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DRAFT: Participatory Design that matters – facing the big issues

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Abstract

At a time where computer technology is putting human lives and work under pressure, we discuss how to provide alternatives. We look back at Participatory Design (PD) which was originally about possibilities and alternatives as much as it was about specific solutions. The paper aims to revitalize and revise PD to help people influence *big issues*. The agenda for this is set through proposing a set of key elements for realizing new, important possibilities. We discuss the possible changes of partnership with users, call for a new role of researchers as activists, debate how to work with demanding visions for lasting impact, and democratic control. We focus on high technological ambitions, on deployment of working prototypes, on alliances, and on scaling up, all seen as important for a PD that matters. We conclude the paper with an invitation to participate in the continued discussion, codesign and realization of a PD that matters.

1 Introduction

We are currently entering an era where the life conditions of many people are deteriorating, and corporate interests penetrate life at large, while political parties and institutions seem unable or unwilling to take action. Facebook, Uber and Mechanical Turk, as well as their underlying data collection, are examples of such technology-based phenomena that are causing a variety of challenges to

our lives and organizations. We are not convinced that HCI at large and PD in particular are able to embrace these challenges, and accordingly, we aim to revitalize participation so as to innovate Participatory Design (PD), in a manner where PD may again help people influence *big issues*. By big issues we mean for people, in various communities and practices, to take control and partake in the shaping and delivery of technological solutions, processes of use, and future developments that matter to them and their peers. Our concern is that *user gains* [20], [21] are not only better processes for the direct participants but more importantly, solutions that are controlled by the future users.

PD was one of the early contributions of Scandinavian research to HCI [8]. It emerged in a period where computers were beginning to change what was going on at the workplace. It was developed as a tool to help workers and their unions influence the changes brought about when management introduced computers on the shop floor. Accordingly, it was also concerned with strengthening the weak part when conflicts loomed. At the time, PD was about future possibilities and alternatives as much as it was about specific solutions to specific problems. Today PD has a role in all of the World and encompasses a broad spectrum of perspectives, as illustrated by e.g. the growing body of HCI4D¹ activities, see also the Health Information Systems Program, presented in section 4. However, the focus of most present-day PD is on how to facilitate direct collaboration between users and designers in codesign processes to engage with everyday issues of use, through technology or otherwise (see also [43], [4]). This role has been adapted by HCI at large, leading to what we see as a focus on ‘*small issues*’ (in contrast to big and important ones) such as products and technological solutions that the users like, rather than on solutions that profoundly change their activities as well as the goals they are supported in pursuing. And the motivation for involving users is very much in the hands of research. As Bossen et al. [21, p. 31] stated: “*In most approaches, users are involved in order to tap into their ideas and knowledge. User involvement is a one-way process: Requirements are elicited from, usability tested upon, and systems are delivered to users.*”

Bossen et al. [21] pointed out that while a two-way process, long-term engagement and maximal effort on behalf of both researchers and users are important for a process of mutual gain, it is not necessarily sufficient. Furthermore,

¹Originally HCI4D was an abbreviation of “HCI for Development”, see e.g. [28]. More recently HCI4D is described as concerning the role of technology in diverse domains such as, but not limited to: Conflict zones; literacy; infant mortality; rural and urban community development; and marginalized populations in both developing countries and industrialized nations, see <https://chi2014.acm.org/spotlights/hci4d>

participation in specific projects is often not viewed as positive by the involved users/workers, because they get too much of it while they also get too little out of the effort. Rather it is seen as a tiresome addition to the tasks already to be carried out, an addition with no relation to goals that are important to the users (see e.g. [63] or [30]).

We aim to revitalize participation by changing PD so that it may again become a tool to help people influence important matters in their lives. We want HCI at large, and PD in particular, to play a role in people’s sustainable income and livelihood rather than as a part of the Competition State ([27], [64]) with its focus on competitiveness of organizations acting on global markets. The Network of European and North American labor unions and worker organizations calls for transnational multi-stakeholder cooperation to ensure fair working conditions in digital labor platforms² and recently ended the report of the status of work today as follows:

“We close this document with a brief reflection on the founding principle of the International Labor Organization: “Labor is not a commodity.” This is a philosophical principle that asserts the fundamental and universal dignity of human beings, regardless of the indifference with which they may be treated in any given social, political, or economic context. This principle has clear implications for policy, including centrally the protection of the right of workers to organize. This principle – and its policy implications – is just as crucial to a decent society in the “information age” as it was in the industrial era. We believe that information technology, shaped wisely, holds great promise for expanding access to good work”.

The big issues we address are, hence, connected to wisely shaping IT for a decent society. In the current paper, we explore possible roles of technology and design processes in this shift, and discuss processes that recognize that conflicts and tensions are important when different groups of people exercise influence.

As part of this we are aiming to support processes where users and researchers partner up to develop long-term visions for technology, skills and redistribution of power and resources. In doing so, we also recognize that the partners we work with must play a major role in developing the visions; that we as researchers are siding with the partners in relation to the redistribution of power and resources and, hence, that important parts of this kind of development is political, and will entail disagreement as well as conflict regarding

²<http://crowdwork-igmetall.de/>, accessed January 5, 2017.

both means and ends. While we choose the term partners here, we will later, in sections 5.2 and 5.3. , discuss how our proposal changes the roles of what we know as users and researcher. To develop this kind of processes, we need a lot of concrete experience, and this means engaging in action research-like initiatives addressing how to increase the influence of groups of people in areas that are important to them, e.g. of pupils, parents and teachers on how schools are organized, including how we learn and how computers are used. And even more importantly, we have to engage in initiatives where the partners we work with are among the primary drivers and where they take on this role because they expect the initiatives to create major, lasting changes in areas that are important to them.

In order to contribute to major, lasting changes, such development processes may also have to engage in development of structures underpinning the specific initiative e.g. by supporting our partners in exercising influence and sustaining the changes achieved (see also [10], [53] and [54]). The structure of the paper is as follows: First we look back on the history of early PD or cooperative design. We move on to address the current situation, first by discussing what has been lost and found in current research, and second by presenting three projects that give us hope for a future PD that matters and embrace the big issues that we propose should have an explicit focus if PD research is to be revitalized. We then discuss these issues by means of a set of key elements for realizing new, important possibilities. We conclude the paper by briefly discussing how to move on, addressing issues, perspectives and research we would like to understand better. We end with an invitation to cooperate on PD that matters, emphasizing why this is important and difficult.

2 History

In many ways, PD, or cooperative design, was an early, strong Scandinavian contribution to the field of HCI. Parts of this history have been told many times, most often with a focus on tools and techniques, such as the role of prototypes or various forms of workshops. Cooperative design in the Scandinavian tradition began in the early 1970s when technology as well as education regarding technology were very different from what is discussed in many later projects. In the following we will look back at history, not to recapitulate it systematically, but to reinterpret some of the history to re-orient the PD discussion away from tools and techniques. We look at the many parts of the original work that are not about PD tools and techniques, but rather about the partnerships and

politics considered in the Scandinavian tradition.

2.1 NJMF, Demos, DUE

The first generation of projects included the NJMF (1971-73) [62] , Demos (1975-79) [38], [37] , and DUE (1977-80) [55]. They were situated in each their Scandinavian country, and did research on

- the impact of computer use at workplaces,
- the formulation of demands on computer-based systems in organizations,
- the formulation of agreements between employers and unions, regulating the introduction and use of technology at the workplaces,
- the need for knowledge, teaching material and courses among workers and union members,
- new frameworks for worker influence, by addressing worker controlled resources, as well as new models of negotiations.

The projects developed with different emphasis, but an important part of all of them, as seen from the point of view of the researchers, was cooperation with the local trade unions so as to focus also on what it meant to deploy computers at work. To illustrate how the projects addressed more than tools and techniques for PD, the following examples from one of the factories in the Norwegian NJMF project show a profound concern for the technological possibilities and limitations:

- A new production planning system was shown to have been constructed in such a way that it would inevitably lead to more overtime work.
- In addition, the production planning system had shop-floor terminals that only allowed data entry, i.e. it was not possible for the workers to get e.g. status information at the shop floor (a discussion that has parallels in much later analyses of production planning systems (see e.g. [22])).
- It was problematized that Computer Numerically Controlled Machines were introduced that did not allow for shop floor programming, hence preventing flexibility and control at the shop floor (see [61], [35, p. 29]).

Largely, these first projects pointed to computers as managerial instruments of increased control, as well as to the need for training and education for workers on the shop floor. The focus was on *local action and negotiations* based on central support in terms of teaching materials and support for negotiations.

2.2 Utopia

Among researchers who participated in these early projects there was a rising concern for the possibilities of offering technological alternatives. In the poetic style of Pelle Ehn [33]: “*focusing on democracy – and worker participation – actively searching – alternative futures – through collaborative – design things – at the time when computers – entered the shop floor – threatening to deskill workers – and tighten managerial control.*” These concerns were seeding the Utopia project (1981-84) [11], [13], [12], [33]. In collaboration with central labor unions, researchers went on to target new technology for newspaper production and cooperate on its commercialization in order to make new, alternative types of systems available for newspapers. The idea was to expand local choice through centrally developed alternatives. Specifically, researchers set out to address systems that support (E.g. [35, p. 32]):

- Quality of work and products
- Democracy at work and
- Education for local development

The emerging design of possible alternatives involved envisioning, then, bleeding edge technologies, such as inexpensive desktop laser printers, and a WYSIWYG newspaper production system. It is important to remind ourselves that this was before laser printers moved out of Xerox’ research labs, and WYSIWYG became commonly known to people with the introduction of the Apple Macintosh (both ca. 1984).

In order to codesign together with graphical workers, the researchers developed a new design method together with new techniques and tools. And the project collaborated with a commercial company that intended to build and market the technological solution. In the end, however, the cooperation with this company failed, and Wikipedia quite adequately describes what the Utopia project is remembered for: “*In the Utopia project, the major achievements were the experience-based design methods, developed through the focus on hands-on experiences, emphasizing the need for technical and organizational alternatives.*”³

While these methods became influential in the wider HCI community, the methods as such say little about what the users would gain from participating in the design processes (see also [21]).

³Same

2.3 The results of the early projects in summary

Over the years, several authors have looked back at these passed projects and discussed their importance for current challenges (e.g. [17], [46], [44]). In a recent paper, Bratteteig and Wagner [24] analyzed a number of their past PD projects from the 1980s onwards. They discuss how participation in PD projects must necessarily be seen in connection with decision-making and the power of the users to act. The platform for users to act, in the early projects, were organized in cooperation with trade unions, and the unions played a major part, both in decision-making through the practical work and on the steering committees, paving the way for users.

In addition, the original research focus embraced workplace democracy and worker influence on technology, and the results of design, more than the design processes as such, were seen as important steps toward workplace democracy. In a certain way both the actual move from expert researchers towards an active collaboration with the users, starting in the NJMF, and the methods, resulting not least from Utopia, were rather coincidental. In this sense, the projects were action research projects with an agenda of strengthening workplace democracy and worker influence on technology that developed into PD projects in order to achieve project goals. The work on PD methods, tools, techniques and theory definitely improved the results of the design work, at the same time as PD was not explicitly on the agenda from the outset. In summary, we may say that the first Scandinavian PD projects had a vision of contributing to a more democratic society. They based this on cooperation with a strong partner, the trade unions.

To promote this vision together with the unions the projects worked on

- strategies for influencing the use of IT in the workplaces, and improve quality of worklife,
- new technological solutions and new ways of working, as a strategic way to expand local choice available to the trade unions locally, and
- new tools and techniques for design.

As it turned out, the work on tools and techniques for codesign lived on, and was developed further in the PD tradition. In contrast, the idea of promoting visions of democracy together with strong partners was largely forgotten as was the development of strategies that would allow these partners to influence technologies at work based on their own interests and goals.

Participatory Design was born at a time when computers were introduced at the workplaces as a managerial control instrument, thus severely challenging

worker influence at the shop floor [62], [37], [?]. It was developed further, and was embraced by HCI research, when computer systems began to substitute traditional craft tools at the shop floor [11], [35]. However, as the trade unions became weaker, the trade union quest for industrial democracy grinded to a halt and the political aspect of PD, with an explicit focus on the interests of labor, gradually faded [51].

At the same time computers became commonplace, and although the results from the first and second generation of Scandinavian PD projects supported continued knowledge build-up in the unions, the failure of the Utopia project to initiate the development and deployment of a viable alternative to the commercial main stream solutions meant that local choices continued to be very limited [13]. In short, dealing with computer issues was reduced to “business as usual”, and computer issues were handled by the unions like wages, working hours, etc. without much attention to actual alternatives (see also [51]). An important exception from this was the work by the Swedish TCO union to certify computer screens. The TCO label offered a useful alternative that became so ubiquitous that the link to the strategic work of the union was often forgotten⁴.

3 Questioning the state-of-the-art of current research

What we originally knew as cooperative design was inspired by many theoretical traditions, and Marxist theories played an important role in the early Scandinavian projects [35]. Voss et al. [74] summarized the common grounds of the many different kinds of current user-designer collaboration, across approaches, as follows:

Work and technology are situated and socially organized; design must be grounded in an understanding of this context; participation of users is generally beneficial for design; users have relevant knowledge and skill; skills change when technology is introduced; technology should support work practices, and support quality, not only quantity; and last, design processes are political and have a potential for conflict.

At some level, we are certain that most PD researchers would subscribe to this core, yet it seems that for many, the focus is entirely on the actual collaboration in design between designers and relevant stakeholders, including users. We note that in many projects the idea that processes are political and have a

⁴http://tcocertified.com/tco_certified_story/

potential for (profound) conflict seems to be non-consequential. As an example of this, Pedersen [63], in analyzing a project where users lose interest in participating, focuses on how design is managing and setting up design processes, what he calls design before design. An alternative or supplementary explanation may have focused on the lack of projects goals that were really important for the users.

In the following we dissect current PD in order to discuss how, from a research perspective, we can move beyond this current state-of-the-art and the challenges this gives to the development of PD. The first issue, we look at, is the focus on the here-and-now without considering what happens after a project. Then we discuss the low technological ambitions that we find permeate current projects and hampers the potentials for substantial, long term benefits for the participating users and the groups they represent. The third issue we discuss is the do-gooding element, which often seems to steer projects away from conflicts. Finally, we consider how politics is often reduced to ethics, i.e. reduced to questions of how a researcher should behave when involving users in design.

3.1 The here-and-now

We are critical of current literature in (and around) PD which seems to focus on how researchers set up here-and-now co-creation and collaboration with groups of people for a here-and-now purpose (e.g. making) without much perspective on the future (or for that matter for the past). This is analyzed (by [45] as well as [52]) as processes with little concern for sustaining relationships and networks after the project. In contrast, bottom-up, ad-hoc here-and-now activities dominate. Kyng [52] pointed to the difference between the early PD projects where learning and empowering were important outcomes and more recent ones where the design process as such and its methods seem most important as outcome. Balka [1] discussed and supported this position by discussing how the PD community has focused on processes of participation and forgotten about project outcomes, i.e. the *“impact that the efforts of participatory design practitioners and participants have on either technology design or work practices and workplace democracy”* [1, p.78]. Whittle [75, p. 121] used Balka’s work to conclude that: *“The charge to the PD community is that participation has become ‘a goal in itself’ and has led to an obsession with methodologies for engendering participation and a willingness to see success in terms of ‘feel good processes’ rather than any long-term, sustained outcome.”*

Halskov and Brodersen Hansen [40] supported this claim when they sum-

marized their studies of research papers in PD pointing out that participatory design does not address the product of the design process as much as it focuses on specific domain experiences for the involved participants. They pointed to the number of papers that are about specific methods or PD activities, some of which are in new domains. As sympathetic and well-meaning as these projects may be, they are focused on local learning without concern for scale and reach of this learning. Halskov and Brodersen Hansen [40] questioned whether the results of well-intended participation as such improve quality of life, despite the merits of supporting e.g. the wellbeing and changed mindset of participants. In addition, Halskov and Brodersen Hansen [40] discussed the summary of [68] and concluded that in many PD projects, there seem to be no development of action possibilities, etc., that point ahead for participants. The projects analyzed became strangely non-committal with no long-term perspectives, for the groups that the user came from, or for that matter, for the researchers, designers or other possible stakeholders.

With this direct here-and-now focus on a specific collaboration, these projects have become more process than outcome. They are about doing something for and with the people directly involved in the processes, whether or not this leads to a technological solution that will sustain beyond the actual process. In our view, this leads to too many processes and products, with no utility and no impact.

3.2 Low technological ambitions

With our background in computing, we find it surprising how current PD research can be about anything, including processes without a technological focus at all. We seem to have lost the anchoring of PD in IT projects (see also [50]). As a matter of fact, many current projects seem to focus on maker technologies (e.g. [6]) which may, or may not have much connection to IT as such: Neither 3D-printing nor singular Arduino boards, in our perspective, address the potential development of software under the control of users. In addition, these projects rarely question the tools available and there seems to be no real concern for the long-term learning of users regarding digital thinking and digital/software possibilities in a democratic perspective with a few exceptions such as [48]. This is problematic because it results in a lack of influence on our common technological future. Korsgaard et al. [50] discussed why this has happened and suggested a number of reasons: Publications from early work emphasized processes and methods (e.g. [14], [36]) (see also section 2.3) and resonated with contemporary

movements in related areas (e.g. [2], [39]). PD provided a space for increasingly multi-disciplinary research and less technical disciplines were hence offered an opening to contribute and investigate the impact of technology.

Technology again is not one-off products, even if they can be printed in 3D. Technology encompasses solutions embedded in other solutions and infrastructures, use and design, appropriation and change as it happens over time. For these reasons, we are also concerned with the long and short-term perspectives of the technologies, be they in relation to the appropriation to specific local uses or the infrastructuring with other technologies (see [58]). We lack a concern for the fact that no technology design projects start from scratch today (see also [10]) and we are largely missing concerns for the long-term perspectives (of both technologies and the skill development of people). Makerspace researchers and practitioners have begun to discuss sustainability issues, in terms of how their making may – or may not – contribute to a more sustainable future. see e.g. [69]. This paper discusses sustainability in terms of the so-called Brundtland report from the World Commission on Environment and Development from 1987, and as of yet this type of sustainability does not seem to embrace long-term learning and design, as discussed by Iversen and Dindler [45].

Meanwhile we see technologies appearing that more than ever challenge democracy and PD, both on a shorter and a longer time scale. In our view, the centralization of (the major commercial platforms on) the Internet, big data and large-scale infrastructuring challenge the core democratic ideals of PD. And this is to a degree where sharing economy, crowdfunding and participatory cultures are not explored in terms of their democratic potentials as much as they are simply put to the service of a sharing or platform economy dominated by Uber and Airbnb, as well as direct brokers of work such as Fiverr. Hence, many of these platforms are mainly about commercial interests of the few, based on the ‘participation’ of the many (see also [67]), and it is concerning why no PD research seems to profoundly question and challenge these technological uses.

Hence, we lack projects that have a high technological ambition even if the technical solutions may not be immediately accessible to a universal set of users. As Carroll et al. [26] pointed out, the technological ambition in particular projects may not simply be for all, here and now. Or as they stated: *“There may always be emerging technologies within the grasp of a few and beyond the grasp of many others.”* We need to do PD research that spearheads and challenges technologies, even if these technologies never become mainstream (see also discussion in [25] and [18]). This emphasizes the need to go beyond the here-and-now and consider technological alternatives in PD as much as main-

stream solutions, not in order to go back to a “technology first” design approach, but because most ambitious PD work, including work on social communities, requires ambitious IT design as well (see also e.g. [19]).

3.3 Do-gooding

Thirdly, there is a strong *do-gooding* element in the current state of PD research ([9], [10], [75]). Bødker [9] pointed out that in the 1990s in particular, participatory design became something good in itself, no matter with whom researchers and designers collaborated. This development was questioned by ([52], [?, ?], [7]).

Many current projects seem to be working with agreeable or politically *good* communities, rather than concerning themselves with conflicts and tensions in and around groups of users. There is, accordingly, a focus on co-creation, more than on participatory design that also exposes difference and profound conflict. Björgvinsson et al. [6] talked about transforming antagonism into agonism, and conflict between enemies to constructive controversies among adversaries who have opposing matters of concern but also accept other views as legitimate. However, we do not see this as an obvious path forward when it comes to redistribution of power and resources, in addition to which we see several examples of participation being discussed in the context of art, which, as pointed out by Carroll in the panel discussed in [?] has led to the term participation being used in too many ways in HCI, e.g. as co-creation with the purpose of some form of artistic expression. Does this kind of co-creation, e.g. initiated for the benefit of some form of art, have any impact on how people use and develop technologies in the longer-term and wider perspective? Does it help people ask questions or just find comfort? We doubt that the former is the case, and we view this diversification mainly as a diversion from impacting technology, how technology is developed and how it is used.

3.4 Politics reduced to ethics

The politics of design was an important concern in the early projects and e.g. Ehn and Kyng [34], [35] and Kensing and Blomberg [49] addressed the introduction of computer-based systems and power dynamics that emerge within the workspace. Fundamentally, unions and workers were seen as threatened in their involvement in production and their ownership over their work situation, leading to PD projects such as Utopia that specifically teamed up with this ‘weaker’ side. [35], [49] addressed the introduction of computer-based systems

and power dynamics that emerge within the workspace. Fundamentally, unions and workers were seen as threatened in their involvement in production and their ownership over their work situation, leading to PD projects such as Utopia that specifically teamed up with this ‘weaker’ side.

Pedersen [63, p.172], discussing codesign in particular, recognizes the role of politics as part of codesign: *“Codesign’s emphasis on design as political is an important corrective to more common understandings of design as primarily about function and aesthetics (...). Codesign, in other words, is a welcome challenge to an overly individualistic conception of design practice and an uncritical view of design’s role in society.”* At the same time, he is very critical of the assumption that this recognition is sufficient as political stance in design: *“However, (...) I want, in this paper, to question the implicit, if not explicit, assumptions that codesign necessarily is in the interest of the people and organisations it is ‘for’, despite codesign’s declared intentions and that we can rely on an interest among participants to be directly involved in design activities over a sustained period of time.”*

In our view there are several critical questions to be derived from this: Are practices of design facilitating development of relevant forms of empowerment, e.g. decision-making, among the involved people? Are they supporting the involved people in representing and promoting group interests? And is a specific project addressing a really important concern?

In recent years, e.g. Mouffe’s notion of agonism [60] has inspired many HCI/PD researchers, such as Björgvinsson et al. [6], and DiSalvo [32]. Agonism addresses conflict and difference rather than consensus, yet in PD projects it also shifts the focus away from the more classical notion of profound conflicts between the haves and the have-nots to design processes that allow for difference and conflict, without designers/researchers taking side in this [40]. One reason for this is probably that it reduces politics to something, which is acceptable in a company or pluralistic community context.

We find the issues of how researchers should behave, ethical issues, important. At the same time, we find it problematic that politics has been reduced to how researchers should behave and act fairly when involving users in projects. We would argue that politics is more than fairness and ethics, and we hypothesize that the tendency to avoid profound conflicts also makes it difficult for current PD to engage in some of the more controversial areas where researchers could really help people by taking side with them.

Based on the analyses of [40], [4] it seems that political stance, conflicts and societal analyses have lost way to more generic political process thinking,

where design processes are recognized as political (dealing with multiple, different opinions and standpoints), but the design *results* and their use are not considered in a political context of potential conflict. Thus, there seems to be little focus on underlying contradictions, causing differences in standpoints, or on consequences of designers/researchers siding with one or some of the involved parties. This means that the methodological focus on e.g. working with prototypes for the sake of giving (direct) users a voice has increased, but the user's voice is not placed in a context of potential conflict. In addition, the increased focus on that designers' need to learn from users, is not considered in a context of mutual learning where the users also learn e.g. about how to promote group interest. Finally, we note that more general understandings of quality of work has given way to specific users' needs, as can be seen across the entire field of HCI.

With the current move of PD towards ethics and agonism, we sincerely lack a notion of *partnership in conflict* or a concern for how researchers team up with partners to fight for shared political goals in the interest of the partners. Or, vice versa, how may partners help PD researchers who are accused of being political when they side with partners?

3.5 Summary

The issues we have with current PD add up to: A focus on here and now situations that are in many ways convenient to researchers; a lack of technological ambition on behalf of both users and researchers, a choice of researchers to work with communities of users that are immediately sympathetic and generally shying away from a political stance, especially when it entails conflict with powerful adversaries. All of these issues have elements of a very short-term attention span of the research towards the users and use domains, and a least-effort strategy for researchers with respect to time spent, alliances and partnerships, technological challenges and even convincing the research community that the project is meaningful.

In addition, current PD is refining design tools and techniques that support the involvement of users, current and future, in design processes. However, the questions of how design goals are defined, and how decisions are made about what to implement, are outside the realm of this type of PD. Strategies for the processes of design and for how and why the outcomes of design could and should change the work activities of users are not developed together with these same users and the organizations. Hence, when conflicts loom, workers may

simply lose interest in participation [30], [75]. Ironically, this is parallel to the understanding and critique of the socio-technical approach in the 1970es, which led to the development of Scandinavian PD (For a short summary of the critique see e.g. [35, 22ff.]).

In the following section, we move on and present three cases that point in directions that are different, and as we argue, more promising. We will also address their shortcomings as a way of approaching the future of revitalized participation in design.

3.6 Inspiration for a new PD

First, we briefly describe three cases that have inspired our work on a new PD: HISP, The Health Information Systems Program⁵ [23], Fablab@school [10], [31], [45], [70], [71] and especially the telemedicine initiative centered around 4S: The Foundation for Software-based Health Services⁶ [53], [54]. None of these are presented because they are perfect. Rather, we present them mainly to discuss and inspire a new PD, even with the limitations they have. Then, in sections 5 and 6, we present and discuss our proposed new PD, by drawing on examples from the first and second generation of Scandinavian PD projects, on current projects as well as the three cases described further below. In section 7, we discuss how to move on, addressing issues, perspectives and research we would like to learn more about.

3.7 HISP: The Health Information Systems Program

HISP is a global network of people, entities and organizations that design, implement and sustain Health Information Systems in support of decentralized and empowering structures.

HISP began as an initiative in South Africa addressing two issues. First of all, to contribute to the provision of useful health related data on all citizens, independent of race. Secondly, to help build flexible local data processing capabilities to support not only the local collection and delivery of centrally requested health data, but also to make it possible, locally, to evaluate the effect of health initiatives in the community, e.g. regarding “Measles immunization coverage under one year” [23].

⁵HISP webpage: www.hisp.org, accessed January 19, 2017,
HISP at UiO webpage: www.mn.uio.no/ifi/english/research/networks/hisp/, accessed January 19, 2017.

⁶4S webpage: 4S-online.dk, accessed January 19, 2017.

As a network, HISP globally follows a participatory and action research approach to support local management of healthcare delivery and information flows in a growing number of developing countries. Hence HISP is address many concerns of HCI4D. HISP was established by the Department of Informatics at the University of Oslo.

HISP started as a Research and Development Pilot Project in three health districts in Cape Town, South Africa, in 1994. Initially, focus was on Community Information Systems and grassroots health committees, but after upsets caused by local elections in 1995, focus shifted to integration processes and information systems within the Department of Health. The District Health Information Software (DHIS), finished in early 1997, was adopted by the Western Cape Province in mid-97, by the Eastern Cape Province in Oct. 1998, and finally, as a national system in Feb. 1999 with rollout completed during 1999 and 2000. The first web-based system was developed from 2005-06. From late 2000, it was also piloted or adopted by other countries, including India, Cuba, Botswana, Kenya, Mozambique, Sierra Leone, Vietnam, and Zanzibar. Today, HISP South Africa is organized as a not-for-profit NGO with more than 50 full-time staff. Activities include software development, database management, health information systems support and training, as well as short courses in health information. These courses have been attended by several hundred health information officers and health staff involved in management⁷.

HISP at the University of Oslo, Norway, is one of the leading members of the network and their contribution includes in-country capacity building, research, a PhD program, hosting the core development of the DHIS software and implementation support⁸.

In recent years multinational companies are aggressively promoting their own, alternative software-based services, and to counteract this trend HISP is focusing more on developing local capacity to master new technologies [23].

HISP has been going on for 20+ years and has inspired us because it is an initiative with an explicit democratic agenda with a focus on decentralization, an agenda it has developed and grown over the years as an important resource in an ongoing democratic process that addresses how to plan and use resources related to health and how to understand and evaluate outcomes. We have been inspired, in particular, by the dual, continued focus on developing approaches to data collection and use, in support of local action and on contributing to

⁷HISP webpage: www.hisp.org, accessed January 19, 2017.

⁸HISP at UiO webpage: www.mn.uio.no/ifi/english/research/networks/hisp/, accessed January 19, 2017.

an ongoing participatory process of standardization of data in order to support both local/local and local/central cooperation, hence facilitating scaling up. At the same time HISP has created a self-sustaining organizational network which handles the technological core and the processes of continued development, deployment and use.

3.8 The Fablab@school.dk

The FabLab@school.dk project [10], [31], [45], [70], [71] was launched based on a 2014 reform of standards in the Danish primary and lower secondary school. This educational reform emphasized the use of digital technology in all subject matters. A new program in crafts and design replaced woodwork and needlecraft in order to support the digital competences. As a response to this FabLab@school.dk focused on digital fabrication and design thinking so as to develop an educational environment to integrate new digital fabrication technologies and construction kits that would help students and teachers work in designerly ways with real world problems. Currently, an estimate of 12000 students and 1160 teachers in 44 schools have been engaged in the project, either by directly taking part, or by integrating elements of the project finding in their teaching. During the first two years, 10 schools have established a digital fabrication laboratory on campus in which students have access to digital fabrication tools and construction kits. Moreover, three municipalities have established a central fabrication laboratory with equipment and staff (2-3 per unit) to assist [10].

Because of its embedding, politically and administratively in the Danish educational system, FabLab@school.dk involved many different local and national stakeholders in a variety of diverse project activities. According to Bødker et al. [10] the list of stakeholders differed significantly from activity to activity. In some cases, school teachers and students were engaged as end-users and in other activities, politicians and officials. In addition, many other types of activities were carried out to engage e.g. the national and local political level. Some of these activities used PD methods while others consisted of presentations and survey reports. Bødker et al. [10] described how the project worked to stimulate emerging new configurations of collaborators through participatory activities where participants engaged in defining future infrastructures and in sustaining the networks of people and technologies that embrace the design. They present many multifaceted activities involving a broad range of authorities that all together were involved in introducing digital fabrication technologies to

the Danish school system. In Fablab@School.dk, participatory processes played out in several political and practical arenas. The project involved many, sometimes messy, activities before, between and after, what we would normally call, participatory workshops. The project is furthermore, according to [10] focused on how participatory processes tie into existing networks across organizations and how initiatives in the project become dispersed across these networks. In this way, the project reaches across six levels of authority of the Danish educational system, and covers the many parents, students, teachers, industry representatives, and policy makers that took part in PD activities throughout the project.

Most recently the project has been involved with the development of a new national elective course in primary schools. In [47, p. 27], the project researchers, Iversen, Smith and Dindler, discuss how *“a commitment to political participatory design defines a new role for children in participatory practices – the role of protagonist. The objective here transcends the goal of giving children a voice in design, and addresses more broadly how children can be empowered to shape technological development and critically reflect on the role of technology in their practices.”*

We find FabLab@School interesting because it integrates maker and fablab technologies into educational settings with an emphasis on engaging students and teachers so as to obtain long-term perspectives on digital thinking, design, and democracy. It addresses the specific roles that students as well as teachers may have in participatory design, and combines this with processes to engage the many necessary political and organizational levels in a national school system.

3.9 The 4S: The Foundation for Software-based Health Services

The 4S⁹ Foundation for Software-based Health Services was set-up to govern open source software for telemedicine in Denmark. The software is mainly developed in PD-inspired projects funded by different public research and development grants. And this is reflected in the 4S organization, which only have members from public organizations: a board of managers, mainly from public health, a software group with software architects also mainly from public health

⁹As indicated by the headline, 4S is the short name for “The Foundation for Software-based Health Services”. 4S is an acronym for the original Danish name of the foundation: “Stiftelsen for Software-baserede SundhedsServices”. The Foundation has no connection to the Society for Social Studies of Science, which is also known as “4S”.

and finally health forums with public health personnel and, to a smaller degree, patient organizations and a few PD researchers.

In Denmark, health and care are financed by tax-payers. Five regions administer the public hospitals and 98 municipalities are in charge of prevention, elder care and rehabilitation. When evaluating technology for telehealth (including telemedicine and telecare) the major public health providers found that either system quality was too low or the price was too high. In order to change this situation, government, regions and municipalities agreed on a reference architecture for a national telehealth infrastructure. In addition, five large-scale demonstration projects were initiated. Two of these were to develop a common open source telehealth system called OpenTele. At the same time, a national research project developed an open source infrastructure toolbox compliant with the reference architecture and some of the researchers became involved with the two demonstration projects.

After having had discussions involving the researchers, national agencies, regions, municipalities and people from the two demonstration projects, it was decided to establish an open source software foundation, called 4S. 4S was established in 2013 and governs both OpenTele and the infrastructure toolbox. In 2015 the government, regions and municipalities agreed to offer telehealth-based treatment to patients suffering from Chronic Obstructive Pulmonary Disease (COPD) by the end of 2019. They also decided to base this on the reference architecture and on OpenTele [53], [54]. Currently, OpenTele is being redesigned in a sequence of PD projects based on experiences from ongoing use. At the same time, the software architecture is changed into micro-services. A number of companies are ready to use the new software as soon as it is ready. In competition with this, a private company is using the OpenTele open source software to develop closed source versions, where they add several new features without contributing the code as open source. The activities of the private company have reopened discussions of open versus closed source among regions and municipalities. Furthermore, in order to strengthen their push for PD-based open source software, the healthcare fora have upped their activities to demand more democratic control over design, continued development and deployment of treatment regimens and IT-support.

4S was established with a rather traditional role in mind: To govern a collection of open source software. We have been inspired by the ongoing transformation of the 4S organization and the vision of the initiative, driven by the close cooperation between healthcare personnel and researches/activists, towards more and more emphasis on work place democracy in combination with influence by

patients and their organizations. And we have learned from the very important role played by deployment, use, experience and continued development of software as a vehicle for demonstrating the implications of the vision and thus for the continued and growing engagement of personnel and patients. Finally, this initiative has illustrated the importance of working at different levels, e.g. hospital, region and government, while drawing on and combining arguments, based in different professions, such as IT and healthcare.

3.10 Summary

In summary, we see the following main qualities of the three projects:

HISP in many ways represents a long-term perspective with an explicit democracy agenda with a focus on strengthening possibilities for local action and on internationalization based on a growing network of quite different national nodes. Thus, HISP is also adding to our understanding of possibilities and challenges for PD in developing countries. FabLab@School.dk is featured for its extended network activities, working politically with both informal, and formal political systems; and for its focus on education for future design and technology skills in a context aimed at education for democracy. 4S illustrates how open source technologies may become a useful vehicle for local engagement, play a role in increased democratic control, potentially being a broker for bridging local and national levels of participation, and for network activities parallel to those of FabLab@School.dk.

With these three cases, we are beginning to see possibilities, and hopes for future processes and structures that embrace participation, whether in classical PD forms or not. They all share the characteristics that they *address important changes* related to the lives of the involved partners, have *complex partnerships beyond here-and-now collaboration between direct users and researchers*. They are furthermore characterized by the *researchers taking side and working with their partners on shared visions* as well as having an agenda of their own, an agenda that is both a social and political agenda and a technological one. In the following we will discuss these elements further and set the scene for revitalizing participation before we present and discuss the set of basic elements of our proposed new PD.

4 Agenda for a new PD – the core elements

In the following we will discuss the possibilities for a new PD. We see the cases as giving some leads for where to head, and what we really aim for is an invitation to participate in the continued codesign and realization of a *PD that matters*.

We are not naive when it comes to the possibilities of carrying out this agenda, and certainly contextualization and revision of means and even ends are important as emphasized by e.g. HCI4D research. However, it seems that several things are happening in society that may support such agendas. Piketty [65] described capital accumulation and the rise of what he called patrimonial capitalism, in which a few families control most of the wealth. Mazzucato [59] talked about how, in the last financial crisis, big private companies seemed to take the money and the states took the risk and paid the bills. “*Socialization of risk, privatization of gain*” as Mazzucato has put it. In many areas jobs are disappearing and it seems that often new investments do not create new jobs. In many public sectors, the budgets are being reduced and at the same time public spending on IT is increasing, leading to further cuts in personnel. An increasing awareness of these matters seems promising for the realization of a PD that empower new groups of people, create new possibilities in areas important to these people and impact use and distribution of resources that is a PD that matters. At the same time, empowering new groups of people will often create strong opposition, and as stated above contextualization is important, also when it comes to empowering and handling opposition.

In the following we present and discuss five basic elements of our proposed new PD. They are based on the three inspirational cases presented in section 4, as well as our re-interpretation of the first generations of Scandinavian projects. The five elements form the core of the new PD, where politics matter and a neutral position is not possible:

1. PD that matters should address *areas where dramatic, potentially negative, changes are under way*, hence forming the basis for engagement and action by researchers and especially by partners.
2. Partners *as a major driver* constitutes the second element.
3. Researchers, in the *dual role of researchers and activists* is the third element.
4. Researchers and partners cooperating on a *vision for high and lasting impact* to counteract potentially negative developments is number four and

5. Safeguarding and developing the impact through *democratic control* is number five.

We turn to discuss the five elements across the three cases presented in section 4, and we look back on historical PD in order to discuss the possibilities of new and revitalized form of participation in design. In section 6 we proceed with discussing what we may call support action for this research agenda.

4.1 PD that matters should address changes that matter

The potentially negative consequences of the introduction of computers at the shop floor drove the first and second generation of PD projects in the 1970s and 80s. Today we are witnessing dramatic, potentially negative, changes in many areas. However, current PD projects unfold in many different contexts, that are mainly not oriented towards these large, dramatic changes. We find this problematic and argue that a *PD that matters should address changes that matter*. To better understand how this might happen we look at our three cases.

The Health Information Systems Program, HISP, began as a cooperation between South Africa and Norway. As a legacy of apartheid, the health system in South Africa was inequitable, fragmented according to race and with centralized management structures contributing to the marginalization of the black majority [23, p. 237]. HISP put high on its agenda to turn this around.

The FabLab@school on the one hand was constituted as part of a large move internationally to address digital literacy and digital fabrication in the school systems. On the other hand, FabLab@school, with the background of the researchers in PD and design research embraced the challenge of exploring design thinking in schools, hence aiming to prepare (Danish) school children to better deal with technology in the future, individually and as society. This focus on future digital skills, and the potential lack thereof among teachers and pupils, was a major driver for the project. The lack of digital skills and interest is currently seen as a major threat to the development of e.g. the Danish society and industry.

The 4S initiative on Software-based Health Services began at a time where public budgets for healthcare were being cut and severe negative consequences for both patients and personnel began to surface. At the same time, public health managers as well as IT companies promoted telemedicine as a major element in reducing costs and improving healthcare. However, the large, national telemedicine projects led the people behind the 4S initiative to the conclusion that unless something was done, telemedicine would become just another ele-

ment in the managerial control over healthcare services, emphasizing cost reductions and throughput, being delivered by companies who would charge and earn as much as possible. The 4S initiative set out to address this situation and emphasize quality as well as spending of money for patient care rather than for company profit [53], [54].

Dramatic changes, as we see them in the three cases, relate to the fragmentation of society, the role of digital literacy, and general attempts of corporations to make money from the public sectors and for people’s lives at large (e.g. Facebook and Google). Design at large, and PD in particular, should in our proposal help create alternatives, in terms of both processes and outcomes, that expose these challenges and offer other possibilities.

4.2 PD that matters is based on engaged partners

We consider profound cooperation between researchers on the one hand and actors from the groups experiencing dramatic changes, to be crucial – and we term these actors partners.

In the 1970s, Trade Union partners were strong and had an agenda of industrial democracy [62], [37], [?], [35].

Current PD basically does not have such partners as drivers. On the contrary, the PD researchers often have to orchestrate and sustain participation by users in specific PD projects [63], [52].

A new PD that matters, is based on engaged partners, since PD researchers do not create societal change by themselves. The engagement of partners is closely related to the changes they experience or expect, and to their hope for major, lasting changes in areas that are important to them. In some ways, individual partners thus share characteristics with the Lead Users identified by von Hippel, who notes that lead users expect relatively high benefits regarding the needs they have encountered [73], Chapter 2. However, as discussed by Bjögvinsson et al. [6], von Hippel’s concept of democratizing innovation does not consider aspects that go beyond market economy, whereas our focus here is on partners that help progress the new technological development for other than simple commercial reasons. Today there are often no obvious organizational frameworks supporting potential partners. Thus, it is part of what is needed from a shared agenda for researchers and [?] partners to develop an understanding of which [?] partners to involve, and how to support the development of the specific cooperation. Hence, developing this kind of understanding may be a question of trial and error in terms of exploring alliances and new or-

ganizational forms. It also means that the role of the researchers as well as the partners will and should change over time. Initially it may be the researchers who are driving the processes and setting up structures and frameworks, but for long-term development it is necessary for partners to take a more active role and responsibility. Partners need support and resources to act, learn and to exercise influence, and without preexisting organizational frameworks like the trade unions' ongoing work on providing resources, as they did in the 1970s, it is an important part of the projects we discuss here to develop frameworks and attract resources to also involve the partners.

In the 4S telemedicine initiative, a few healthcare professionals have been instrumental in the initial creation of the initiative. They also engaged in the ongoing involvement of healthcare partners. As the initiative expands the healthcare partners are now major drivers in overcoming resistance and developing alliances. The creation of national health care fora for discussion and development of treatment regimens, was one of the first important steps in the transformation of the initiative from a software governance organization towards more emphasis on work place democracy in combination with influence to patients and their organizations.

HISP was initiated in South Africa in 1994 as part of a new government reconstruction and development program [23]. From the outset HISP was based on a partnership between public health researchers and activists with a background from the anti-apartheid struggle and researchers from Norway with a background in Scandinavian PD and action research.

According to Bødker et al. [10], the Fablab@school.dk project engaged with local and national politicians at several vertical scales, as well as with parents and their organizations (see above) in order to identify potential strong allies and to find ways of collaborating with these. The difference between the national and local levels, however, also created tensions that were partially leveraged by alliances with top international university partners. Bødker et al. [10] also described a search for strong allied who could support and spread the project in front of political and administrative decision-makers, hence providing the support and alliances surrounding the project. Iversen et al. [47] discussed the partnership with the pupils as protagonists with whom the project has a strong partnership beyond here-and-now codesign.

Across the cases, our analyses made it clear that design at large and PD especially need to partner not only with future users. Developing, or engaging in, fora where collaboration may flourish, organizing networks with partners across e.g. local and national levels, and working with different levels of political

systems seem to leverage positive change in the cases we have looked at and are examples of what is needed.

4.3 PD researchers should be activists

The idea of doing research in the interests of labor was a key element in the early Scandinavian PD projects and as noted above Marxist theories played an important role in these projects. Hirschheim and Klein [42] even went as far as to characterize the researchers in the Utopia project as labor partisans, even though it was and is highly debatable that we (the Utopia researchers) went as far as that.

Today most researchers in PD as well as HCI probably agree that science is not neutral, yet we find it important to explore how researchers act in this field of non-neutrality in the new PD: On the one hand, the researchers are researchers with an interest in understanding the subject matter of their research better, and with skills to help design technologies together with partners, do research on new tools and theories, etc. On the other hand, they are activists working for a vision that they believe in; a vision of great importance to them, and of great importance to their partners. In their work as activists they create opposition of a different type than as researchers. At the same time, this may cause tensions as people in opposition to the vision may try to compromise both research and researcher, based on the role as an activist.

Furthermore, PD research activities and PD activist activities need different kinds of support and resources. In the current age, it is quite evident that what counts towards research is publications. This is what attracts research resources for many researchers. However, in order to also progress the activist agenda, more long-term engagements are often needed and less easy to fund. This challenge is not new, even if the push for publication, and the competition for research funding, are possibly stronger now than ever before. Often there are no obvious way to get resources for long-term activist activities, and it is part of what is needed from a shared agenda for researchers and partners to work on providing this kind of resources.

The creation of national health care fora for discussion and development of treatment regimens, were part of the 4S initiative as was the provision of resources for research in terms of support for software people to co-develop different aspect of the IT solutions.

The Fablab@school.dk project has been supported by private foundations interested in innovation of e.g. the industry (The Danish Industry Foundation),

it is leveraged by its connections to Fablab@school at Stanford University, and further, significant funding from private foundations. The work to make this happen is significant, as discussed in [10], [44], [45], [47].

An activist agenda in our perspective means to get involved, also with the many activities of forming partnerships and alliances, and with the activities that otherwise support the users in participating. It means to work with funding schemes outside mainstream research funding, but first of all it means to side with particular communities or groups of users and take a stance, and when others don't agree, conflicts are often immanent. At times, the need to be a respected researcher and have a future career seems to be a hindrance for this activist role, or at the very least, a choice to be made. However, our three inspirational cases all illustrate that it is possible, with hard work and strong partners and allies, to get significant funding for these types of projects.

4.4 PD that matters should have a vision for high and lasting impact

It is an important task for PD researchers/activists and partners respectively to negotiate, maintain, develop and concretize a shared vision. The vision of the NJMF project [62] was based on industrial democracy, specifically fighting the lack of democracy as changes were happening at the shop floor. In current PD projects, it is often not clear that there is a vision, other than helping researchers do a better design (See e.g. [72]), or, as suggested by Kyng [52], the vision is about user involvement throughout design and about better systems for all. However, there is little focus on what happens after design, when the researchers/activists have moved on, and the users are left to their own devices (A somewhat extreme case of this, designing with homeless people is discussed in [57]).

We hypothesize that today an overall vision for PD that matters can and should be based on *The good life* as opposed to The Competition State (see 1. Introduction).¹⁰ Where the good life supports people in living the lives they would like to live, including e.g. good jobs with a fair wage, education and healthcare, the Competition State in contrast focuses on conditions that make companies competitive [27]. The current state of the sharing or platform economy to us illustrate that many companies are 'in it for the money', the users/employees are an instrument for this, but they are not supported by these

¹⁰Obviously, proponents of The Competition state won't agree, but we don't believe that this type of disagreement can be bridged, it's a matter of politics.

companies for wages, education and healthcare. In contrast, they are left to their own devices as e.g. court cases against Uber drivers show. However, a PD that matters is grounded in specific aspects of the life of the partners and these aspects are a core element of the vision.

In 4S, the vision of new treatment regimes, where healthcare personnel and patients were the main innovators, were a strong driver for many partners. In addition, the ideas regarding a different economy of software projects and software, and hence more resources for better health care, keep otherwise different partners together. In FabLab@school.dk, the immediate gain for the active schools/classes of access to maker technology, is tied in with a strong long-term vision of digital skills for future generations. The FabLab@school.dk project connected with national and international agendas regarding the 21st century skills and digital literacy to focus beyond maker projects in specific schools and classes, hence emphasizing a wider educational agenda. In both 4S and FabLab@school.dk, the engagement with political levels is part of aiming for lasting impact. In our reading of the HISP program the track record of actual and previous partnerships and projects help sustain the vision and the promise of a lasting impact across partners.

A vision of high and lasting impact is, in our view, rooted in a vision of how society can be changed for the better, reemphasizing some of the fundamental assumptions such as fair wages. Such a vision is certainly in contrast to the visions often connected to current technological developments such as the so-called sharing economy. Hence lasting impact also needs to connect to more profound alternative visions of technology and to how such technologies may be anchored in the long-term development of use, both of which we see as a challenge to HCI at large. In addition, such visions are sustained through ongoing negotiation and maintenance among the partners, and they unfold in ongoing dispute and conflict with opposing visions.

4.5 PD that matters strives for democratic control of IT

Striving for democratic control over information technology in different contexts is an important part of a PD that matters. When PD cooperated with Trade Unions the question of democratic control was handled by developing models for Trade Union influence on design and deployment of computers [35, p. 38ff.], In current PD, the issue of democratic control is basically sidestepped and the focus is on process and on treating users fairly. What happens after design is left to existing structures outside the projects.

In our view, the question of democratic control is one of the most challenging for a new PD. The lack of democratic ideals in current PD, as well as consequences of this lack, has been debated extensively in e.g. [5], and [52]. However, to our knowledge the lack of democratic control in relation to outcome, deployment and future use, and development has not been high on the agenda when new projects were designed. Nonetheless it seems that part of what has happened historically, that we could learn more from today, is the role of education and basic skills for a present and future with more prominent role of IT.

HISP began as a Norwegian/South African PD project in 1994/5. Democratic control has been part of their agenda from the start and community ownership is seen as an important prerequisite. One of the first steps towards democratic control was taken when HISP South Africa was formed as an independent NGO in the late 1990s [23, p. 240].

In 4S [53], [54] democratic control is high on the agenda for both partners and PD researchers/activists. The formation of 4S was originally suggested by the PD researchers as a way of exercising public control over collections of open source software. Today, the main activities of 4S are carried out in the board, the software group and the health forums. The *board* mainly represents public health management at the state, regional and municipality level, the *software group* consists of software architects from PD and public healthcare organizations and *health fora* consist of health personnel and, to a smaller degree, patient organizations. To strengthen the democratic control especially patients, citizens and healthcare professionals need fora for critical debate, sharing of experiences and idea generation, and the 4S initiative sees the continued development of the health fora as crucial ([53]).

Fablab@school.dk works in a setting of public schools and government-run programs that are already, but in rather complicated manners, controlled democratically: Bødker et al. [10] described the mixture of legislation being controlled by parliament and budgets by municipal governments and local school boards. However, it is not obvious that these are appropriate for control over the project as such and Bødker et al. [10] described a number of activities to engage users at various levels. Fablab@school.dk has explicitly on its agenda to develop future skills in the digital domain, primarily for the school children, but secondarily also for the other groups surrounding the educational activities and the project as such (teachers, parents, local politicians). Education is a useful element in opening up democratic debates, in particular regarding technology which is often considered an expert domain for the few.

Democratic control is happening in the three cases we discuss, yet in some in-

stances, such control could be developed even further, and in particular perhaps, in a more long-term perspective. We will, in relation to democratic control, also emphasize the role of education of the relevant partners and allies to participate in participatory design processes and in using and envisioning technologies in a longer time-scale.

4.6 The first part of our agenda

This ends our presentation of the five core elements of the new PD, the five elements where politics matters and a neutral position is not possible. In the following section, we move on to the last six elements of our new PD, elements which can be said to be the support action, with more technical content.

5 Agenda for a New PD – The support action

In this section, we present and discuss a second, and last, set of elements that are important when developing a new PD that matters. We see these last six elements as crucial for the success of initiatives based on our proposed new PD, at the same time, however, they are more technical and we have named the set of elements support action. Like the five core elements, the support action is also based on the three inspirational cases presented in section 4, as well as our re-interpretation of the first generations of Scandinavian projects.

1. *High technological ambitions* are necessary in order to influence our technological future.
2. *Deployment of working prototypes* is an important tool for creating impact and experiences, and for sustaining a PD initiative over prolonged periods of time.
3. *Alliances* with other actors beside the direct partners are an important part of creating and sustaining impact.
4. Furthermore, we need to consider how to develop and use ideas and results on a larger scale—how to *scale up*.
5. In addition, we need to *understand the issue of success vs failure*.
6. Finally, we stress that *new PD is also action research*.

5.1 PD that matters have high technological ambitions

A new PD should be based on a concern for influencing our common technological future. Although much important work can be done without high technological ambitions, for those of us who want high and lasting impact on future technology, we advocate high technological ambitions as well as persistent questioning of even the most advanced technologies at hand. For instance, if we don't want to depend on Facebook we shouldn't make solutions based on Facebook but rather help find and develop alternatives. For us, high technological ambitions are not as such in conflict with processes that explore user needs, and where ultimately these processes do not as such lead to the introduction of new technologies.

It is indeed appropriate for PD projects to explore the possibilities of Facebook or 3D-printing with various community groups (to pick some examples). However, we find it problematic to take these technologies for granted, because this way we don't help users understand and question the fundamental assumptions in the technologies, and e.g. the commercial interests behind them. Hence, we propose to have higher technological ambitions. At the same time, we do not advocate for PD projects that investigate a few new technological aspects without any plans for actual use, a concern we share e.g. with Bratteteig and Wagner [25]. We believe there is a strategic concern in how we, as technological researchers, help push for technological change. Korsgaard et al. [50, p. 73] support this: *“Although there may be arguments for basing solutions on existing frameworks within the user domain (integration, sustainability, familiarity, licensing etc.), this development comes with implications that are important in PD research.”* They go on to discuss how the taken-for-grantedness of the technology, of users and researchers is problematic because they then cannot be critical towards the technology. Hence, alternatives are needed. *“Alternatives help both users and designers imagine beyond the taken-for-granted. Uncritically adoption may make researchers and user insensitive toward the ideological premise embedded within the (commercial) platforms.”*

High technological ambitions were introduced in the Utopia project, and the failure to deliver a working system may be the most important factor in understanding why the project was not followed by new Trade Union based projects as discussed.

In HISP the initial ambition was to identify information needs and support interim district management teams [23, p. 238]. In the first years, high ambitions concerned the application of rapid prototyping and what is called 'builds' being released weekly or even daily. As HISP developed they adopted new tech-

nology like cloud computing and the ability to add new features daily while in full production. At the same time, they have continuously worked on integrated health information architectures, according to Braa and Sahay [23, p. 250ff.].

In 4S the initial software architecture is currently being substituted by a micro-service architecture. The micro-services are intended to function as a continually expanding set of building-blocks which are expected to form the technical core in a software ecosystem, and the basis for the construction of highly flexible support for a constantly evolving set of new treatment regimens and uses of health IT, that will eventually supplant monolith like current electronic patient record systems.

To succeed with new PD initiatives, we see high technological ambitions as an important aspect. It is simply important that research finds ways of developing viable technical alternatives, that serve users well and are technically sound. Hence, we want to develop alternatives to current and future commercial systems. These alternatives seem to have a way forward if they are technically infrastructured with other technologies, and based on open rather than proprietary platforms. This also requires digital literacy in some form or other and hence education for digital literacy is an equally important component (see also [10]).

5.2 PD that matters builds working prototypes

There are indeed many tools in the PD toolbox. In our view however, the deployment of *working prototypes* is important for creating experiences and impact, and thus for sustaining a PD initiative over prolonged periods of time. The use of mock-ups has since the Utopia project [10] been a pivotal tool for exploring and evaluating concepts and designs as well as to demonstrate these to people outside the design group. However, there is a fundamental difference between mock-ups and working prototypes especially when it comes to sustaining a PD initiative over prolonged periods of time: A mock-up is about giving form to concepts and designs but not about actual use. Thus, a mock-up is not, and will never become, an important part of the daily life of partners since it does not support them in their daily activities. Deployment of working prototypes in daily use in contrast means, that some of the partners can be involved in the PD initiative on a daily basis. It is certainly not sufficient to have a working prototype for this to happen, but it is indeed necessary, as discussed also by Voss and collaborators, e.g. in [41], [74].

Furthermore, to use a working prototype over prolonged periods of time

makes it possible to co-develop and re-develop the technology in interplay with the processes of use. In other words, working prototypes make appropriation possible, and can support the users in making more radical changes, and – if the use process is followed actively – support changes initiated by the researchers. Finally, with a stable, working prototype it is possible to begin to scale up and involve new groups in other organizations. In this sense, working prototypes are important for education and understanding among users.

The issue of working prototypes was not on the agenda for the first generation of PD projects. Rather, they left actual development of systems to management-controlled projects and IT companies. In the Utopia project, the key idea was to change this and expand local choice through centrally developed alternatives. However, the project did not succeed in making alternatives available. Without a viable technological alternative, there were also no viable alternative ways of organizing work and in the end no strong push from the Trade Unions to continue development of technology and organization. For the involved researchers, a simpler and rewarding path was to expand their international cooperation on tools and techniques and *better systems for all*. This development is reflected in e.g. the book *Design at Work* [?] and major European Union projects like Palpable Computing¹¹.

Many current PD projects do not develop working prototypes, but stop at exploration of new concepts. Hence the results only live on in research papers. This is the natural way of doing research, and since basically all PD projects are initiated, planned and managed by PD researchers, it is probably not surprising. However, as discussed in e.g. [52], research papers are usually not a very positive type of result for the involved users (see also discussion in [25]).

Some PD projects have produced and deployed working prototypes and some have been turned into products, e.g. in the Dragon project¹² [29] and the iHospital project¹³. But these PD projects were just that: projects. When the prototypes were transformed to products, new organizational contexts were created and in this process the PD aspects, as well as democratic ideals, were lost and traditional commercial interests took over [53]

In the 4S initiative, the visions of public ownership to software via open source, local control of organization, use, and IT-solution and of development of treatment regimens in cooperation between patients, health professionals and care workers were developed by deploying working prototypes or pilots e.g. for

¹¹Palcom webpage: www.ist-palcom.org, accessed January 19, 2017.

¹²COT webpage. 1998. Case 5: Dragon Object-Oriented Architecture of a Global Customer Service System. www.cit.dk/COT/case5-eng.html, accessed January 19, 2017.

¹³<http://www.ihospital.dk/>.

pregnant women with complicated pregnancies and the personnel involved in their treatment [53].

In HISP the deployed systems largely functioned as working prototypes for further projects supporting the vision of equitable health services in decentralized and empowering structures with local control of data [23].

In the two projects, we have seen how working prototypes, and especially how working with prototypes on a daily basis, have been used to sustain PD initiatives over prolonged periods of time. A working prototype is necessary for sustainability of the processes.

5.3 PD that matters must develop strong alliances

To fight negative changes and create high and lasting positive impact a researcher/activist/partner-based initiative needs to develop and maintain numerous alliances. And alliances are also important for the generation of resources, including funding.

For the first generation of PD projects alliances were not really an issue: The Trade Union partners and the university setting of the 1970s were sufficient to create action possibilities and to secure resources and funding. For instance, the DUE project was supported by the research council of the Danish Trade Union Council.

For the Utopia project the Trade Union partners and the university environment were still very important, but in addition the cooperation agreement with the IT company expected to develop a system based on the Utopia specifications was also important for the funding of the project [11, p.258].

Most current PD projects seem to be quite similar to other types of research projects when it comes to alliances, i.e. alliances may be important to secure funding, to get access to organizations and their employees, to keep employees interested in prolonged participation or to carry out experiments with specific technologies. However, due to the emphasis on fair involvement of users in many current PD projects, some authors have discussed the need for creating alliances with management in order to secure more fair conditions for the participating users, see e.g. [1].

In the HISP program, alliances were created with various levels of local administrations and politicians, and at the same time funding alliances secured rather large amounts of money for the program¹⁴.

Bødker, Dindler and Iversen [10] described the alliances and policymaking necessary for the FabLab@school: At one level, PD activities happen in partner-

¹⁴HISP webpage: www.hisp.org, accessed January 19, 2017.

ship with specific schools, pupils, parents and school staff. On the other hand, e.g. teaching curriculum and funding for schools are happening in two parallel political systems, a national and a local one, and hence, Fablab@school.dk has worked through activities/workshops with politicians locally, and nationally, working with civil servants, locally, nationally as well as at the EU level. Currently these alliances have led to Fablab@school.dk being involved with national curriculum development as a result of these alliances.

In the 4S case, alliances have been developed with regional hospital owners and IT departments, government agencies working with health IT, and to some degree with municipalities as well as with private companies. Part of developing these alliances has been developing exemplary business models for IT companies based on open source.

PD projects, like other projects, are limited in time, and since the results of PD projects are usually limited to research papers, the issue of alliances is usually not extended beyond the timeframe of the project. A PD that matters, on the other hand, has to create, maintain and develop complex alliances in order to be able to continue working for realizing the vision, including get support for deployment of solutions developed and the resources to continue development – thus alliances are often a matter of life or death.

5.4 PD that matters must explore larger scales

In the first PD projects, scaling up was carried out through education in the form of books and courses for shop stewards. The focus was on implications of computer use in different kinds of industries and how to deal with introduction of computers at the workplace. In the Utopia projects the Trade Unions also played a major role in scaling up, in terms of distribution and use of results from the project. For example, Graffiti 7, the popular end report of the Utopia project, was produced in 70000 copies in five languages [12]. In addition, the plans to develop and market a commercial product were important elements in scaling up, even though this development actually failed in the end. As a consequence, long term scaling up was reduced to the area of PD research, and focused on tools and techniques.

Few contemporary projects discuss scaling up beyond the specific activities, as we have seen above. Bødker and Zander's discussions of the possibilities in the municipal sector [18] may be an exception though they provide more questions than answers e.g. when they discuss the role of municipal democracy and its strategic discussions in the meeting with engagement and participation of mu-

nicipal workers who also want to exercise their influence from this perspective. In those cases where scaling up beyond research papers has happened, it has been through the development and marketing and/or deployment of commercial products as with the system developed for the Maersk shipping company¹⁵ and the hospital logistics system developed in the iHospital project¹⁶.

In this sense, these PD projects have scaled up just like any other commercial start-up, and we may even say that they are more part of the problem than a solution to the challenges of globalization since they try to build a multi-million-dollar business controlled by the few owners, not by users. Many initiatives trying to deal with the negative aspects of globalization are locally anchored. They try for instance to reduce global dependencies and focus on developing local resources e.g. through ecological farming. Bødker et al. [16], [15] presented the case of a Local Organic Food Community which under the heading of ‘A farmer, a place and at least 20 members’ has now grown into a bottom-up community of about 900 members distributing locally produced organic produce and eggs. The irony of this and many other bottom-up communities is that despite this local anchoring, they easily become dependent on global, proprietary software such as Facebook (see [16], [15]). Scaling up was attempted by development of a common technical platform across some similar food-sharing communities, yet this scaling up was difficult due to the wish for control by each community, as well as due to limited resources.

In both HISP [23] and 4S [53] open source software are key elements, and thus scaling up is financially not as demanding as when physical products are the main element.

However, when democratic control and continued participatory design are crucial, scaling up is still very challenging, and we hypothesize that scaling up usually will require an ongoing effort of maintenance and development of the scaling up itself. Scaling up includes e.g. structures and processes of control and the handling of resources, ‘large scale’ PD processes and coordinating technological solutions, deployment and use.

Some of these issues are handled in many well-known organizational settings, but will have to be dealt with in quite different ways in a PD initiative. To illustrate: Many international IT companies coordinate technological development and deployment worldwide and financing is handled via e.g. shares and loans or kickstarter.com. And although kickstarter.com has several attractive features,

¹⁵COT webpage. 1998. Case 5: Dragon Object-Oriented Architecture of a Global Customer Service System. www.cit.dk/COT/case5-eng.html, accessed January 19, 2017.

¹⁶<http://www.ihospital.dk/>.

it does not seem to be immediately applicable since it basically reduces to a consumer/producer relation. In the HISP case an international, organizational network has been developed. As mentioned above, a prominent member of this is a South African not-for-profit NGO with more than 50 full time staff. On the software side, scaling up is facilitated by a cloud-based server hosted by the HISP team at the University of Oslo, which is also handling the core development of the software and implementation support¹⁷. In 4S a new microservice architecture and a new quality-control system have been developed, in part to facilitate scaling up¹⁸. The issue of scaling up in relation to democratic control has not been addressed by the 4S initiative yet.

Scaling up, or, how to apply and further develop good ideas on a larger scale, is important to this kind of initiatives. A PD that matters is about people and usually locally anchored, and to apply and develop ideas and results on a larger scale challenges core political elements, especially democratic control. On the other hand, to fight negative changes and create high and lasting impact usually requires going from local to large scale as we have seen discussed above. So far, the Fablab@school.dk project and the 4S initiative, try to deal with scaling to a limited extent, also through the newest technological possibilities, for good and bad. Eventually they probably have to scale-up in order to continue to attract and engage partners. To this end they may look to HISP for inspiration.

5.5 PD that matters must address its successes and failures

In many research projects, failure with respect to outcome can be turned into research papers. However, in PD that matters, success in terms of outcome is often necessary in order to continue to work towards the vision. The success of the first PD projects was largely a result of a then unconventional research approach based on close cooperation between committed researchers with an activist stance and local unions at the factory level, and with support from the national trade unions.

In the Utopia project, success was to a large extent a matter of making an alternative system for newspaper production available for Nordic newspapers. As mentioned earlier, in order to design such a system, the project developed new design methods, techniques and tools. This made the project a success from the PD researchers point of view, because the methods were publishable in the

¹⁷HISP webpage: www.hisp.org, accessed January 19, 2017, HISP at UiO webpage: www.mn.uio.no/ifi/english/research/networks/hisp/, accessed January 19, 2017.

¹⁸4S webpage: 4S-online.dk, accessed January 19, 2017.

international, academic literature. However, for the unions and the workers, the lack of a viable alternative was a major failure. Even though the researchers tried to draw attention to desktop publishing, this got no support from the unions, who were entirely focusing on newspapers. Furthermore, the suggested desktop publishing initiative was primarily educational, standing in the way of the PD researchers' careers as researchers.

In current PD, the notion of success is usually related to processes during a project and research papers after, not to outcomes for the participating users. And as discussed above some projects, which are a success for the researchers did not produce useful results for the participating users, see also [1], [24], [25]. As with Utopia before, researchers are often more interested in moving on to the next research project, especially if their employer does not offer them much choice except being involved in a new research project.

In HISP the initial successful development of IT in support of decentralized and empowering structures was the basis for two decades of ongoing work, and in the case of 4S the successful deployment of the software in two national demonstration projects was the reason for the continued support from partners and the development of alliances. In FabLab@school.dk, it is similarly the local fablabs that provide the early, and visible steps of a success, because they engage pupils, teachers and for that matter parents locally and because the fablab spaces are very visible. However, ultimately the risks seem to lie at other organizational levels and on longer time scales, where the infrastructure as such needs support and sustaining, and e.g. work needs to happen to change the school curricula nationally, where fablabs and digital thinking compete for time, room and teacher competencies.

A PD initiative that matters and face big issues will also face big, sometimes unforeseen, challenges and high risks of failure. And although PD researchers may learn a lot also from failures, success is important for our vision, our partners and for ourselves in the role of PD activists.

5.6 PD that matters is action research

In the first Scandinavian project, the Norwegian NJMF, as well as in the Utopia project, important parts of the research approaches and design techniques were developed 'on the fly' based on needs that arose during the work. They were primarily action research projects aiming to provide change for the users, as we illustrate above. Participatory design, while important, came next, and was embedded in these other forms of research. In current PD, we find that focus

is usually on refinements of ideas and techniques, not on major shifts, seeded from outside the PD processes.

Acute attention to emerging needs, also outside the field of PD, is important and often vital for success. At the same time, the contributions of the researchers also come from their professional insights, and not just in PD methods. It is important that the people working on a PD initiative that matters are willing to work with new issues when the need arises. Balca [1] in her discussion of Kyng [52] addresses the connection between PD and Action Research. She concludes her discussions with a concern for whether or not we can see evidence of users' *"design influences in the technologies whose development they contribute to, or in work practices that work better from end users' perspectives"* she finds Action Research instrumental in helping researchers *"remain focussed on our scope of influence and (...) guard against 'engaging in politically correct research with little scope of influence.' "* [1, p. 81]

HISP is explicitly based on an action research approach, as well as on PD, and they list open source as one of the important elements in their strategy, which they find important in connection with current technological developments in this area [23, p. 255]. Bødker et al. [10] largely pointed to the many types of activities needed to carry out a project as organizationally and technologically diverse as FabLab@school.dk. The 4S initiative on telemedicine has worked with both innovation theory, business models and open source. In addition, quality control and the cost of CE-marking software according to e.g. the European Union Medical Device Directive became a major issue and was close to make the software too expensive to use if they wanted to establish an ongoing process of development based on PD. However, the 4S team had the resources to make a small project that succeeded in developing a new model for quality control and CE-marking of systems build from open source modules.

An action research approach can facilitate discussions of how researchers continue to contribute to projects and visions, especially when unforeseen needs arise, and the approach may help avoiding 'PD tunnel vision' (see also [53]). This is a further illustration of how researchers have, and must have a research agenda that is their own.

6 Moving towards a PD that matters

Our proposal for a new PD that matters is based on both on the early history of Scandinavian PD, the limitations of current PD and HCI at large and a few exemplary initiatives. None of the cases we have studied are perfect but they

do think beyond making a handful of direct participants happy, here and now.

However, to evaluate our ideas and develop them further we need extensive concrete experience as well as further research on several intriguing theoretical aspects of PD and HCI. This means for us and others to engage in action research-like initiatives and focus on how to increase the influence of groups of people in areas that are important to them. This will be done in the continued work on the 4S telehealth initiative and hopefully in an increasing number of new initiatives.

In the search for new initiatives we find that areas that are publicly financed and managed, e.g. education and health in the Nordic countries are good candidates since the public element gives claims about democratic control a broader appeal and makes the creation of strong alliances more likely than in entirely commercial settings. In addition, the combination of reduced budgets for welfare, reduced company taxes, and increased tax evasion makes many people look for non-commercial alternatives in these areas.

All the same, the call for transnational multi-stakeholder cooperation to ensure fair working conditions in digital labor platforms¹⁹ by the *Network of European and North American labor unions and worker organizations* could also provide a possibility for new PD initiatives that draw on some of the knowledge-building aspect of the early Scandinavian projects. We will not make further specific suggestions for new initiatives. However, we will briefly mention two related areas of work that we want to look into in the future, and then we present a shortlist of issues that we have identified as in need of new research.

The two relevant areas to look more into are HCI4D and work on digital thinking and production. With the recent developments in HCI4D towards conflict zones; literacy; infant mortality; rural and urban community development; and marginalized populations we consider it a potentially very useful source of cases and theories that go beyond the taken for granted in Western societies. Work like that of [76], which theoretically ground their work on community consensus in the concept of ‘Ubuntu’ can be seen as useful supplement to the HISP case. The Fablab@School.dk project is not alone with addressing digital understanding and production. In the work of Kafai et al. [48] they focus on youths’ critical understanding of new media, and DYI in order to understand the participatory competencies of youths. With this in mind, makerspaces and sustainability certainly have potentials for a future PD that matters.

Issues in need of new research are first of all, the two roles of researchers in the new PD: On the one hand, they work as researchers, on the other hand, as

¹⁹<http://crowdwork-igmetall.de/>, accessed January 5, 2017.

activists working for a vision with their partners. In addition, we find hope in e.g. the recent work of Forlano and HALpern [56] in revitalizing work with labor activists with this perspective in mind, as labor activists are important when it comes to considering wages and welfare even in the current millennium.

Secondly, when success depends on working prototypes and deployment of products, we need to better understand how relations among research, activism and the work by partners develop over time, as deployment and use scales up. Accordingly, scale takes a new role for research both regarding time and use. This adds to concerns for time and deployment discussed e.g. in relation to infrastructuring (See [66], [10], [58]).

Thirdly, we want to learn more about how to develop and sustain organizational frameworks for democratic control, critical debate, development of visions and politics, and how new organizational frameworks interact with existing ones. With our analysis of the state of the field of human-computer interaction at large, this seems a necessary concern for the field of HCI, if it wants to escape the iron-grip of the big corporations (see e.g. discussion of Google’s implicit data gathering in [72]). In this field, we see an emerging critical debate (e.g. in [3]) but the step towards constructive visions has not yet been made.

Fourth, like with the early projects, we see a new need for public debate and education of the public, through the educational system, such as FabLab@school.dk, through profession-based and trade union channels and through the media.

Finally, we see a number of issues related to the relations between a PD project, limited in time and space, and our ideas about high and especially lasting impact. Thus, we would like to investigate different aspects of series, or networks, of projects that are part of the same initiative. HISP has much to offer concerning these issues.

Our agenda for a PD that matters calls for the help of – and critique by – many partners as well as strong alliances, also in the research community. Long-term commitment by researcher-activists is important, but perhaps also more difficult than ever. At the same time, more than ever, it seems important to come up with strong, democratic visions fueled by ambitious technological alternatives.

7 Conclusion

Dramatic changes will happen over the next decades, computers will play a major role, and a marginalization of the many in relation to power and technology seems unpleasantly likely. However, we believe that a new PD can play a role

in fighting for democratic influence, and influence the entire field of human-computer interaction in doing so. At the same time, such new PD initiatives may be at odds with the traditional demands on university researchers and require that the people involved allow themselves to emphasize working as activist more so than as researchers.

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