Editorial

The user – the great unknown of systems development: reasons, forms, challenges, experiences and intellectual contributions of user involvement

INTRODUCTION

We are witnessing an interesting era in the history of computing and information technology (IT). Computing, telephone and television on the one hand and data, voice and video on the other hand are converging. Internet, the World Wide Web and mobile computing have made IT truly global. IT has become pervasive – it is increasingly difficult for human beings to live their lives without encountering IT. The applications of IT have expanded from traditional automating (e.g. process control and embedded applications), augmenting (e.g. word processing), informating (information systems proper) and communicating (e.g. email) applications to various accompanying (e.g. computer pets), entertaining (e.g. computer games) and fantasizing applications (e.g. virtual world applications such as Second Life) (Iivari, 2007).

Modern IT has enabled us to organize our society, business, and lives in new ways. Both in the private and public sector, services or ‘meta-services’, i.e. services required for or supporting the acquisition of the primary service, are increasingly transferred to the internet, and people are being coerced more or less gently into using these electronic services (e.g. Internet banking). These electronic services frequently change the division of labour between people, e.g. between the customers and employees of the service providers. For instance, in internet banking, customers perform many operations previously performed by the bank clerks. Customers have become users of banking applications.

IT has enabled organizations and individuals to become globally networked, as evidenced by network organizations and virtual communities. The IT field has not only been the supplier of the technology, but has also been profoundly influenced by these new ways of organizing. The digital nature of software has made it a natural application area for global e-commerce, outsourcing, offshoring, geographically distributed development and also virtual community-based open-source development.

The world of digital convergence and the new IT applications challenge many traditional boundaries. The border between IT and non-IT has become blurred, and as a consequence IT use may be implicit in the sense that people may not necessarily perceive themselves as IT users. For example, are people watching TV and interacting with the program using short
messages IT users? What if they watch the same program on Internet and use e-mail to interact with the program? People simply make use of various services, which may be more or less IT-based.

The nature of usage of various IT applications and services has become more varied. This usage is not necessarily active use, such as writing a piece of text using word processing software or intensively playing a computer game, but may be passive, merely holding the line. For example, one may have e-mail open most of the day and one may actively use the application only when new messages arrive. The passive use with the aim of being promptly informed may be just as important to the user as active use. However, such passive use is not captured, e.g. in the measures of individual use discussed in Burton-Jones & Straub (2006).

In contrast to passive use, people may be active producers of the content of many applications (e.g. wikis, YouTube, etc.). IT applications are no longer merely tools for professional instrumental productivity, but also (re)constitute and mediate different social structures and practices as a result of personal content production (e.g. Orlikowski, 2000). This kind of user-generated content integrates words, pictures, videos and audio into human-technology interaction with the aim of sharing stories within a certain virtual community (e.g. Koskinen, 2003). Hence the activity of IT channels users in socio-technical spaces that seem to be increasingly important reference points for people. An essential question for IS researchers and professionals is: What makes people invest their time and effort to produce such content?

Much of existing research (e.g. Davis, 1989; DeLone & McLean, 1992; Venkatesh et al., 2003; Burton-Jones & Straub, 2006; Barki et al., 2007) assumes that individual use of IT applications takes place in the workplace context. However, IT applications are increasingly used outside work. Many of them do not support separate activities such as business processes, but their usage itself is the activity. Consequently, it can be conjectured that the determinants of use may be different. If an application or service is not used to support any external activity, measures such as perceived usefulness (Davis, 1989) and performance expectancy (Venkatesh et al., 2003) are not directly applicable.

Although it is becoming more and more difficult to know who the users are, and further to identify, contact, sample, involve and represent them, it is vital to understand users when developing new IT applications and services. Focusing on traditional IS development in an organizational work context, DeLone & McLean (1992) argue that an information system is not successful if it is not used by its intended users. Even in this context, when IS applications support core business processes such as internet banking, failure to get the intended users to use the system may be fatal to an organization. This constitutes a challenge for systems developers as the user group has become more heterogeneous, complex and diverse; the same system may be intended to be used by an IT professional, an average middle-aged layperson, a teenager nerd and a granny.

Technology companies developing and selling IT products or services to individual consumers in particular are struggling with diverse groups of target users. How to design a mobile phone application to satisfy heterogeneous groups of users when there are numerous competitive applications available? How to conceptualize or model ‘the user’ in such a situation? How to develop a useful and usable system that creates explicit, significant surplus for the company?
This versatility and complexity force companies and organizations to understand the users’ needs and wishes, and construct appropriate products and services. In a global context, with systems development outsourced, this necessitates a thorough understanding of the user, or more specifically, understanding the systems developers’ or designers’ interpretations of the user. Hence it is important to understand all stakeholders interacting with the user.

This special issue focuses on understanding the user in the systems development context. Although users and their participation in systems development has been studied extensively for decades, the user is still often seen as a validator of design decisions, having local knowledge about the context of use and a misuser of the system. However, in the aforementioned situations a thorough understanding of users, their needs and their interpretation of those needs is emphasized, likewise how this understanding is connected to systems development and systems development methodologies. This special issue attempts to shed light on the user, the great unknown of systems development.

How to involve the user?

Systems development has been a topic of intensive research within the fields of Software Engineering (SE), Information Systems (IS), and also in Human Computer Interaction (HCI). However, user involvement has not been a particular research topic in the SE tradition. The most recent version of the SE body of knowledge (SWEBOK, 2004), for example, does not even mention user participation or user involvement. As far as it is included at all, it is considered only at the beginning of the development cycle, in the requirements engineering or construction. Yet user participation is also identified as crucial to the success of the requirements construction (engineering) process in the SE literature (Hofmann & Lehner, 2001).1 Deficient requirements are recognized as the greatest single cause of failures of software projects (Hansen et al., 2008). This appears as a gap between intention and reality when taking the users’ needs into account in the software development processes (Bygstad et al., 2008).

Contrary to SE, user participation has been a prominent research topic in IS for decades. This is understandable, because user participation is closely related to the distinctive activities of IS development (Iivari et al., 2004): (1) mutual alignment of IT artifacts and the organizational and social context in which the artefact is to be used; (2) identifying and specifying the needs of people who are assumed to use the system (user requirements construction); (3) the organizational implementation; and (4) the evaluation/assessment of these artefacts and related changes. It is hard to imagine that any of these four activities could be carried out in a valid way without any user involvement or participation. Users usually are the best experts on the local work practices to be aligned with and to be supported by a system. Users also are the final ‘implementers’ of the system, and evaluation of the system without any attention to subjective user-oriented criteria, such as perceived usefulness, perceived ease of use, perceived usability and user satisfaction, is seriously limited.

1In line with Iivari et al. (2004) we prefer to speak about requirements construction rather than about requirements engineering. Both these terms underline that requirements are artefacts to be engineered or constructed rather than to be identified, found or gathered somewhere out there. The word ‘construction’ emphasizes that they are socially constructed.
While IS researchers have mostly focused on developing IS for the organizational, workplace context, HCI researchers have taken a more open approach and focused broadly on the design of ‘interactive’ systems. Much of this research is characterized as ‘user-centred’, although the concept ‘user-centeredness’ has a variety of meanings and interpretations (Iivari & livari, 2006). Interestingly, not all varieties of user-centred design particularly emphasize user participation or involvement. Grudin & Poltrock (1989), for example, argue that there is a dire need for earlier involvement of usability practitioners’ contribution to the design process instead of involving users directly in the process.

Despite this interest, it is not clear how user involvement should be integrated with systems development. There is a gap between IS development methods and user involvement (Markus & Mao, 2004). In the case of user-centred design (ISO, 1999) Gulliksen et al. (2003) report problems in integrating it with modern systems development methods such as RUP. Agile methods provide, at least in theory, better and more precise consideration of customer requirements, wishes and expectations (cf. Avison & Fitzgerald, 2003; Lynch & Gregor, 2004), but they are quite limited as methods of stakeholder identification (Ballejos & Montagna, 2008), organizational change design and management (DeMichelis et al., 1998) and requirements negotiation between different stakeholder and user groups (Coughlan & Macredie, 2002).

Many more traditional approaches or methods emphasizing user participation or involvement such as participatory design (Schuler & Namioka, 1993; Kyng, 1994), user-centred design (ISO, 1999), cooperative design (Grønbæk, 1991), and joint-application-design (Wood & Silver, 1995) do not explicitly point out exactly how user involvement should take place in which phases of the systems development process. Similarly, with a few exceptions (e.g. Rose, 2002), participative IS development methods provide no instructions when, how or indeed whether to engage the user. ETHICS (Mumford, 1983) and Multiview (Avison & Wood-Harper, 1990), for example, attempt to bridge the gap but instead of presenting detailed instructions for developers, they rather describe philosophical approaches that are not very practical from the systems developers’ point of view.

Furthermore, participative and participatory systems development methods have encountered difficulties in gaining acceptance in practice. Clement & van den Besselaar (1993) and Oostveen & van den Besselaar (2004) note, for example, that most participatory design projects have been small, stand-alone applications of IT with low organizational complexity. They report considerable difficulty in sustaining the continued use of the approaches after the research intervention and funding from researchers has ceased. Hirschheim (1983) also found continued use of ETHICS difficult.

Who is the user?

Although since the 1960s there have been numerous studies on understanding the user and capturing the requirements (Iivari, 1991), it is evident that the user largely remains unknown.

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2The adjective ‘interactive’ as a quality is misleading in the context of IT artefacts, since they all are more or less interactive. Interactivity is a quantity rather than a quality.
when the studies are examined in detail. In most traditional technology-oriented IS development methods (Avison & Fitzgerald, 2003; Seffah & Metzker, 2004) the user is often seen only as an insubstantial user of a technology, not a social-psychological actor in an organizational setting (Isomäki, 2002). Even when recognized, the role of the user as a social actor (Lamb & Kling, 2003) is often reduced to that of a static entity (Lindsay, 2003), a source of individual task productivity (Isomäki, 2007) regardless of whether the user is ‘envisioned’ (Bardini & Hovarth, 1995), ‘projected’ (Akrich, 1992) or ‘configured’ (Woolgar, 1991). The problem has been approached by theorizing and by conceptually separating social and technical factors, making the so-called socio-technical approach quite popular (Iivari, 1991). However, the problem of biased perception has not been eliminated by separation. The separation of social and technical, even analytical, is problematic since the two are tightly interwoven. Such a separation may also easily lead to accentuating the one and undervaluing the other. Furthermore, the view of the ‘social’ is still limited in most IS development methods and approaches. It is seen either as non-interpretive communicative interaction resting on individualistic cognitive models, or as straightforward, joint performance of certain organizational tasks (cf. Lamb & Kling, 2003). Users are considered as mere faceless objects for who the systems are designed. This is due to the tenuous connections between IS development methods and user involvement (Markus & Mao, 2004; Isomäki & Pekkola, 2005; Iivari & Iivari, 2006).

**From hierarchically governed user participation to market-driven user involvement**

Barki & Hartwick (1989) proposed a conceptual distinction between ‘user participation’ and ‘user involvement’. User participation refers to assignments, activities and behaviours that users or their representatives undertake during the IS development process while involvement is a psychological state reflecting the importance and relevance a user attached to a given system. Although this distinction is clear and justified, it becomes blurry if user participation is seen to extend to weak forms of ‘participation’, e.g. situations where users are mere passive objects under observation. ‘User involvement’ is thus a broader concept in which users are somehow involved in the systems development process. ‘User participation’ is a special case of user involvement, in which users (or their representatives) are actively involved in the process. This is consistent with much of the existing literature on user involvement in product development context (e.g. Alam, 2002).

In IS research, user participation has often been approached as a hierarchically governed phenomenon in the context of in-house development. This is because it can be argued to improve the quality of the system and facilitate its organizational implementation, and the users can claim to have an ethical right to participate in issues that affect their daily work. Despite these alleged benefits user participation in in-house development has been found to be fairly inefficient (Boivie et al., 2003) – even in this context, it is in many respects simplest to implement.

Market commodification of IT artefacts and their increased service-orientation have revived the significance of user involvement but at the same time have changed the conditions and challenges this entails. User involvement has become a market-driven issue, dependent on the extent to which an understanding of users’ needs is perceived to be vital for companies.
producing IT artefacts or services. However, as pointed out by several authors (e.g. Gould & Lewis, 1985; Grudin, 1991; Kyng, 1994; Alam, 2002; Kujala, 2003; Iivari, 2006) user involvement in the IT product development context is challenging as identifying and making contact with the prospective users is often difficult, and there may be not be enough time to involve the users or for iteration.

A way forward

Despite all the challenges and problems, the situation is not as grim as it may seem. There are some signs that the IS research community is broadening its focus towards user-oriented methods. Zhang et al. (2005), for example, propose a human-centred method that attempts to integrate HCI design with traditional systems development throughout the development cycle. Yet, they perceive the user mainly as a psychological actor (cf. Te’eni et al., 2007) without a tight connection to the social-political context of organizations. Bødker et al. (2004) emphasize user participation from a PD perspective, but leave the connection to systems development methods and detailed instructions intact. Their work can be seen as a collection of experiences that can be satisfactorily capitalized on in IS development. Pekkola et al. (2006) approach the user and IS development method more comprehensively, but construct only an initial version of a method.

The special issue on ‘User – the Great Unknown of Systems Development: Reasons, forms, challenges, and experiences’ presents recent developments of research into user involvement in IS development. The issue was motivated by several factors, including the notion that information systems are often developed and studied from an organizational viewpoint–how they support organisational activities and processes – rather than how they support individual users, their characteristics, preferences, and actions. Even when focusing on information systems in the workplace context, one should note, however, that information systems are not used by organizations but by the individuals working in those organizations. Users do their jobs, individually and in groups, and use IS for their tasks. Contemporary IS and IT applications should therefore also be designed with individual users in mind, catering for human characteristics, not only organizational needs. This special issue thus attempts to shed light on the reasons, forms, challenges, practical experiences, and intellectual contributions of user involvement against the backdrop of the present technology and IT applications, along with the current ways of organizing systems development, current methods and approaches as well as current economic and social context of ISD and IT applications use.

Articles included in the special issue

The special issue includes four articles. The first two were chosen from 29 initial submissions. These two papers have gone through three rounds of review before final acceptance. The last two were accepted using the normal ISJ review process and were included in this special issue by virtue of their topics.

All four papers represent IT applications that are not conventionally discussed in the IS literature. Millerand and Baker’s case is the development of a standard called Ecological Metadata Language for an ecological science research community. This standard, once implemented, can be interpreted as a meta-information system on ecological data produced at the local sites of the research network. Within this network, Millerand and Baker discuss the shift between the roles in IS development process. They present a long-term case where the developers, users and ‘mediators’ and their roles have changed and become intermingled during the project. Such webs of users and webs of developers necessitate new approaches to comprehend the systems development, its introduction and enactment in organisational settings.

Henfridsson and Lindgren report an action research project that provides insights into user involvement in the development of mobile and temporarily interconnected systems, as they call them. User involvement has also become a focal concern in terms of the customer-developer relationship in order to both utilize market knowledge and to exploit profitable opportunities in a volatile marketplace, among them the mobile applications market. User involvement in developing mobile systems relying on network technologies for increasing the ubiquity of information services for users on the move implies new challenges in systems development. Henfridsson and Lindgren suggest that user involvement practices and user perception have to be adjusted according to the features of such systems.

The other two papers are quantitative surveys informed by technology acceptance or usage models (Venkatesh et al., 2003), but focusing on atypical IT applications which are mainly used in a non-work context. Lu, Deng and Wang explore the use of a short message service for personal communication in China. They utilize TAM (Davis, 1989) to identify factors influencing the adoption of SMS services, namely perceived usefulness, perceived enjoyment and perceived service cost, consequently providing the point of foci for new service introduction. Lin and Bhattacherjee also study technology usage, but instead of SMS services they analyse online video games. They argue that existing theoretical models cannot provide a comprehensive understanding of hedonic systems as there are strong motivational differences, namely in enjoyment and social image, between these and organizational systems. They thus provide a new theoretical model that was tested on Taiwanese students.

Altogether, these papers provide some insights to understand the user. Although we still do not understand the user holistically, we understand a little more: interactions with developers, activities in varying environments and use contexts. The user still remains largely unknown but maybe we, and you, will be able to learn a little more about them. Enjoy the special issue!

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REFERENCES


IEEE Computer Society, Washington, DC, USA.


