiedonkäsitys ja oppimiskäsitys luokanopettajan pedagogisessa ajattelussa. Joensuun yliopiston kasvatustieteellisiä julkaisuja 36. Joensuun yliopistopaino: Joensuu.
Resnick, L. (Ed.) 1989. Knowing, learning and instruction. Essays in honour of Robert Glaser. Erlbaum: Hillsdale N.J.
Robillard, P.N. 1999. The role of knowledge in software development. Communications of the ACM 42 (1), 87-92.
Schön, D.A. 1983. The reflective practitioner. How professionals think in action. Temple Smith: London.

Schön, D.A. 1987. Educating the reflective practitioner. Jossey-Bass: San Francisco, CA.
Suchman, L. 1987. Plans and situated actions: The problem of human-machine communication. Cambridge University Press: Cambridge, U.K.
Strauss, A. & Corbin, J. 1990. Basics of Qualitative Research - grounded theory procedures and techniques. Sage Publications: Newbury Park. CA.
Svensson, L. 1979. The context-dependent meaning of learning. Paper presented at the 3rd International congress of the European Association for Research and Development in Higher Education. Klagenfurt University, Austria. University of Göteborg. Reports from the institute of Education 82.
Tourunen, E. 1992. Educating reflective system designers by using the experiential learning model. Paper presented in IFIP W.G. Professional development of IT professionals conference, Singapore, 13.-17.7.1992.
Tynjälä, P. 1998. Kirjoittaminen ja asiantuntijatiedon rakentaminen yliopistossa. Teoksessa: L. Laurinen (toim.) Koti kasvattajana, elämä opettajana. Atena: Juva, 127-145.
Uljens, M. 1991. Phenomenography - a qualitative approach in educational research. Teoksessa L. Syrjälä & J. Merenheimo (toim.) Kasvatustutkimuksen laadullisia lähestymistapoja. Oulun yliopiston kasvatustieteiden tiedekunnan opetusmonisteita ja selosteita 39/1991, 80-107.
Uljens, M. 1993. Phenomenological features of phenomenography. University of Göteborg. Reports from the department of education 3.
Vosnidiaou, S. 1994. Capturing and modeling the process of conceptual change. Learning and Instruction 4 (1), 45-69
Walsh, E. 1994. Phenomenographic analysis of interview transcripts. In J.A. Bowden & E. Walsh (Eds.) Phenomenographic Research: Variations in Method. The Warburton Symposium. The Royal Melbourne Institute of Technology: Melbourne, 17-30.
Winograd, T. 1995. From programming environments to environments for designing. Communications of ACM 38 (6), 65-74.
von Wright, G.H. 1984. Tarpeesta. Ajatus 41, 25-38.
von Wright, J. 1979. Ihmisen tiedonkäsittelykyvyn rajoituksia. Academia Scientarium Fennica, 163-171.
Wood, L.E. 1997. Semi-structured interviewing for user-centered design. Interactions IV.2, 48-61.
Yin, R. K. 1989. Case study research: design and methods. Sage Publications: Beverly Hills, CA.
Ylijoki, O-H. 1998. Akateemiset heimokulttuurit ja noviisien sosialisaatio. Vastapaino: Tampere.