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## Usability professionals—current practices and future development

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### Abstract

The usability concept has now received such a wide recognition in information technology (IT) development that working with usability can be regarded as a profession in its own right. In recent research projects, we have surveyed and studied usability work on an individual level in a number of Swedish development organisations, including success factors and obstacles. What we have seen relates to the individual usability professional and her background and experiences, the organisation in which she operates, the development process, communication and communication means, and finally the attitudes and basic values held by the people involved.

In this paper, we compile and reflect on selected findings from different studies on usability work in practical systems<sup>1</sup> development in a number of Swedish organisations. We discuss our findings from a practical point of view and relate them to the research of others within the international HCI community. Finally, we discuss some issues we consider important for the future development of the practice of usability that we believe is of interest to the international community of usability professionals.

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<sup>1</sup> In this paper, we use the term ‘system’ or ‘IT system’ to denote the kind of products and/or applications developed in the organisations that we have studied. We consider ‘software’ too limited a concept, being only a part of the IT system. Our use of ‘system’ does not include humans or other technology, although they may be seen as part of an overall system.

## 1. Introduction

Usability is one of the main concepts that have emerged from the human–computer interaction (HCI) field. The concept, as defined by Schackel (1984) has subsequently been addressed by, among others, ISO (ISO/IS 9241–11:1998). Although there has been much debate about the meaning and application of the concept, many IT development organisations now recognize the importance of usability. Usability has become a component that is visible in organisational structure, in terms of usability task forces or teams, usability labs, etc. Usability also appears in the system lifecycle in all its phases. ISO/TR, 18529:1998 and ISO/IS 13407:1999 provide general guidelines for how and when to address usability issues in the systems development lifecycle, and there are numerous methods and development approaches that address usability (Schaffer, 2004; Faulkner, 2000; Constantine and Lockwood, 1999; Cooper, 1999; Mayhew, 1999; Beyer and Holtzblatt, 1998; Nielsen, 1993). Universities have defined specialised HCI profiles in education programs and organisations have started to employ HCI/usability specialists. Practitioners within the field have formed virtual communities and associations, for instance, the usability professional association (UPA) ([www.upassoc.org](http://www.upassoc.org)) not only providing support for usability specialists but also attempting to define the profession, currently discussing an accreditation scheme for usability professionals<sup>2</sup>. Working on usability has become a profession in its own right.

## 2. Background, scope and context of our research

In 1991, a workshop at the HCI'91 conference (Diaper and Addison, 1992) identified three main categories of problems within the HCI field. The categories were problems concerned with the basic nature of HCI, the application of HCI in systems development, and the education and marketing of HCI. Our research concerns the second category—how to apply HCI knowledge and expertise in systems development, so as to improve the usability of the systems and products being created.

The last decade has seen much research and important progress in all three-problem categories. There is, for instance, considerable discussion about the basic nature of what HCI is and should be. For instance, Long and Dowell (1989) suggest a definition of the area and Diaper suggests a general theory for the area (Diaper, 2004, in this issue). Moreover, HCI has met some success in marketing itself in that HCI issues have made it into the boardrooms of companies (Lindegaard, 2002; Donahue, 2001) and into

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<sup>2</sup> In this paper, we use the term 'usability professional' as a generic term for all the job titles used to denote somebody with the skills, knowledge and expertise to work with usability issues, for instance, interaction designer, usability specialist, HCI practitioner, HF expert, UCD professional, etc. Our main reason for doing this is that there is a large, international, community within the area that denote themselves 'usability professionals' (see the Usability Professionals Association, [www.upassoc.org](http://www.upassoc.org)). Another reason is that we really think that working with usability has become a profession in its own right. Moreover, 'usability' seems to have more connotation in industry as a job title whereas HCI is more academic.

international standardisation (ISO 9241-11:1999, ISO/IS 13407:1998; ISO 18529/TR:1998).

There is considerable debate about the ‘best’ approach to placing usability on the agenda, reflected in, for instance, different usability maturity models (see, for instance, Mayhew, 1999, and ISO/TR, 18529:1998). There are top–down approaches, bottom–up approaches, as well as integration on various organisational levels, for instance, project, process, management, including senior management, and legislation.

The focus of this paper is to discuss the practical concerns of the usability professional involved in designing and creating systems or products—a ‘shop floor’ perspective on usability. We do not wish to argue with or play down the importance of management initiative and support, legislative measures, process integration, etc. Usability<sup>3</sup> is a multi-faceted aspect of a system in use and systems are created by means of a systems development process of which usability issues must be an integral part. We believe that integration on all organisational levels is equally important. Management, and legislative bodies can create leverage for usability, but they rarely make the design decisions that ultimately lead to a usable system or product. Management initiatives often stop with appointing an individual or a team to take ownership of the issue. The mandate rarely extends to changing the way other people in the organisation work (Siegel and Dray, 2003). Prescriptive processes cannot guarantee that usability receives attention and is prioritised in the individual project—usability is, unfortunately, very often abandoned. One reason, perhaps, being that systems development in real-life is often characterised by a “... prolonged period of confusion at the start followed by a frantic scramble to finish on time at the end” (McCoy, 2002, p. 288) instead of the orderly progress towards a finished system or product prescribed in typical development processes. Thus, processes may have less to do with the actual outcome of the development project than what we all like to believe. Nor do legislative measures guarantee success. The Swedish work environment act (Swedish Work Environment Authority, 2001) states that

Technology, work organization and job content shall be designed in such a way that the employee is not subjected to physical or mental strains which can lead to ill-health or accidents.

Despite the legislation, which has been in place for at least a decade, there is ample evidence that computerisation in the workplace often increases a number of risk factors for repetitive strain injuries (RSI) as well as stress-related disorders of various kinds (see for instance, Åborg, 2002). Such negative effects are related to work organisation, job design and deskilling and other organisational factors in the work place, but the effects of the technology as such cannot be neglected (Boivie et al., 2003).

The design decisions that determine the usability of the system are, to a large extent, made in the systems development projects. Therefore, usability expertise and knowledge is crucial in the projects. Integration on this level is about people communicating,

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<sup>3</sup> In our research, and in this paper, we use the ISO/IS 9241-11:1998 definition of usability: “extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use.”

interacting and coordinating their activities—working together to create something. Integration for the usability professional on this level is about getting into the team, getting action space (that is, establishing a role and a position within the team and creating the conditions that are required for performing the desired/necessary activities), and creating leverage for usability within the project (that is, obtaining attention and support as well the required resources for usability work). We believe that looking at the ‘shop floor’ perspective of usability work is an important and complementary contribution to the ‘bigger picture’. Usability issues need to be addressed on all levels.

In our research, we have therefore focused on studying what usability professionals do and how they perform in real projects, including the quality and results of their work, and how these results are received and used. Over the years we have been involved in a large number of development projects in a number of Swedish development organisations, particularly in bespoke systems development—in-house or contract. Our primary aim has been to introduce usability and user-centred design into the organisations and the projects. When we started this type of research, over fifteen years ago, usability expertise was rare and usability activities were primarily limited to evaluations and tests—if deployed at all. Most usability experts in industry were autodidacts (that is, a self-taught person). With increasing attention and recognition of the importance of usability came an increasing understanding of the need for knowledge and expertise and the need for integrating usability issues and knowledge into the development process. In the mid-nineties, we started our work with defining a role—the usability designer (UD)—as one way of introducing usability issues and user-centred systems design (UCSD) in systems development in practice (Göransson and Sandbäck, 1999). The role has been introduced and evaluated in two Swedish development organisations (Boivie, Gulliksen and Göransson, in this issue). The UD role was part of a larger research effort covering key principles for UCSD as well as a usability design process (Gulliksen et al., 2003; Göransson, Gulliksen and Boivie, 2003). We have also conducted a survey on usability professionals in other Swedish organisations (Gulliksen, Boivie, Persson, Hektor and Herulf, 2004).

In this paper, we compile and reflect on selected findings from our research. We discuss our findings from a usability profession point of view and relate them to the research of others within the international HCI community. Finally, we discuss some issues we consider important for the future development of the usability profession.

The context in which we have conducted our research shapes the way we see the usability profession, our findings and our discussion. Contextual factors, such as, organisational culture, employer-employee relations, the view of users, and usability maturity and IT maturity in organisations and in society at large, vary between different contexts and different cultures. At the end of this paper, we discuss some of these factors and the way they may influence our findings and discussion. We nevertheless believe that there are similarities as well as dissimilarities and that the international usability professional community may learn from one another. Moreover, the Scandinavian perspective is based on a cooperative design approach (Greenbaum and Kyng, 1991), which has had impact on HCI research, but perhaps not so much on systems development in practice.

### 3. Related studies on usability professionals

Looking back at the concerns voiced at the HCI' 91 workshop, one would have believed, or hoped, that the situation should have improved significantly over the last decade. A recent study on how usability professionals (HCI practitioners) and software engineers interact shows, however, that relations are still problematic (Jerome and Kazman, 2005)

[T]he application and adoption of methods and processes from SE and HCI research has not yet trickled down into industry. Not only has the research not reached industry, but the collaboration between software engineers and HCI practitioners has not yet grown as it has in the respective research areas. (...) And the two groups of practitioners even have differing perceptions regarding how often they communicate.

The lack of impact on products, projects and organisations and its causes are a great concern to many usability practitioners and researchers. Meads (2002) discussed the matter, laying the blame at the door of management—they do not understand the importance of usability and its money-saving potential. Siegel and Dray (2003) discuss the lack of impact, suggesting various tactics for placing usability on the agenda. Clegg et al. (1997) report that usability issues were successfully addressed in 60–70% of the projects in their study, but that the view on usability was largely mechanistic, reducing it to a matter of technology, e.g. graphic versus character-based user interfaces.

There are several surveys of usability professionals and their work, primarily in the US (at the annual conference for the usability professionals association (UPA) and SIGCHI conferences (human factors in computing systems)). Rauch and Wilson (1995) conducted two surveys, among UPA members in 1993 and at CHI'94, showing that usability professionals had a low profile in the development process, and that usability was not considered a key quality factor. Vredenburg, Mao, Smith and Carey (2002) conducted a survey of user-centred design practice at the CHI'2000 conference and among UPA members. Contrary to the Jerome and Kazman study quoted above, their results indicated that things had improved since the mid 1990's. User-centred design (UCD) methods were becoming more widely used and gaining impact in industry. They were considered to have improved product usability but to have uncertain impact on product development time. One interesting finding in their study was the narrow application of UCD methods to user interface related issues only.

Gunther, Janis and Butler (2001) conducted a survey of 100 usability practitioners investigating how they address day-to-day challenges in their work. Among other things, Gunther et al. report about obstacles to usability, including, resistance to usability, usability unawareness, and time constraints. In another survey, Rosenbaum et al. (2000) identified obstacles to strategic usability including, resource constraints, resistance to UCD/usability, lack of understanding of the usability concept, and lack of trained usability experts.

These studies point to problems with placing usability on the agenda, on organisational levels as well as in the individual project. Even though the above studies are primarily American and/or British, usability professionals in Sweden seem to face fairly much the

same problems. In a study of the Swedish software industry, [Katzeff and Svärd \(1996\)](#) report that usability maturity was fairly low, and that usability issues were only sporadically and non-systematically addressed in the development projects. Our own, recent survey of usability professionals in Sweden, ([Gulliksen et al., 2004](#)) (briefly summarised below) shows that there are still plenty of obstacles to usability and that it still has fairly low priority in the software industry.

There are several initiatives for addressing the problems, not least from the international standardization organization, ISO. ISO has defined a number of processes, principles and models for integrating usability issues in systems development, ([ISO/IS 9241-10:1996](#), [ISO 9241-11:1998](#) [ISO/IS 13407:1999](#), [ISO/TR, 18529:1998](#), etc). In addition to the ISO efforts, there is a multitude of processes, methods and models that address usability in systems development, as well as ambitious top-down approaches for changing the attitudes and work practices of whole organisations (see for instance, [Mayhew, 1999](#), and [Schaffer, 2004](#)). The focus of this paper is, however, the usability professional—the practitioners working with usability in projects, what they do and their day-to-day challenges in coping with all the obstacles and possibilities they face in their work.

#### **4. To design or not to design**

One particular problem in connection to the lack of impact is to what extent usability professionals actually contribute directly to the product or system being constructed. [Siegel and Dray \(2003\)](#), for instance, emphasise the importance of usability professionals contributing to the design, and joining other disciplines in ‘the difficult work of weighing trade-offs to create solutions’ (p 27). [Cooper \(1999\)](#) emphasises the importance of design, placing the interaction designer in the ‘driver’s seat’ in the development process, arguing that systems developers do not have the skills required for producing good interaction design.

In a previous paper ([Göransson, Gulliksen and Boivie, 2003](#)), we have argued that the usability engineering approach (e.g. [Nielsen, 1993](#); [Mayhew, 1999](#); [Rosson and Carroll, 2002](#)) focuses on analysis and evaluation as the primary means for integrating usability issues. We believe, however, that you can only design your way to usability. Therefore, usability professionals need to get involved in the design process to the extent that they actively participate in and contribute to the generation of interaction design solutions.

The products or systems produced in systems development primarily consist of software, i.e. program code. Therefore, the artefacts produced by the usability professional must be usable in the construction, i.e. code production process. We do not argue that usability professionals should become programmers. However, they need to cooperate, communicate and interact with systems developers and programmers, who are, or should be, on the receiving end of the results produced by the usability professional. Therefore, one important issue in the future is to investigate how interaction design can better be integrated in the system development process. Moreover, the results produced in the interaction design process must be represented and communicated in such a way that they are useful and usable to the systems developer, so that the final system or product adheres

to the ideas, concepts and principles specified in the interaction design. The frustration sometimes felt by developers is expressed in the quote below from our interview study.

at the end of the day it is the code that we have produced that matters, therefore any activities that counteract this purpose should not have highest priority

Design is, however, rather elusive as a concept. There is a multitude of definitions. Jones (1981, pp 3–4) lists a number of different definitions, including

The performing of a very complicated act of faith

A creative activity-it involves bringing into being something new and useful that has not existed previously.

Such definitions are applicable on a variety of design areas—interaction design, as well as software design/engineering. Nevertheless—these two design areas differ in many ways. Sommerville (1992) describes software design as

an iterative process where informal ideas are transformed to a detailed definition of how the system can be implemented.

This description covers a number of different perspectives of the system, including the architecture, the data structure, and interface. Interaction design, on the other hand, is about designing the interaction between the human user within a particular social context and the computer technology, in terms of, for example, concepts, structures and navigation.

In addition to different design areas, Atwood et al. (2002) identified seven definitions or views of design in a large corpus of design literature, each of which is subscribed to by a particular design community. These definitions include participatory/cooperative design, user-centred design, cognitive engineering and design theorists. We base our work primarily on the definitions and concepts of cooperative design and user-centred design (see for instance Greenbaum and Kyng, 1991; Ehn, 1988; Gould et al., 1997; Norman, 1986; ISO/IS 13407:1999). (For more details about the principles underpinning our work, see Gulliksen et al., 2003). We see the design process as a collaborative process between users, designers and developers—where each participant brings his/her expertise, and each contribution is important for the outcome of the process. Such an approach requires cooperative design methods, for instance, design workshops with users and contextual prototyping. We also see the design process as a process for creating knowledge and common ground, i.e. the knowledge, beliefs and suppositions people share, or think they share (Clark, 1996). The design process is also a process of change. Cooperative design methods facilitate knowledge building and the process of change, creating a common ground in that they, ideally, allow all participants to contribute on equal terms and to influence the outcome. Cooperative design in real-life is rarely as democratic and truly collaborative as is made out in the literature. There are underlying power relations, attitudes and structures that privilege the position of the developers over that of the users (see, for instance, Symon, 1998; Beath and Orlikowski, 1994; Greenbaum, 1990). Cooperative design was, moreover, primarily developed in Scandinavia and relies on certain underlying cultural factors (Nyce and Löwgren, 1995). Nevertheless, imperfect as

cooperative design may be in reality, we still believe it to have qualities worth pursuing as compared to non-cooperative approaches.

There is an on-going discussion about the extent to which design processes and practices can be specified, described and thereby communicated and made explicit to others (see for instance [Fällman 2003](#), for a recent account). There is, however, not much evidence that design can be made independent of talent or all aspects involved in craft work ([Lewis, 1990](#) as cited by [Wallace and Anderson, 1993](#)). Wallace and Anderson describe the craft approach:

“... each design project is viewed as unique, solutions evolve under the guidance of a skilled human factors expert, to suit the circumstances. ... Supporters of this approach tend to believe that a structured methodology for the development of interfaces is impossible, as the aesthetics of interface design do not lend themselves to analytical techniques. ... what interface designers need is talent not methodology.” (p 260–261)

This means that, in addition to processes and methods, there is a need for skilled designers in the systems development process, i.e. designers that have the skills and background required for designing for usability.

To sum it up, we argue for the need for usability professionals to get deeply and actively involved in the interaction design of the system or product, in line with the ideas of the interaction designer ([Cooper, 1999](#); [Muller and Carey, 2002](#)). However, we place a stronger emphasis on user involvement and cooperative design. We do not argue for usability professionals being graphics designers or visual designers or similar roles, but they need to be able to do interaction design in terms of concepts, structures, and navigation. We believe that usability professionals can and should assume the responsibility for driving the interaction design process, including user involvement. To do this they need support from, for instance, project management, and their role in the project/process must be clearly defined. There may, of course, be conflicts with other people that have already claimed these tasks. However, our experience indicates that it is more often a matter of interaction design not being explicitly addressed at all in the project. The design simply emerges from other activities, such as; use case modelling, or coding ([Boivie et al., 2003](#)).

## **5. Usability professionals in Sweden—two recent studies**

In two recent studies of usability professionals in Sweden, we mapped out their background and experiences, their work practices, the methods and techniques they employ and some key factors for successful usability work. One study consisted of a questionnaire that was answered by 194 respondents working with usability in Sweden ([Gulliksen, Boivie, Persson, Hektor and Herulf, 2004](#)). In the other study, we interviewed a number of usability designers and people cooperating with them. The usability designer (UD) ([Göransson and Sandbäck, 1999](#)) is a role that we defined as one step towards a user-centred design approach, hoping that it would facilitate knowledge transfer and help in placing usability on the agenda in systems development and in maintaining a focus on



the users' needs throughout the development process. The role was implemented and evaluated in two Swedish systems development organisations (Boivie, Gulliksen and Göransson, in this issue).

The results of these two studies are reported elsewhere, but below we discuss some salient points. For reasons of readability, we refer to the two studies as 'the survey' (the survey among usability professionals) and 'the UD study' (the interview study with the people holding the UD role).

### *5.1. The individual—background and expertise*

#### *5.1.1. Educational background*

One interesting issue was the background of the respondents in the survey. The majority had a degree in computer science or engineering, had done HCI as part of the program, as on-the-job training, or were autodidacts. They had worked on average 15 years in total and approximately 7 years with usability-related issues. These figures may imply that the typical usability professional in Sweden is a former systems developer with an interest in usability issues, either from their educational background, or from their subsequent work as developers. Having a background as a systems developer may be an advantage as well as a disadvantage. Several of the respondents in the UD study discussed the importance of being able to communicate with developers 'on their own turf'. Systems development in general is technology-driven (Clegg et al., 1997), and in order to have an impact you need to speak the language of the developers. You need to be able to assess the technical solutions suggested by the developers in order to make trade-offs between what is feasible from a construction perspective and what usability requires. On the other hand, usability is a complex issue and must be understood as such. Introductory courses in HCI and methods descriptions in the literature on usability engineering and discount usability may not be enough for understanding the full complexity in usability. It may therefore, be perceived as 'cake-frosting', i.e. something that is painted on to the system by means of user interface with smart, appealing design.

Usability professional with a background in cognitive/behavioural science has superior knowledge in, for instance, the cognitive processes underlying the user-computer interaction and the social processes at play in a workplace. The question is how much that knowledge counts in a technically oriented development organisation where the technical focus and the tools and processes used combine to keep out human and organisational factors in systems development (Clegg et al., 1997).

#### *5.1.2. Domain knowledge*

Domain knowledge is often overlooked in the discussion on required skills and expertise within usability work. It is, however, very important for the overall success of the project in developing a usable (i.e. useful) product. Curtis et al. (1988) suggest that 'The thin spread of application domain knowledge' is one of the main problems in systems development. They also discuss the 'exceptional designer'; i.e. somebody in the development team with extensive application domain knowledge, inter-disciplinary skills and great authority within the project. Most of the respondents in our UD study agreed on the importance of domain knowledge, at least to the extent that they felt that domain

knowledge made things easier in the project. Some of the UD's had built up extensive domain knowledge, but it takes time, sometimes several years. With the domain knowledge comes authority within the project—the UD becomes the 'user expert', being the one who spends most time with the users. Curtis et al., report that the exceptional designer became "...a primary source of coordination among project members, and assumed, without formal recognition, many management responsibilities for ensuring technical progress". Coordination aspects in systems development are further discussed by Chesney and Gallagher (2003). They describe the role of one of the engineers (Paula) in a development project. Paula became the focus for communication and coordination within the project, prioritising and filtering requests from the users, controlling communication between the users and the developers and distributing tasks among the developers. The UD's in our study may not have had that kind of crucial position in their projects, but some of them talked about the pressure they feel to integrate different perspectives, and to provide answers and design solutions to all the questions that the systems developers have about the use of the system and the users.

### 5.1.3. Experience

When we defined the UD, we wanted to emphasise the importance of a 'multi-disciplinary' background, including both computer science and behavioural science. We also believe that having experience from the systems development industry, in particular, in user-centred design, is important.

The mean age of the respondents in the survey was 38.9 years. On average they had worked 15.1 years in total and 6.71 years with usability work. They had spent, on average, 5.3 years in their current employment. In the UD study, the average age was 32 years. They all had less than 10 years of experience in industry, averaging just about 5 years. Even though the software industry is young in itself, and high status and authority do not automatically come with age since new technology quickly makes experience and expertise obsolete, being young and inexperienced is probably a major drawback for the usability professional. Speaking on behalf of the users and arguing for usability in technically oriented organisations require authority and high status. Some of the UD's in our study mentioned having problems when coming straight from university to their first jobs. They felt that they carried little weight in the organisation, and that working with usability requires experience. One of the UD's also brought up the gender issue in connection to authority and status in the organisation:

Sometimes, I feel that—I'm young, I'm a woman, and all I do is stand there and bla, bla, bla and nobody listens to you. While NN, who is a bit older than me, and a man, and has experience, but no experience in usability, nevertheless, people listen a lot more to him than they do to me.

## 5.2. The role

### 5.2.1. Areas of responsibility and power

One purpose of the UD role was to clarify the responsibilities and activities of usability professionals in development projects. The UD's in our study were typically responsible

for planning and conducting certain usability-related activities in the project, but not for the usability of the system or product. That was the responsibility of the project manager, having responsibility on an overall level for the quality and functionality of the system/product. Most of the UDs seemed to accept this as inevitable. They felt that they could not assume full responsibility for the usability of the system/product since there are so many different aspects that have to be taken into account. Therefore, the responsibility for usability cannot be placed on the UD alone. In particular since they had no powers to veto solutions adverse to usability. Furthermore, the UDs had little if any formal power in the project. On an informal basis they were considered responsible for and made decisions about the interaction design and user interface design, within certain limits, self-imposed or external.

“If there were no particular consequences for the systems developers, I could do as I wanted... If [a particular design solution] was a lot more problematic, then I would need to raise the issue with the project management, and in the X project they always said, ‘stop’.” (from a UD)

### 5.2.2. *Establishing the role*

In spite of the definition of the UD role (Göransson and Sandbäck, 1999) and the descriptions of the role in the two organisations, the UDs said that they had to establish the role, its activities, responsibilities, etc., at the beginning of every project. In one of the organisations the UD role was often mixed up with the user interface (UI) designer role defined in the Rational Unified Process™ (RUP) (Rational Software Corporation, 2003). Thus, it seems that even though the role was defined, it was not yet a natural part of the development process and the UDs had to spend a considerable amount of time explaining and justifying their role in the project. There seemed to be a never-ending struggle to become accepted and valued within the organisations and projects. Nevertheless, the role seemed to fill a need in the systems development projects, in particular the needs of the systems developers to get answers to their questions about the use and the users.

### 5.2.3. *Support from project manager*

Both our studies point to the importance of the project manager in establishing a role and creating action space for the usability professional. In the survey, some of the main keys to successful usability work were skilful management and support for usability matters from the project manager, management and the users. These results are partly in line with, for instance (Gunther, Janis and Butler, 2001; Rauch and Wilson, 1995; Rosenbaum, Rohn, and Humburg, 2000). The vagueness of the UD role briefly discussed above, as regards for instance the areas of responsibility and expectations, is a management issue, also implying that the project manager is crucial for the UDs in our study. The project manager must be willing to stand up for usability, to set priorities so that usability is not abandoned and to support the usability professional when there are conflicts between usability and other concerns in the project, for instance, system architecture. Our impression from the UD study was that this support was important also for personal reasons. It made life easier for the UD to have support from the project manager whose role is to balance all conflicting interests in the project and make sure that

there is progress enough to meet deadlines. The project manager's attitudes regarding usability were therefore crucial. His/her attitudes were, for instance, important for the status of usability, whether it was considered a user interface issue alone, or a quality of the system/product as a whole. Reducing usability to a matter of user interface design only circumscribed the UD's possibilities to have real impact on the product and in the project. He/she was restricted to designing the user interface (or creating guidelines for designing the user interface) for services specified by others.

### 5.3. *The process*

#### 5.3.1. *Usability in the process*

One recurring finding in both our studies was that the development processes, used in the organisations, often did not in themselves contain any support for usability activities, or user-centred design. There seemed to be a general agreement on the necessity of integrating usability into the systems development process in the two studies.

In Sweden, the RUP is one of the most commonly used systems development processes. It is explicitly architecture-centred and does not guarantee usable end products, although efforts have been made over the last few years to add usability to the process (see for instance, Göransson, Lif, Gulliksen, 2003). Usability requires a user-centred development process (Gould et al., 1997; ISO/IS 13407:1999; Gulliksen et al., 2003). The UDs, in our study, discussed the importance of having a user-centred process focusing on the users' needs, and that usability is tightly integrated into the process. In one of the organisations, the UDs were responsible for integrating usability in their RUP development case. Nevertheless, the process still seemed to have a strong technical focus. For instance, the UD role was simply ignored in several projects, despite it being mandatory. Shifting a technically oriented process to a more user-centred approach requires more than adding a few usability activities. We started out with the idea that defining the UD role would be a short cut to shifting the focus of the systems development process. The UD would safeguard and promote the interests of the users and the focus on usability and users' needs. Judging from the data in the UD study, the role did not meet our expectations in this respect. There may be several reasons why. Above we discuss how background and experience may affect the impact the usability professional has in the projects and organisations. Obviously, problems with insufficient authority in the projects and organisation would spill over to the development process. If people do not listen to you, they will not bother to do as you say.

#### 5.3.2. *Time pressure*

Time was pointed out as a major problem in the UD study. When time gets tight, usability and user involvement are typically among the first items in the project plan to be abandoned (McCoy, 2002). The UDs emphasised the importance of being allowed ample time to do things properly, for instance, a proper user analysis and proper evaluations. Unfortunately, there is virtually never enough time in the development projects. Time pressure in systems development is high. Increasing requirements on rapid time-to-market have generated new systems development models, methods and tools promising shortened development times and shortened lead times. The software industry is under constant

pressure to deliver ever faster. The clients are also on a constant lookout for time-saving approaches, perhaps being reluctant to face the true costs of systems development. We believe that this constant move towards shorter development time may lead to poorly designed systems with insufficient or inadequate functionality (as well as next-to-impossible working conditions for the development team). We further believe that this is a problem in particular in bespoke systems development in a work context. IT use in a work context is often intense, e.g. 4–8 h a day. It is also non-discretionary, i.e. the users have little choice but to use what is installed on their computers and may even have to resort to workarounds to get their work done. In such situations, poor usability may be a direct or indirect risk factor for occupational health problems, for instance, repetitive strain injury or stress-related disorders (Boivie, 2003). IT systems in a work context must support not only the official rules and version of the work practices but also the particularities in each situation (Sachs, 1995; Harris and Henderson, 1999), which requires a deep understanding of the context of use. Building up that kind of understanding takes time—and it must be allowed to take time. “Data on customers work will always be complex because work practice is complex.” (Beyer and Holtzblatt, 1998, p. 416). Furthermore, new IT systems in the workplace inevitably lead to changes in the work practices and the organisation. Thus, the systems development process must be coordinated with complex processes of organisation development and job design. In the face of all this complexity, we argue that the systems development process is by necessity complex and time-consuming. It is rarely the quick and easy road to success often described in the model/method handbook. Introducing the UD role was an attempt to make these issues visible and create time for them in the development process. However, a single role is far from sufficient for addressing the full complexity of a systems development project—succeeding is always a matter of the collaborative efforts of the team, including the client and the users.

### 5.3.3. *Usability as a fuzzy concept*

Another problem, discussed by the respondents in our UD study, is that usability is perceived as a fuzzy concept, despite the ISO 9241-11 definition (ISO/IS 9241-11:1998). It is taken for granted—nobody would confess to deliberately building non-usable systems—and is therefore not included in project plans and budgets. Usability is, moreover, based on promises of uncertain future gains and advantages (McCoy, 2002). The software industry is unfortunately rather big on promises—and yet another set of promises may not be well received by managers and clients, regardless of the importance of the usability issue. Usability is, moreover, a truly difficult concept—it comprises a set of quality aspects that vary from situation to situation. Usability always depends on the users, their needs (goals) and the context—three variables that are inconsistent and unstable in themselves. The users’ preferences and needs vary between individuals and over time, their tasks are invariably complex and change with the situation. There are never any simple answers, such as, ‘use font XYZ and your system will be usable’. Failures of IT are rarely technical in origin—instead the major problems are concerned with organisational complexity, e.g. poor management, poor project management, failure to understand the needs of the users and the business, and failure to involve users properly (Clegg et al., 1997). In the face of such complexity, building usable systems may seem an insurmountable task and one that it is far easier to turn a blind eye to rather than

compromise deadlines and deliveries. In particular, if the future gains/advantages seem uncertain, and since usability often is just one out of many issues that calls for attention in the process. In the words of one of the UD:

You have to appreciate that we are one out of many stakeholders, and learn to work from that starting point. Usability is one out of many priority areas.

#### *5.4. The role of roles*

It was evident in the UD study that a formal role description only goes so far in defining the areas of responsibility and powers of the UD. It is up to the individual holder of the role to flesh it out with expertise, methods, techniques, and the kind of authority that comes with knowledge, experience and seniority. What the UD ends up doing and deciding in the project is partly defined by the role, partly by the professional abilities and expertise of the individual role holder, partly by the expectations and experiences of the other team members as well as by various constraints in the project.

A role can be seen as a set of responsibilities and behaviour, as described in, for instance, the RUP. A role is a way of making processes independent of the people participating in them (Bødker, 1998). The role describes what the holder of it will do in the process, what responsibilities she/he has, what skills and expertise are required, what the other project members can expect from him/her, etc. The description is independent of the individual role holder. The underlying assumption is that the role holder can be replaced at any point in time, during the process, as long as the person taking over holds the same set of qualifications and skills, conducts the same activities and assumes the same areas of responsibility.

Roles often come with processes and methods, and all three concepts are basically ways of disconnecting knowledge and experience from the individual 'knower'. Making the process independent of its participants would, however, require that not only formal qualifications and skills are separable from the individual but also knowledge, experience and 'informal skills', such as, communication skills.

"The result of any process will never be better than the people who participate in the process ... the skills and abilities of the designer determine the quality of the final product." (Löwgren and Stolterman, 1999, p. 14)

Neither knowledge, nor experience and communication skills can be fully separated from the individual holding them. This implies that processes can never be independent of the people involved in them, nor can roles be independent of the people holding them.

"methods are not followed but made working in the specific contexts and situations ... designers make use of their experience in adapting rules, procedures, and methods to actual situations" (Bødker, 1998, p 109).

Role descriptions can only serve as indications of what is expected from somebody involved in a particular process. It is then up to the individual role holder to fill the role with contents, to flesh out the bones.

Clemmensen (2002) discusses roles in terms of role schemas: “Role schemas refer to knowledge of norms and behaviour in specific role positions in society, e.g. the HCI specialist role or the user role or the role of interaction designer.” (p. 861). Role schemas are sets of expectations (‘cognitive structural concepts’, p. 861) that we have and apply to people in specific role positions. Role schemas are not so much based on abstract or ‘official’ role descriptions as on our own knowledge and experiences (real or imagined) of people in particular positions or groups.

Thus, roles can be defined either by external, prescriptive descriptions or by shared sets of beliefs about a particular role, built on people’s knowledge, experiences and (possibly) unfounded preconceptions. The UD role mixes both accounts. The definition outlines the qualifications and the areas of responsibility of the UD, i.e. an external, prescriptive description. On the other hand, it was evident in our interview data that the UD was not a ready-made, set role that was simply assigned to an individual on a project-to-project basis. The role is based on other people’s conception of the skills, behaviour, and expertise of the UD, i.e. their role schemas. The role description is an attempt to help people build role schemas about the UD in order to pave the way for usability professionals and a usability focus in systems development teams and organisations.

### 5.5. *Coordination and communication*

The UD study indicated that one function of the UD role was to provide answers to the questions that the systems developers have about the use and the users. In their study of a systems development project, Chesney and Gallagher (2004) describe the importance of queries. Queries, the authors claim, should not be seen as ad-hoc, background noise, to be avoided. They make up a communication genre in that they have a socially recognised purpose (resolving technical issues) and they support coordination mechanisms of various kinds. Thus, they are an integral and necessary part of systems development, and should be accommodated within the formal systems development process. Answering questions in the way some of the UDs described that they were doing, is therefore essential to the development project, making the role critical for success. We believe this is an important function for the UD. It does more than just provide answers and resolve problematic issues. According to Chesney and Gallagher, it also helps in maintaining smooth collaboration within the project, and in coordinating the information flow. It seemed moreover, that the UD’s providing answers made the systems developers happy and helped in promoting the UD as a ‘useful’ team member. Knowing whom to turn to with their questions and concerns saves time and effort for the systems developers as well as the client.

Communication skills are essential for the UD, given that one of the main tasks is to act as a communication channel between the users and the systems developers. This was pointed out several times in the UD study. In order to have an impact in the project the UD must be able to argue strongly and effectively for the importance of usability.

### 5.6. *Transferability of our findings*

The context in which we have defined, implemented and evaluated the UD role is primarily bespoke systems development in a work context, conducted by an in-house

development organisation or a contractor. This, of course has shaped the role in certain ways in the same way as it shapes the systems development process as such. Grudin (1991a) distinguishes between product development, in-house development and contract development. These three development contexts differ in, among other things, user focus and user involvement. We believe, however, that there are differences in the use of the systems that have or ought to have an impact on the systems development process, more so than the relation between the developing organisation and the users or user organisations. The use of IT systems in the workplace is mainly non-discretionary, i.e. the user has little control over what systems to use, when and why. Moreover, IT systems in the work-place are often heavily used, for long hours, every day. The users depend on the systems to get their work done. These matters put the user at a disadvantage as compared to using a web shop or some shrink-wrap software product at home. They make the users particularly susceptible to frustration owing to poor design and inadequate functionality. It is often argued that good design, good usability, including usefulness, are essential in product and web development, but, based on the above discussion, we would like to argue that these aspects are equally important in bespoke systems development in a work context.

These aspects make active user involvement crucial in bespoke systems development. Building up sufficient knowledge and understanding of the context of use requires user involvement. Few development teams have that understanding, and writing requirements documents or creating abstract models are not enough. Only the users themselves can provide that kind of understanding. There are several studies describing obstacles to user involvement (see, for instance, Wilson et al., 1996; 1997; Grudin, 1991b; Poltrock and Grudin, 1994). These obstacles include finding the right users, gaining access to them, maintaining their involvement throughout the project and facilitating their feedback. The UDs in our study describe similar problems and obstacles—which may imply that not much has happened to improve the situation in the last 10 years or so. On the contrary, there seems to be a trend away from user-centred design and user involvement on account of users not knowing what they want, and not being designers (see, for instance, Constantine and Lockwood, 1999; Cooper, 1999). We strongly disagree with the notion that users should participate in the development process as informants or subjects of observation only. Instead, we defined the UD role to promote user involvement and to facilitate a cooperative design process where the users participate as co-designers.

The idea of involving users as co-designers is an important principle underpinning the Scandinavian approach to participatory or cooperative design (see for instance, Greenbaum and Kyng, 1991). The principle has its origin in the movement of worker emancipation and workplace democracy that had great impact on relations between employers and employees in Scandinavia in the 1970's and 1980's, and still has. User-centred systems design as expressed in, for instance, the 12 key principles defined by Gulliksen et al. (2003) or in ISO/IS 13407:1999, plays down the role of the political legacy of user involvement, basing its arguments on functional empowerment of the users rather than democratic empowerment of workers. With democratic empowerment workers are given a decision-making role in the operational planning, and in organisational and technological change (Spinuzzi, 2002). Functional empowerment is about holding the



employees accountable for the results of tasks, and in return give them a degree of power to make decisions about how to execute their tasks (*ibid.*). It has little to do with real worker emancipation. Yet, the legacy is there, with the political standpoints underpinning it and cannot be disregarded. User involvement and user empowerment form the basis of our UD role, and they are in their turn, products of the cultural and historical features characterising the Scandinavian employer–employee relations. Nyce and Löwgren (1995) discuss the importance of cultural aspects in relation to cooperative design. The authors argue that the idea of involving users as co-designers on equal terms with the developers is based on ‘a particular set of beliefs about language and action’ (p. 43). They make a comparison between Scandinavia and the US, and argue that the views of language as action differ, and therefore meeting users, talking to them, etc, would have different connotations in these two different cultural contexts. There will, of course, be other types of cultural differences, perhaps even more pronounced, between Scandinavia and other parts of the world where software is now developed.

The concerns discussed above add dimensions to the practice of roles, such as the UD, or usability work in general, that have to be addressed and resolved when transferring concepts between development contexts and cultures. They moreover have to be taken into account in the very contexts in which we have defined and implemented user-centred design and the UD role. User involvement, for instance, and the degree of power granted the user representatives are typically limited in ‘real’ systems development projects—outside the context of cooperative design projects in research (for instance the UTOPIA project described in Ehn, 1988). The notion of participation ‘on equal terms’ is never unproblematic.

## **6. Summary**

To sum up the above discussions of our two studies—they point to the importance of the individual usability professional—i.e. his/her skills, expertise and experience, as well as personal qualities. We firmly believe that usability requires a specialist with experience and expertise in HCI in general and user-centred design, as well as basic mastery of the technology, processes, methods and tools used in systems development and finally knowledge of the application domain. Moreover, usability professionals need communication skills, authority, the diplomatic skills required to argue for usability as well as a great deal of stamina and backbone.

The obstacles and problems that the usability professional meets in his/her line of work are related to and compounded by the technical nature and complexity of systems development in combination with time pressure. Time pressure and complexity are, however, general problems in systems development.

Nevertheless, the UD role in our study seemed to fill a need in systems development, primarily by providing answers to the multitude of questions about the users and their needs. Finally, support from project management, upper management and users are crucial, as well as support for usability and user-centred design in the systems development process.

## **7. The Role, the process and the profession**

The above discussion primarily concerns the UD role. In this section, we move beyond the role and discuss the relations between the role, the process and the profession.

We believe that the strength of a process lies in its ‘visual’ and communicative aspects. A process can be visually represented as an artefact that everyone can relate to. It can be communicated and used, not as a detailed prescription, but as a framework that illustrates the ‘big picture’. A process can also serve as an introduction for beginners and less experienced project members. However, when it comes to ‘the craft’, i.e. the actual activities making up the process, we believe that mentorship and apprenticeship are better tools for transferring knowledge and know-how than detailed process manuals and instructions.

A weakness of processes is that they tend to describe the ‘official’ view of how systems development should be conducted within the organisation<sup>4</sup>, rather than the real work practices of the developers. *Sachs (1995)* describes the difference between the official (explicit) view of work and the tacit, activity-oriented view, the latter representing

“...the range of activities, communication practices, relationships, and coordination it takes to accomplish business functions is complex and continually mediated by workers and managers alike. (pp 36 and 38)

This difference is of course applicable in a systems development organisation as well. Hence, typical systems development processes do not fully describe what the developers do on a day-to-day basis. Processes also undergo constant changes when applied in practical development projects. Therefore, the official description of the process rarely matches its practical use—the official version in the project manager’s bookshelf does not reflect how projects develop systems in practice. We believe that any official version of a process must be continuously updated to reflect actual development practices, or it will soon become obsolete, and likely to be ignored and abandoned.

Roles are typically parts of processes and we believe that one of the primary functions of roles is to support communication. However, over the years, we have come to see the increasing importance of the individuals behind the different roles in the processes. The profession is about the individual as opposed to the abstract notion of a role, placing the focus on the individual’s contribution and potential in a development project. We therefore believe it more important to have a well-functioning team of dedicated individuals with an appropriate mix of skills and expertise, than having a particular role or set of roles.

The next issue is how the profession relates to the process. We believe that, contrary to roles that are typically part of the process and adapted to the requirements and notation of it, the profession is not subordinate to the process. However, processes and roles are important in that they provide (more or less) action space for the profession and in that

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<sup>4</sup> This is not the same as tailored processes versus non-tailored—also tailored processes tend to represent an official view describing systems development as a sequence of well-defined steps producing deliverables, rather than the real, informal, work practices of the developers.

they make that space visible. The profession, on the other hand, is important for initiating the changes required in the processes and roles, and for making use of the action space created by the role/process in the best possible way.

## 8. Major issues and concerns

Below, we discuss a number of issues and concerns that we believe are important for the future development of the usability profession in Sweden. The list is based on our findings from the two studies described above together with our previous research in systems development and that of others, as well as extensive experiences of practical systems development. As discussed above, our findings and discussion are shaped by the context in which we conduct our research. However, based on discussions in international contexts, we do believe that many of the items below are applicable in or transferable to other contexts.<sup>5</sup> (Please note that there is no order of importance or significance attached to the sorting order of the list).

### 8.1. *Gaining a seat at the decision making table*

In a provocative interview at CHI 1999, Donald Norman argued that all usability professionals should get an MBA<sup>6</sup>, in order to reach a level in the organisation where people start paying attention to what you do and say. We agree with Norman in his claim that usability professionals need to get a seat at the decision making table, although the ‘MBAs only’ approach to the usability profession is, we believe, not a particularly likely scenario. Nor is it necessarily applicable in Sweden. Authority, power and status within an organisation depend on a number of different cultural factors that vary between countries and contexts. The attitudes to workplace democracy, worker empowerment, participation and consensus are probably quite different in Sweden as compared to the USA. The Swedish co-determination act has an impact on many aspects of work and employer–employee relations, including attitudes towards the individual employee. In Sweden, we at least like to believe, that the individual employee has more decision-making power and more action space in the organisation than in many other countries.

### 8.2. *Visibility in the process*

Our studies point to the importance of usability being a natural and visible part of the development process. Visibility in the process means that usability is made a part of the

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<sup>5</sup> Our research approach is based primarily on action research and qualitative studies. These research approaches do not generate laws or principles that are generally and universally applicable. Instead they produce knowledge and ‘general pragmatic principles’ (Fishman, 1991) that may be applicable in similar settings, i.e. it is a matter of transferrability (Miles and Huberman, 1994) rather than generalisability. The conclusions of qualitative research can never be simply added up, or mechanically transferred to other settings. It is always a matter of interpretation, translation and synthesising from several studies.

<sup>6</sup> MBA, masters degree in business administration.

official development process in terms of, for instance, a role, activities, and/or deliverables, i.e. that usability has got its own ‘boxes’ in the process. As discussed above, roles are often used to create ‘space’ for usability, since many development processes use roles for the division of labour and responsibilities. A role produces artefacts and deliverables and has areas of responsibility. Having a role places the usability professional on ‘the same level’ as other professionals involved in the process. Having a role, a place in the process, also means that you are included in project plans and in the budget.

However, we believe that usability places special demands on the process. It must be able to accommodate non-structured activities and the particularities of everyday problems. Working with usability, in particular the design component of usability, is to a large extent a craft profession (Wallace and Andersson, 1993). Its activities cannot be defined or described by means of detailed routines. (We believe that this also applies to virtually all the other professions involved in systems development.) The creativity needed for design work calls for a certain ‘design space’ in the process since design does not easily lend itself to highly formalised and structured approaches. It is a fairly unstructured process that can be predicted and structured only to a limited degree. This conflicts with the structured perspective in many development processes, and poses a challenge.

One question related to visibility in the process, is how to create space for usability and the usability professional in commercial systems development processes. Initially, we attempted to modify all activities in such a process to ‘make room’ for usability. However, organisations are typically unwilling to undertake such a major modification of their systems development process, once they have adopted and implemented it (see for instance Ferre, et al., 2005). Therefore, for political reasons, we decided to define usability as a specific sub-process (Göransson, Lif and Gulliksen, 2003). Having usability as a clearly defined sub-process creates less disturbance in the existing work practices and processes for systems development. This approach proved to have an additional value in that it increased the visibility of usability as a particular concern in the development process, important enough to deserve its own sub-process. Just like a role, a sub-process can help in having usability being included in the project plan and budget. However, if usability is a separate sub-process, it is important to make sure that the results are usable in the overall process.

### *8.3. A place in the project*

Visibility in the process is in most cases, a pre-requisite for getting into a project and becoming a project team member, but as evident in our UD study, a usability ‘box’ in the official development process is not enough. The usability professional must be involved in the individual project, producing artefacts and conducting activities. The systems/products are designed and constructed in the projects, and this is where the ‘real’ action takes place which requires usability expertise.

We argue that the usability professional should be a member of the project team, participating in the everyday activities of the team. The usability professional must make contributions that are constructive and move the development team’s progress forward, closer to their goal of producing a particular IT system or piece of software. Usability

approaches that rely solely on usability evaluations or ‘studies’ may set the development team back in their work, rather than helping them along, and are likely to be perceived as troublesome, and perhaps to be avoided.

Getting into the team and the project is, of course, not a simple matter. We do not intend to give any specific recommendations about how to do it, since it depends on the context and the individual. However, our studies point to the importance of support from project management, as well as management in the organisation, and to the importance of visibility in the process as discussed above.

#### *8.4. Individuals make things happen*

As discussed in the introductory section of this paper; roles and processes only go so far. It is then up to the individuals to flesh out the abstract concepts of roles and processes. No matter how good support people have for their work, it cannot substitute for their individual skills, experience and personal qualities. This poses a challenge, since very few projects are made up of experienced and senior professionals only, and calls for the careful staffing of projects. We believe that more research into the social processes and the ‘people-ware’ underpinning systems development is required. We also believe that people-centred and communication-centred processes, such as the agile approach ([Agile Alliance, 2001](#)), may be better equipped to deal with such matters than the highly structured, more ‘traditional’ processes favoured in many organisations. Even though agile has been criticised for relying too much on experienced developers, we believe that the focus on systems development as a social process opens up for new possibilities as regards usability.

#### *8.5. Respect for and appreciation of other people’s knowledge and contributions*

Multi-disciplinary teamwork requires that the people involved respect and appreciate the knowledge, skills and contributions brought by each participant. Systems development involves people with very different goals, needs, wishes, expectations, knowledge, experiences and skills. We need to be aware of these differences and respect them. In our research, we have unfortunately come across a lack of respect in several forms:

- For users and domain expertise

Users are often assumed to be ignorant and afraid of new technology, indecisive, ambivalent and adverse to change. Of course this is not true, users are experts in their own domain. The ‘user’ concept is, in itself, problematic since it groups people of various backgrounds, with various needs, etc, into one single group that is defined by its relation to an IT system. It also has the connotations listed above. Perhaps it is time to move beyond the user concept. There have been various suggestions for better alternatives over the years, e.g. ‘actor’ ([Bannon, 1991](#)), but we still seem to be stuck with the user concept.

- For usability expertise

Our studies and many other studies point to the problems that usability professionals have with getting into the team, getting action space, and creating leverage for usability. As discussed in the introduction, there has been much research to identify the factors that generate these problems and what to do about them. We believe that one important factor is an attitude problem in systems development at large. It is primarily considered a technical undertaking, leaving out human and organisational factors. We also believe that the community of usability professionals has not succeeded to fully prove that they can contribute effectively to the development process.

Moreover, usability is a complex concept. Initially, there was a tendency to consider usability a simple matter that required no particular skills or knowledge, a ‘topic about the obvious’ (Nygren et al., 1992). Despite the increasing attention usability has received over the years, it is often discussed as a user interface matter alone, or a matter of applying simple design guidelines. We believe that the complex and multi-disciplinary nature of usability must be recognised within organisations that want to build usable systems or products. It requires a multi-disciplinary team as suggested in ISO/IS 13407:1999.

- For technical expertise

Within the HCI community, developers (or engineers/programmers) are sometimes referred to in disparaging terms, such as, ‘geeks’ or ‘programmer jocks’. In our opinion, the developers are the people who actually construct the systems/products that we all want to be usable. These are the people that the usability professional depends on to get his/her ideas implemented, and, thus, has to cooperate, communicate and interact with. Referring to them as geeks or jocks does little to facilitate that collaboration. Nor does it do much to promote usability and HCI within the developer/software engineering community.

In the development context where we conducted our studies, leading edge technology and innovations are rarely on the agenda. Instead, it is a matter of making use of existing technology in new ways, and a matter of explaining the potential of that technology to the users in order to help them understand how they best can benefit from it. In our experience, there is nevertheless a problem with the lack of technical expertise within these organisations. Development projects are often started without the required technical expertise being in place. We believe this is partly a result of an inability or unwillingness to acknowledge the difficulties involved in implementing a particular technology.

## **9. Impact on education and attitudes**

So far, this paper has been a retrospective account and discussion of some of the findings we have made and issues and concerns that we have identified in our research into and practical experiences of systems development, user-centred and not so very user-centred. In this paper we discuss the usability professional as an individual, and in relation to the systems development process as well as the development team. Education and

attitudes are two areas that we believe essential for the future development of the usability profession, and its impact on systems development.

We believe that a profession requires some kind of common educational background. Hence, the responsibility rests on academia to develop university curricula and provide education that produce the basic skills of the usability professional. We suggest that such a curriculum, among other things, would contain the below items:

- Basic HCI knowledge including understanding the human and his/her capabilities from a psychological and social point of view, user interface design, evaluation and user-centred design (for example according to the [ACM curricula, 1992](#))
- Software/System engineering knowledge—the systems development process is the future work context for the student, and he/she should know enough about it to understand how user-centred design and usability issues can be integrated into it, and be able to communicate and collaborate with other team members.
- Development tool knowledge—industrial designers, architects, graphic designers, etc. learn about the materials that are used to make real their design ideas and we argue that the usability professional should learn about the ‘materials’ used in software production, including development tools. The usability professional must learn enough about development tools to be able to discuss and trade off design and implementation solutions with the developers, and to communicate the potential of new technology.
- Skills in context analysis methods—including interviewing techniques, contextual interviews, observations, etc. Application domain knowledge is essential for the usability professional. This can and should not be taught at universities, with perhaps a few exceptions, such as, medical informatics. However, universities can provide the usability professional with a set of methods and skills for acquiring knowledge about a particular domain.
- A wide interdisciplinary understanding—providing capability to understand a wide variety of disciplines, e.g. business, anthropology, computer science, etc.
- Design—practical knowledge and skills in doing design, we believe that the craft aspects of design are particularly important.

In some ways, usability work is akin to research. Many organisations look for and employ usability professionals with a research background, and this no coincidence. The tools and methods used by the usability professional, primarily for analysis and evaluation activities, are similar to some of the methods used by the researcher. The usability professional needs to gather valid and reliable data in a structured way. He/she needs to know how to analyse and draw conclusions from the data, and how to relate the findings to existing theory. However, such expertise is not enough, the usability professional also needs design skills to create solutions, and social skills to manage contacts with users as well as developers. We do not argue that all usability professionals must have a PhD—but we do believe that it takes more than a basic degree within some related area (software engineering, computer science or cognitive psychology) to become a professional usability professional. We therefore think that it is essential that universities offer Master’s programs in HCI and usability to students with a basic degree in a wide variety of appropriate areas. We are ourselves currently

working on identifying the curriculum for such a program, as part of the Bologna process<sup>7</sup>. This does not eliminate the need for including HCI in the basic curriculum.

University education can, however, never substitute for experience and practical know-how. Usability professionals, like all other professionals, need practical experience, on-the-job-training and social skills, such as, communication skills. The usability professional also needs skills in teamwork and project work—and we believe that universities can do more to provide a sound basis for such skills, e.g. by using problem-based training approaches and the like. This applies to software engineering education as well, since not only the usability professional needs teamwork skills, but the other participants in the development process as well.

This brings us to the issue of attitudes. The attitudes and basic values held by the people involved in the process are crucial for the outcome of the result (Öhman Persson, 2004). There is little point in introducing usability issues and user-centred design into a development organisation if the attitudes held by the developers, project managers, management, the client, etc. are not conducive to UCSD and usability. Attitudes are, however, difficult to identify and specify since they are expressed in so many ways and so much a part of the identity of the organisation. Attitudes can be explicitly expressed in, for instance, business strategies and official policies. But they are also implicitly embodied in work practices and day-to-day problem solving activities, as well as jargon. Attitudes involve commitment, knowledge, and practice and in order to change them it is essential to address the attitudes on multiple levels and dimensions within the organisation. Changing official policies and strategies is not sufficient if these changes are not reflected in the work practices and standard operating procedures used on ‘the shop-floor’. Introducing a usability expert, or sending some developers on a crash course in usability engineering will not do much to improve things, if their knowledge is not disseminated throughout the organisation. Improving practices by introducing new processes and methods has little effect if people do not learn how to apply them properly and do not appreciate the attitudes and values embodied in them. And in order to do that, there must be a willingness to change and to learn new things.

## 10. The future of the usability professional

What is the future of the usability professional? What are the most urgent issues? In what ways can the usability professional contribute to the systems development process and to usable systems? Again, taking a shop-floor perspective, we argue that

- the usability professional must design, i.e. generate interaction design solutions in terms of e.g. concepts, structures, contents and navigation.

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<sup>7</sup> The Bologna process is an EU initiative with the purpose of adapting the university system to European standards. The main objectives of the Bologna declaration are to increase the mobility and employability of European higher education graduates thus ensuring competitiveness of European higher education on a global level.



- the usability professional must be actively and directly involved in the systems development projects, on a continuous basis, throughout the entire system lifecycle.
- usability requires efforts and support on a strategic level in terms of individuals within the organisation who act as usability champions or ‘sponsors’, providing leadership, resources and coordination. This is to say that we agree with, for example, Schaffer that usability professionals need substantial support on management level, from someone who can act as a chief user experience officer—CXO (Schaffer, 2004).

Below, we elaborate on and discuss these issues.

### *10.1. Design*

You can only design your way to usability, hence, the usability professional must design—i.e. generate interaction design solutions in terms of e.g. concepts, structures, contents and navigation.

We agree with Cooper’s (1999) criticism of the usability discipline focusing on usability evaluations and the inefficacy of such methods, “... sanding away at their tables with usability methods, trying to make chairs.” (p. 207). Moreover, usability professionals must have ‘skin in the game’ and need to contribute in the difficult task of turning analysis and evaluation results into design. Designing means putting things at stake and opening up for criticism. Showing the design to users is necessary for improving and developing it to fit their needs. Moreover, exposing the design to the critical eye of others is necessary in order to improve and develop the professional skills as a designer. This is often the difficult part—in particular showing the design to other designers and developers. However, it has to be done, since the design eventually has to be turned over to the developers for implementation.

On the other hand, we do not believe that the solution is handing everything over to some creative mastermind, some ‘know-it-all’ interaction designer. On the contrary, we think the design process must be a cooperative process, relying on the input of several different disciplines and also, of course, the users. Good design requires UCSD. The usability professional is essential in this process, being the one who drives the UCSD process, doing most of the interaction design but little of the graphic design. This design process has the potential to fill the gap between analysis, evaluation and construction, and the gap between UCSD and software engineering.

Design requires new and improved representations—which we believe is a key research issue for the future. We need to develop new types of representations for communicating design and facilitating the iterative process. These representations must be equally useful to all participants and stakeholders in the design and development process, including the developers. They must also facilitate the translation of user needs to code, and decrease the number of transition steps<sup>8</sup> to a minimum, since information is inevitably lost in each transition. We know that prototypes and other informal documentation methods are useful for communicating with users, but sometimes considered ‘sloppy’ and imprecise by

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<sup>8</sup> Going from one representation to another.

developers (Constantine and Lockwood, 2002). We also know that unified modelling language (UML) (Fowler, 1997), use cases (Jacobsson, Booch and Rumbaugh, 1999) and other structured notations are difficult to understand for people who are unfamiliar with them, for instance, users (Gulliksen et al., 2003). Such notations do not have the capacity to provide concrete visualisations of the future use situation.

Design includes more than just designing the interaction between the user and the system. We would also like to emphasise the importance of doing work redesign. In bespoke systems development, it is virtually impossible for the development team not to become involved in organisational development in terms of redesigning work. New IT systems in the workplace create changes in work practices and roles on a level of detail that is rarely, if ever, described in visions or business process development. Instead, the visions and business process modifications are turned into work practices on the individual level by means of the new system. The system embodies the new business processes by representing the new work practices. It makes them 'real' and concrete. The ideal situation is where the organisational development process, including a work redesign process drives the systems development project. However, in our experience, it is rarely the case that the new work practices are fully defined up-front, ahead of the systems development process. In fact, we believe it is impossible to define work practices up-front, down to the level of detail required to build an IT system to support them. Instead, what is needed is an iterative process where each new answer and solution produces new questions. Redesigning work is therefore an integral part of the design process—it is part of framing and reframing the design problem (Schön, 1995). Hence, the usability professional as well as the rest of the team must be involved in the work redesign process prior to and in parallel with the design process.

## 10.2. Project

In this paper, we have discussed the importance of the individuals holding the roles prescribed in the development processes. Integrating usability on the process level alone is not sufficient. Regardless of the process, the result of a systems development effort is generated by the individuals making up the teams doing the actual work. The usability professional needs to be in the project, be a part of the team, in order to safeguard the needs of the users and usability. In agile development (Agile Alliance, 2001; Cockburn, 2002) more attention is paid to the knowledge and experience of the team members and their individual contributions. Therefore, we need to investigate how usability can be integrated into agile systems development approaches (Blomkvist, 2005). This implies that the usability professional has to be a part of the development team—since this is the focus in agile approaches.

In order to be part of the team, we argue that the usability professional needs to participate continuously throughout the entire development process. Traditionally, usability is introduced at particular points in the process when there is an explicit call for usability activities. Our UD study indicates that usability professionals can make the greatest impact when they are involved in the projects on a continuous basis, including the construction phase where many usability issues need to be resolved. Many usability-centred processes (e.g. Contextual Design, Beyer and Holtzblatt, 1998)

unfortunately focus on the early phases of the development process—analysis, user interface design and evaluations—but do not address the construction phase.

On the other hand, it is essential that usability professionals do not become substitutes for user participation. On the contrary, the usability professional should facilitate user participation in order to create the best possible basis for the design. We believe, having our roots in the Scandinavian school, that it is essential that organisations that hire usability professionals understand that they must plan and provide for user participation as part of the deal. They must allow for the time it takes to involve users.

Communication is a key factor for effective multi-disciplinary teamwork and the ability to establish a common understanding of the design problem and common ground. One problem that we have frequently come across is the way user participants, and other non-technical stakeholders adapt to and adopt the terminology of the developers. We believe that the usability professional is particularly important in the process of maintaining and adhering to the terminology used within the application domain, instead of developers' jargon. Communication skills are therefore essential to the usability professional and in systems development in general. We argue that communication training should be provided to all team members, including training in how to create a mutual understanding of a problem, how to negotiate and solve conflicts, etc.

Many usability professionals report that usability is among the first items in the project plan to be abandoned when time gets tight. However, time pressure is a reality that must be dealt with. We believe that one of the problems is that usability is often considered a quality in the user interface alone—and one that can be fixed late in the project. Once the project has reached that point in their plan, there is rarely enough time left to deal with the matter, and, as we all know, it would have been too late anyway. Usability, we argue, is about functionality—it is embedded in the functionality of the system as well as in the representation of that functionality in the user interface. Therefore, usability concerns are inextricably integrated with functional requirements as well as non-functional requirements. If usability is linked to functionality as well as 'quality', it becomes more difficult to cut it out of the project plan when time gets tight.

### *10.3. Strategic level*

It has been argued that usability professionals must gain a seat at the decision making table. (e.g. Norman, 1999). Earlier in the paper, we discussed the importance of the project manager, but the overall management support is equally important, but generally more difficult to achieve. In our experience, overall management often pays lip service to usability, but when it comes down to setting priorities for development, time and money are more important. Usability professionals need a usability lead, or sponsor, an executive champion (Schaffer, 2004), providing leadership, resources and coordination.

Management support is provided by means of overall development strategies that support usability work and specify usability and UCSD as key goals in systems

development. Moreover, management must supply the resources needed in terms of the number of usability professionals (Nielsen, 2003, proposes that current best practices are spending about 10% of the project budget on usability). Management must also create resources for raising the general awareness of usability in the organisation, for instance, by means of providing all developers with basic education and training in UCSD. Management must make sure that usability is made a major concern in the procurement process and that usability is evaluated during the entire systems development lifecycle. We believe that it is the responsibility of management to make sure that usability is not abandoned or sidestepped in the development projects, or traded off against time and/or money. However, management do not make design decisions and cannot create usable systems/products, these can only be created in projects.

The organisational position of usability professionals has long been a matter of discussion and is considered important for their impact. It has been argued that the higher up in the organisation, the better access to the ‘decision making table’. We do not argue with that, but are concerned with the lack of attention paid to usability on a project level, where the ‘real’ action takes place. Hence, we primarily argue for de-centralised usability, i.e. usability professionals in the development team. As described above, we believe that the usability professional needs to be where the action takes place, i.e. in the projects. Markensten and Artman (2004) argue that the procurement process is crucial to usability, i.e. that including usability in the requirements specification will make sure that it is addressed in the development process. We believe that usability requirements provide an effective means for creating leverage and action space for usability in the project—but they are not in themselves sufficient to guarantee usability in the product or system. It is equally important to have usability expertise in the development team, or these requirements are not likely to be met. We further argue that organising usability professionals in a centralised team may achieve significant results, in terms of impact on and visibility in the systems development process. However, this approach must be seen as a complement to active and direct involvement in the projects. Hence we argue that it is essential that the organisational ‘home’ of the usability professionals should be close to the developers and the development projects. Ideally, usability should be an integrated part at all levels in the organisation. However, when an organisation is in the initial phases of building up its usability team and expertise, we believe it is important to focus on the projects. Improving the development process is a later step.

It has been argued that certification of the profession would increase its status and the attention that usability and usability professionals receive in the software industry (Bevan, 2003; Bevan, Earthy and Jarrett, 2002) and the matter is still debated, for instance, on the UPA site ([www.upassoc.org](http://www.upassoc.org)). Given that the usability field has been criticised for not taking a sufficiently serious approach, bordering on quackery (Karat, 1996) we believe that a certification of the profession may be worthwhile. As of yet, there is no accreditation scheme in operation that we know of, although there are corporate certification schemes that are marketed by separate companies. Human factors international has, for instance, defined a process for assessing a HFI certified usability analyst™ (Human Factors International, 2004). Ambitious and commendable as such an effort may be, it would be much better if such an accreditation scheme were managed by an international, independent and recognized organisation, with no commercial interest in the scheme.

## **11. Some final notes**

One may conclude, on a ‘frivolous’ note, that in order to be a successful usability professional, you need to make sure that the project manager understands the full complexity of usability and fully appreciates its importance. You need systems developers that are brilliant programmers and ready to put in as much time as required to do as you bid, and at the same time willing to make numerous modifications to their solutions in order to accommodate the changing requirements inherent to systems development, without complaint. You need a client that is committed to user-centred design, willing to spend unspecified amounts of money on your development project. And you need users that are willing and able to spend unspecified numbers of hours with the project in various analysis, design and evaluation activities. As well as being at your beck and call, at any time of the day to answer all the detail questions that are inevitable throughout the entire course of the project.

This is of course not a serious attempt to describe what it takes to succeed as a usability professional, but it captures fairly much of the gist of the interview data, observations and experiences that we have compiled over the years.

To sum it up, we firmly believe that there is a great need for usability expertise in systems development. In Sweden, for instance, the amount of interactive systems development that takes place indicates that usability professionals are needed. However, the current demand for usability expertise does not reflect that need. Many usability professionals were, for instance, made redundant in the wake of the dotcom crash. We believe that the situation is similar in other countries. Unfortunately, as discussed above, the solution so far has been to turn a blind eye to usability, perhaps because usability professionals have failed to prove their value in systems development. We therefore, need to work on several fronts. We need to educate and train more usability professionals in order to meet the need for usability expertise that we know is there. We also need to increase the general awareness of usability within systems development, in order to make up for the lack of usability expertise. Finally, we need to improve and prove the usefulness of usability activities in systems development, something that will place even greater demands on the usability professional. Working with usability is not an easy matter—nor is systems development at large. Usability is just one out of many aspects that must be taken into account in systems development, although we would like to argue that it is one of the most important issues.

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