(Lay) PD in the small: Everyday grassroot innovations

Anna-Liisa Syrjänen
Department of Information Processing Science
University of Oulu, Finland

ABSTRACT
The current society can be associated with such terms as information and technology winners, expert systems, and 'know-how'. While members' active participation has been seen as important, neither the shift from information usage to information technology (IT) usage is fully understood, nor is the source of innovation. In this paper, a framework for studying grassroot innovating conditions is developed and applied to a (lay) participatory design (PD) in a non-profit community. As a grassroot innovation, this self-developed IT setup is epitomizing natural activity systems where PD in the small joins wider systems design. From the viewpoint of grassroot actors, different IT setups and conditions influence and produce different innovationing. This is an important consideration for the design of collaborative systems and for informing related IT practices.

Keywords
Grassroot innovation, in-situ design, in-situ system, collaborative system, lay-PD, dog breeding

INTRODUCTION
Traditionally technology design can be associated with product (tools, dwellings, machines, etc.) development resulting from development of a society system and division of labor, in the so-called modern world. Though all built technology is socially constructed (designed by humans for certain purposes), complex and expensive constructions cannot be changed easily or at a moment when some need arises. Sometimes people just have to be reconciled to the available setting, yet, through new local innovations resulting from non-use, misuse, bypassing or redesigning the setting.

The participatory design (PD) movement, especially the Scandinavian approach has evolved in order to influence design by taking the side of workers in an industrial setting and then the side of users in contexts of developing computer and information technologies (IT). This development has stimulated change in design from stable technology oriented structures toward more participative IT practices, to designing collaboratively and including several activities influenced by design. On the other hand, technology assessments have involved in order to give decision-makers and citizens more information on the impact of technology and new tools coming onto the market.

However, in many cases production and use of technology are still separated from each other and assessments of technologies 'postmortems'. In addition, in the current 'nomadic society' [7, p. 223] 'design at work' [9] is now about activities 'carried out everywhere' and not designing for sustainable solutions but 'for the ephemerality and prototypicality'[5]. For most people, IT is increasingly a 'self-service' and in their other than work roles [20]. The IT, not the information, has thus taken the main role, through technology winners' 'virtual realities' where a community of diversity is about and for similar 'techno-cultures' [22, p. 94].

Suggestions that evocative face-to-face communities should be rejected, diversity, free access to information and care of people are hard to discern beyond the 'virtual' are all essential starting points for the study of information usage. Regarding people as subjects in 'the second media age' [22] and usage of IT, these insights reveal also difficulties in reaching beyond the material world, care, and participation in activities and communities in the first place. Areas, where local co-members provide support for IT-usages, put forward ideas, and modes of information found in grassroot activities, are relevant but less studied IT scopes in the sense of how to innovate in in-situ systems.

Usually innovating is included in professional or professionalized work activities, seen as *ad hoc* applications which at the moment lack professional quality [6; 7, 2]. It is associated with certain types of professionals, 'gatekeepers' of resources, 'pickers' of others' brains by denying their formal recognition and explicit support [1]. On the other hand, innovating as "Intuition or know-how, … is neither wild guessing nor supernatural inspiration, but the sort of ability we all use all the time as we go about our everyday tasks" [8, 31]. Briefly, that is 'what normally works', in the context of everyday activities, serving often and primarily other purposes than innovating per se (cf. [28] [17]).

Thus, including in-situ design for sustainable technologies and innovations of how to put IT into practice, lay-PD and its creative processes are rarely regarded as innovating. Such practices, 'wisdom' and tacit conceptual means that cannot be formulated explicitly are put into strategies, tactics and intentions to find workable solutions to the demand of some organization or group. These values of everyday activities with and for living beings, these aspects of innovating are important as alternatives to 'quickly moving nomads' (experimenting in IT on one's own terms and solely for one's own business) in the 'nomadic society' [7, p. 223].

In this work, everyday grassroot innovations are approached as long-term achievements and diversification within the core activity served by sustainable IT. A particular innovation setup is studied in the context of a community of dog-breeders. It relates to essence of relationships in a 'natural-cultural' [10] symbiosis of field knowledge, care, and responsibility, which creates self-served IT for the sake of the community and continuity of its relevant (deemed as important by the subjects) practices.

It relates to the creation of new knowledge about existing resources, about goals and processes available to people in their practice field. This definition is adopted from Ciborra [6, p. 304] in the sense that creation of new knowledge rests on local ideas and their diffusion through 'tinkering' by people close to 'operational level'. Another principle is to create knowledge by restructuring meanings associated with day-to-day assumptions about relevant activities, in systems development and strategies of change in a drifting situation. In practice, this means to favor learning for continuity of relevant practices and innovations for systems development 'close to–and to serve–the grassroots' (ibid).

What the above definition implies about modes of innovating and participation in systems design is that they link design and domain in the practice field studied. A grassroot perspective studies activities in situ including designers, users, and others. Therefore, this study examines work on systems design by grassroot actors' possibilities to participate and innovate within their particular circumstances. This part is

chronological and cumulative. A long-term case is then described, the case is analyzed by illustrating grassroot innovating conditions and the results are summarized in a discussion of lay-PD.

PARTICIPATION – INNOVATING – SYSTEMS DESIGN

Theoretical, organizational, and social perspectives are an important background for systems design; they are needed in modeling activities and provide opportunities for discussion. In this case, the focus is on participative design practices and innovating from the starting point of grassroot users, who have not been regarded as relevant participants in these discussions or information systems (IS) design.

Participation has to be 'legitimated' [15]. By starting from 'community information' that cannot be decided by 'data base administrators' but "… must be determined through learning and negotiation among the relevant users" [14, 31], participation modes have been extended to include in-situ design at work, collective subjects (e.g. communities) and the study of everyday settings of members of society in their ordinary 'ways of life'.

'Participation' as an object of IS user activities

When users are observed to produce design theories, meanings of participation can be linked to abstractions, formalization and generalization needed in systems design. Since the pioneering era of computer and information systems, design methods and knowledge of user activities have been developing, but participation as a legitimate innovator is often associated with experts and less with users and their 'practical' knowledge [17, p. 32].

Traditionally, 'technological design' [4, p. 16] has focused on computer systems whereas users, if needed at all, have mainly served as objects of study. Givers of 'user views' for systems' requirements, testers of computer interfaces and measured 'human errors' [19, p. 8] have provided a problem focus for systems' research and design. Even though observation of IS user activities and users as objects of study broaden IT scopes from technical to social domains, many grassroot actors would not consider these activities as 'participation'. The usage of such terms as 'user', 'information system', 'negotiating' in 'design meetings' and systems design via use or user 'problems' are hardly terms originated from grassroot activities.

Hence, if systems are seen only through IS 'user activities' (when other roles are not observed, IT not meant to be designed changeable, etc.) innovating remain rather limited and a lot of the relevant context will be closed off. Usually, 'negotiating' about 'problems' in current settings is more difficult for lower-level than for upper-level actors. For many users, problems, errors at work and faults in IT uses measure individuals' inability [4, p. 169]. Revealing such defects or pointing limitations in systems (designed by upper-level actors, IT experts) may risk job rather than serve ideas to be put further. In such cases participation in design remains objectified, 'design a user' [23] through abstractions of theories about what relevant use might be.

Participation as an IS user in PD project activities

A more participative [19] design mode is often associated with the introduction of information systems during temporal projects. When computer and information technology was just becoming more common in lay use, the introduction of computer

systems could serve as ‘a major catalyst for change’ [25, p. 10]. The following shift towards more everyday work-oriented practices brought about a wise strategy to influence the (macro) politics of design. Conflicts in work, organizing, hierarchies and ‘cultures of computing’ accumulate, following major societal changes. Systems or their objectives cannot be changed 'radically' or all at once.

Considering that participative design usually relates to design with ‘relevant users’ in some use organization, relating to in-house development of collaborative systems, Mumford and Henshall [19, 4-9] identify three forms of participation. *Consultative* practice means designers are consulted by some user. *Representative* practice denotes that designers work with representatives of all grades of staff selected by management. A *consensus* setup is when designers work with representatives of all users in different positions; users are elected by the staff and are involved continuously in design during the PD project in question.

These participative positions are often associated with ‘sociotechnical’ design where the autonomy of the technical systems is challenged, by the intentions of designing together with social systems. In practice, innovating positions rest on the abilities to express ideas in relevant terms, to ‘negotiate’ about practical, economical, conceptual, material, social or ideological aspects from the viewpoints of individuals or groups, stakeholders, and the user collective. It is obvious to whose work setting these terms mainly belong.

Even though the above demands are pointing to users as experts in organizing, in work/job/IT design in one setup, allowing learning by doing together when some improvement is required, experience on various long-term conflicting situations cannot be fixed by new external means. Semi/autonomous design groups, etc. hardly improve innovating conditions if rest of activities remains the same or not all parts (terms, discussion practices, design/management, etc.) can be studied. This was noticed already in early social studies of industrial ‘microcosms’. “An articulate complaint only rarely, if ever, gave any logical clue to grievance in which it had origin; this applied at least as strongly to groups as to individuals” [16, p. 73].

Nonetheless, the ‘feeling of competence’ [19, p. 3] in participative design and in IT use activities is important. Such competence areas demand also differing resources, skills and practices but in both cases, to innovate with IT and improve work systems means something has to be measured first. It means to determine where IS use activities are efficiently organized and thus users have to reflect their own setting and user role (self-study) or serve as objects of others’ study activities.

Hence, to see beyond local microcosms and obstacles of innovating in grassroot activities, participation in everyday settings with changing roles, structures, objects of activities, etc. demands that all activities and roles are understood more ‘ethnographically’. To gain authentic knowledge of insiders, participation in users’ ‘forms of life’ means in-situ study with the users, so, not only through formal, short-term IS use situations within some special project setup.

Participation as an insider in an ethnographic study

The study of situated work practices has been carried out in ethnographic setups with several techniques inherited from anthropology and sociology [2]. Usually an in-situ study is arranged to gather data on activities in a natural setting, from the insiders’ point

of view, broadly and descriptively over a longer term. Studied sites and people need to understand that data gathered from practices could also work against informants, jobs, and fields, influencing thus people's willingness to contribute in such studies.

Regarding situated PD practices, Mumford [18, 31-36] has identified several challenges, such as problems with trust, election vs. selection of design/study groups, conflicts in interests, communication, in the roles of professional designers, managers, facilitators, etc. and with rapidly changing technologies. New IT can–if well designed–solve many problems but when its introduction is more motivated by technology agency itself, or is meant for sole control/monitoring of others' activities than for actual enhancement needs, unforeseen difficulties may result as well.

Thus, one prerequisite for participation as an insider or an informant in systems design is that it, its values and objectives are accepted by the people studied. In this respect, from the side of users study of activities cannot rest on 'objective recordings' as early "ethnography in the service of powerful actors interested in managing relevant others" [27, 50] was. As no one can fully control the use of accounts and reported 'facts', they should be seen as inherently partial, committed and incomplete, rather than innocent 'descriptions of others' serving understanding or interventioning. "Involving informants and participants both in the process of system design and in the accounts of ethnographies is no easy task" [21, 5].

Local people who would like to participate in design or innovating actively do not always share the practices of design or ethnography [12]. In such cases, their contribution to design is interpreted and mediated by ethnographers [29] and dependent on how well the activities are studied, understood and mediated. One difficulty in ethnography is capturing the history of individuals and communities [5], long-term commitment and care mediated through *here-and-now* collaboration. Another challenge is participation as an informant that may be more demanding for grassroot actors, who are not familiar with any study method or observation practice. In such situation, 'ordinary' users are more like 'laypersons' in study and design whereas upper level participants may be more 'professional' in both via their expert education.

One interest of trade unions has thus been to intensify grassroot users' participation on company boards, in work and technology design. Relevant mediators with a collective voice and perspectives gained from experience in the activities studied are often needed to show the limits of participation, critical resources and of organizing materially. To influence and change, to innovate and learn from the practice in question as subjects means that all resources need to be joined together, with the viewpoints of several actors within the same framework.

Participation as a subject in collective activities

In order to relate the views of members of a collective activity setting through 'the second route to new knowledge' by 'forging new competences to emerge and consolidate' [6, p. 304] an inherently multi-competence and practice-oriented bottom-up setup should be outlined and relevant activities studied. One way to frame it is to shape a system around an object of activities with 'active subjects' [13] and use their terms-in-use in their natural setting.

With regard to grassroot activities, the meanings of material and social aspects, 'real' objects of activities and IT's practical applicability become more evident. They can also be more associated with core activities that with IT systems design per se. It means identifying activities in the terms of local grassroot actors. Their practical experience, the local 'know-how' may differ from upper-level terms such as 'business process re-engineering' but allows the meanings and ideas for objects of shared activities when expressed by local terms-in-use.

Activity-oriented setups have been applied to work and systems design since the 1990s. In work systems design, participation as a subject is essential and innovations in IT include introduction, use and diffusion of ideas to a wider practice field. The 'ethnography of trouble' (today often analyzed in built setups called change laboratories™) allows user-drivenness, learning and innovating by doing together [24, p. 11-18]. Through the large scale and practical job design, these IT setups seem to get closer to traditional PD, though by differing tenets. Less radical changes, tacit relations between professional IS-designers and users, IS-uses and terms easier for higher-level actors, and in-situ design more like discussion practices fit the larger job design and similar kinds of competence demands too.

Aspects of handling several activities together with historical data and analyzed activities (ibid, 68-72) shape IT settings where actual in-situ systems design, IS-use and job design remain separated, are realized by different actors. Such specialized division of labor is often sensible in larger collectives and especially when design is about IT with/for living beings, responsibilities are set by an underlying care institution, which demands continuing relations between smaller and larger IT setups, to share an object of activities.

Hence, as a mode of design for collaborative systems, what seems to be emerging through the above-described modes of participation and innovating conditions is a kind of local 'teamwork' PD. This means lighter work and design ethnography in favor of more in-situ (lay) PD, changeable in-situ systems and IT within outlined core practices. In summary, the following frame can be shaped (cf. Figure1).

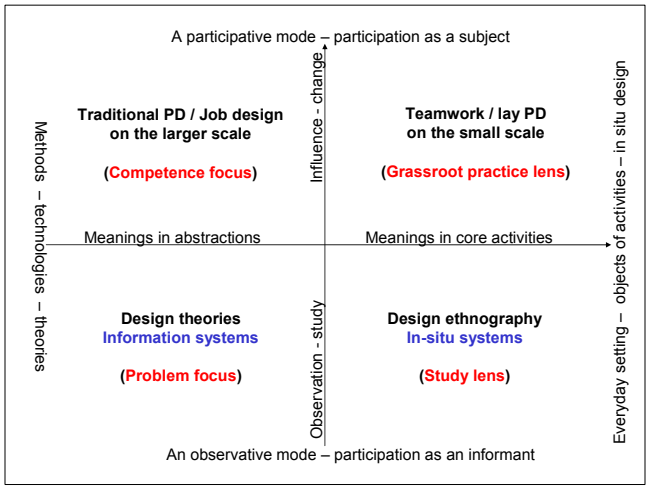

Figure 1: Modes of participation in systems design

Summary

Modes of participation, theories and tenets behind conceptions of actors and of design overlap and accumulate, regarding participation and innovating in design aspects can be summarized (Fig.1). From a viewpoint of grassroot actors, meanings of (professionalized) information systems design can be often associated with abstractions, design theories, methods, and IT as such. Correspondingly, IS projects and job design on a larger scale demand certain competences to be considered as more participative. Local actors' innovating and influence rest often more on discussions about IT than on systems design in situ.

When approaching everyday settings as in-situ systems (without a particular prefix), design ethnography examines local actors, resulting informants' meanings as mediated. An emerging mode, collaborating by sharing activities and their objects as understood by grassroot actors, joins local teamwork and as realized without specialized professional IS projects, it can be called 'lay PD'. What the following case clarifies is that participation as a subject in collective design activities demands to identify different positions and IT setups for contributors to influence and change practices, to innovate within and for everyday activities.

THE STUDY SETTING FOR AN IN-SITU CASE STUDY

A non-profit practice field and hunting dog enthusiasts with varied social and educational backgrounds provided the setting for this in-situ case study. Their voluntary activities, including the lay PD and systems design were studied as a microcosm community. The informants were selected in relation to their position in the community's structures and in relation to different activities and experience in different practices of hunting dog breeding were included (cf. Figure. 2) (the author has also earlier experience in the activities studied). The study data contain aspects of field knowledge on organizing, breeding, hunting trials/hunting, IT design, use and related outputs.

Actual fieldwork (cf. [2] [26]) was carried out during five years when overlapping (use/design/field roles) activities have been documented (audio/video, field note recordings) and complemented with existing historical material, including breeding databases. The common (non-IT-professional) role was identified as a 'dog breeder' (DB). The data came from interviews [11], use/design and field activities in situ so that two dozens actual informants in all were engaged by the author (a part-time field worker). By the historical material and trough interlocutors' interpretations on related activities, several indirect contributors were mentioned so that individuals could be identified too. Otherwise, agreed study activities with the informants were 'ordinary' in the sense that they followed common interaction modes and were not organized as such only for study, design or project purposes but were about what people do 'all the time'.

Interpretational (cf. [30, 94-118]) activity-oriented analyses reflected the case in the light of 'sensitivity' to the substance of the study material. 'Dialoguing' with the whole and its parts took place also collaboratively in workshops (at the university, with fellow PhD students, and in sessions run by experienced researchers) recordings of which have served as an outsiders' analytical lens to the grassroot practice described in this paper.

DOG-BREEDERS' GRASSROOT INNOVATING

The case community, Karelian Bear Dog (KBDC) enthusiasts, is affiliated to a larger breeding organization (the Finnish Spitz Club, FSC) within the distributed practice field of hunting-dog enthusiasts. The members ('laymen' as breeders and as IT-designers) have developed the IT and field systems within the organization of about five thousand members. The case focused on lay PD and innovating conditions in IT realized for hunting dogs and their breeders.

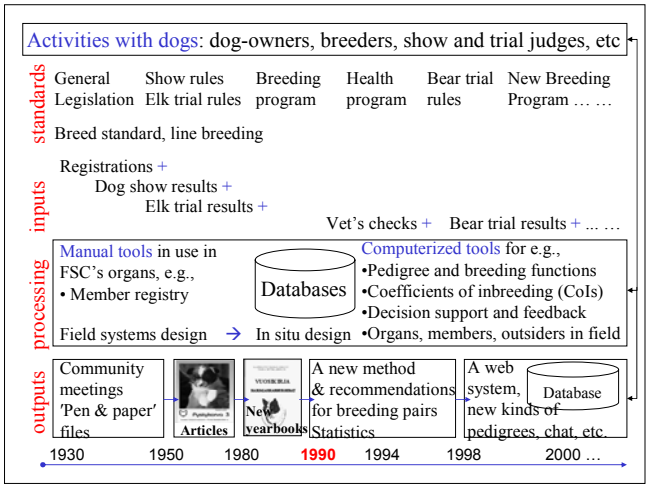

Figure 2: the KBD breeding system within the FSC

A problem focus–a care institution of indigenous dogs

In order to cast more light on the lesser known grassroot dog breeding and IT activities of KBD enthusiasts, additional terms from more well-known application areas are needed. Some can be found, for instance, from Bødker and Christiansen [5]. Their terms, such as ephemerality and prototypicality can be borrowed with new meanings. In their design theory, ephemerality includes design for social awareness that incorporates the habitual into the casual, through a zone of public and private, and prototypicality to the software artifact in the making. How to produce requirements for collaborative systems, group or organizational interfaces, raises issues about how people can commit, orient historically, and learn from and about each other if they hardly meet in this time or place and if the present setting 'gets reset' as actors leave it without a trace.

In the context of the case study, by replacing the word 'design' by breeding, the 'artifact' by a dog, and 'requirements' by a breeding standard, a common breeding theory can be defined. In joining the present setting to the wild and the actors to humans and dogs (collected form the nature) tracing game, a more specialized breeding theory challenges requirements. In the 1930s (cf. Fig. 2), the inherited point-of-view of breeding was "without knowledge of (KBDs) background" (BD15), the care institution with related IT setups was created. After 50 years (1990) the field systems (with data about registrations, shows, hunting trials, breeding counsel, etc.) were in place but the breeding results were still unsatisfactory. The grassroot members took over the helm of IT as a self-service. By altering the common line inbreeding theory and remote (computerized) IT setup by a specialized breeding and IT for KBDs, the design followed

a course so that “we have to look at the things more carefully, regarding the KBDs’ whole situation, and by thinking about their future” too (DB5).

This theory was based on the material world of dogs, their original setting and the features used ‘to get food for the pack’. Between 1930 and 1990, while following the general line breeding (pairing related dog-lines), the dogs’ ability to pass down hunting features weakened and the entire young breed suffered. To open the ‘bottlenecks’ (DB4) the history of the dogs was put into a new digital medium by user-designers. “The incentive comes from the dog world… dogs themselves have always set the requirements for (IT) development via the breeders” (DB2).

As a continuous process, the KBDs’ history has been opened by developing database systems with constructed structural elements such as the dogs’ coefficients of inbreeding (CoI) produced by the ‘Breed’ software. CoI collated 7-generations of pedigrees of 255 dogs and the social network of the breeders into one ‘simple’ percentage. This can be integrated with other structured and scalable elements and they can show the nature of social and cultural ideas related to dog breeding. In short, these IT creations measure changes in breeding practices, which then help the community to redirect the process through field activities with dogs.

As a layman innovation, this implementation of genetic ‘path analysis’ theory [31, p. 299] realized by “the database and the Breed (software) are still (after sixteen years) in use” (BD16). They serve to measure other social and economic aspects, such as the members' willingness to cooperate in breeding and value the goals set collectively regarding the self-developed institution of care for indigenous hunting dogs. Hence, the competence in PD is dependent on how the sociomaterial world and its critical resources (e.g., dogs, breeding knowledge) are understood by the user-designers, whose work is measured by breeding results, theories and learning in the field practices.

A competence focus–work with community structures

In the case community, changes in long-established, habitual breeding practices took a long time but the process quickened visibly as the new IT was shown capable of displaying its results. After using the system, the user-designers in charge of infrastructural (cf. [26]) services realized the need to develop the community’s social systems further by taking into account the local circumstances of each breeder.

By keeping in mind that for dog-enthusiasts dogs are ‘the flesh and the soul’ [10], the user-designers, as enthusiasts of IT and of dog breeding, began to create culturally possible feedback processes for community members. This changed the remote IT strategy (supporting more larger-scale ‘quantity produces quality’ breeders ‘backbiting each others’ (DB4)) to the raison d’être activity. “It is clear that people want KBD to be successful… as a breed” (BD5) but it demanded specialized systems design.

Handling tensions such as that why ‘the KBD community doesn’t even want to solve its hip dysplasia problem seriously… they should use only dogs with A-class hips for breeding’ were notes relevant for the community but justified “good advice in theory but not in practice”. The new IT could support the advice but because of limited dog resources “We’ve got to continue gradually… there’s no turning back to… inbreeding” and “preserving diversity is one of the most important methods in KBD breeding.” (DB5)

As a result, a much more demanding, sustainable way (breeding of healthy dogs with a more diverse gene pool and tested hunting ability) was chosen. The competence focus and innovations were supported by relevant practices and learning in the field. Thus, systems design and IT were involved with a specialized study lens, by focusing on the dogs' histories, separating these first from the histories of dog-owners and of breeders and then shaping new kinds of combinations so that "planning the future of the whole population" (BD5) was possible. This tactic has restructured the field even radically.

A study lens–a long-term quality via in-situ systems

The relationships developed from the user-designers' participation have laid down the foundation for extensive communication. Practical domain expertise is highly valued, it is not enough for a person "to be eager and just sign up" (DB1) as an IT designer. "One needs to have evidence… people in the field trust and respect" (DB3). This expertise is particularly significant in understanding the normal quality of the field activities of others, including deviations from collective 'work systems' [19, p. 8]. This feature required an in situ study of the real or perceived objects of activities, goals, and resources and how they have been made available through historical field conditions.

In this case, 'design ethnography' was adopted (with the collected dog data) in the decision-making by earlier actors in relation to the nature of the genetic processes. "In nature, all sorts of processes are inevitably occurring simultaneously, and even in the best-planned experiments this phenomenon is largely unavoidable" [31, vii]. Neither the study of visible or tacit consequences of activities was a pleasant job. "It had to be irritating for those with poor results to be told this statistic." Then again, community meetings "become more popular as IT made it possible to produce statistics and feedback on how we have succeeded in our breeding work." (BD4)

The studies done revealed the importance of IT in serving field thinking. Responsible breeders realized quite soon that new tactics could help achieve the goal set decades ago of improving the dog breeding activity in a 'sure way'. Sustainable practices and success were positively received "with very great enthusiasm. All details were welcome" (BD5). All this progress strengthened the members' identity, competence and place in community and IT structures and gained a 'mode of information' [22, p. 93] as part of a local teamwork, lay PD in the small related to a larger IT setup.

A grassroot practice lens–lay PD for the field conditions

Through dialogues between the user-designers, advisers and the FSC, the original 'pen and paper' system has been extended further to examine why, how, and for what purposes the field act. "We just began to work … we did what was needed in (breeding) practice" (DB1). A code was open for individual user-designers "I just began to practice… until I learnt how the code worked" (DB2). It was open in workshops where "issues dealt were to my actual needs" (DB13). Work around the dogs and the code took place "by computing as participating in FSC's… meetings" (DB2) where ideas or prototypes were often justified "just what we need now" (DB3). Some solutions were redesigned later in practice but many ideas are working in their original forms and suit to the needs of the grassroot breeding practices.

As most people, lay user-designers make errors and their self-service IT have been shown as 'lacking professional quality' by anonymous web-users when, for example,

some service were supposed to be available, or statistics supposed to be 'partial', etc. On the other hand, "at least two dozen organizations" use (or have used) the system or its parts (BD2) and "requirements have been put further" (BD16) to upper organizational levels. Through "the social network" (DB9) - with "an awful lot of contacts with members of other breeding organizations" (DB2) and "a broad spectrum of interests across the dog worlds" (DB13) - the IT practice is shaped continuously. The system made by 'tinkering' [6] is also described as "the best and mostly used system" (BD12) in the field.

The IT set-up for KBDs, shows how the grassroot innovations cannot be taken *ad hoc* in the sense of done haphazardly. In this case, in-situ design is linked to the larger activity setup, guided by self-set goals, conceptual, material, and social resources grasped and owned collectively. It is developed by the users who secure continuity of the practice. In this respect, this lay PD shows that "the rank-and-filers and small-scale breeders… have (also) learned how to play the game" (DB5) and breeding results improved.

(LAY) PD IN THE SMALL–IN SITU SYSTEMS DESIGN

In seeking what the nature of lay-PD is, a particular innovation setup was studied in a community of dog-breeders. It created self-service IT for the sake of community's raison d'être and continuity of the dog-breeding practices. Two modes of innovating, one related to existing resources, goals and processes available to people in their practice field (i.e. 'tinkering'), another to restructuring meanings associated with day-to-day assumptions about relevant activities, were adopted for the study of systems development ('close to–and to serve') the grassroots.

In order to put the lay-PD within the existing frames of information systems, related works were reflected through the grassroot actors' possibilities to participate and innovate in systems design. Observative (problem focus) and participative (competence focus) modes, participations as an informant (study lens) or as a subject (grassroot practice lens) were applied (cf. Fig. 1). These allow different approaches and setups for grassroot contributors to influence and change practices. Accumulated meanings in systems' abstractions and in core activities shape IT scopes and innovation conversely.

The case shows that, as a design process, lay PD has similarities with the practice described by Blum [4, p. 360] but from the outset the entire case process was realized by lay-IT-practitioners, outside proper PD projects and related support. However, a pre-specification-free activity was enabled and strongly guided by the raison d'être and related 'standards' (cf. Fig.2), also realized by dog-enthusiasts. Their crafted integration and applications through in situ design allowed a wider competence and productivity focus (actors use/design IT, results improved in core activities) which achieved systems design and collaboration in the field. In this case, "diversity" was found to be the most important method regarding domain issues, when linked to relevant aspects of the practice. Hence, the competence focus through collaboration and measured sustainable results achieved in the field, means that people have learnt about the relevant practice.

From the point-of-view of IT-practitioners, in domains where goals are to improve care, health, provide education, etc, the resulting system should meet these scopes, otherwise "it should not be considered as success" [3, xix]. In this case, the lay-PD practice and resulting IT meet the criteria of usage and learning, through care and

vitality of dogs and people. So, it can be regarded as a grassroot innovation [6] at levels of IT use, design, participation in the field and even on the level of society.

1) People's willingness to use the self-served IT and learn about their practices and contribute to the raison d'être of the community as active subjects [13] is clearly expressed in the case. It can be seen as IT for community usage.

2) "When one can formalize a problem it is not difficult to write a program and produce the prescribed solution" [3, xix]. This fits the case but programming was involved especially in order to find the actual problem (line breeding, of which tricky nature was not truly demonstrated with dogs' hunting ability). As the new breeding practice is rather different, the change has been 'radical'.

3) An essential issue of PD is relevant users [19] [4, p. 303] designers of their systems. In this case, user/designer/field roles united in actual subjects, who shaped a distributed 'social network' already in the end of 1980s when the "FSC was the only one breed organization of this kind, which had its own computerized IT and design activities" (DB1). The networked IT mode and organizing design in existing field-practices (not stimulated by research, etc.) were innovative.

4) On the level of society, the lay-PD practice has influenced certain aspects of the 'nomadic society'. By maintaining the self-served IT, the institution of care for indigenous dogs, with their 'fulfillment of possibility' [10] in their natural setting is the priceless value. Voluntary activities - that changed the dog-owners' drifting between 'instant prices' and quantity as an only measure of business into the sustainable quality, self-control and development of collective systems and resources - brought also the information and IT usage, in 'ordinary' users' ways.

As a result, when acting with and for living beings innovating cannot be a very free process for local people who care about IT consequences in collectives. In this case, the change, from freedom in the dog business as an individual affair to collaboration and measurement of resources and results of activities, was deemed sensible by the subjects measured. This positive 'freedom to' do something [20] by knowing how and why, brought an understanding of natural limits, and new resources and processes. As a crucial form of learning, gained by 'artful integration' [28] of available resources, it leaves enough space for local 'diversity' within the frames of a self-developed institution.

Regarding organizing modes, the case community's IT setup epitomizes a natural mode of activity systems [13] where lay PD in the small links to wider systems design. However, it is important to notice that when we approach systems design as information systems, it influences our innovating, reference settings and may risk relevant aspects of in-situ systems deemed sensible by the grassroots. In the developed framework (cf. Fig. 1), these differences were considered as differences in design theories, PD/job design or in related study activities and were tentatively illustrated by the case. Results show that from the viewpoint of grassroot actors, different IT setups and conditions influence and produce different innovationing. This is an important consideration for the design of collaborative systems and for informing related IT practices.

Finally, though the case shows that skillfulness of community and IT structures (cf. social awareness) and usage of available resources is crucial (rather than professionalism), this framework is tested only in voluntary lay PD activities. In the

contexts of paid work, in professional PD, with different temporal scopes and domains, innovationing and conditions may occur differently.

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