Distributed Participatory Design: An Inherent Paradoxon?

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Abstract. This paper contains a study on how Participatory Design (PD) and distributed software development (DSD) are linked up and whether Distributed Participatory Design is an inherent paradoxon. For this purpose, potential areas of conflict for DSD are identified and two literature surveys of PD and DSD literature have been done.

Introduction

Software development projects face more and more distributed project settings due to fast growing globalization, networked organizations and the extensive use of internet technologies. The trend towards DSD is growing (Audy et al. 2004). Companies at different locations work together — as partners in networked organizations, as customers and contractors, or in the course of offshoring and outsourcing (Heeks et al. 2001). In such environments, software development takes place and therefore software development has to deal with different dimensions of distribution like physical, organizational or temporal distribution, and several challenges like cultural differences, dispersed tasks or information access respectively (Gumm 2006). In distributed environments, communication and knowledge sharing is challenging (Coar 2004; Audy et al. 2004). In particular, this is true for tasks regarding user involvement or requirements engineering since they need extensive communication.

Participatory Design (Floyd et al. 1989; Muller et al. 1993) focusses on the relationship between developers and users and the real involvement of users in the
development process. PD approaches aim at decreasing the distribution of users and developers so that either designers participate in users’ worlds, or users directly participate in design activities, or a mix of both (Muller et al. 1993).

It seems like PD and distributed development being mutually exclusive. Another picture results from the PD conference 2004 keynote by Tone Bratteteig. She emphasized the challenge of globalization that Participatory Design has to face. Furthermore, one can find articles in the PD literature addressing single aspects of distributed environments, e.g. (Divitini et al. 2000; Finck et al. 2004). However, often PD approaches are applied in research or other public projects that differ from commercial projects. Literature about (global) distributed software development mainly address commercial project environments.

The research question discussed in this paper is: Are Participatory Design and Distributed Software Development incompatible concepts? In other words: Is Distributed Participatory Design an inherent paradox? We will discuss this question in the following steps: In the next section, we approach to Distributed Participatory Design (DPD) by introducing briefly the areas of Distributed Software Development (DSD) and Participatory Design (PD), and by identifying areas of potential conflict. After that, two literature surveys, focussing on the identified areas of potential conflict, are presented and discussed. The paper closes with a summary and suggestions for further work.

**Approach to Distributed Participatory Design**

For a fist approach to DPD we will discuss what DPD is about. We deal, on one hand, with distributed software development, and on the other hand with participatory design. For our discussion, distributed software development represents the *project settings*, the environment in which software development takes place. Participatory design represents the *approach to develop software* and to design the process respectively. Figure 1 is a graphical presentation of this context.

We will now have a closer look in what way distributed project settings and participatory design principles might be conflicting or even incompatible. For this purpose, DSD and PD are briefly introduced in the next two subsections. In the third subsection, potential conflicts of DSD and PD are identified.
Distributed Project Settings

Distributed software development describes project settings that are characterized on one hand by the fact that people, stakeholder groups and thus other entities are distributed; and on the other hand by several challenges caused by the distribution (Gumm 2006). For our discussion in this paper, we concentrate on the distribution of individuals and stakeholder groups. For them three dimensions of distribution have been identified: physical, organizational and temporal distribution (Gumm 2006).

The physical distribution of people is the most obvious dimension of distribution: people working at different locations spread over a country, continent or even the world are working together. Organizational distribution is related to the structures people are working in. Organizational distribution means that the given project people are involved in does not necessarily present the structure of their everday-work or employer organization. The temporal distribution refers to the synchronicity of working hours, i.e. time people are available for same-time interaction.

In addition, distributed projects are often characterized by its economical focus, (globally) taken out for economical reasons (Holz et al.1998). In DSD literature, distribution is accepted as a given project circumstance. DSD papers mostly report on approches to deal with challenges caused by distribution. Some examples of such challenges are given in the next paragraphs.

One major challenge are the cultural differences. An example for cultural differences is e.g. that US companies prefer “working with extensive written agreements and explicit documentation (...). Japanese clients tend to prefer verbal communication, more tacit and continuously negotiated agreements (...)” (Krishna et al. 2004). Cultural differences refer not only to national cultures, but also to project or organization cultures (Evaristio & Scudder 2000). Organizational culture and the project orientation of the organization are part of the people’s background
and implicit assumptions. The difference between backgrounds and assumptions on different sites might be one source of misunderstandings (Evaristo & Scudder 2000).

Another important issue is information access and management across different sites and stakeholder groups, discussed e.g. by Ćubranić & Booth (1999). Documents, code and other artifacts are spread among several locations. For example, in OSS projects, requirements appear from different stakeholder groups (developers, other users) or from vision documents, and are “spread across different kinds of electronic documents including Web pages, sites, hypertext links, source code directories, threaded email transcripts, and more” (Scacchi 2001). The dispersion of requirements documents and other artifacts can cause problems like a lack of information or information overhead, inconsistency or undiscovered incompleteness.

Participatory Design Approach

PD origins in workplace democracy and shared power (Kensing & Blomberg 1998). One goal of PD is to enable workers to make effective contributions to the development and design (Muller et al. 1997). Nowadays the discussions include the developer-user-relationship in various contexts (Carmel et al 1994; Sjöberg 1996). Even though PD approaches are developed for workplace technology in general, we limit the discussion in this paper to software development. Kensing and Blomberg (1998) distinguish between three PD areas of concern: (1) the politics of design, (2) the nature of participation and (3) methods, tools and techniques for carrying out design projects.

In the area of politics PD aims, e.g., at workplace democracy (Muller et al. 1993) or at “the empowerment of workers so they can codetermine the development” (Clement & Van den Besselaar 1993). Such aims contribute to the goal of work-oriented software development: workers know best what kind of (software) support they need; therefore they should play a major role in the process (Muller et al. 1993) to articulate their needs. Related goals can be found in Mumfords well-known approach to PD, ETHICS, (Mumford 1993). Three principal objectives of ETHICS are a common/shared responsibility, giving users a major role, and giving people opportunity to design their own work life.

The area of participation contains issues like establishing a close relationship between users and developers (Carmel et al. 1994) which is necessary for mutual understanding and respect. According to Kensing and Blomberg (1998), basic requirements for a participatory process are access to relevant information, the possibility for taking an independent position on the problems, participation in decision making, availability of appropriate participatory development methods, and room for alternative technical and/or organizational arrangements.

The area of tools and techniques include principles of organization as well as tools and techniques that “support users to see the connections between their work
and abstract and technically-oriented descriptions of new systems” (Kensing and Blomberg 1998). Organizational techniques to support a cooperative process between different stakeholders are, e.g.: a democratic process (Muller et al. 1993) to give users a major role in the decision-making process; mutual learning (Carmel et al. 1993) to enable the participants to understand the others’ domain or to develop a shared vision of the future technology; facilitated interaction (Carmel et al. 1993) or facilitated requirements engineering (Macaulay 1999) to help the stakeholders with different backgrounds to communicate in an adequate way.

PD approaches address mainly the requirements handling tasks in a software development process. Even if there are techniques to involve users in the implementation process, for example via end-user programming (Repenning et al. 2001), most of the PD approaches focus on issues like vision development, requirements elicitation, requirements negotiation etc. This is no surprise since requirements are a natural contribution by the users to the development process. As Kensing & Blomberg (1998) state, participating users could take an active part in

- the analysis of needs and possibilities,
- the evaluation and selection of technology components,
- the design and prototyping of new technologies and
- the organizational implementation.

Conflicts in DPD

As we have seen in the last subsections, DSD as well as PD cover several areas of interest; and not all areas of one field will be in conflict to all areas of the other. In the following, we will discuss this first from the viewpoint of DSD and then from the viewpoint of PD.

Main challenges in the DSD area of organizational distribution refer to different organizational cultures and habits, the different background of the people and thus to different ‘languages’ that might cause misunderstandings (Evaristo & Scudder 2000, Krishna et al. 2004). The PD approach has it’s actual strength in dealing with such problems: The mediation between workers and management represents the mediation between different organizational areas. Mutual learning also aims at decreasing organizational distribution since it aims at enabling the participants to understand the others’ domain. General facilitation techniques support the communication between stakeholders with different backgrounds.

The physical distribution seems to be a bigger challenge for PD and the main area of potential conflict. For example, on one hand the physical distance between people hampers informal communication (Lanubile et al. 2003) that might lead to a lack of information in a project. On the other hand, information access is a critical requirement to conduct PD projects. A second example is the physical distribution of tasks. For projects where people and their skills are spread over distant places, Turnlund (2004) recommends to compose “the teams to discrete
tasks on a geographic basis” to minimize communication overhead. This, in turn can cause that people “work[ing] almost exclusively” (Coar 2004). Such task separation hampers synchronous work, face-to-face meetings, the cooperation and mutual learning between these groups. Furthermore, separation by time and space causes the “difficulty of building trust among remote developers” (Lanubile et al. 2003) which might also hamper cooperative or democratic design processes.

In the area of politics PD focusses on users’ rights to greater control or information access. The design interest lies more on users’ satisfaction, on system quality and on the idea of designing tools for skilled work. These goals are not necessarily conflicting distributed project settings, however, they are barely mentioned in DSD literature. Rather, economical reasons play a major role in (globally) distributed software development (Holz et al. 1998).

More conflicts seem to be in the area of participation and the respective tools and techniques. The distribution of stakeholders makes the information access and interchange quite difficult. Facilitation methods to mediate between stakeholder groups mostly rely on face-to-face meetings. Mediated cooperation via E-mail, telephone or internet technologies hampers the real involvement of users. Issues often cannot be discussed in the same detail level than on face-to-face meetings.

Thus, the potential inherent paradoxon of DPD seems to lie in the PD area of user participation and the physical dimension of distributed project settings. Participation and physical distribution are main concepts of Distributed Participatory Design and these concepts tend to conflict each other. However, PD projects are already confronted with distributed settings (e.g. Finck et al. 2004). In addition, the communication between stakeholder groups and the problems respectively are a major topic in distributed projects (Gumm 2005).

In order to follow these links between participation and physical distributed project settings, two literature surveys have been carried out which will be described in the next section.

Literature Surveys

The literature surveys presented here are carried out to analyze in what way the areas of PD and DSD are connected. Goal of these surveys is to find indications whether the concepts of physical distribution and users’ participation in the development process really represent an inherent paradoxon of DPD.

The first literature survey addresses the question: Are PD (related) issues addressed in DSD literature and in what way? For this purpose, a literature base had been identified. The contributions had been evaluated regarding PD issues as discussed above. Main leading keywords used to evaluate the literature base were (related to the areas of politics, participation and tasks for participation):

- user empowerment (politics)
- common/shared responsibility (politics)
• user-developer-relationship (participation)
• user involvement (participation)
• mutual understanding (participation)
• Requirements engineering tasks like requirements elicitation, vision development, analysis of needs, evaluation of technology (task).

Since this literature survey showed that PD issues are barely mentioned in DSD literature, a second survey had been carried out to find indications for how participatory design can deal with distributed project environments. For this study, also a literature base had been identified. Here, the contributions were evaluated regarding DSD issues referring to the physical distribution of stakeholders:
• Geographically distributed users and developers;
• Geographical distribution within a developer team;
• Appliance of PD techniques in distributed settings.

DSD Literature Base

The workshops on Coordinating Distributed Software Development Projects were held at WET-ICE. The workshops on Software Engineering over the Internet took place at the ICSE. The workshops on Global Software Development are the continuation of the ICSE workshops. The IEEE Software published a special issue (Volume 18(2)) addressing global software development. ACM Queue published a special issue (Volume 1(9)) addressing distributed development.

The other papers are collected from various general IS conferences (e.g. HICSS, ICEIS), journals and books. The selection in this category was made by finding interesting papers cited by other papers as well as by scanning online data bases of conference proceedings, digital libraries and journals. This inquiry included, among others, ACM Digital Library, IEEE Computer Society Digital Library, SpringerLink (the electronic data resource of Springer), the AIS e-Library. In addition, I searched for keywords, for example with Google Scholar or the Computer Science Bibliography of the University of Trier. Twelve papers were found that address the social context of distributed Software development published between the years 1998 and 2004.

Table 1 summarizes the literature base. In the left column the paper sources are listed. The middle column contains the years in which the corresponding papers were published. The right column contains the total amount of papers. One exception is the section for “other papers”. Here, the total amount of papers do not reflect all investigated papers in this category (since the category includes many conferences etc.) but inherently a selection of papers that address social or requirements engineering related issues in distributed software development.

\[\text{http://www.informatik.uni-trier.de/\~{}ley/db/index.html}\]
Table 1. DSD Paper Sources

<table>
<thead>
<tr>
<th>Sources</th>
<th>Years</th>
<th># Papers</th>
</tr>
</thead>
<tbody>
<tr>
<td>WS on Coordinating Distributed SWD Projects</td>
<td>1998,1999</td>
<td>20</td>
</tr>
<tr>
<td>WS on SW Engineering Over the Internet</td>
<td>1998–2001</td>
<td>38</td>
</tr>
<tr>
<td>WS on GSD</td>
<td>2002–2004</td>
<td>19</td>
</tr>
<tr>
<td>IEEE Software: GSD</td>
<td>2001</td>
<td>11</td>
</tr>
<tr>
<td>ACM issue on Distributed Development</td>
<td>2003</td>
<td>11</td>
</tr>
<tr>
<td>Other papers</td>
<td>1998–2004</td>
<td>12</td>
</tr>
<tr>
<td>Total amount of papers</td>
<td></td>
<td>111</td>
</tr>
</tbody>
</table>

Table 2. PD Paper Sources

<table>
<thead>
<tr>
<th>Sources</th>
<th>Years</th>
<th># Papers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participatory Design Conference</td>
<td>1990-2004</td>
<td>334</td>
</tr>
<tr>
<td>SJIS</td>
<td>1989–2005</td>
<td>161</td>
</tr>
<tr>
<td>CPSR Bibliography</td>
<td>1974-1998</td>
<td>178</td>
</tr>
<tr>
<td>Total amount of papers</td>
<td></td>
<td>673</td>
</tr>
</tbody>
</table>

PD Literature Base

Since PD is a much older research field than DSD, much more literature can be found here. In addition, PD literature can be found not only in the PD domain itself, represented e.g. by the biannual PD conference. In addition, the fields of HCI or CSCW include a variety of PD contributions. Thus, the PD literature base is, even though it contains more contributions than the DSD literature base, more a snapshot on the PD research. However, since this survey aims at finding examples of distributed PD and at getting an insight of how distributed settings are addressed rather than to provide a complete literature analysis, the PD literature base is limited to the following resources:

The PD conference proceedings from 1990 until 2004 include around 334 contributions like regular conference papers, short papers, work in progress papers or workshops. The Scandinavian Journal of Information Systems is not restricted to PD related issues but a main PD resource accordings to the CPSR. However, for this survey, all 22 issues with 161 papers from 1989 until 2005 have been consulted. The PD bibliography provided by the CPSR is a list with 199 entries with publications until 1998. The list consists of single papers as well as of books or whole special issues on PD. Four entries refer to PDC proceedings and seventeen entries are papers from the SJIS. Thus, the bibliography provides 178 additional papers. Table 2 summarizes the literature base which is designed analog to Table 1.
DSD Literature Survey Results

PD by its name is barely mentioned in DSD literature. Even though social-technical problems are a topic in several papers, especially regarding RE tasks and cultural differences, only few contributions have been identified that relate to PD.

The result is presented in Table 3 where the reader can find the paper resource, the total amount of papers and the references found respectively. The references are cut into two areas: The first area, called RE (requirements engineering), refers to the software development tasks where users contribute most frequently. The papers found for this category do not relate explicitly to PD issues. However, many aspects of RE relate to socio-technical problems as well as PD does (e.g. involvement of stakeholders, requirements negotiation, managing conflicting user needs and system requirements, see e.g. (Macaulay 1996)). The second area called PD contains references that address PD issues as discussed above.

Requirements engineering as the main area of tasks where user could participate in the development process is topic of various contributions. One subject matter is requirements elicitation and management in general (Rönkkö 2002) and regarding the usage of groupware (Herlea and Greenberg 1998), the analysis of global software development by means of the Capability Maturity Model (Prikładnicki et al. 2003), open source software development (German 2003) or challenges of distribution (Zowghi 2001). Damian & Eberlein (2001) discuss groupware support for distributed requirements negotiation and Damian et al. (2003) address the problem of workspace awareness in the requirements management process. Several socio-technical issues that arise during RE tasks are addressed, for example the social effects of using groupware support (Damian & Eberlein 2001), RE that is complicated by the unavailability of good tools that support collaboration across time and space (Hersleb and Moitra 2001), and problems related to collaborative theory building (Rönkkö 2002).

The relationship between stakeholder groups in general is mentioned by several papers (Oppenheimer 2001, Damian 2002, Paasivaara 2003, Evaristo & Scudder 2000). The relationship between users and analysts is a topic by Audy et al. (2004). Evaristo and Scudder (2000) point at the many types of stakeholders in a project and the impact on contracts, different perceptions and the distributedness. However, since these topics are touched by the papers in a quite general way, they are not included in the PD section of the summarizing table.

Discussed challenges regarding the relationship between users and developers or analysts respectively are also issues in PD:

Information access: Kaiser et al. (1999) accentuate the need for providing the user with the information needed at each stage of the development process. Paasivaara (2003) addresses the needed transparency of the project process to keep stakeholders informed about the progress.
Trust and respect: The aspect of establishing relationships of trust and respect is mentioned by Oppenheimer (2001), an issue also mentioned in the workshop report (Damian 2002) as a topic for further research. Even if this aspect is not explicitly discussed regarding PD or user-developer–relationship, it is, however, an aspect close to PD and therefore this paper is included in Table 3.

Mutual knowledge/understanding: The paper by Audy et al. (2004) addresses distributed analysis with which the authors focus on the early stage of the (distributed) software life cycle. Their goal is to understand the distributed analysis process better and to identify sources of problems. They address the difficulties in communication from a mutual knowledge perspective: “lack of shared context inherent in a dispersed environment creates additional problems for developing shared understanding between communication partners”. Cultural problems and the reference to the need for mutual understanding are mentioned by (Coar 2004, Olson & Olson 2004); unfortunately this was only discussed regarding developer team intern and thus it is not included in Table 3.

The contribution of Repenning et al. (2001) is the most PD-related contribution in the literature base. In this project different stakeholder groups worked closely together to enable a very fast cycle time. Interesting is that the first stage was not distributed at all. But a culture of discussion had been maintained over the entire project period and several techniques to involve users had been applied like creating mockups, end-user-programming, web-based prototypes to enable discourses in the distributed phase.

<table>
<thead>
<tr>
<th>Resource</th>
<th>#</th>
<th>PD</th>
<th>RE</th>
</tr>
</thead>
<tbody>
<tr>
<td>WS on Coordinating Distributed SWD projects</td>
<td>20</td>
<td>Kaiser et al. 1999</td>
<td>Herlea &amp; Greenberg 1998</td>
</tr>
<tr>
<td>WS on SW Engineering Over the internet</td>
<td>38</td>
<td>--</td>
<td>Damian &amp; Eberlein 2001</td>
</tr>
<tr>
<td>WS on GSD</td>
<td>19</td>
<td>Oppenheimer 2001</td>
<td>Damian 2001; Zowghi 2001;</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Damian et al. 2003; Prikldniki et al. 2003; German 2003;</td>
</tr>
<tr>
<td>ACM issue Distributed Development</td>
<td>11</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Other papers</td>
<td>12</td>
<td>Audy et al. 2004</td>
<td>Rönkkö 2002</td>
</tr>
<tr>
<td>Total amount of papers</td>
<td>111</td>
<td>4</td>
<td>10</td>
</tr>
</tbody>
</table>

Table 3. Results: PD in DSD Literature
PD Literature Survey Results

A variety of PD contributions deal with geographical distribution in one or the other way. The results are presented in Table 4. The papers found, and thus the table, cut into three areas: The first area called *General* includes papers that address issues of distribution in general. Papers about the appliance of PD techniques can be devided into two areas: PD techniques applied in distributed settings (table column *Distributed settings*) and PD techniques adapted for distributed project settings (table column *DPS* (short for Distributed Participatory Design)).

Several papers deal with geographical distribution in general. The distribution between users and developers is most frequently a topic for product development in general (Grudin 1993; Grønbæk et al. 1993), large scale projects (Oostveen & van den Besselaar 2004), large organizations (Pilemalm & Timpka 2004) with geographically distributed business units (Ruhleder & Jordan 1998) and for large user groups (Carmel et al. 1994, Grudin 1993, Irestig & Timpka 2002). The larger the amount of users, the bigger is the difficulty of establishing a close relationship between users and developers (Carmel et al. 1994). Discussed issues that come along with distributed stakeholder groups are, for example: the distribution of artifacts among systems (Beuschel et al. 1994), the usage of the infrastructure metaphor to apply PD principles (Neuman and Star 1996) or the sharing and coordination of information, knowledge and memory in mobile and dispersed (Kristofferson and Ljungberg 1997).

Often, PD techniques that require the participants being at one location are somehow applied in distributed settings: Kahler (1996) used interviews and workshops for the development of groupware for the geographically distributed government. Hallberg et al. (1998) developed a special method which contains PD techniques used for developing inter-organizational information systems. Lenman et al. (2000) used PD techniques to create a communication environment between three different locations of a distributed workplace. PD techniques like workshops were held by visiting the locations one by one in two rounds. The Action Design (AD) technique, actually developed for small and geographically concentrated groups, is modified to build a system that would suit 225000 users (Irestig & Timpka 2002). For the resulting method, called DISC, AD has been modified to longer and fewer meetings. Oostveen & van den Besselaar (2004) supported local involvement of users with using a variety of PD methods in a project where users are coming from different countries and have different cultural background. Organizational Prototyping (OP) as a PD method is introduced by Bardram (1996) to deal with “the amount of people involved and their distribution in time and space”.

The adaption of PD techniques for distributed settings is used for interaction analysis, e-prototyping and the general involvement of users. Ruhleder and Jordan...
(1998) adapted VIBA (Videobased Interaction Analysis) which is traditionally used in single-site settings. Bleek et al. (2002) frame the participation of web users to get feedback on frequently released software versions with e-Prototyping. Dearden et al. (2004) discuss electronic paper prototyping which could be applied when users and designers are not able to arrange a face-to-face meetings. For user involvement in general, internet-based technologies are used in several ways (Divitini et al. 2000, Farshchian & Divitini 1999). Questionnaires are used by Beuscelh (2000) to involve the distant alumni, a user group that is “defined rather by their absence than presence”. Mediated feedback is used to support a participatory process with a large and unknown user group (Finck et al. 2004) where a groupware system as well as humans serve as media. Salz (2004) presents a tool called Integrated Polling that combines the advantages of e-forums and e-surveys to support e-participation. Henninger & Sieber (2000) report on a study on software engineering in small enterprises and the use of new media for user participation. The authors conclude that the size and resources of software firms and the communicative needs of developers influence user participation rather than the technical possibilities of new media.

<table>
<thead>
<tr>
<th>Resource</th>
<th>#</th>
<th>General</th>
<th>Distrib. Settings</th>
<th>PD</th>
</tr>
</thead>
<tbody>
<tr>
<td>PDC</td>
<td>334</td>
<td>Carmel et al. (1994); Beuscelh et al. (1994); Neumann &amp; Star (1996); Henninger &amp; Sieber (2000); Pilemlam &amp; Timpka (2004).</td>
<td>Kahler (1996); Hallberg et al. (1998); Lenman et al. (2000); Irestig &amp; Timpka (2002); Oostveen &amp; van de Besselaar (2004).</td>
<td>Ruhleder &amp; Jordan (1998); Divitini et al. (2000); Farshchian &amp; Divitini (1999); Beuscelh (2000); Bleek et al. (2002); Dearden et al. (2004); Finck et al. (2004); Salz (2004).</td>
</tr>
<tr>
<td>SJIS</td>
<td>161</td>
<td>Kristofferson &amp; Ljungberg (1997)</td>
<td>Fitzpatrick (2000); Bardram (1996);</td>
<td>--</td>
</tr>
<tr>
<td>CPSR bibliography</td>
<td>178</td>
<td>Grudin (1993); Grønbæk et al. (1993).</td>
<td>--</td>
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</tr>
<tr>
<td>Total amount of papers</td>
<td>111</td>
<td>8</td>
<td>7</td>
<td>8</td>
</tr>
</tbody>
</table>

Table 4. Results: DSD in PD Literature

Discussion

Is Distributed Participatory Design an inherent paradoxon? That mean: Are geographical distribution and user participation contradicting concepts?

The DSD literature survey shows that PD issues are barely discussed. Furthermore, although the need for mutual understanding has been mentioned, due to organizational and national culture differences, this is normally a topic

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4 This paper is not published at the PDC but added to the respective section in Table 4 because it is related to Divitini et al. 2000
within the development team; user-developer—relationship in general and mutual understanding in this relationship was hardly ever a topic in the consulted literature. On the other hand, the very fact that these needs are identified in DSD shows that PD issues seem to be important for DSD projects. Especially the goal of gaining mutual understanding becomes more relevant in distributed project settings where cultural and organizational differences often lead to misunderstandings (see e.g. Evaristo & Scudder (2000)).

A reason for this result could be that PD approaches do not fit to the economic-oriented goals of distributed and commercial projects. PD approaches are mostly applied in public (research) projects which are maybe more open to social-technical problems than DSD projects. Indeed, most of the case studies discussed in Global Software Development deal with projects where large global operating companies are involved. Outsourcing and offshoring, main topics, are economic-centered concepts, and user-developer—relationships or users’ satisfaction are not in focus. On the other hand, the importance of good cooperation between all stakeholder groups is general knowledge also in commercial companies and projects. In addition, PD approaches have been applied successfully in commercial projects, already reported in 1993 by Muller et al. (1993).

The PD literature indeed shows that distributed project settings play a role in Participatory Design. Especially identifying or selecting relevant users for the participatory process or the development of systems for such groups is taken into account. In particular, this is a topic in the area of product development. The overall impression is that geographical distribution is seen as challenge or even hindrance while using PD techniques rather than as special situation to which PD techniques should be adjusted. However, there are nevertheless 8 papers that can be seen as part of a Distributed Participatory Design. With this little literature sample we cannot draw a realistic picture of Distributed Participatory Design, but the identified papers give some examples: Distributed Participatory Design can, for example, supported by

- Using groupware and establish good communication culture;
- Using technical or personal media to gather feedback;
- Using surveys to involve unknown users;
- Using video-based interaction analysis;
- Using e-prototypes or electronic paper prototypes to get feedback from distant users;
- Combining distributed and non-distributed phases.

Good practices to apply PD techniques in distributed settings might depend on the type of project. Product development complicates user involvement in a specific way (Grudin 1993). Appropriate PD techniques maybe differ from those adequate for customer-specific but distributed development.
All things considered, Distributed Participatory Design does not seem to be an inherent paradoxon. There are a number of examples where PD principles and goals are successfully realized in distributed projects. But the literature surveys also show that the fields of DSD and PD are only little connected and DPD could be developed in more detail.

Summary and Future Work

In this paper, we have discussed whether Distributed Participatory design is an inherent paradoxon. For this discussion, geographical distribution and the PD concern of users’ participation have been identified as the areas of potential conflict. Furthermore, two literature surveys have been carried out to show how PD related issues are addressed in DSD literature and DSD related issues in PD literature. Nearly 800 papers have been consulted.

That kind of literature study might have other results with a different perspective on PD or a wider literature base. For example, I chose rather general PD issues that do not meet all important PD approaches. In addition I focused the DSD literature base on (global) distributed development and left out the wide area of open source software development or discussions about virtual teams in software development. Furthermore, the PD literature base could be broaden to CSCW literature or a general search of PD papers published elsewhere. However, the detailed description of the literature base and method of analysis may help the reader to evaluate the results for her or his purposes.

Further work should be done regarding the question of good practices to apply PD approaches in distributed projects. Current projects could be analyzed regarding aspects of distribution.

References


Gumm: Distributed Participatory Design


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