

# Empowering the users? A critical textual analysis of the role of users in open source software development

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**Abstract** This paper outlines a critical, textual approach for the analysis of the relationship between different actors in information technology (IT) production, and further concretizes the approach in the analysis of the role of users in the open source software (OSS) development literature. Central concepts of the approach are outlined. The role of users is conceptualized as *reader involvement* aiming to contribute to the *configuration of the reader* (to how users and the parameters for their work practices are defined in OSS texts). Afterwards, OSS literature addressing *reader involvement* is critically reviewed. In OSS context, the OSS writers as readers *configure the reader* and other readers are assumed to be capable of and interested in commenting the texts. A lack of OSS research on non-technical reader involvement is identified. Furthermore, not only are the OSS readers configured, but so are OSS writers. In OSS context while writers may be empowered, this clearly does not apply to the non-technical OSS readers. Implication for research and practice are discussed.

## 1 Introduction

This paper outlines an approach following the social shaping of technology (SST) tradition for the critical analysis of the relationships between different actors involved in information technology (IT) artifact development, and further concretizes the approach by utilizing it in the literature analysis of the relationships between the actors involved in the open source software (OSS) development. Particularly the role of users will be examined in the OSS development. The fuzzy and criticized term

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*user*<sup>1</sup> refers to people using a particular IT artifact (Bannon 1991), in direct interaction with the artifact (Beyer and Holtzblatt 1998). IT artifacts are ‘bundles of material and cultural properties packaged in some socially recognizable form such as hardware and/or software’ (Orlikowski and Iacano 2001, p. 121). In OSS context the IT artifacts are packaged solely in software. In OSS development, the source code needs to be ‘available for anyone who wants to use or modify it’ (Niderman et al. 2006, p. 131). There are differences in the licensing agreements, however, due to which there actually is a ‘continuum of openness’ (Niderman et al. 2006, p. 131). OSS development was selected as the object of analysis due to its current nature both in IT research and practice (Fitzgerald 2006; Niderman et al. 2006).

This paper will critically examine OSS literature, particularly from the viewpoint of the role of users in OSS development. It is acknowledged that OSS is targeted at user population, which does not consist only of OSS developers anymore. Traditionally, OSS developers have developed software to serve them and their particular needs, but today, this no longer applies (Fitzgerald 2006). Fitzgerald talks about *OSS 2.0*, referring to the new, commercially viable OSS, related to which IT companies try to gain a competitive advantage of OSS. They release the source code of their commercial products and produce OSS compliant licenses (Dahlander and Magnusson 2005; Niderman et al. 2006). In addition, service and support business related to OSS has emerged: OSS companies have emerged, developing their business around raising money through licensing (Dahlander and Magnusson 2005; Fitzgerald 2006; Ljungberg 2000; Niderman et al. 2006). New product domains are addressed: earlier the OSS product domain was horizontal infrastructure (operating systems, compilers, servers), but nowadays applications are developed for different kinds of vertical product domains that necessitate application domain knowledge (Fitzgerald 2006). The OSS 2.0 phenomenon will be highly influential in the future software landscape and there is a need to analyze it in depth (Fitzgerald *ibid.*).

In this paper, it is acknowledged that nowadays OSS is targeted at a mass of users, not only for developers developing it for their own use. The user population of OSS is becoming larger, including a growing number of non-technical, non-computer professional users, who are not interested in OSS development, but only in the resulting solutions (Bergquist and Ljunberg 2001; Cetin et al. 2007; Franke and von Hippel 2003; Frishberg et al. 2002; Nichols and Twidale 2006; Niderman et al. 2006; Scacchi 2002; Tuomi 2001; Viorres et al. 2007; Ye and Kishida 2003). Related to this, it is assumed that also in the OSS development context, some attention to the (non-technical) users should be paid. It has been widely accepted that users should be involved while developing IT artifacts, both in information systems (IS) and human computer interaction (HCI) literatures. The Scandinavian trade unionist tradition in IS research, and more recent participatory design (PD) traditions have been particularly influential in emphasizing active user participation in IT artifact

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<sup>1</sup> The term is criticized since it positions people only as users of a ‘particular piece of technology’, even though these people and their motives for interacting with the technology include much more (i.e., they are, e.g., particular types of workers, carrying out their work tasks that in part include also the use of the technology, etc.), which should be acknowledged through the terms used. However, in this paper the OSS users are not known in more detail, due to which the paper settles for the very general term user and prospective term reader (again, people being positioned only as ‘readers of a particular piece of text’).

development (see, e.g., Asaro 2000; Greenbaum and Kyng 1991; Spinuzzi 2002). More generally in IS research; user involvement has been a central topic for decades, and currently in need of revisiting (Markus and Mao 2004). The field of HCI has also addressed the development of usable, useful IT artifacts by highlighting the importance of involving the users in approaches such as usability engineering (UE) and user-centered design (UCD) (Bannon 1991; Cooper and Bowers 1995; Kujala 2003). In the field of HCI, however, user involvement has traditionally been accomplished by representing the user in the development (Cooper and Bowers 1995). The responsibility to represent the user has been assigned to a group of HCI specialists labeled, e.g., as usability/UCD/UE specialists in the literature (Iivari 2006). It has been argued that the rhetoric on representing the user has been crucial for the whole legitimacy and identity of the field of HCI (Cooper and Bowers 1995).

As is evident, there is some confusion related to the role of users in IT artifact development. First of all, user involvement can be of different types. It can be direct, but also indirect, in which case user influence is exerted through intermediaries (Mumford 1983). Users' role can be classified as informative, consultative or participative (Damodaran 1996): in informative role users act only as providers of information and as objects of observation, in consultative role they are allowed to comment on predefined design solutions, while in participative role they actively participate in the design process and have decision-making power regarding the design solution (Damodaran 1996). Especially the PD tradition has advocated the participative role for users in the development, while in the HCI literature, where HCI specialists represent the users, user involvement is indirect, i.e., user influence is exerted through these intermediaries. In this situation, it is interesting also to consider the role of the HCI specialists; it can also be classified as informative, consultative or participative in the similar sense as is the case with the role of users (cf. Damodaran 1996). It might be that the HCI specialists are only allowed to act as providers of information or as commentators of predefined solutions. However, they might also be allowed to participate and have decision-making power regarding the solution (Iivari 2006).

Regarding the motives of user involvement, it has been argued that user involvement aims at empowering the users, but the empowerment can be either democratic, which maintains that users have the right to participate in decision-making in their workplace, or functional, which maintains that users have the right to be able to do their job effectively and efficiently, related to which their involvement in the IT artifact development is needed (Clement 1994). Altogether, as one can see, empowerment can be interpreted in many different ways. Management may view empowerment as a tool for motivating the employees to strive for management goals by giving them some power (Hardy and Leiba-O'Sullivan 1998; Howcroft and Wilson 2003; O'Connor 1995). However, from the viewpoint of critical research, empowerment cannot happen through those having power giving some to others, but instead empowerment should be seen as a means to fight against different forms of social domination, i.e., the oppressed combating the oppressors (Hardy and Leiba-O'Sullivan 1998; Howcroft and Wilson 2003; O'Connor 1995). In the context of user involvement literature, these different forms can be identified. Democratic empowerment and the struggle against the capital are evident especially in the Scandinavian

trade unionist tradition, while functional empowerment and giving the users some decision making power are argued for in the mainstream IS and HCI literatures.

There has been a tendency to neglect critical research during recent years. However, calls for critical analyses have also emerged (Asaro 2000; Beck 2002; Howcroft and Wilson 2003; Spinuzzi 2002). Critical research aims to criticize the status quo, to emancipate and liberate the ones studied from oppression and false consciousness, the role of the researcher being to help to eliminate alienation and domination in capitalist or patriarchal society (Orlikowski and Baroudi 1991). One should focus on dominance, power, marginality and exclusion that takes place both in IT development, adoption, and use (Beck 2002). IT artifact development is always conflictual and political, and researchers, instead of defining better development methodologies and accepting the managerial agendas of IT artifact development, should carefully analyze this conflictual and political context and question the agendas (Howcroft and Wilson 2003).

Critical studies on the role of users in IT artifact development have been called for. OSS literature argues that user involvement is an important element of OSS development, but this has also been questioned (Bødker et al. 2007; Feller and Fitzgerald 2000; Nichols and Twidale 2003; Nichols and Twidale 2006; Viorres et al. 2007; Zhao and Deek 2005; Zhao and Elbaum 2003). More generally, literature on IT artifact development suggests that the role of users needs to be critically examined, since user involvement may be used only as a buzzword or weapon for achieving solely managerial ends (see, e.g., Alvarez 2002; Howcroft and Wilson 2003; Kirsch and Beath 1996; Sarkkinen and Karsten 2005; Symon 1998). Critical management research has also shown that even though the term *involvement* is used, only those favorable to management goals are included, and those not favorable are excluded and sent to training that produces so-called involvement (Howcroft and Wilson 2003; O'Connor 1995). Also *empowerment* may be seen as rhetoric trying to conceal that IT artifacts and other kinds of organizational change efforts (e.g., business process re-engineering, total quality management) are designed solely to serve management goals (Casey 1999; Howcroft and Wilson 2003; O'Connor 1995; Sayer and Harvey 1997; Tuckman 1994; Zbaracki 1998).

This paper critically analyzes the role of users in the OSS development by utilizing an approach following the SST tradition (see, e.g., Grint and Woolgar 1997; Bijker et al. 1994; Bijker and Law 1992; Williams and Edge 1996). The approach emphasizes textuality<sup>2</sup> of IT artifacts and their development.

<sup>2</sup> However, it is acknowledged that the metaphor of text clearly provides only a limited viewpoint to the IT artifact development. The limitations have been summarized, e.g., by Iivari (2006): it is emphasized that the metaphor is a particularly limiting one when applied in the IT artifact use context. “Conceptualizing implementation/adoption/use of IT artifacts as mere ‘reading’ does not do justice to the heterogeneity and multiplicity of material and non-discursive practices and consequences of the implementation/adoption/use of the IT artifacts. IT artifacts are not only texts waiting to be read by the readers, but they are texts that will actually be ‘put in use’ and ‘have effects’ in a much broader sense than, e.g., television programs or advertisements; safety-critical systems could be taken as an extreme example.” (Iivari 2006, p. 192). Therefore, it is acknowledged that people interact with physical items in the world. People (i.e., the users, readers) are not only socially constructed, but they act and interact with each other and with the IT artifacts in the material world. However, in the IT artifact development context the metaphor succeeds in emphasizing very important issues, which will be discussed further in the discussion part of the paper.

The approach is influenced by recent developments in literary criticism, feminist and media studies and generally in social sciences. However, increasing interest has been paid to SST analysis also in the IT context (e.g., Grint and Woolgar 1997; Mackay et al. 2000; Suchman et al. 1999; Williams and Edge 1996; Wilson 2002), some studies also in OSS context utilizing its constructs (Divitini et al. 2003; Sack et al. 2006; Tuomi 2001), but not in the sense introduced in this paper. Here, the approach enables critical analysis of technology production and the role of users in that process. Specific focus is on the empowerment of users in that process.

The next section outlines the critical textual approach following the SST tradition utilized in this paper. Central concepts of the approach are discussed. Based on them, the third section analyzes the role of users in OSS development literature. Finally, the fourth section summarizes the results, discusses their implications, and outlines a number of paths for future work.

## 2 Analytical lenses

In this paper SST tradition refers to a ‘broad church’ without clear ‘orthodoxy’ (Williams and Edge 1996, p. 892). However, some general characteristics can be outlined (see, e.g., Grint and Woolgar 1997; Pinch and Bijker 1994; Williams and Edge 1996). The tradition takes as a starting point the social constructivist<sup>3</sup> view of technology. This view has its background in the research on sociology of scientific knowledge. Studies in this area take the content of scientific ideas, theories and experiments as the object of analysis. Scientific knowledge is seen as socially produced. The approach has been applied also in the research on sociology of technology. Within this stream of research, technology is seen as socially produced (Grint and Woolgar 1997; Pinch and Bijker 1994; Williams and Edge 1996). A multitude of different meanings are attached to technological artifacts, and interpretive flexibility of technological artifacts is highlighted (Bijker et al. 1994; Grint and Woolgar 1997; Suchman et al. 1999). Technological determinism is rejected and anti-essentialist perspective advocated (Grint and Woolgar 1997).

Different strands of the studies reflecting the SST tradition can be identified; e.g., social construction of technology (SCOT), SST and actor-network theory labeled studies (Akrich 1992; Akrich and Latour 1992; Grint and Woolgar 1997; Latour 1992; MacKenzie and Wajcman 1985; Pinch and Bijker 1994; Wilson 2002; Williams and Edge 1996). In this paper, the interest is particularly on studies in which the metaphor of text has been utilized in the critical analysis of technology (e.g., Akrich 1992; Akrich and Latour 1992; Latour 1992), and especially of IT (e.g., Bloomfield and Vurdubakis 1997; Grint and Woolgar 1997; Mackay et al. 2000; Suchman et al. 1999; Wilson 2002).

<sup>3</sup> ‘Social constructivism’ has been criticized to be an overused and obscure term (see, e.g., Hacking 1999). It is suggested that one could prefer ‘socially produced’ instead (e.g., Hacking 1999), which is done in this paper.

This leads us to mass media and cultural studies, in which the production and reception of different kinds of texts have been central focuses of study. In these studies there has been a shift of focus from the texts to the audiences. In the beginning, the interest was on the effects of the texts on the audience, the audience being perceived to be only a passive receiver of the texts (Morley 1992). The critical tradition influential in media studies also focused strongly on the ideological functioning of the texts, and studies were textual analyses of the ideological messages the texts were trying to deliver (Ang 1992; Fiske 1987; Morley 1992). Later, however, interest started to turn to the uses of the texts as well, and to how audiences actively make sense of texts. The focus shifted to the specific interpretations of the texts made by the readers and, more widely, to the multiplicity of audiences, heterogeneous interpretations and varying reading contexts and practices (Ang 1992; Fiske 1987; Morley 1992; Weedon 1987, 2004).

Therefore, currently it is emphasized that even though the writers encode a preferred reading into the texts, the readers can negotiate or oppose it as well as adopt it (Hall 1980). It is assumed that during the writing practice, the readers are (more or less) socially produced through offering them natural, obvious subject positions—making the text easy and obvious to make sense of (Fiske 1987; Hall 1980, 1997)—to be occupied. The subject positions must be occupied and the messages decoded accordingly before the message can ‘have intended effects’ and “be put to a ‘use’” (Fiske 1987; Hall 1980, p. 130, 1997). In a situation in which the reader decodes the message in the terms in which it has been encoded, an ideal of ‘perfectly transparent communication’ is achieved (Hall 1980, p. 136). However, the subject positions offered may also be resisted, and the messages decoded in a negotiated or even opposing way (Fiske 1987; Hall 1980, 1997). Critical tradition suggests that the preferred reading is defined by the dominant ideology advocating the interests of the elite groups (Hall 1980, 1997).

Regarding writing, on the other hand, the critical tradition suggests that the writing strategies can be disruptive or conservative, feminist studies classify them as feminine or masculine (Fiske 1987; Hall 1980; Weedon 1987, 2004). Conservative strategy works within a dominant set of structurings of knowledge—relying on the dominant discourses within the organization, research community or society, the disruptive strategy aiming at disrupting these structurings and challenging the mechanisms of order maintenance and domination (Deetz 1996). Furthermore, in recent studies in anthropology and in feminism, media, cultural, racialized and queer studies, there has been a call for previously marginalized and neglected authors (female, black, homosexual, working class, non-Western...) to speak for the marginalized, neglected groups they represent, who have earlier been totally dismissed, or situated only on the side of the reader. The authoritative, marginalizing writers have had full control of the writing of the texts and have utilized a writing strategy advocating the interests of the dominant groups. But now it is argued that a voice should be given to these marginalized groups to enable them to speak—either they are encouraged to write themselves, or at least they are invited, as co-authors, into the writing practice (Clifford 1988; Clifford and Marcus 1986; Weedon 1987, 2004). This discussion bears clear resemblance with the literature arguing for user involvement in the IT artifact writing practice, which will

be discussed further in the next section. However, it needs to be noted that the users as well as these other marginalized groups, all form very heterogeneous groups of people, related to which the differences rather than the similarities should be acknowledged.

In the IT context, it has been pointed out that *users are configured* during development by defining and delineating them and by establishing parameters for their work practices (Grint and Woolgar 1997). The developers inscribe predictions about the world into technological artifacts (Akrich 1992). They produce projected, anticipated users with specific competencies, motives, tastes and aspirations, as well as the relationships between the actors in the use setting (Akrich 1992). They assume certain kinds of relationships between the artifact and the surrounding actors, and attempt to predetermine the use setting, but again, technological determinism is not assumed, but instead it is assumed that the prospective users are able to react to what is prescribed or proscribed in different ways (Akrich 1992; Akrich and Latour 1992; Latour 1992).

Furthermore, it has been emphasized that not only are the users configured, but also the developers. The locale and processes of encoding need also to be considered, and the developers seen as configured—by users, by their own organizations, but also by broader actor networks extending outside their own organizations (Mackay et al. 2000). There are numerous intra-organizational constraints configuring the developers; certain methods and practices need to be followed, and there are also rivalry and complex power relationships between different departments and between different stakeholder groups inside the development organization that affect and constrain the developers and their work (Mackay et al. 2000). Users and customers may also have a lot of influence during the development: users are not necessarily the power weak group, but instead users as buyers, consumers and as the ones making the final adoption decision might be very influential group possibly configuring the developer (Mackay et al. 2000).

### 3 The role of users in OSS development

#### 3.1 OSS literature on the role of users

A review of OSS development literature has been carried out by utilizing numerous electronic databases (ABI/Inform (ProQuest), Academic Search Premier (EBSCO), ACM Digital Library, Ingenta Connect, Elsevier's Science Direct, Springer and IEEE). Keywords used were 'user' and 'usability' combined with 'open source'. Few articles were found to explicitly address the role of users in OSS development. The literature is discussed next.

User involvement has been emphasized as an important element of OSS development (Feller and Fitzgerald 2000; Nichols and Twidale 2006; Zhao and Deek 2005; Zhao and Elbaum 2003). However, it has also been noticed that in OSS development the distinction between user and developer is blurred (Zhao and Deek 2005). In OSS context all users are potential developers. However, the project leader and the core members have the most influence on the OSS (Ye and Kishida



2003). Active developers carry out the main part of the development work (Ye and Kishida 2003). Peripheral developers occasionally contribute (Ye and Kishida 2003). Bug fixers and reporters contribute only by fixing or discovering and reporting bugs (Ye and Kishida 2003). Readers mainly read the source code and try to understand the system (Ye and Kishida 2003). Finally, passive users only use the system (Ye and Kishida 2003). In OSS context, the developers typically produce the OSS for themselves to serve their particular needs without considering the passive users at all. However, exactly for that reason, OSS development has also been argued of utilizing a truly user-driven approach (Nichols and Twidale 2006; Zhao and Deek 2006).

Nevertheless, the OSS community is now acknowledging that ‘we are not our users’ (Frishberg et al. 2002, p. 933), the acknowledgment of which has been the cornerstone of the field of HCI (Nichols and Twidale 2006). From the point of view of non-technical users, usability of the OSS tends to be poor, and the development process anything but user centered (Andreasen et al. 2006; Benson et al. 2004; Feller and Fitzgerald 2000; Nichols and Twidale 2003, 2006; Twidale and Nichols 2005; Viorres et al. 2007; Zhao and Deek 2005, 2006). The field of HCI emphasizes the need of HCI specialists to contribute to the development. Related to that, the problematic is that the HCI specialists do not typically participate in the OSS development and the OSS developers do not normally have the knowledge and skills needed (Benson et al. 2004; Bødker, et al. 2007; Cetin et al. 2007; Frishberg et al. 2002; Nichols and Twidale 2003, 2006; Twidale and Nichols 2005; Zhao and Deek 2005, 2006). In addition, no HCI methods are typically employed, because this can be seen as being in contrast with the open source philosophy; it is assumed that in OSS development there is no possibility for systematic HCI work or formal process models (Benson et al. 2004; Bødker et al. 2007; Cetin et al. 2007; Frishberg et al. 2002; Nichols and Twidale 2003, 2006; Zhao and Deek 2005, 2006).

However, it is argued that there is a great potential for HCI work to contribute to OSS development. One solution suggested is the use of HCI guidelines that outline the best practices of HCI. Especially large corporations that nowadays participate in OSS development can provide professional HCI resources and guidelines (Andreasen et al. 2006; Benson et al. 2004; Cetin et al. 2007; Nichols and Twidale 2003; Viorres et al. 2007). In all, OSS development is a new, challenging context for the HCI community to enter into, and the HCI specialists have to work as evangelists with engineers, who are typically not familiar with HCI and are accustomed to working according to a decentralized and engineering-driven approach (Benson et al. 2004).

Especially usability testing and bug reporting have been suggested as ways to involve the users in OSS development—typically there is a large user base and existing procedures for bug reporting (Andreasen et al. 2006; Benson et al. 2004; Bødker et al. 2007; Cetin et al. 2007; Nichols and Twidale 2003; Zhao and Deek 2005, 2006). Studies have also revealed that user participation in this form has been substantial and effective in OSS development (Zhao and Elbaum 2003). IRC, discussion forums, bug reporting, feature requests, mailing lists, how-to guides and online user manuals are listed as means for user-developer cooperation in OSS development, through which users can deliver input and feedback and



developers provide user support (Ge et al. 2006; Lakhani and von Hippel 2003; Scacchi 2002; Ye and Kishida 2003). However, non-technical users may be uninterested, intimidated or unable to use these means (Cetin et al. 2007; Nichols and Twidale 2003, 2006; Scacchi 2002; Twidale and Nichols 2005; Zhao and Deek 2005, 2006).

Power and politics have already been connected with OSS development. There is a hierarchical structure also in OSS communities; the technically capable and active core team being respected and having authority to make the decisions related to what to include in the code base (e.g., Divitini et al. 2003; Glass 2003; Niederman et al. 2006; Sack et al. 2006; Ye and Kishida 2003). There is meritocracy in OSS projects, and it might be difficult for HCI specialists to show their merits (Andreasen et al. 2006). The OSS developers may welcome HCI specialists as advisors, but they do not want to give them decision making power regarding the solution (Andreasen et al. 2006). Furthermore, in OSS development developer criticism/feedback tends to be considered much more important than end-user criticism/feedback (Luke et al. 2004). Clearly, there is a potential that developer and user interests clash, since users demand stability, but the emphasis in OSS development is on continuous change and flexibility (Tuomi 2001). Finally, a very important factor influencing OSS development is the open source ideology that argues for free software, free information, sharing and gift giving, values code quality and technical knowledge and enables achieving status and reputation through showing one's competence in OSS development (e.g., Bergquist and Ljunberg 2001; Ljunberg 2000; Steward and Gosain 2006). The overall aim is also to oppose commercial software development (e.g., Bergquist and Ljunberg 2001; Ljunberg 2000; Steward and Gosain 2006).

However, as mentioned, also IT companies are getting involved with OSS development, related to which issues relating to power and politics clearly emerge. It has been argued that companies and OSS communities as value creating systems are not similar, and the companies are the ones that need to adapt (Heikinheimo and Kuusisto 2004). An important topic of future research is the integration of OSS with the commercial world, in which there is a desire for profit maximization, while in OSS the emphasis is on 'collectivist, public-good community values' (Fitzgerald 2006, p. 596). There is a potential for tension between 'value for money' and 'acceptable community values' (Fitzgerald 2006, p. 596). Typically companies are not thought highly by the OSS communities, but the companies should try to adhere to the community values and spirit to be accepted by the community (Fitzgerald 2006). On the other hand, researchers have also already shown that the companies and the OSS communities can end up with many different kinds of relationships, and in some cases the company clearly can influence the community (Dahlander and Magnusson 2005).

### 3.2 Critical textual analysis of the role of the users

In this paper it is argued that IT artifacts as texts are full of potential meanings, but also suggest a preferred reading to the readers. It is assumed that during the writing practice the user-readers are (more or less) socially produced, i.e., they are

configured through offering them natural, obvious subject positions making the text easy and obvious to make sense of. The subject positions must be occupied and the messages decoded accordingly before the message can ‘have intended effects’ and “be put to a ‘use’” (cf. Hall 1980, p. 130). In a situation, in which the reader decodes the message in terms in which it has been encoded, an ideal of ‘perfectly transparent communication’ (cf. Hall 1980, p. 136) is achieved. However, the subject positions offered may also be resisted, and the messages decoded in a negotiated or even opposing way.

Critical tradition suggests that the preferred reading of a text is defined by the dominant ideology advocating the interests of the elite groups in patriarchal and/or capitalist society/organizations. In the IT context one can also argue that the preferred reading is encoded into the IT artifact texts—preferred reading being in this case defined by the management. In the OSS context, however, the preferred reading probably reflects the interests of the core team, who are assumed to have personal interest in writing the text, and who are capable of making all the important decisions regarding the text. In the OSS 2.0 context, the participating company might also have some decision-making power regarding the text, but as indicated, the companies are probably those, who need to adapt. However, in case the company has created the community to serve their commercial purposes, it is naturally the commercial interests that are being served.

It has been accepted for decades that the user-readers are to be involved in constructing IT artifact texts. Either it is assumed that the readers are to be in a participative role having right to influence what kind of subject positions and preferred readings are offered to them, or they are to be in a position capable of informing or commenting on what kind of subject positions and accompanying preferred readings are natural, obvious and understandable to them. The HCI literature legitimizes its existence largely with the latter argument, while especially the Scandinavian trade unionist IS and the PD literatures argue for the former.

In both cases it is assumed that the writers are incapable of constructing subject positions that make the texts easy and obvious to make sense of. They encode the preferred reading and subsequent subject positions into the texts, but too often they have been resisted or simply not understood by the readers, due to which *reader involvement* is needed. The readers might be involved in informative role providing information to the IT artifact writers, in consultative role commenting on already written pieces of text or in participative role acting as co-authors actively taking part in the writing practice. The HCI literature also maintains that the involvement can be organized by the HCI specialists, who, furthermore, aim at gaining a position of a co-author in the IT artifact writing practice, but, however, their role might be restricted to be only informative or consultative, i.e., they may be only consulted related to how to write a particular part of a text, or they may be only allowed to comment on already written pieces of text (cf. Iivari 2006).

In OSS context, it has traditionally been assumed that the writers as the readers (or the core team of writers) are capable of constructing the subject positions and associated preferred readings. They alone encode them into the texts without involving other readers. The reader community is assumed to be capable of and interested in commenting the texts and suggesting changes. However, as mentioned,

during recent years the number of *non-technical readers* has been growing and there has emerged a need to take somehow into account these readers as well. However, in OSS literature, *non-technical reader involvement* has not been discussed much.

In the HCI literature addressing the OSS context, it is maintained that reader involvement is to be organized by the HCI specialists. In OSS context it has not been demanded, however, that the specialists should gain the position of a co-author in the writing practice, but instead their role is restricted to be informative or consultative; they are needed for providing HCI guidelines and for commenting the predefined solutions. The OSS writers are assumed to have the power to configure the reader. Reader involvement is needed for indicating what kind of subject positions and accompanying preferred readings are natural, obvious and understandable to the readers. The question of what kind of subject positions and preferred readings are offered in these texts is assumed to be answered by the OSS writers. The non-technical readers are assigned only the consultative role; they are needed only for commenting on predefined solutions through participating in usability tests and through bug reporting.

Regarding *configuring the writer*, on the other hand, as mentioned, it has been argued (Mackay et al. 2000) that also writers need to be seen as configured (as defined and parameters for their work practices established, Grint and Woolgar 1997), by readers, by the writing organization, but also by broad actor networks extending outside their own organization. In OSS context the writers can also be argued to be configured, but clear differences can be identified. In OSS context the core team can be argued of having enormous power in configuring the writer in the sense that they are the decision makers related to what to include in the code base, whose contributions are accepted, and what features requested will be implemented (e.g., Divitini et al. 2003; Glass 2003; Niederman et al. 2006; Sack et al. 2006; Ye and Kishida 2003). Since OSS is written by the writers, who also are the readers of these texts, the readers can be argued of being clearly empowered. However, when considered from the viewpoint of the non-technical readers, the situation is actually the opposite. In OSS context there seems to be no tradition in contacting or involving the readers or HCI specialists representing the readers in the writing practice.

Furthermore, open source ideology can be argued of truly configuring the writer; the ones willing to become OSS writers need to acknowledge the basic values such as free software, free information and gift giving, through which (and through showing technical competence) one can achieve status and reputation (Bergquist and Ljunberg 2001; Steward and Gosain 2006). OSS development opposes the world of commercial software development. The goal is to empower the writers from the domination of commercial software development companies. Critical research suggests positioning IT artifact writers as warriors, partisans, activists and emancipators of the oppressed ones (Hirschheim and Klein 1989). The OSS writers can be positioned as some kind of emancipators, the oppressors in this case being the commercial software companies. However, it seems that the non-technical users are still not given any decision making power. Either their empowerment is totally neglected, or they are to take part in consultative role (through bug reporting and usability testing), or they are to be represented by the HCI specialists, who are to take part in informative or consultative role.

Furthermore, regarding empowering the OSS writers, one can argue that the companies entering the OSS development context and the other OSS communities might have some influence in configuring the writer as the broader actor networks mentioned earlier. They may wish also to be able to decide what is included in the code base and what kind of features will be implemented in the future. In the case of companies, it has been argued that the companies are the ones that need to adapt and try to adhere to the community values and spirit (Heikinheimo and Kuusisto 2004; Fitzgerald 2006). However, this argument needs to be reconsidered in the OSS 2.0 context; it is not necessarily the companies that need to adapt, but the relationship can be of many different types (cf. Dahlander and Magnusson 2005).

The results of the analysis are summarized in Table 1.

#### 4 Concluding discussion

This paper has argued for a critical textual approach following the SST tradition in IT research, and concretized the approach in the analysis of the role of users in OSS development. IT artifacts were seen as texts written by the writer-developers and read by the reader-users. As a result, user involvement was conceptualized as *reader involvement* in the writing practice. Reader involvement tries to contribute to the *configuration of the reader*, i.e., the way the readers are defined and parameters for their reading practices established in the IT artifact text. In the literature advocating reader involvement in the writing practice, it is assumed that the readers should be empowered to influence what kind of subject positions and preferred readings are offered to them, or it is assumed that they should be empowered to indicate what kind of subject positions and accompanying preferred readings are natural, obvious, and understandable to them. The literature advocating *HCI specialists to represent the readers* in the IT artifact writing practice has traditionally legitimized its existence with the latter argument, while especially the critical IS and PD literatures emphasize the former.

In the OSS context, the IT artifact writers as the readers configure the reader, and other readers are assumed to be capable of and interested in commenting on these texts. Very few articles arguing for *non-technical reader involvement* or for *HCI specialists representing the non-technical readers* in the OSS context were found. Clearly, the OSS writers and the technically capable OSS readers are empowered to take part in the decision making regarding the texts, but the non-technical OSS readers are neglected. Research on enabling the non-technical reader involvement in OSS writing practice needs to be initiated.

Another interesting path for future work would be to consider the role of the HCI specialists in the OSS writing practice. As has been reported, their role tends to be only informative or consultative in the IT artifact writing practice, but some literature argues for a more participative role. In the OSS context, where emphasis is especially on technical competence, this is unlikely to be achieved. The OSS writers are probably not willing to allow the HCI specialists decision-making power in the OSS writing practice (cf. Andreassen et al. 2006). The HCI specialists are likely to concentrate on indicating what kind of subject positions and accompanying

**Table 1** The role of users in IT artifact and OSS development

	IT artifact texts in general	OSS texts in particular
Empowering the reader and the writer	<ul style="list-style-type: none"> <li>• The readers suggested to be (democratically) empowered to take part in decision making regarding the subject positions and preferred readings offered in the texts</li> <li>• The readers suggested to be (functionally) empowered to indicate what kind of preferred readings are natural, obvious and understandable for them</li> </ul>	<ul style="list-style-type: none"> <li>• The OSS writers are (democratically) empowered to decide the subject positions and preferred readings offered in the OSS texts</li> <li>• The <i>technical readers</i> are (democratically) empowered to take part in decision making regarding the subject positions and preferred readings</li> <li>• The <i>non-technical readers</i> suggested to be (functionally) empowered to indicate what kind of preferred readings are natural, obvious and understandable for them</li> </ul>
Configuring the reader	<ul style="list-style-type: none"> <li>• IT artifact writers configure the reader</li> <li>• The readers suggested to take part in informative, consultative or participative role</li> <li>• The readers suggested to be represented by the HCI specialists, who are suggested to take part in informative, consultative or participative role</li> </ul>	<ul style="list-style-type: none"> <li>• OSS writers, as readers, 'configure the reader'</li> <li>• The <i>technical readers</i> take part in consultative or participative role</li> <li>• The <i>non-technical readers</i> suggested to take part in consultative role</li> <li>• The <i>non-technical readers</i> suggested to be represented by the HCI specialists, who are suggested to take part in informative or consultative role</li> </ul>
Configuring the writer	<ul style="list-style-type: none"> <li>• IT artifact organizations (methods, power and politics, business needs) configure the writer</li> <li>• The readers (and the HCI specialists representing the readers) configure the writer</li> <li>• Broader actor networks (e.g., consumers, buyers, researchers) configure the writer</li> </ul>	<ul style="list-style-type: none"> <li>• OSS community (core team, open source ideology) configures the writer</li> <li>• Broader actor networks (OSS 2.0 companies, other OSS communities) might configure the writer</li> <li>• The <i>non-technical readers</i> (or the HCI specialists representing the <i>non-technical readers</i>) currently do not, but could configure the writer</li> </ul>

preferred readings are natural and understandable to the readers. The question of what kind of subject positions and preferred readings are altogether offered to the readers is to be answered by the OSS writers, who also in the future are likely to write the OSS to serve their own needs as well as other readers'. However, future research should consider in more detail what the role of the HCI specialists should and could be in the OSS writing practice.

It was also emphasized that not only are the readers configured during the writing practice, but also the writers. Intra-organizational constraints, the readers and the broader actor networks have been argued to *configure the writer*. In OSS context the core team of writers can be argued of having a lot of power as the configurers of the writer. The non-technical readers can hardly be argued of configuring the writer at all. Open source ideology, on the other hand, can be argued of truly configuring the writer. This ideology opposes the commercial interests associated with IT artifact

development and emphasizes the empowerment of the OSS writers. However, this argument needs to be reconsidered in the OSS 2.0 context, in which future research is needed (cf. Fitzgerald 2006), including empirical, interpretive research on mixing of these two, clearly conflictual worlds.

Open source ideology resonates with critical tradition in stressing the emancipation of the oppressed or, at least, in criticizing and opposing commercial software development. However, the researchers arguing for more reader involvement in the OSS writing practice do not refer to critical tradition at all. The researchers arguing for studies on OSS development—to improve the IT artifact writing practice in general, or the OSS writing practice in particular—seem rather to concentrate on defining better methodologies and accepting the managerialist agendas of IT artifact development than to question the agendas (cf. Howcroft and Wilson 2003; O'Connor 1995). Empirical, critical research on OSS development could utilize the approach discussed in this paper and analyze what kind of subject positions and preferred readings are offered in OSS texts. Also analysis of the offered and occupied subject positions, and associated preferred, negotiated and opposing readings would be interesting. Furthermore, configuration of the writer should also be acknowledged in relation to these texts and their reading/writing.

Regarding limitations, as mentioned, the metaphor of text clearly provides only a limited viewpoint to the IT artifact development. However, the metaphor also succeeds in emphasizing important issues (see, e.g., Suchman et al. 1999) relating to the complexity and uncertainty related to encoding and decoding messages in any kind of text. The preferred readings and subsequent subject positions can be adopted, but also negotiated or even opposed. The configuration of the reader, which takes place in writing any kind of text, is to be acknowledged: the practitioners writing the IT artifact texts should understand their role as the configurers of their reader, but also acknowledge that textual determinism is to be rejected. Finally, it is emphasized that using any kind of metaphor makes people see and understand phenomena in 'distinctive yet partial ways'; using a metaphor produces always a simplified picture of reality; it highlights certain aspects and sets aside some other (Morgan 1986, p. 12). The metaphor of text proved to be highly useful in the critical examination of the relationships between different actors involved in IT artifact development, and particularly of the role of users in the OSS development. Other researchers are warmly invited to utilize this powerful tool in similar type of analysis.

Regarding practical implications, first of all it is emphasized that to a certain extent OSS development really empowers the users. Especially the OSS developers are empowered to produce software that suits their needs. Also technically capable OSS users are empowered to take part in the development or at least to comment the solutions. However, the situation is problematic from the viewpoint of non-technical users, which as a user group will constantly grow in the OSS context. Related to their involvement, the OSS developers should try to utilize their existing mechanisms devised for that: IRC, discussion forums, bug reporting, feature requests, mailing lists, how-to guides and online user manuals have already been used as means for user-developer cooperation. However, the non-technical users might be uninterested, intimidated or incapable to use these tools. Thus, also the

need for HCI specialists is quite evident in OSS development. The HCI specialists are trained to represent the users in the development. They can carry out empirical inquiries in the user population and organize usability tests and other kinds of usability evaluations (see, e.g., Iivari 2006). An open question, however, is the role of these specialists in decision-making: as mentioned, it has been reported that the OSS developers are reluctant to give any decision-making power to the HCI specialists (cf. Andreasen et al. 2006). However, if the HCI specialists do not have any decision-making power, there is a great risk that their work does not have any effect on the solution, and they are perceived only as police pointing out negative issues (cf. Iivari 2006). For this reason, the HCI specialists should also be empowered in OSS development, but it is up to the OSS developers to enable that.

Regarding paths for future work, especially critical, empirical studies on the role of users in the IT artifact and OSS development context are recommended. In these studies, one could examine the writing strategies (be they conservative or disruptive) in more depth, and particularly from the viewpoint of the (IT artifact, OSS) writer. Configuration of the writer needs to be empirically explored. In addition, the (IT artifact, OSS) texts could be analyzed as embodying and realizing particular preferred readings and associated subject positions. One could critically analyze whose interests are being served in these texts. Furthermore, studies on reading the (IT artifact, OSS) texts including analyses of both offered and occupied subject positions and associated preferred, negotiated and opposed readings would be interesting, even though, as mentioned, the metaphor is a limited one especially in the use context. Finally, studies on the role of readers in OSS writing practice are called for. Especially empirical analyses of the ways the OSS readers and the HCI specialists representing the OSS readers currently are—and could be in the future—involved in the OSS writing practice are recommended.

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