Doctoral theses at NTNU, 2024:89

Tangni Cunningham Dahl-Jørgensen

Exploring end-user participation in the design of digital public services: an empirical study of discourse and practice

Doctoral thesis

NTNU
Norwegian University of Science and Technology
Thesis for the Degree of
Philosophiae Doctor
Faculty of Information Technology and Electrical Engineering
Department of Computer Science

NTNU
Norwegian University of
Science and Technology

Tangni Cunningham Dahl-Jørgensen

Exploring end-user participation in the design of digital public services: an empirical study of discourse and practice

Thesis for the Degree of Philosophiae Doctor

Trondheim, March 2024

Norwegian University of Science and Technology
Faculty of Information Technology and Electrical Engineering
Department of Computer Science

NTNU
Norwegian University of
Science and Technology

NTNU
Norwegian University of Science and Technology

Thesis for the Degree of Philosophiae Doctor

Faculty of Information Technology and Electrical Engineering
Department of Computer Science

ISBN 978-82-326-7772-6 (printed ver.)
ISBN 978-82-326-7771-9 (electronic ver.)
ISSN 1503-8181 (printed ver.)
ISSN 2703-8084 (online ver.)

Doctoral theses at NTNU, 2024:89

Printed by NTNU Grafisk senter

Abstract

The public sector is intensifying the employment of digital solutions in providing public services based on promises of efficiency and improving citizens' experiences. This thesis explores how the participation of end-users - citizens and frontline workers - is approached when designing and developing digital solutions for use in services provided by the local government. The Scandinavian countries have shown a particular interest in promoting democracy and participation in Information and Communication Technology projects. However, this does not exempt them from encountering significant issues in designing and implementing new systems, ranging from low user acceptance, a lack of digital competence among citizens and government officials, and regulatory and organizational blockages. Additionally, public services are increasingly designed to be accessed online, shifting more of the work onto the citizen, potentially leading to increased digital exclusion of marginalized and vulnerable people. Considering these emerging issues stemming from the increased digitalization of public services, understanding the repercussions of how participation is viewed and enacted by government officials in ongoing projects is important for practitioners and researchers.

This thesis is the culmination of 4 years of work investigating how a Norwegian municipality includes end-users in the design and development of digital services. The research is based on two case studies: a pilot study of municipal efforts to create a database of recreational activities and a large-scale effort to create a case management system and digital interface to facilitate communication between caseworkers and citizens in contact with Child Welfare Services. The thesis expands the understanding of participation in public service development by zooming in on what impacts the characteristics of participation, specifically the socio-technical context and underlying goals, motivations, and regulations.

- Challenges: The lack of clear descriptions of how to approach the facilitation participation of citizen-users often leads to municipal workers advocating based on their user groups and little direct participation in projects. In addition, decision-making in large collaborative projects was fragmented based on local government organization and where the funding from projects came from. Though citizen-users voiced their opinions directly to project management, their needs and opinions were filtered through

project management when discussing directly with IT developers and steering groups who decide much of the framework for the project.

- Opportunities: Interdisciplinary teams consisting of municipality workers and IT experts that worked together through the entire lifecycle of a project established mutual understanding for both the technical limitations and the practices that new systems had to support.
- Other implications: Though public officials see the benefit of end-user participation, the decision-making power in multidisciplinary, collaborative projects remains so fragmented that what one participates in and how one can impact the outcome is difficult to decipher.

The research in this thesis is based on using Participatory Design as a framework for viewing participation, power, and politics in public organizations. However, reflecting on how participation was envisioned in different ways, I investigated what participation can mean locally and in complex constellations consisting of different public organizations, stakeholders, professions, and end-user groups. I drew on the tradition of Computer-Supported Cooperative Work in viewing the work practices that impacted end-user participation and Information Systems to address issues related to scale and the socio-technical infrastructure digitalization projects contend with.

With this thesis, I contribute to a broader understanding of end-user participation in public service projects through produced materials and constellations of people collaborating in decision-making while drawing attention to opportunities and challenges in the design work. I also contribute to theoretical discussions of participation in design within the confines of an existing infrastructure.

Preface

This thesis is submitted to the Norwegian University of Science and Technology (NTNU) for partial fulfillment of the requirements for the degree of Philosophiae Doctor.

This doctoral work has been performed at the Department of Computer Science at the Faculty of Information Technology and Electrical Engineering under the supervision of Associate Professor Elena Parmiggiani (main supervisor), Professor Dag Svanæs (co-supervisor), and Professor Aksel Tjora (co-supervisor)

The thesis consists of two parts. Part 1 is a synthesis consisting of an introduction and motivation for my research, main contributions, theoretical background, research method, case introduction, and discussion of all findings. Part 2 consists of the four papers included in this thesis, which are:

1. Dahl-Jørgensen, T. C. and Parmiggiani, E. 2020. Platformization of the public sector: Assessing the space of possibility for participation. In Proceedings of the 16th Participatory Design Conference 2020- Participation(s) Otherwise - Vol. 2 (PDC'20: Vol.2), June 15-20
2. Dahl-Jørgensen, T. C. and Parmiggiani, E. 2023. Caseworkers' participation in procurement: Infrastructuring Child Welfare Services in Norway. Computer Supported Cooperative Work – The Journal of Collaborative Computing and Work Practices.
3. Dahl-Jørgensen, T. C. and Aasback, A. W. 2023. The role of contextual conditions in systems development: The impact of design context on participation in Norwegian Welfare Services. Presented at NIKT/NOKOBIT 2023.
4. Dahl-Jørgensen, T. C., Dahl, Y., Svanæs, D. and Parmiggiani, E. (Submitted to a journal). The discourse on user involvement in the design of digital public services: A case study of two municipal projects in Norway.

Acknowledgments

It is said that every story has a beginning, a middle, and an end. The same is not entirely true for research. My research began long before I thought of doing research, and I came into the world of research to build upon what was already there.

This research is a product of those who came before me and the partnerships I have made along the way. Therefore, I thank all the countless people I have discussed with and gained knowledge and insights from and informants who have openheartedly shared their experiences with me.

I thank those who have encouraged and nurtured me by sharing their precious time and wisdom. Those that have asked direct and critical questions, poking and finding holes in my logic or arguments while always suggesting ways to improve. Doing a PhD is indeed challenging, but that is also what makes it worth it.

The feeling of belonging to something greater than myself has made it worth it for me personally. The feeling that I might contribute to something that continues to grow. What I write today may inspire and be built upon by those who come after me.

Specifically, I want to thank my mentor, cheerleader, and main supervisor, Elena Parmiggiani, for being a sturdy captain in uncharted waters. I thank my co-supervisor Dag Svanæs for philosophical debates and being an endless book depository, and co-supervisor Aksel Tjora for thorough methodological guidance.

Thanks to co-author and confidant Anne Wullum Aasback, co-teacher and supporter Associate Professor Babak Farshchian, and IDUN mentor Professor Martha Larson. Thanks to the DICE research group, Forskerfabrikken, the members of Digital Publics, and the Information Systems research group at the University of Oslo for invaluable input.

I thank Copenhagen IT University for providing a breath of fresh air and a welcoming place to write and share research ideas.

Thanks to my loyal friends Feli, Stian, Krizzly, Queen D, JC, and especially Jenny, who proofread most of this thesis and sprinkled in encouraging comments. I am lucky and privileged to have friends like you.

Thank you to my inspiring mother, Carla, and father, Einar, for modeling hard work and encouraging my academic achievements, and to my brother, Rolv, and sister-in-law, Therese, for being a supporting sounding board for all my big life choices.

I thank you most of all, Jannis, for being the Han Solo to my Chewbacca and holding me when the world seems too big and I too small.

Tangni Cunningham Dahl-Jørgensen

Table of contents

Part I – Synthesis

1. Introduction

We live in an age where the leading discourse around digital technology focuses on its extreme capacity for innovation and ability to change our everyday lives, at times, quicker than we can respond. Scandinavian countries seem to have the resources and will to be at the forefront of technological advancements and plan to integrate these into welfare services and digital systems for the public sector (OECD, 2017; DESI, 2022). However, the reality for many public services starkly contrasts with the optimism of technological advances around Artificial Intelligence, data sharing, and service automation (Lindgren et al., 2019). Norway's efforts serve as a case for countries aspiring to increase the digitalization of services for their populations, offering valuable insights on an international scale (OECD, 2017; Ministry of Local Government and Regional Development, 2020). Simultaneously, organizational structures and a lack of expertise hinder such efforts by addressing transparency and trust issues in the development process.

Many Norwegian governmental institutions struggle with outdated systems designed as archival databases, often resulting in writing and receiving physical letters (Støkken, 2019). At the same time, politicians and public officials use slogans such as ‘digital first’ and ‘digital transformation’ (Parmiggiani & Mikalef, 2022) to indicate a future vision that is in stark contrast to the realities on the frontlines of public services in Norwegian municipalities. This contrast between the public discourse and the behind-the-scenes practice of providing welfare services grants an opportunity to shed light on the realities of developing new systems in public services. Providing effective support through welfare services is arguably the backbone of Nordic countries.

Though it could be tempting to view the development of systems from merely a technical point of view, social, political, and organizational aspects influence what is developed and how. Therefore, several researchers have called for a socio-technical perspective in researching digital service projects (Oostveen & van den Besselaar, 2004; Tilson et al., 2010; Lindgren et al., 2019), as digitalization does not happen in a vacuum. One crucial aspect of this digitalization process is the active participation of end users, i.e., citizens and frontline public workers. Researchers have provided several arguments for increased end-user participation in digitalizing public services, ranging from ideological to practical (see, for example, Kensing & Greenbaum, 2012).

This thesis investigates an ongoing transformation in how public services are provided within the context of Norway's local public sector. Public services have a variety of functions for citizens, like providing helpful information and advice (Bassetti et al., 2019) and providing financial or social aid through various life events (Holten Møller et al., 2019). These services are covered entirely or partly through taxing the population residing in the geographic area. The participation of citizens and other end users (e.g., frontline workers) has gained traction, especially in the past decade (Brandsen et al., 2018; Fledderus et al., 2015; Adnan et al., 2022). However, research on the entirety of the process and what this means in practice is still lacking (Fledderus et al., 2015; Starostka et al., 2022).

Though Norway is a comparatively rich country with a high degree of political and financial support for digitalizing public services (Ministry of Local Government and Modernization, 2016; 2019), many municipalities report not coming far in this endeavor (Rybalka et al., 2019). By researching development initiatives in Trondheim, Norway's third most populous municipality, I describe how international technological trends, international and national policies and regulations, and governmental structures impact end-users' participation in the design and development of public services. This research contributes to researchers' and practitioners' understanding of current issues in public service development, challenges to including end users in such projects, and how such issues are discussed at all levels of the governmental hierarchy.

The empirical foundation of this thesis comes from research on two digitalization projects. The first was a pilot case where workers from different units within the same municipality attempted to collaborate to make a digital recreational activity database available to citizens. Public officials envisioned it as an informational database and a booking system. This project lost funding but provided an opportunity to learn about the municipal structure, the views of some workers from different units, and information about other projects. The second and main case was a large-scale digitalization effort by Child Welfare Services (CWS) involving several Norwegian municipalities as well as state and private actors to develop multiple interconnected systems. This innovation project aimed to improve the service in several ways, promoting greater transparency and more information for citizens, easing communication between citizens and frontline workers, and streamlining access to documentation between public entities.

1.1 Theoretical Framing

In researching the participation of end users in the design of public services, I draw from and aim to build upon the research tradition of Participatory Design (PD) by using the foundational interest in participation not only as a vehicle for better design outcomes but as emancipatory and a part of a healthy, democratic society.

> "Participatory Design can be defined as a process of investigating, understanding, reflecting upon, establishing, developing, and supporting mutual learning between multiple participants in collective 'reflection-inaction'. The participants typically undertake the two principal roles of users and designers where the designers strive to learn the realities of the users' situation while the users strive to articulate their desired aims and learn appropriate technological means to obtain them."
>
> *Robertson & Simonsen, 2012, p. 2*

In this thesis, I use PD as a framework to view how the participation of citizens and frontline workers is constructed and practiced in the design of digital public services. Research in this field has provided a pool of literature researching participation in public sector design in different contexts, e.g., public service design and digitalization projects in the public sector (Dittrich et al., 2002; Oostveen & van den Beesselaar, 2004; Borchorst & Bødker, 2011; Karlsson et al., 2012). I draw inspiration from PD literature that goes beyond the creation of artifacts to discuss the fundamental issues of politics and power. This includes how participation is understood and argued for (Bratteteig & Wagner, 2016; Robertson & Simonsen, 2012) and how context and existing infrastructures shape participatory practices (Gartner & Wagner, 1996; Dittrich et al., 2002; Bødker et al., 2017; Bødker & Grønbæk, 2020).

The PD literature has influenced other research domains in researching and motivating participation in a larger context and mechanisms such as politics, societal trends, and organization. I draw from the research field of Computer-Supported Collaborative Work (CSCW) in addressing the importance of practices and the contextual aspect of design work. As the Nordic approach to PD originally grew out of CSCW in the 1990s (Beck, 2001), it became a natural progression in my research to draw on parts of CSCW literature while reviewing PD literature, as CSCW provides insights on what constitutes collaborative design work (Bratteteig & Wagner, 2016), while PD has focused more on developing

methods for collaborative system design (Kensing & Blomberg, 1998). I also borrow insights from Information System (IS) literature, specifically to talk about the scaling of design work. I view the initiatives detailed in this thesis as part of a bigger context as new systems are implemented into existing infrastructure (Hanseth & Monteiro, 1998; Karasti, 2014; Bødker et al., 2017). I see a scaled-up initiative (the main case) as a component of an infrastructure-building process and a global platformization process (the pilot case) as influencing local views on participation. Therefore, I also draw on literature related to the scaling of PD (e.g., Oostveen & van den Besselaar, 2004), platforms and platformization (e.g., Roland et al., 2017; Poderi, 2019), and infrastructuring (e.g., Aanestad et al., 2017; Karasti, 2014; Bødker et al., 2017; Parmiggiani & Karasti, 2018). All of this literature will be reviewed in the theory chapter.

1.2 Main Concepts

As this thesis contributes to the understanding of the context and way end users participate in the design of digital services in the public sector, it is imperative to define some of the central themes and concepts upfront and how they are used in this thesis. Therefore, I address how three concepts are defined: 1) participation, 2) design, and 3) digital public services.

1.2.1 Participation

In this thesis, I draw first and foremost on the theoretical and research tradition of Participatory Design (PD). Though there are many aspects and characteristics of this tradition that I come back to in the theory chapter (Chapter 3), generally, "Participatory Design is a concern for engaging human beings in the design of future technology" (Bødker et al., 2022, p. 4). Participatory Design literature has also greatly informed my understanding of participation as a concept. For a long time, papers on participation have stressed that mere inclusion is not tantamount to participation and have attempted to categorize elements of participation (Arnstein, 1969; Cornwall, 2008; Bratteteig & Wagner, 2016).

Based on the work of Bratteteig and Wagner (2016), I define participation as power over decisions made in the design process. In the theory section (Chapter 3), I will come back to views of power that have informed my work. However, this definition presupposes some form of action that impacts the outcome. With this definition in mind, I set about understanding the impact end users have over the decisions being made in what is being

designed, the actual design development process, and the effects on the outcome. The Norwegian translation of participation (medvirkning), which I used throughout data collection in conversations with informants, is a more fitting term in that it combines the collaborative (med = co-/together) and the action upon something else (virkning = effect). Comparatively, the word participation is more passive, as in taking part in something. However, in daily parlance, the Norwegian word medvirkning is used similarly to the English word participation.

Inspired by the theory of social construction, I explore the meaning of participation in the context of designing digital public services. By utilizing this theory in the design of digital public services, we can investigate the social construction of participation in these systems. By analyzing how participation and users are understood by actors engaging in design and the underlying power dynamics at play, we can better understand how participation is conceptualized and practiced within the context of digital services.

1.2.2 Digital Public Services

Providing a service is often differentiated from providing a product, though providing a product may be part of a service (Sangiorgi & Prendiville, 2017). A service can be defined as "a process in which value is created for someone" (Lindgren & Jansson, 2013, p. 1). This includes a form of interaction between the provider of the service and the recipient that has been envisioned as creating an experience for a customer (Sangiorgi, 2011). Public institutions, non-profit organizations, and businesses can all provide services, though their goals and methods for creating value vary slightly. When a public institution provides a service, value creation cannot be quantified based on profits and voluntary repeat customers.

A citizen in contact with public services, like an unemployment office or child welfare services, would likely not be there entirely willingly, nor would the service provider consider it successful if the citizen were to come back repeatedly (Osborne, 2018). The value or benefit deriving from digitalizing public services can be found at the individual level, by receiving financial aid or other support, at the network or community level, and for the public service provider (i.e., state, county, or municipality) in saving resources.

By prefacing the word digital, I suggest that the services are provided online or are digitally mediated, usually through a digital interface (Lindgren et al., 2019). However, a service is often provided both through face-to-face and technologically mediated interactions

(Sangiorgi & Prendiville, 2017). By digitalizing public services (Lindgren et al., 2019; Tuikka, 2020), I mean the integration of digital technology in a way that transforms the practices of frontline workers and citizens to include information and communication mediated through an online website, computer system, or mobile application, all of which can be part of providing a service. In particular, I will address the design of new systems within a public service in this thesis.

1.2.3 Design and Development

In this thesis and the included papers, I use both the terms design and development. Design as a concept in PD encompasses imagining, modeling, or producing "artifacts, systems, work organizations, and practical or tacit knowledge" (Spinuzzi, 2008, p. 164). The term development is used mainly to differentiate between the practice of designing services and service design as a field of study. It is used to describe the production of systems within the design process. In investigating new design challenges, I will also discuss aspects of scaling in the theory chapter.

1.3 Motivation

As the design of digital services in the public sector is growing significantly, there remains a lack of research addressing the impact of digitalization on interactions between citizens and the government (Lindgren et al., 2019). Therefore, how such changes are envisioned and enacted deserves further scrutiny. As such services will impact the work lives of frontline workers when providing public services and the personal lives of citizens in applying for and receiving services, efforts that impact the service's quality and efficiency should also consider the practices and needs of these end users.

Kensing and Greenbaum (2012) distinguish two main arguments for participation in design, i.e., pragmatic and political. The political argument for participation in design stems from having the right to impact one's working conditions (see also Bratteteig & Wagner, 2016). The pragmatic argument posits that in actively involving end users in design, mutual learning takes place between users and experts, leading to better outcomes. Similarly, two decades before, Bødker and Greenbaum (1992) distinguished between the same two main perspectives, the ethical perspective of promoting democracy and the pragmatic suggesting that participation leads to better outcomes. This endurance in the literature suggests that these arguments are at the core of PD.

Based on the research literature, I see four main arguments for studying end-user participation in the design of services. First and foremost, the participation of end users in the design and implementation of digital public services ensures that their needs, preferences, and concerns are taken into account. Citizens are the ultimate beneficiaries of these services, and their engagement can provide valuable insights into making them more user-friendly, accessible, and effective (Gärtner & Wagner, 1996; Fledderus et al., 2015). By involving end users, local governments can avoid the pitfalls of developing digital services detached from the reality and expectations of the citizens they serve. The benefits can be linked both to the increased value of the service and savings in public spending and time (Anthopoulos et al., 2007; Wetter-Edman et al., 2014).

Secondly, studying end-user participation in digitalizing public services promotes inclusivity and equity. In many societies, there are diverse groups of citizens with varying levels of digital literacy, access to technology, and socioeconomic backgrounds. Local governments can identify barriers to digital inclusion by involving end users in working towards bridging the digital divide (Midtgård et al., 2022). This approach ensures that public services cater to the needs of all citizens, irrespective of their technical proficiency or socioeconomic status.

Furthermore, participation is thought to foster a sense of ownership and empowerment among end users (Bratteteig & Wagner, 2016; DiSalvo et al., 2012). When individuals are actively involved in shaping the digital services provided by their local government, they become more invested in the outcomes. This engagement can lead to increased trust, satisfaction, and civic pride, as citizens perceive their voices as being heard and valued. Consequently, participatory approaches to digitalization can strengthen the relationship between the government and its constituents, promoting a collaborative approach to public service delivery.

Lastly, studying the participation of end users in the digitalization of public services allows for continuous maintenance and improvement after implementation (Trigg & Bødker, 1994; Ehn, 2008; Bannon & Ehn, 2012). By gathering feedback, observing usage patterns, and analyzing user experiences, local governments can identify areas for enhancement and make iterative improvements. This iterative process ensures that digital services remain responsive to evolving citizen needs and technological advancements, ultimately leading to more efficient and effective public service delivery and ensuring the sustainability of the

system or service (Issa & Isaias, 2022). Based on these arguments and the rise of digital public services, the participation of end users in the design of services and systems within them is, and ought to be, of interest both to practitioners and researchers.

1.4 Research Questions

My research was based on two objectives that are closely intertwined. The first objective was to examine how decision-makers understood citizens through their language. The second objective remained more theory-driven, examining the activities that were connected to the inclusion of citizens and how they were operationalized. In the PD literature, there is a lack of problematization in relation to the former objective, i.e., how decision-makers perceive citizen participation (Hatling & Sørensen, 1998; Smith et al., 2017). Based on the aforementioned concerns, the construction, and operationalization of citizen participation are important research topics, particularly in the context of a government that generates digital interventions, due to the potential consequences for citizens and the degree to which one can contribute to the advancement of one's society. Drawing on social constructivism, I see the discussion around what participation means as affecting the practice of participation. Public services are embedded in a national and local context, with accompanying regulations, practices, and attitudes (Oostveen & van den Besselar, 2004), and national directives impact local initiatives. Therefore, I see a need to investigate how participation is envisioned and enacted in the design and development of digital public services involving discourse and practice.

In creating systems that facilitate communication between citizens and government employees, harboring an unexamined view of how citizens are involved in the design process of the service may have negative consequences both for citizens and public institutions. Understanding how actors involved in the planning and design process of public digital services enact and socially construct participation was a guiding theme for my research.

RQ 1: How is end-user participation constructed in the planning of digital public services?

RQ 2: How is participation practiced in designing digital public services?

RQ 3: What challenges and opportunities exist for participation in the design of digital public services?

These questions will be answered based on a case study of two digitalization projects in the Norwegian public sector. The framing and context of this case will be presented in Chapter 4.

1.5 Contribution

In a public context, applying PD principles and methods leads to issues related to methods, tools, complexity, and scale (Bassetti et al., 2019; Dalsgaard, 2010). Bratteteig and Wagner (2016) state that literature on participation in PD is still lacking discussions on the differences in how participation is interpreted and its outcomes, and therefore, it "often remains unclear what it is that users participate in, what and how they contribute to the design results, and how they can see that they have contributed" (ibid, p. 425). Based on empirical findings from the design of digital services for Norwegian municipalities, I contribute to filling some of these gaps by 1) being specific about what impacts end-user participation in a municipal context, 2) what participation can look like, and 3) how municipal workers view participation.

Further, I aim to contribute to PD literature by highlighting how the context of design and aspects related to scaling design projects affect and are affected by efforts to facilitate participation in a highly complex and regulated public setting. By focusing on the contextual nature of design and how participation is molded by the practices of human actors and the inflexibility of existing infrastructures, I detail the actual challenges of local participation activities despite increasing interest and incentives for end-user participation in public service design.

I illustrate the contribution of the reviewed literature in Figure 1.

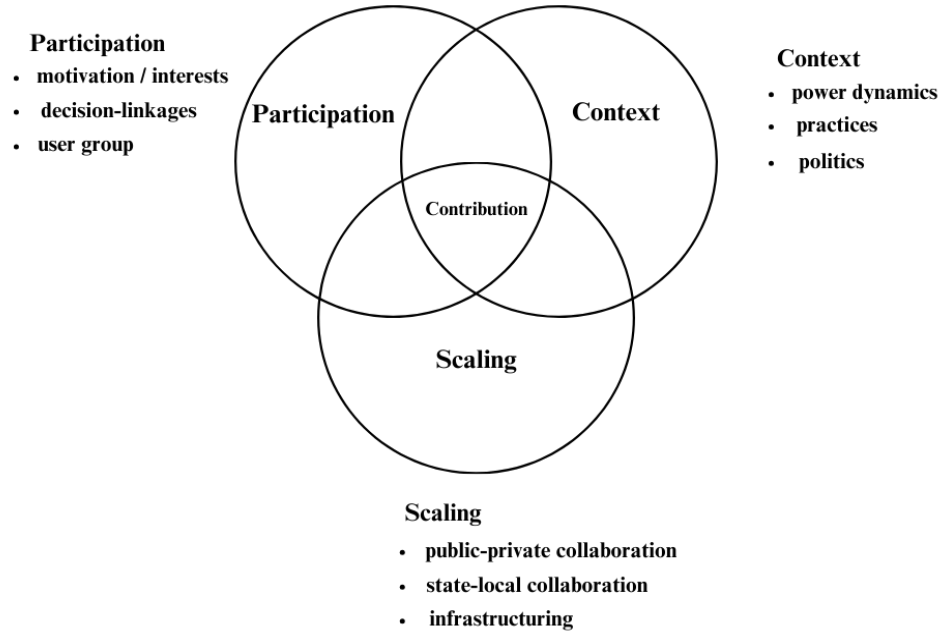

Figure 1: Illustration of the contribution of this thesis as an intersection of core issues embedded in the design context, some expressions of scaling, and central aspects of participation.

2. Background Literature

In this chapter, I begin by introducing existing trends in the discourse on digitalization in the public sector, followed by a review of the emerging challenges presented in the literature. This will constitute the background against which I will define the theoretical framework of this thesis in Chapter 3.

2.1 Current Trends in Public Sector Digitalization

The increased digitalization of public services has been a transformative force in how governments interact with citizens, especially in the last few decades. By leveraging advancements in technology, governments aim to improve the delivery of services, increase efficiency, and improve citizens' experiences of social services (Lindgren et al., 2019; Rybalka et al., 2019; Boyd et al., 2023). However, issues remain in relation to system interoperability, effects on public approval, and adapting to the use of new systems (Anthopoulos et al., 2007). Previous insights have linked digital experiences with governmental agencies to citizens' trust and satisfaction with the government (Brown et al., 2019; O'Leary et al., 2021). The same effect has been proposed when designing digital experiences, as a lack of end-user input can lead to a reduction of trust in public services and government officials (Bratteteig & Wagner, 2012; Fledderus et al., 2015).

Though goals differ from those of the private sector, the public sector is being influenced by private sector innovations in technology that promise user-friendly digital solutions that are intuitive and easily adoptable (Støkken, 2019; Haug et al., 2023). This has led to the introduction of new ways of designing and views of technology as a revolutionizing force for improving the usability and efficiency of digital systems and services. Expertise in system design has become a hot commodity in the Scandinavian public sector, but building up a knowledge base on development and design in the public sector has been slow work (Rybalka et al., 2019; Nesse & Erdal, 2022). Therefore, there remains a reliance on public-private collaboration for innovation (Støkken, 2019; Rybalka et al., 2019; Anthopoulos et al., 2007).

Private-public collaborations can mean hiring outside consultants for short-term projects or consultants that are embedded into the public organization for a longer time period, the procurement of fully or partly finished digital systems, or the development of future

systems. However, collaborations between differing organizations add to the complexity, like clarifying who 'owns' the solution, e.g., where the funding comes from and who is in charge of development and maintenance. For example, a private company could develop a system or service for the public market, meaning it would need to fit multiple organizational contexts. Though private-public collaborations benefit from utilizing distributed knowledge in designing systems and services for a complex context, they also lead to high levels of 'broken agency' (Anthopoulos et al., 2007; Casady et al., 2019). “In traditionally procured projects, this 'broken agency' has incentivized infrastructure planners to systematically overestimate project benefits and underestimate costs" (Casady et al., 2019, p. 2).

Public-private collaboration in the current sense became prevalent during the era of New Public Management when the focus was on minimizing bureaucracy and public spending while maximizing efficiency in public services. New Public Management has since been criticized for being overly concerned with quantifying work practices and outcomes while curtailing public expenditure to the detriment of the quality of public services (Osborne & McLaughlin, 2002).

Though there has been a shift from New Public Management, some aspects have remained, such as an over-reliance on numbers and economic factors in decision-making (Bødker & Greenbaum, 1992; Broadbent & Laughlin, 2002). Borchorst and Bødker claim that public services still depart from an administrative rationalization "and, essentially, let citizens serve themselves when applying for various benefits" (2011, p. 174). Thereby, much of the priority when designing new public services is efficiency in providing services, and the logic of New Public Management is still exemplified in current systems (Gillingham & Graham, 2016). Bratteteig and Wagner (2016) have pointed to the legacy of New Public Management and the drive for standardization and curtailing spending as negatively impacting participation in design. PD, in many respects, tries to counter this legacy by promoting participation with the goal of improving the quality of use. However, with varying outcomes, as I will outline in Section 2.2.

2.2 Challenges in Designing Public Services

Though participation is considered an important component of the successful outcomes of public services, challenges in facilitating participation in the public sector remain. Several researchers have looked into the design of technology for public services from the vantage

point of PD (Dittrich et al., 2002; Oostveen & van den Besselaar, 2004; Anthopoulos et al., 2007; Borchorst & Bødker, 2011). Anthopoulos et al. (2007) pointed to a range of variables that have not been sufficiently considered in strategic plans for digitalization in the public sector. These included civil servants' unique abilities and experiences, distributed knowledge across organizations, legal frameworks, the slowness of change in the public sector, and the possible impact on the government's reputation, leading to a larger focus on citizen satisfaction. As "public services are embedded in – but not necessarily completely dependent on – national regulations and procedures" (Oostveen & van den Besselar, 2004, p. 175), initiatives at the local level are impacted by national directives and vice versa, as are discourses and practices related to participation in the design of public services. Additionally, how end users impact the outcome of design change in different design phases.

In defining the need for new technological solutions, allowing citizens to voice the issues and obstacles they currently encounter in public services is vital for the quality and usefulness of the designed solution. In this way, PD promotes a *use-before-use* by imagining a future-designed solution in collaboration with those who are going to use it (Greenbaum & Kyng, 1991; Redström, 2008; Ehn, 2008). Oostveen and van den Besselar (2004) studied a public services innovation project aimed at international migrants moving from one European country to another. Migrants expressed significant obstacles in their interactions with public officials and often utilized personal networks in order to navigate these interactions. Different stakeholders expressed different interests in the development of a new system. While citizens and frontline workers prioritized usability, frontline workers were especially critical as the implementation would influence their work the most. Management, however, was more concerned with privacy, safety, and interoperability with other systems. As this project was large in scale and dealt with citizens, frontline workers, and management in different European municipalities with differing practices, regulations, and concerns, the participation of end users was conducted through representations and researchers working as intermediaries between citizens and designers.

Anthopoulos et al. (2007) found that public service provision relies on the tools and methods for participatory design adapted from commerce that can be adapted to a limited extent. Therefore, practices have to be altered based on these. The implementation of PD tools and methods can, therefore, be seen as an approved and more tailored experience for increasing the participation of end users. A large part of existing PD research focuses on the production of design representations, i.e., different materials, documentation, prototypes, etc., that

represent the outcome with continued refinement (Bratteteig & Wagner, 2016). These representations are especially essential in coordinating design work "that support, standardize, synchronize, and connect local practices so as to take care of logical, functional, spatial, social, and other interdependencies in complex design projects" (ibid., p. 429). Meaning that larger, more complex projects require increased use of design representations.

Dalsgaard (2012) points out specific challenges in large-scale public projects, particularly the increased complexity of involving a heterogeneous group of stakeholders in design. Following the building of a municipal library and Citizen Service department in Denmark, participation was a core value and motivation for the project. However, it was not a traditional PD project. Dalsgaard and collaborators borrowed principles on participation and methods from PD in an effort to increase stakeholder participation. Though reaching and engaging citizens remained challenging, several complementary activities, like workshops, aim to elicit reflections and opinions from citizens. In reviewing the literature on scaling PD approaches for large-scale projects, Zahlsen et al. (2022) identified seven categories of issues regarding scaling, including involving users and ensuring continuous engagement. The participation of end users in large-scale projects is often secured through the recruitment of representatives.

In addition to the importance of recruiting good representatives that can adequately represent the heterogeneous user base, the representatives have to be afforded time and resources in order for their contributions to be of value for a more participatory design outcome (Bødker & Grønbæk, 2020; Iversen et al., 2014). For projects that span many years, changes in project management and participants have also been isolated as a major issue (Dalsgaard & Eriksson, 2013; Zahlsen et al., 2022) in that mutual learning, trust, and creating common goals take time, which can be hampered through replacements, and that ideas generated early in the project might not be followed up by new management.

During prototyping and development, conflicts between stakeholders are often based on misunderstandings, which require enough time and language to foster a mutual understanding of regulatory and technical constraints and opportunities (Oostveen & van den Besselar, 2004). However, substantial resources are needed, as establishing trust and mutual understanding takes time. Additionally, as PD projects have shifted from workplace studies with union backing to 'the public sphere,' the expertise of designers and PD

researchers risks being unbalanced when interacting with frontline governmental workers and citizen users (ibid.; Robertson & Simonsen, 2012).

In researching the design of supportive technologies for public services in two Swedish municipalities, Dittrich et al. (2002) observed a shift when the supporting technology was implemented, and the responsibility for the designed technology was transferred to frontline workers. "As agency shifts, the object of design changes character as well: the supporting software, its adaptation, the whole infrastructure for service provision" (ibid., p. 129). This meant that in its use, technology was influenced by end-users' local practices and, therefore, designed and tailored after initial implementation to fit into the existing context and socio-technical infrastructure. This description is similar to Ehn's (2008) description of design-in-use. As he states,"(e)nvisioned use is hardly the same as actual use, no matter how much participation there has been in the design process" (ibid., p. 5). Instead of being an argument for scraping participation altogether, Ehn argues for a design process that allows for more flexibility in use, thereby allowing for further participation of end users in tailoring a design solution to better fit their needs and practices. "The complexity of the world makes it difficult to anticipate all the issues that will eventually be important in the final solution" (Henderson & Kyng, 1992, p. 221). However, what should be tailorable within a designed solution would also require knowledge about the application domain and, therefore, require participation in earlier phases of the design process.

3. Theoretical Framework

This thesis uses Participatory Design (PD) as a theoretical framework for understanding participation in the design of municipal services. This means that I based my understanding of end-user participation on PD research by seeing how end users were included in design activities in two municipal projects. However, in using an interpretive approach to answer my main research questions, I have not taken on the traditional role of a PD researcher. The findings presented in this thesis were acquired through an exploratory approach to data collection, which I elaborate on further in Chapter 5. Officials from the Norwegian public sector were in charge of and initiated these projects. Therefore, the research strategy differs from more traditional PD research, where the researcher initiates an intervention.

In writing the articles included in this dissertation, I have borrowed concepts and insights from other research traditions, such as Information Systems (IS) and Computer-Supported Cooperative Work (CSCW). However, the foundation of my contribution is towards PD, and the concepts I have used from other fields aim to expand the understanding of participation in larger contexts. Therefore, in this chapter, I present concepts used across article publications as they relate to PD.

In this chapter, I describe the theoretical framework my thesis is based on. Firstly, I summarize the main principles or tenets that PD research (section 3.1) is based on before delving into the three Ps I see as central to unpacking in order to understand the issues this thesis touches upon – namely, the concepts of participation, politics, and power in decision-making. Thereafter, I address the underlying view of social construction in this thesis, as many of the descriptions of power in decision-making are founded on the same understanding. The following sections describe the methodological aspects of PD, first in terms of what is meant by design in PD and then how scaling has been pinpointed as a central theme in the future of PD.

Traditional PD research has previously been focused on small interventions, though newer exceptions have described how PD can be used to understand large-scale digitalization projects (Dalsgaard, 2012; Dalsgaard & Eriksson, 2013; Roland et al., 2017; Zahlsen et al., 2022). As digital services become more complex and impact a wider set of stakeholders, researchers need to engage with wider political and socio-technical contexts that impact participation in system and service development, as envisioned by early PD.

Though the cases this thesis is built upon are not strictly PD projects, I found PD literature to provide a lens for understanding participation, especially considering the interlinked concepts of politics and power in decision-making that have greatly informed the work in this thesis. Additionally, I use the concepts of platformization and infrastructuring, work traditionally discussed in IS literature, to describe processes of development and implementation of new artifacts and information systems.

3.1 Main Tenets of Participatory Design

PD projects and research interventions have, since their advent, encompassed many different strategies for design and development but have been built upon core tenets. Generally, the goal of having a say in the design and implementation of technology that impacts one's working and personal lives is at the root of PD. In the Handbook of Participatory Design, Simonsen and Robertson (2012) defined PD as "a process of investigating, understanding, reflecting upon, establishing, developing, and supporting mutual learning between multiple participants in collective 'reflection-in-action' (Schön, 1983)" (ibid., p. 2). Bødker et al. (2022) summarize the primary ambitions of PD as "designers working together with people; reflecting together to accomplish a shared goal; a process characterized by mutual learning; and both the design outcome and the learning process are legitimate end-goals for a Participatory Design process" (ibid., p. 1). Ehn (2008) described the values of participatory design as hinging on the "idea of democracy as a value that leads to considerations of conditions for proper and legitimate user participation" and "the importance of making the participants 'tacit knowledge' come into play in the design process, not only their formal and explicit competence" (ibid., p.4).

Kensing and Greenbaum (2012) highlighted six main principles of PD developed throughout the 1990s: “equalizing power relations,” “democratic practices,” “situation-based actions,” “mutual learning,” “tools and techniques,” and “alternative visions of technology” (ibid., p. 33). The first principle of equalizing power relations, though straightforward in labeling and as a goal to aspire to, is difficult in practice as structural hierarchies are not easily changed. However, an easier central tenet to aspire to in PD projects is that of establishing democratic practices with the goal of lifting underrepresented and marginalized voices and facilitating stakeholder collaboration. The third principle of situation-based actions refers to designing with end users in the actual context of use, like the workplace or home. The fourth principle upholds the process of mutual learning by

finding common ground and understanding between users and designers. A way of establishing common ground is through the fifth principle: the use of tools and techniques, such as prototyping and workshops. These tools and techniques should aid stakeholders and end users in expressing their needs for functionality and in revising work practices. This can, for example, be holding workshops or the creation of teaching materials, mock-ups, and prototypes with varying levels of fidelity. The sixth and last principle presented by Kensing and Greenbaum (2012) is the development of alternative visions of technology that promote equality in use. By facilitating opportunities for visualizing future technologies together with end users, designers contribute to innovations that are grounded in the realities of end-users' needs.

Many PD researchers have repeated the objective of mutual learning, particularly between designers and end users (Bratteteig & Wagner, 2016; Saad-Sulonen et al., 2018; Akoglu & Dankl, 2021; Bødker et al., 2022). By designing in the situation that the end user inhabits, there are more opportunities for their tacit knowledge to come to the forefront and enable mutual learning to a greater extent (Spinuzzi, 2005; Ehn, 2008; Bjögvinsson et al., 2012). Workers or other end users might possess such tacit knowledge, but it is challenging to formalize or even acknowledge it as being significant before an intervention. This is particularly true of work practices that revolve around organizational, social, and technical systems. This process of uncovering tacit knowledge to enable mutual learning with the goal of designing systems and new practices for a specific context is seen as central to PD projects. In achieving such a goal, democratic or emancipatory practices are utilized, seeking to prioritize the voices of end users in decision-making that affects their daily lives and work.

3.2 Untangling the Meaning of Participation

How participation is understood in research on public sector digitalization processes is a discussion that requires revisiting, as what constitutes participation is not always evident in strategy documents or even in the research literature. PD differentiates itself from other design traditions, such as user-centered design and user-driven innovation, based on how participation is practiced as a more genuine form of participation (Kensing & Greenbaum, 2012). Genuine participation, according to PD researchers, necessitates two-way communication and mutual learning. Extracting experiences and needs from end users through interviews and reference groups in a process otherwise decided upon by designers

is not enough (ibid.). Participation in design can be defined as how individuals can influence technology that affects their work practices or daily lives (Bødker et al., 2022).

Andersen et al. (2015) state that although participation is the central element of PD, paradoxically, there is a lack of explicit discussion of what participation is and consists of in many PD projects. However, definitions of participation have been offered within PD with some regularity, and attempts have been made to create taxonomies of differing types of participation that PD literature has leaned on. Arnstein's (1969) Ladder of Participation, presented in Figure 2, presented citizen participation as a function of power distribution between citizens and government in decision-making processes in which participation of user involvement moves from non-participation to tokenism, where token users are represented or consulted in a passive form of participation, and, finally, to citizen power, where users are treated as partners in the design process.

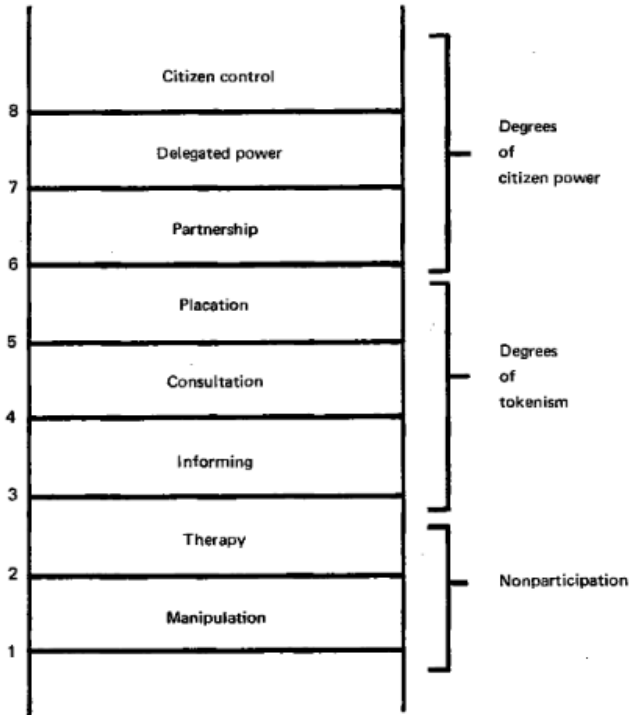

Figure 2: Arnstein's ladder of participation (1969, p. 217)

Another categorization of participation came from White (1996). She distinguished between four types of participation based on the level of participation and their power over decision-making: nominal, instrumental, representative, and transformative (presented in Table 1). As she notes, "sharing through participation does not mean sharing in power" (White, 1996, p. 143). These forms of participation also indicate the directionality of the interest, moving from top-down or bottom-up. Top-down indicates how designers and developers view the participation of others, and bottom-up indicates how participants view their contribution. Cornwall (2008) adapted White's model further into a typology of interest.

Table 1: Forms of participation (White, 1996, p.144)

Form	**Top-Down**	**Bottom-Up**	**Function**
Nominal	Legitimation	Inclusion	Display
Instrumental	Efficiency	Cost	Means
Representative	Sustainability	Leverage	Voice
Transformative	Empowerment	Empowerment	Means/End

Nominal forms of participation serve the function of displaying participation to legitimize the decision-making of designers and developers and show that they are doing something. What that something is less clear. Though participants are included in name and on paper, the effects of participation are low. Therefore, the function of this form of participation is for display purposes only, while participants join such efforts with the hope of retaining access to some potential benefit. Instrumental forms of participation serve the efficiency interests of those funding projects. However, for participants, participating in design is a cost in the amount of time they spend on activities that are not repaid. Participation is then a means to achieve efficiency goals in terms of time and resources and not a value in itself. Representative forms of participation allow participants to voice their needs and concerns in a project in order to have leverage in influencing the direction of the project and its management. This is seen as a way for management to ensure the sustainability and usefulness of a project while giving a voice to those affected by it. Finally, transformative forms of participation equate to empowerment and direct decision-making (White, 1996; Cornwall, 2008).

Cornwall (2008) states that such typologies function as a starting point for differentiating forms of participation, but they do not encompass all the factors in participation. For

example, it does not distinguish between types of participants or change over time. She also warns against viewing these typologies in a linear way, moving from a lack of participation to increasing amounts as, in context, forms of participation become ambiguous.

Bratteteig and Wagner (2016) offer a more dynamic view of participation. In viewing participation in decision-making as a sequential process of seeing-moving-seeing—i.e., seeing what choices can be made, making a choice, and then seeing what subsequent choice can then be made—they articulate the fluidity of participation. Sequential decision linkages are pervasive in design projects in that one decision links to a number of others. Some decisions have greater repercussions on the design result than others. Based on viewing this interdependency in decision-making, they formalized a model of the dimensions of participation, including what shapes participation, how participatory the design is, and, crucially, what choices one can participate in (see Figure 3). Decision-making is, therefore, a "complex and often subtle process, in which 'moves' of opening and closing choices in the process of 'making' are driven or modified by decisions that users participate in as co-producers of design ideas and as 'evaluators' (ibid., p. 427).

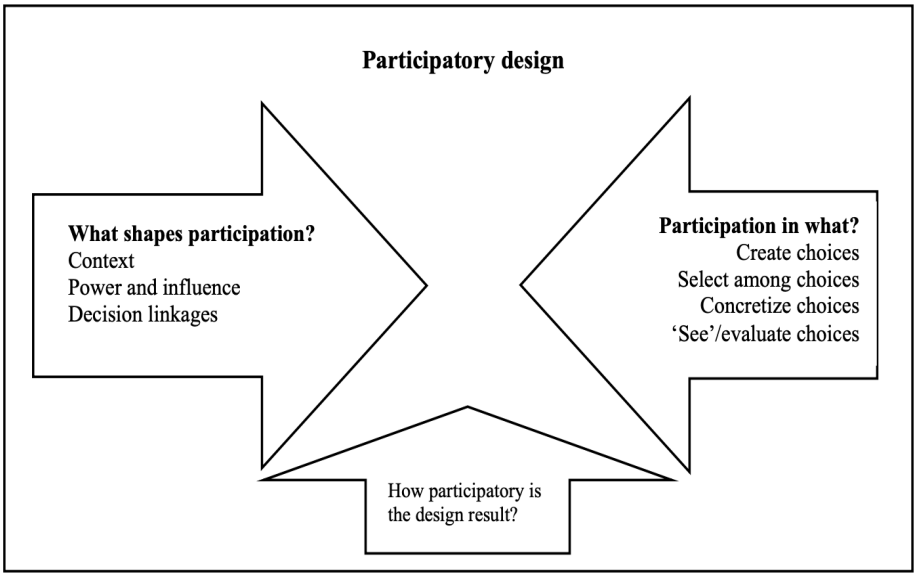

Figure 3: Dimensions of participation (Bratteteig & Wagner, 2016, p.41)

The model acknowledges that external forces shape participation through the organizational and cultural context, the participants' level of power and influence, and decision linkages. Bratteteig and Wagner (2016, p. 466) state that "participating is creating choices," though they add that what one can participate in is also selecting among choices, concretizing choices, and seeing or evaluating choices. By creating choices, end users are directly involved in creating significant ideas in the design process through design activities or ethnographic studies. PD aims to increase the number of choices participants can engage with by opening up the possibilities for future solutions. When decisions have to be made, participants can also be engaged in selecting among possible choices. Participants who might not have been able to participate in the development of technology can be included in the concretization of choices in physical artifacts, like documentation, prototypes, and envisioned scenarios of use. Participants can also be involved in evaluating and seeing choices enacted through testing solutions or illustrating episodes or functionality in workshops (ibid.). User participation should also be visible in the result of the design, and it is generally considered that a deeper degree of participation leads to better outcomes, higher quality, and ease of use (Robertson & Wagner, 2012).

As these models suggest, there are different ways of understanding participation and how it is expressed that have been influential in PD and other research domains. Bratteteig and Wagner's (2016) framework has remained central to how I view participation throughout the thesis, as it illustrates the complexity of enacting participation and how intrinsically linked it is to the design context. It has helped me understand the nuances of participation and its relationship to the design process.

3.3 Centralizing Politics in Participation

"Participating in design processes is participating in political processes characterized by different values, and different resources and means for exercising power" (Bødker et al., 2022, p. 24). In understanding and advocating for participation in design, PD literature has had to consider the political context in which new systems have been implemented since its beginnings. However, politics has been approached in slightly different ways related to the design context in PD literature. Politics as a concept in PD has been used to describe dealing with the organizational structure, be it working practices (Gartner & Wagner, 1996), policy documents (Dixon et al., 2022), or empowering workers in relation to management (Kensing & Greenbaum, 2012).

The political and social movements of the Cold War era served as an inspiration for workplace studies in the 1970s and 1980s, which is when PD as a research tradition first emerged (ibid.). This reactionary approach to computer system development led to new action projects that considered the political context in which systems were being implemented. In the 1980s, smaller personal desktop computers were built, which changed work practices and the way computer applications were designed. Early design textbooks promoted a waterfall model of design where management defined which problems to address, and the process was characterized by rigidly delineated stages and a linear progression from one stage to another (ibid.; Royce, 1970).

According to Kensing and Greenbaum (2012), the field of Human-Computer Interaction followed the cognitive premise of early views on computer system design by generalizing how users think and describing a set of procedures for design. In contrast to this cognitive design approach aimed at single users, Computer-Supported Cooperative Work (CSCW) was concerned with the cooperative nature of work, introducing ethnographic approaches and raising the experiences of workers to the forefront in system design. However, for the group that established PD as a separate tradition and the first Participatory Design Conference in 1990, CSCW did not adequately concern itself with the political context and power relations in the workplace (ibid.).

Early PD is soundly rooted in Scandinavia and the prevalence of strong worker unions. Kensing and Greenbaum (2012) pointed to two factors that lay the foundation for PD. The first was a reaction to the standardization and specialization of work with the goal of cost reduction. This was characterized by hierarchical decision-making and repetitive work. The second factor, which was unique to Scandinavia, was legislation aimed at increasing workplace democracy. This facilitated the foundational work of computer scientist Kristen Nygaard, who worked with economist Olav Terje Bergo and the Norwegian Iron and Metal Workers Union, advocating for workers to have a say when new technology is introduced in the workplace (Nygaard & Bergo, 1975). In the pursuit of democratizing computer system development, Nygaard and Bergo shifted the development process from a traditional type with the mapping of project goals and the formulation of workers' requirements, with experts leading the process, to an action-forward approach. Shifting to an action research strategy, they aimed to actively engage workers in the development and output, including strategies for new knowledge and teaching materials and reference groups of workers collaborating in smaller groups. The project emphasized learning and the acquisition of new

knowledge for the workers involved in the development. Ideologically, the project was based on a Marxist critique of capitalist mechanisms that stripped away the skills and autonomy of workers in favor of quicker and cheaper labor (ibid.).

Another foundational PD study took place in Scandinavia in the early 1980s, namely the UTOPIA project, which was a collaboration between computer scientists and social scientists from Sweden and Denmark. The goals of the project were in opposition to those of management, aiming to develop technology for typographers and improve the quality of newspapers and the autonomy of workers (Ehn, 1988). This led to direct confrontation with management, promoting the creativity and autonomy of workers ahead of management's agenda. The outcomes of the Florence project at the end of the 1980s also highlighted issues of designing in a hierarchical organizational structure. Bjerkenes and Bratteteig (1988) aimed to build a computer system to support nurses' work. Though nurses were the central focus of this intervention, other professional groups at the hospital wanted their work to be considered as well.

White (1996) saw the qualities of participation in how it was embedded and expressed in practices. Learning from her experiences in research in Zambia, she saw that what began as a broader problem regarding politics gradually converted into a technical one. Advocating participation in projects can quickly become a facade, as participation accommodates and serves different interests. White (ibid.) proposes investigating who is considered important to include and the level of participation, i.e., how much impact their input has on actual decision-making.

3.4 Participation as an Expression of Power

Recent work suggests that a lack of critical engagement with issues of power and power relations may lead to circumstances in which participatory approaches may be harmful (Mulvale et al., 2018; Osborne et al., 2016). Power as a theoretical concept has interested many philosophical thinkers throughout the centuries. Power, both as a theoretical concept and how it is expressed through social structures, participation, and politics, has been of concern to philosophers since Aristotle's writings in Ancient Greece (e.g., Aristotle's Politics, 4th century BCE/2007). Power has remained a central conception of understanding incentives in participation and when deciding whose voices are taken into account. Karl Marx, Michel Foucault, and Hannah Arendt are three such thinkers who have influenced

perspectives of power and its expression in everyday life across different domains, such as social science and design. Though many thinkers have made their mark on conceptual views of power and, therefore, how the concept is used in theory building and analysis, I have chosen to highlight these three specific views as complementary and useful in PD research.

Karl Marx's view of power concerns societal structures, who has the power to dominate and oppress, and who is being oppressed. Marx viewed power in relation to class dominance, with the state serving as an instrument of the ruling class by upholding existing power structures and societal inequality. Marx believed that the ones who own the means of production control them, which in turn serves their interests by repressing the working class and preventing them from challenging the existing structure (Jessop, 2012). Alternatively, in the views of Hannah Arendt and Michel Foucault, the relationship between participation and power is complex and multidimensional, with power dynamics playing a crucial role in shaping the opportunities and constraints that individuals and groups face in terms of participating in social and political life. They have extended traditional understandings of power as not something to be possessed but rather something that is exercised (Pinto & Pereira, 2017).

In the following subsections, I will present the historical understandings of power that have informed PD and, thereby, my interest in expressions of power as they are intrinsically linked to the concept of participation.

3.4.1 Drawing on historical views of power

German philosopher Karl Marx (1818–1883) introduced a critical view of civic power that greatly influenced the early political perspective of PD, especially as it relates to the maintenance of oppressive social structures. In analyzing economic struggle, Marx is specifically focused on the impact of 19th-century industrialized capitalism on the working class. "Men make their own history, but they do not make it as they please; they do not make it under self-selected circumstances, but under circumstances existing already, given and transmitted from the past." (Marx, 1852, ch. 1). Therefore, in Marx's view, one's thoughts cannot be seen as truly individual but as something formed based on what was before.

Jessop (2012) distinguishes between four main ways Marxists analyze power relations. The first way is as configurations of class domination, i.e., through the exertion of social power in the reproductions of class domination. The second way is as links that exist between

economic, ideological, and political structures. The third way relates to how existing class dominance limits exercises of power, making such efforts inherently fragile and unstable, thus requiring continued efforts to enforce structural change. The fourth and final way addresses adopted strategies that reproduce or resist class domination. Through all four ways of Marxist analysis, spatial and temporal dimensions are often also important, as class structures may shift and stabilize depending on the studied time frame (ibid.).

The capability of enacting power is seen as socially structured, thus seeing these capabilities as grounded in social relations. This form of power secures the continuation of existing social relations rather than facilitating change. This mechanism is exemplified through the interconnectedness of capital and labor, wherein workers sell their labor and thereby transfer power and control to the capitalist ruling class. In terms of civic power, Marxists see little opportunity for real participation for the lower working classes within the existing political system. Overall, Marx saw the possibility of civic power as being limited and dominated by the ruling class within the capitalist system and saw revolution as the only means by which the working class could achieve real political power and participate in shaping society in their own interests (Callinicos et al., 2021).

Since the beginnings of PD in the 1980s, researchers concerned with democratization in design have built upon Marx's writings on power and participation. In discussing democracy in design, Ehn (1988) builds on the Marxist approach to design in defining what he calls emancipatory practice. Seeing Marxism as a 'theory on social and technical change at work' (ibid., p. 84), Ehn focuses on practices in his expansion of Marxism, seeing this as the primary way of empowering workers.

Bødker and Greenbaum (1992) revisited Marxist critiques of capitalism's fetish for quantifiable things, which they see as prevalent within Information Technology and the heavy focus on the design of things. "This bias towards the relationship between things, such as information, rather than the relationship among people, also grows out of the Western scientific thought that seeps social issues to the side of replicable, quantifiable facts" (ibid., p. 1). Further, they frame this over-reliance on quantifying and breaking complex problems, including people, into smaller and 'solvable' components as the reason for systems often not being adapted to those who plan to use them.

French philosopher Michel Foucault (1926–1984) understood power in a way that differentiated from traditional views and the views of Marx, who equated power with something more akin to coercion. In Agamben's retelling of Foucault, he states: "One of the most persistent features of Foucault's work is its decisive abandonment of the traditional approach to the problem of power, which is based on the juridico-institutional models (the definition of sovereignty, the theory of the State), in favor of an unprejudiced analysis on the concrete ways in which power penetrates subjects' very bodies and forms of life" (Agamben, 1998, p. 5). Though somewhat convoluted, the point is that Foucault revolutionized the way power is viewed by flipping the existing philosophical narrative on power, shifting the focus from the rulers to those who are ruled. The legacy of Foucault is an expansion of traditional views of power as hierarchical. Power is rather seen as a ubiquitous and distributed force that is not only exercised by those in positions of authority but also by the lower class. This view presupposes that power cannot be possessed but is rather exercised in everyday interactions between individuals and in relations that exist between individuals and institutions. Rather than simply repressing or constraining behavior, power shapes and creates reality and can lead to positive effects, such as enabling individuals to participate in social and political life. This facilitates a different view of politics and the state from those Marx presented, as the state can only exist and "operate on the basis of other, already existing power relations" (Foucault, 1980, p. 122).

Foucault wrote extensively about power and its relationship to knowledge, exploring the ways in which power is exercised and maintained through various social, cultural, and political institutions. He posits that power dictates the terms of knowledge, i.e., what is known and what can be known. This means that where power lies, there is also knowledge-seeking behavior (Foucault, 1980). If there is power connected to a certain topic, like, for example, the effects of Artificial Intelligence or global warming, there is a will to gain knowledge about it. In terms of civic participation, Foucault saw power as being present in the way that individuals engage with and participate in public life, with the state and other institutions playing a role in shaping the ways in which individuals engage with power. Political change would just mean that existing power reconstitutes itself in different forms (ibid.).

Hannah Arendt and Michel Foucault both offer unique perspectives on the concept of power, but there are some key differences in their understandings. For Arendt, power is the ability of individuals to act together in the public realm to achieve a common goal, while for

Foucault, power is a pervasive and distributed force that operates in multiple ways. Arendt views power as arising from the free and equal interaction of citizens in the public sphere, while Foucault views power as being present in the relationships between individuals and in the workings of institutions. Another key difference is that Arendt sees political power as being distinct from other forms of power, such as economic power or the power of the state, while Foucault views political power as being closely interconnected with other forms of power and as operating in all aspects of social, cultural, and political life. Finally, Arendt views power as having a positive role in enabling individuals to participate in social and political life, while Foucault sees power as ambiguous, having both positive and negative effects, and being both productive and repressive.

Habermas (1977) contrasted Arendt's view of power with Max Weber's more traditional view of power as the potential to force one's will on someone else. Arendt understood power as a collective endeavor "to agree on a common course of action in unconstrained communication" (Habermas, 1977, p. 3). Both of these understandings invoke action, but in vastly different ways. What Weber sees as power, Arendt labels as force. "All political institutions are manifestations and materialization of power; they petrify and decay as soon as the living power over the people ceases to uphold them" (Arendt, 1970, p. 41). According to Arendt, group actions by individuals are what create political power. Power is not a quality that one person or group can possess. Rather, it is an outcome of actions and interactions between individuals in the public realm, and any political leadership would require the consent of individuals in order to be governed. In contrast, limiting resources and coercion through threats or intimidation by political leadership would be classified as force, not power. Centrally, "no political leader can with impunity replace power through force; and it can gain power only from a non-deformed public realm" (Habermas, 1977, p. 9). Power accumulates through communicative action and praxis; it is a collective outcome of reciprocal speech in interaction wherein agreement is reached. In this view, power cannot be exercised without debating the outcome of using the power collectively (Arendt, 1970).

Communicative action requires a space in which actors enter and interact—a space where they are seen and heard and reveal their subjectivity while simultaneously allowing for intersubjective agreement. Arendt sees the development of power as a goal in itself, which furthermore is cemented and embodied in political life, and, in a reciprocal way, the main purpose of political power is to allow for and maintain a public realm where individuals can participate to achieve collective objectives and protect their liberty (Arendt, 1958; 1967;

1970; Habermas, 1977). Furthermore, power manifests itself in ways that protect political liberty and in revolutionary actions that establish new institutions of liberty (Arendt, 1970). Critiques of Arendt's approach to power specifically focus on how she isolates politics from the economic and social environment it is embedded in and her reluctance to acknowledge structural violence, much in contrast to Marxist views (Habermas, 1977; Menge, 2019). However, Arendt's emphasis on communication as the locus of power and as a prerequisite for action is missing in Foucault's description of power.

3.4.2 Exercising Power in Participatory Decision-Making

Much of PD and adjacent literature has addressed power relations and activities aimed at equalizing them. In an early contribution to the discussion of power relations in PD, Kensing and Greenbaum (1983) argued that access to resources, including time, money, knowledge, and information, are requirements for 'genuine participation' and distribution of power. Considering this, having power over decisions means that one has power over the resources required for design and access to relevant information to impact decision-making. Furthermore, the concepts of participation and power are closely related in the sense that power dynamics often play a role in determining who is able to participate in political and social life and how they are able to participate. On the one hand, those who hold power may limit the participation of certain groups, either through repression or by creating barriers to entry in certain domains. On the other hand, the act of participating in social and political life can itself be a source of power, as individuals and groups come together to shape laws, policies, and social norms. Additionally, the way in which individuals and groups participate can have an impact on the distribution of power, as collective action can challenge existing power structures and create new opportunities for marginalized groups to participate and assert their influence.

Power is expressed in different ways depending on its directionality and the driving forces. In action, we can distinguish between the directionality of power. In analyzing responses from public relations executives, Berger (2005) summarizes distinctions in the directionality of power using different prepositions such as 'power over,' 'power to,' and 'power with'. 'Power over' reflects traditional models of domination and control (Dahl, 1957; Pitkin, 1973). 'Power with' reflects empowerment, which facilitates "dialogue, inclusion, negotiation, and shar(-ing) power" and shared decision-making (ibid., p. 6). Lastly, 'power to' reflects opposition, resistance, and activism. Bratteteig and Wagner (2016) build on an

alternative notion of 'power to' put forth by Pitkin (1973) as meaning agency and "the capacity to shape action" (Bratteteig & Wagner, 2016, p. 427). Much like Arendt differentiates between power and force, Pitkin emphasizes the need to distinguish between 'power over' and 'power to,' as 'power to' pertains to someone having the power to accomplish something (Pansardi & Bindi, 2021). Though distinct, these directionalities of power can coexist in the same organization. Further, Berger empirically sees power expressed in organizations as decision-making happening within multiple formal and informal coalitions. Considering shifts in coalitions and locations, power and "the decision-making structure in large organizations are somewhat porous; that is, there are multiple points of entry into the process" (Berger, 2005, p. 12).

Based on empirical findings from interviews, Borum and Enderud (1981) identified mechanisms for exercising power over practices in systems design, focusing on conflicts arising from systems design in large organizations in Denmark. They point to specific mechanisms that suppress conflict in the context of systems design, meaning that the process of systems design can in itself be seen as a disrupter of harmony and the status quo in an organization. Power in organizational roles stems from their function in work practices (arbeidsfunksjon). This could be authority as a specialist or as a leader or coordinator, thereby being in a central position in relation to other actors. However, in more hierarchical organizations, they argue that much of the individual power stems from existing societal and cultural norms and traditions.

Actors can consciously or subconsciously counter conflicts in design work through how work is organized. The way Borum and Enderud (ibid.) conceptualize these mechanisms of seeking harmony and subduing conflict in system design is through the use of process filters. These process filters arising from the analysis were (1) participant selection, (2) limiting resources, (3) controlling the agenda, and (4) limiting the number of possible solutions.

Participants carry conflicts with them into the design work; therefore, the selection of participants is an important mechanism for controlling the level of conflict. Through participant selection, different voices and opinions can be elevated or stifled through the groups represented. A more homogeneous group will lead to less conflict. The second mechanism is that of controlling the available time and energy in system design. As they point out from their data, many of the participants are working on system design part-time in organizations where they have to prioritize other work activities, thereby diverting time

and energy that could have been spent on engaging in design-related conflicts. The third mechanism, controlling the agenda, refers to controlling what issues are processed by project management and those engaging in system design and which issues are not brought up. This also connects to the fourth mechanism of limiting the possible solutions, thereby limiting creativity and solutions that could satisfy all stakeholders' needs. Borrowing terminology from economics, they allege that the possibility of conflict increases when considerations have to be made based on the marginal advantage of a solution against the marginal cost of implementing such a solution (ibid., p. 76). The limitations can be related to economic restrictions and budgeting, but they can also be seen as what is technologically feasible and within legal regulations in a public sector context.

Scandinavian PD research has had an ongoing interest in power as a concept. Foucault's work has inspired emancipatory arguments for increasing the decision-making powers of individuals in political and social life, such as the participation of children (Gallagher, 2008; Andersen et al., 2015) and in conceptualizations of participation (Bratteteig & Wagner, 2014; 2016). Bratteteig and Wagner (2016) connect user participation as a practice to power and decision-making. As they see it, power lies at the center of whether decisions are made participatory or not, i.e., if power is shared with end users. For the most part, end users have the 'power to' "create choices that would not have been possible without their contribution" (ibid., p. 38).

Inspired by this work, I see participation in design as having the power to impact decision-making, regardless of how direct this participation is. This can be through voicing needs that impact the design outcome, coproducing representations, or creating or evaluating choices or representations. However, to understand how power through participation is practiced in design, we first need to understand what design is.

3.5 What is Design in Participatory Design?

The act of designing has, throughout modern history, become an increasingly revered and specialized thing to do. However, designing for aesthetics and functionality can be seen as an innately human endeavor. Researchers have found evidence that usability and human-centered design principles were used in Ancient Greece (Marmaras et al., 1999). Also, in the first century BCE, the Roman architect and engineer Vitruvius developed design theories based on the symmetry and proportions found in nature (Sjovaall, 2020). Vitruvius

advocated for three central requirements of design: those of firmitas (strength or durability), utilitas (function), and venustas (aesthetics). Firmitas refers to the durability of materials and structures; utilitas refers to the functionality in use; and venustas refers to the beauty of an object. These Vitruvian design characteristics are still seen as important in the design of IT artifacts (Tractinsky & Hassenzahl, 2005; Hashim et al., 2009).

Since the Industrial Revolution of the 18th and 19th centuries, advances in manufacturing technology and design have led to a greater need for design expertise to create products that are functional, aesthetically pleasing, and, at the same time, easily reproducible (Bannon & Ehn, 2012). After World War I, the job of designer became a distinct profession in conjunction with the establishment of design schools and organizations (ibid.). One key event in the professionalization of design was the founding of the German Bauhaus school in the 1910s, laying "the foundation for what we today think of as modern design—' useful,' functionalist, transparent objects of design" (ibid., p. 38). The Bauhaus School brought together architecture, art, design, and technology to teach a holistic and collaborative approach to design that combined art and technology. Additionally, the school concerned itself with collaboratively embedding social and cultural values into designed objects as vehicles for change. This collaborative design work took place in workshops promoting progressive values and democracy in the increasingly restrictive context of early Nazi Germany, leading to the closing of the school in the 1930s. However, Bauhaus received positive receptions internationally, and modern design took off post-World War II in the USA and Europe, with Scandinavia evolving a distinct, Nordic design style founded on functionalism, or funkis as it was nicknamed (ibid.). This functional, Nordic approach to design can be seen as the pretext for what would come to be Participatory Design.

Suchman's (1987) influential work presented another starting point for refocusing the design of digital artifacts for the office. Using an allegory of how sailors would use context clues, like the stars, to navigate in open waters, she illustrated that human actions are not always guided by clearly defined plans but are grounded in actions that arise from specific situations. While office applications were, and still are, often designed based on defined plans, Suchman pointed out the need to take people's reactions and information exchanges depending on the situations they find themselves in into account. Thus, a system designed as if information always flows from one department to another may break down when workers in one department find that they have to go around the system to get things done

their own way. Suchman's work highlights differences in approaches to the design of systems, suggesting a move away from rigid planning processes that are not tested in situ.

In introducing an emancipatory approach to design, Ehn (1988) builds on Marxist thinking and sees design as a process of changing practices. Ehn departs from what he calls the Cartesian approach to system design in that general rules can be found and applied to situations logically, and therefore, system design can be seen as rational decision-making and not a social and creative exercise. He states that in the design of computer artifacts, designers are often concerned with formal descriptions. In finding new philosophical ways of thinking about design activities he calls design-by-doing, such as prototyping, using mock-ups, and creating scenarios, he concludes by viewing design as an emancipatory practice that should be able to deal with daily activities. This type of design presupposes dealing with a contradiction.

On the one hand, valuing traditions and not upsetting the understanding or knowledge the user has acquired by using existing artifacts, while on the other hand, aiming for transcendence by opening an existing situation up for the user to reflect on alternative designs and new ways of understanding everyday activities:

> "Ideally it seems that we should be aiming at design processes that primarily make it possible for the users (and the designers) to utilize their practical understand-ing, in design of the new situation. But the design process should also incorporate breakdowns as a means for de-tached reflections on what is already understood among the users as well as among the designers." (Ehn, 1988, p. 78).

Further, Ehn argues that design cannot be reduced to a formalized process of decision-making based on theoretical abstractions but requires learning through practical experiences and reflection-in-action.

Design in PD is in contrast to other design traditions, such as service design and user-centered design, where the outcome is centered on designing for the user, while PD is interested in designing with users. When designing for the end-user, the designer still has the last word about what is being designed. Spinuzzi (2008) defines design as "producing artifacts, systems, work organizations, and practical or tacit knowledge" (ibid., p. 164) and differentiates design in PD from other design traditions. Though PD also sees the value of making, the definitions of design seem to vary within the different traditions. Bødker and

Greenbaum (1992) critique the evolution of other design traditions within IT and their focus on designing things, prioritizing this endeavor over the people using them. While debates in the systems field have shifted to enfold the interests of the people who will use the systems, the methods, and suggestions are often stuck in the historical frame of computer science and its reliance on formal problem-solving.

In reaching the overarching design goals of empowering end users, PD researchers can utilize different design activities, tools, or techniques, such as arranging stakeholder workshops, creating prototypes or mockups, and designing iteratively (Bødker et al., 2022). Workshops have been frequently used in PD projects as a venue for designing collaboratively since the very beginning (Ehn et al., 1996). Workshops have been used as an arena for encouraging multiple perspectives and engaging in design work such as prototyping (Bratteteig & Wagner, 2012; Wärnestål et al., 2014). Prototyping is a preliminary, imagined version of an artifact, system, or service and can be seen as an integral part of the learning process. There are different approaches to prototyping that can enable or hinder participation. This was shown by Bødker and Grønbæk (2020), who separated three types of prototyping: i) prototypes that become the system as a supplement to requirement specification and are not meant to be changed; ii) executable specification approaches to prototyping written in a way that makes it easy for end users to understand how the system works; and iii) exploratory approaches to prototyping that are iterative and with varying levels of specificity. One example of simple and exploratory prototyping is creating mockups, which are usually hand-drawn sketches.

From a PD perspective, design activities are more than just the making or prototyping of systems, like trading, which is viewed as traditional design. In summary, what constitutes design in PD can be somewhat unclear as it is more interested in the ‘how,’ i.e., the process and practice of designing, and less of the ‘what,’ i.e., the resulting product (Bannon & Ehn, 2012).

3.6 Social Construction

Some researchers link the act of designing to the concept of social construction. For example, Bødker and Greenbaum (1992) view that computer applications are socially constructed and “designed and used by people, and not driven by some technological need" (p. 3).

Social construction as an epistemology has become useful for understanding the process of technological innovation (Williams & Edge, 1996). This view emphasizes the non-linear construction of technology through negotiation between different social groups and the politics of technology ingrained in both the development and the outcome of systems design (ibid). In this view, technology is also seen as socially constructed and can be investigated empirically (Pinch & Bijkr, 1984). However, the original interest of social constructivists is that of languages and how they inform and shape our actions (c.f. Berger & Luckmann, 1966).

In introducing the concept of social construction, Berger and Luckmann (1966) contend that since knowledge and beliefs can be seen as rooted in social interaction and structures and that society can be understood as a subjective reality, language is the mediator between the 'objective' reality and 'subjective' reality. The social construction of reality is realized through externalization, objectivation, internalization, and legitimization. Individuals externalize through creating and upholding societal structures while creating a sense of objective reality and, subsequently, internalizing one's identity based on this understanding of societal reality and one's role in it (ibid.). The language used in connection with constructing this sense of objective reality becomes, in this light, an important focus when trying to unpack a subject's understanding of reality. Research within the public sector by Winthereik highlights how differences in framing and miscommunication between designers and end users lead to deficiencies in collaborative development of systems providing critical services, such as maternal health care (Winthereik & Langstrup, 2010) and welfare services (Winthereik, in press).

PD was established on the basis of constructivism, which opposes the idea of being able to completely formalize knowledge (Spinuzzi, 2003; 2005; Frauenberger et al., 2015). Entrenched in social construction is the view of knowledge as situated in context, embedded in interactions and artifacts. Knowledge cannot be decontextualized or deconstructed into separate tasks, which then can be generalized. It is a view that contrasts itself with Taylorism and requires an interpretive approach (Spinuzzi, 2005). As previously mentioned, PD literature highlights mutual learning and the embedded nature of tacit knowledge (ibid.). Since the focus is on tacit knowledge, it makes sense to include social construction in building on a theoretical understanding of design within PD. This is the next step in our investigation into involvement. Therefore, I draw on these perspectives of how design

practices connected to participation are shaped and constructed through existing discourses within the public sector.

3.7 Scaling participation

When I began researching the realities of participation in the design of public services, the project scale and the complex organizational structures of the collaborating entities emerged as a recurrent challenge. Therefore, issues related to scale became of interest to me. In explaining these issues of scale, I include two concepts explicitly: platformization and infrastructuring.

PD has traditionally focused on including a small group of future users in non-complex organizations led by one or a few PD researchers (Clement & van den Besselaar, 1993; Oostveen & van den Besselaar, 2004; Bødker et al., 2022). However, the participation of stakeholders changes in character when envisioned and enacted in larger projects. The issue of scaling has been identified as a significant challenge for participating in design and PD (Neumann & Leigh Star, 1996; Oostveen & van den Besselar, 2004; Shapiro, 2005), particularly considering the public sphere as scaling impacts organizational complexity and also the design methods and techniques that can be employed.

Large-scale projects are distinguishable by their distribution across various settings, heterogeneous user groups, involvement of numerous stakeholder organizations and developers, and various uses of a product over time (Roland et al., 2017). Based on this shift in the research literature, there remains no question that the size of the project matters in adding complexity. As noted by Star and Ruhleder, "(t)here are no genuine universals in the design of large-scale information technology" (1996, p. 112). However, researchers have in recent years argued for the viability of PD perspectives in researching large-scale public digitalization projects (Oostveen & van den Besselaar, 2004; Dalsgaard, 2012; Zahlsen, 2022). The nature of participation changes when applied to a large-scale project. In smaller projects, end users can participate directly in the design. In large-scale projects, however, end users can be engaged in parts of the project related to political and strategic goals (Oostveen & van den Besselaar, 2004), as well as in prototyping and envisioning future solutions.

Though it is easy to think of the issue of scale in terms of only the number of stakeholders that are involved in decision-making, it is also an issue of other factors such as time and

space. Echoing the collaborative workshops of Bauhaus, during the 1980s UTOPIA project, researchers invited workers out of the context of their workplace and into a technology laboratory. It functioned as a space where workers could experiment with envisioning future possibilities and digital tools they might need in their work (Bannon & Ehn, 2012). Much like Hannah Arendt's (1970) conceptualization of the public as a space for collaborative power through discourse, physical space has been seen to play a significant role in collaborative design activities. Scaling contributes to the blurring of the boundaries of power, leading to new questions around participation as the locus of power is split across time (Saad-Sulonen et al., 2018) and/or space (Roland et al., 2017; Braa & Sahay, 2012).

In this thesis, I draw on two concepts, platformization, and infrastructuring, that have been linked to viewing participation in new ways in large digitalization projects. Specifically, I use the concept of platformization to describe the way global trends impact local practices and infrastructuring as the way designed systems are implemented into existing infrastructure.

3.7.1 Platformization

The platform literature seems to have two different interests: one is the technical aspects of platforms, and the other is the global implications of platformization. Though the term platform has been used in different ways in the research literature, my use is based on Tiwana's (2013) definition as consisting of a stable, generic platform core upon which add-ons or applications can be built that add functionality and allow for more tailored solutions. Platformization can be understood as the process of implementing and embedding a platform model in a context over time (Plantin et al., 2018).

The literature has different views on the impact of platforms on participation. Some research emphasizes that the emergence of platforms has been a threat to public values and, at times, an oppressive force upon vulnerable and marginalized citizens (Bassetti et al., 2019). At the same time, platforms have been proposed as a tool for innovation in services by allowing external persons or organizations to build upon shared resources (Tiwana, 2013). Though it presents challenges for end-user participation, researchers have proposed platforms and platformization as an opportunity for scaling participation. Roland et al. (2017) suggest platforms can play a role in scaling participation by allowing for serial or parallel participatory activities.

Bassetti and colleagues present a third justification for scaling participation in the face of global platformization efforts. Bassetti et al. (2019) discuss the challenges of public platform design and scaling in the current era of private platforms. In order to influence the design of digital platforms, 'scaling up' and consolidation of heterogeneous groups' interests is seen as necessary. Thereby, it is "reaching critical mass beyond the locality of a co-design intervention" (ibid., p. 259). In this way, scaling is vital if one wants to impact the design of large, global platforms that impact local practices. However, in considering local practices and contexts and issues of scale, infrastructuring provided a better term for explaining changes and challenges in participation in design.

3.7.2 Infrastructuring

Infrastructure as a concept was formalized in the context of researching how technology impacts organizational change in describing an existing, rigid structure that provides barriers prohibiting large-scale change while at the same time being a potential vehicle for change (Star & Ruhleder, 1996). It is central to an infrastructure that it is embedded in a socio-technical structure, often taken for granted, and is shaped by a community of practice over time (ibid). Therefore, the concept of infrastructure and the process of infrastructuring contributes to an understanding of all the barriers and opportunities for technological change in organizations, especially when such organizations reside within a complex ecosystem with a range of diverse and sometimes conflicting interests, regulations, individuals and organizations (ibid; Neumann & Star, 1996; Hanseth & Monteiro, 1998; Karasti, 2014; Parmiggiani & Karasti, 2018). With this intangible description of what an infrastructure is, researchers have suggested describing an infrastructure in its relation to practice and in its failings.

In Neumann and Star's (1996) introduction of information infrastructures, they promote the contextual character of the "practical work of designing and using infrastructures (Karasti, 2014, p. 2). The term infrastructuring is used to describe the ongoing work to manage the shifting complexity of infrastructures by temporarily resolving conflicts between human and non-human actors across time (Star & Bowker, 2002; Parmiggiani & Karasti, 2018).

Infrastructuring has been called a new frontier within PD literature considering the "development of large scale systems that serve a wide range of needs of varied 'publics' (Clement et al., 2012, p. 21). Clement et al. (2012) discovered that PD interventions can

influence infrastructure changes by leveraging breakdowns when studying identification infrastructures and practices around identity card issuance. Therefore, they advocate for the participation of users also in large, complex infrastructures which PD had previously been avoiding. Ehn (2008) connected the concept of infrastructuring to that of design and saw it as design-in-use and designing after design.

Using the concept of infrastructuring to connect participation, Bødker et al. (2017) define participatory infrastructuring as "infrastructure activities that engage users in processes of design and use" (p. 246). This goes beyond the usual ideas of what participation means and includes things that happen behind the scenes of public and staged activities. Therefore, they emphasize a more holistic view of participation as a continuous process at different levels, which informed my understanding of participation and approach to the research presented in this thesis.

3.8 Summary of theoretical framing

In this chapter, I have elaborated on the central theoretical frameworks that informed my research and provided a foundation for investigating user participation in the context of the design of public services. I discussed aspects of power, politics, and design to a greater extent than in the connected papers, as they represent key concepts and principles that guided the analysis and interpretation of my findings. At the same time, power and politics are central issues when attempting to understand participation as a phenomenon within a specific context, as context is critical in addressing design. I elaborate less on the topic of scaling and the related concepts of platformization and infrastructuring because they are explicitly discussed in the papers included in this thesis. Lastly, the concept of social construction is central to understanding the formation of meaning and the shaping of social interactions. It, therefore, provides a useful framework for viewing the ways in which participation is influenced and shaped within a given social context, i.e., in the design of public services.

4. Empirical background

The empirical data for this thesis follows two different initiatives run by the Trondheim Municipality in Norway with the goal of creating digital solutions for public services that municipal employees and residents can use. My interest in doing research on participation in public digitalization projects stems from experiences from my master's program and thesis related to the difficulties of designing technology for schools (DiDiAC) and how social media functionality supports learning and organizing grassroots opposition to city planning endeavors (Dahl-Jørgensen, 2017). Also, as a citizen, I am acutely aware of my privilege in having a passing degree of digital competence and understanding of how the municipality and state are organized. At the same time, I am also acutely aware of how vulnerable I am when seeking public services and how the shift towards more digital encounters and interactions with the public sector adds to this vulnerability.

During the past decade, offices to get help face-to-face have disappeared or are open for appointments only. At the same time, I see value in many digital systems designed specifically for public services, which have, for example, made it easy and secure to access information and services related to health, tax, and unemployment benefits (OECD, 2017; Parmiggiani & Mikalef, 2022).

Based on these personal and professional experiences and interests, I have focused more on the implications of digital public services for those who use them than the novelty of the technology. As many of the services that lag behind in usability, efficiency, and access through digital systems are provided by the municipalities, this became the focus of my Ph.D. work as an area with the potential for great improvement, but that also has to contend with unique challenges. In this chapter, I present the research context for the development of services, first in relation to the policy perspective in the Norwegian public sector within the government and critiques. Then, I describe aspects of public procurement as it provided much of the context for one of the cases the thesis is based on. I round off the chapter by presenting the context for the two different projects that formed the basis of my data collection: a pilot study, Aktiv Fritid, and a main case, DigiBarnevernet.

4.1 Context: Digitalization in Norwegian Municipalities

Trondheim Municipality is the third largest in Norway, with approximately 200,000 inhabitants. It is a part of the administrative region of mid-Norway. In the past couple of years, Trondheim has politically agreed to focus on digital innovation in improving the services provided to its citizens and open for co-creation with actors, volunteer organizations, the private sector, users, and citizens (Trondheim Municipality, 2021). Participation is also mentioned as particularly challenging for municipalities as they view the increased attention on citizen involvement as disturbing the traditional development process and how existing stakeholders collaborate.

The Norwegian government has expressed ambitions that Norway be at the forefront internationally in digital administration (Rybalka et al., 2019). In Norway, digitalization efforts in local government have been seen as a priority. In 2016, a ministry white paper called Digital Agenda (Meld. St. 27 (2015–2016)) for Norway was published and marked a shift in Norway as the government addressed challenges and strategies for digitalization directly. The report presents the government's official view on how Norway can exploit information and communication technology to improve society. The two main goals set focused on citizens: 1) a user-centered and efficient public administration and 2) value creation and participation for all (ibid., p. 11). In this white paper, user participation is mentioned as necessary to 'succeed' in digitalization efforts. The reasoning for this is that they see participation as instrumental in ensuring that services are of high quality and meet users' needs. A 2019 survey (Korsgaard & Ludvigsen, 2019) on motivation and barriers to communicating digitally with the public sector concluded that the vast majority of services surveyed were not sufficiently user-friendly and could be improved by implementing new technology.

The Digital Agenda (Meld. St. 27 (2015–2016)) proposes service design as a method to base the development, planning, and organization of services in a user-centered way. Young adults were pointed out as especially at risk in the development of digital public services, as many young citizens had difficulty understanding official documents and the way public services were organized and, therefore, experienced issues in accessing public services digitally. Even though they may have a high degree of digital competence, they struggle with using digital solutions and contacting public offices for help. The agenda concludes that many residents in Norway do not have sufficient digital competence to use digital

solutions and thus serve themselves online and that these groups must be given the opportunity to acquire the necessary skills and get help if they do not master the digital channel (ibid.).

In June 2019, the Norwegian state and local government collectively published the first digitalization strategy for the public sector for 2019-2025 (Ministry of Local Government and Regional Development, 2019). The stated mission of this document was to establish collective goals concerning digital transformation in all parts of the public sector – all with the purpose of meeting citizens' needs. The strategy document changes between 'the citizen' and 'the user,' underscoring the prevalence of design terminology from the private sector in public sector digitalization projects. In reviewing these central policy documents, Broomfield and Reutter (2022) pointed to this representation of the citizen as a user and, in some cases, a customer in public discourse and policy documents. They found that "citizens are presented as a demanding entity, apparently requesting faster, better, and more efficient services" (ibid, p. 8). The goal envisioned in the digitalization strategy is that when seeking out and receiving services from the public sector, this process should be seamless even though different departments at the municipal or state level may be involved in providing services (Ministry of Local Government and Regional Development, 2019). Therefore, the citizen would not need to know much about how the public sector is organized in order to receive assistance. This is how user-centeredness is envisioned in most strategy documents.

4.1.1 Critiques of Public Strategies

Anthopoulos et al. (2007) pointed out that many plans and strategy documents in the European context lacked specifics regarding the maintenance and further development of public services and the systems they include. Though strategy documents are not necessarily applied directly to action in the public sector, they provide insight into the overarching views on important issues the public sector deals with as a whole and potentially what will be prioritized when receiving funding for development. Such strategy documents play a central role in describing priorities for the future, and many Norwegian municipalities have used this as a basis for their own strategy documents on digitalization. In a 2019 review of digitalization practices in Norwegian municipalities (Rybalka et al., 2019), digital services for citizens ranked as the highest priority for most municipalities, as cited in municipal digitalization strategies (94,5 % of municipalities surveyed), and they expected that digitalization projects would increase the quality of municipal services (94,4 % of

municipalities). However, many municipalities report a lack of competence and low levels of recruitment of in-house experts, something that is seen as a hindrance in developing services.

Even though Norway, along with other Scandinavian countries, is leading the charge in citizens' use of online public services, an OECD Review of Norway's Digital Government (2017) recommended the need for a clearer description of the digitalization roadmap focusing on competence development. This report confirms the Norwegian government's drive to be digital by default, meaning that citizens will be expected to use digital solutions to access services without talking directly to service providers, which is relegated to a last resort.

Again, user-centeredness is encouraged in providing "seamless and integrated public services to its constituents," simplifying day-to-day life (ibid., p. 20). Inclusion of citizens is mentioned, advocating for moving from user-focused to user-driven service delivery, mentioning that new design methods are needed to integrate users' needs, including "new ways of reaching out, engaging and involving users in service design and decision making" (ibid., p. 35). However, how to do so is not addressed clearly. Seeing as the digitalization of public services in local government presents an opportunity to transform governance and citizen engagement, studying the digitalization process from the perspective of end-user participation is crucial for ensuring that public services are user-centric, inclusive, empowering, and continually improved. By actively involving citizens in the design and implementation of digital services, local governments can forge stronger connections with citizens. Unfortunately, this perspective is lacking in state and local strategy documents.

Public-private collaboration is another strategy proposed in strategy documents to improve the delivery of public services (Ministry of Local Government and Regional Development, 2019), and one such way is through public procurement. Though procurement is a common practice in the public sector (Langseth & Similä, 2021), its role in public sector innovation is understudied, especially as it relates to end-user participation in design. This gap provides the rationale for our focus on procurement as the context for design in paper 2 of this thesis, as procurement has implications for the design process, project progression, and practices within the main case, Digibarnevern.

4.2 Public Procurement

With many small municipalities and the decentralization of services, municipalities commonly join forces during formal system procurement processes by inviting suppliers to develop new products or services (Ahlgren, 2019). In the public sector, procurement is subject to legal regulations, institutional frameworks, the vendor market, political considerations, and financial allocations (Thai, 2008). This process is precarious for the customer, requiring them to balance "between the innovation's need for informal dialogical processes and adherence to formal procurement processes regulated by laws" (Mikalsen & Farshchian, 2020, p. 1). In our study case, the systems being procured are embedded in an existing infrastructure. Thus, the procurement process must engage with a mature infrastructure during a turn in its life, which happens when strategically mandated adjustments to existing arrangements are pursued' (Grisot & Vassilakopoulou, 2017, p. 11).

Public-sector system procurement follows a strict process, including a contract between a public procurer and a private supplier. Thus, procurement is defined as a tender process, a competition resulting in a binding public offer (The Norwegian Agency for Public and Financial Management, 2023). This tender process adheres to specific regulations and procurement law (Norwegian Law on Public Procurement, 1999). Public-sector system procurement seeks to achieve a higher level of benefits than in-house system development (Børmer, 2014) by paying an outside company to create a product or service on behalf of the governmental agency. The Law on Public Procurement (1999, § 1) aims to increase societal benefits by securing efficient resource allocation through public procurement based on fair treatment. Meanwhile, public organizations aim to achieve the highest return on investment possible along with the highest socioeconomic benefit. A benefit must have any positive effect for at least one party (Børmer, 2014), which can relate to work hours saved or improved citizen satisfaction. However, hours saved are generally much easier to quantify than citizens' relative satisfaction. To receive funding, public projects require a cost-benefit analysis. When departments cooperate in procurement, who benefits and by how much is more complicated to identify (Langseth & Similä, 2021). The difficulty of identifying benefits in interdepartmental projects has also been mentioned in Norway's current digitalization strategy (Ministry of Local Government and Modernization, 2019). The creation of a tender report and, later, the contract between a supplier and a customer are the main ways to establish future benefits in a procurement project.

In Norway, the procurement process comprises three phases, according to Langseth & Similä (2021): the needs mapping phase, the competition phase, and the contract follow-up phase. All these phases center around the tender as 'the starting point for a potentially broad dialogue with several vendors' (Mikalsen & Farshchian, 2020, p. 6). It is an invitation for companies to submit a proposal for a solution based on a tender report. The tendering process is subject to regulations and includes a report with specific criteria as to what the public entity, acting as procurer, wants—as well as a deadline for submitting an offer (Moe, 2014). Bids from companies, as vendors of a system or service, are based on the needs outlined in the tender report. Therefore, mapping end-users' needs early in the procurement process is vital for ensuring the usability of the procured system or service. Additionally, early and continuous dialog with suppliers is important in creating a common understanding of technical limitations and opportunities (Langseth & Similä, 2021) through conversations and one-on-one meetings with potential vendors during the competition phase (Mikalsen & Farshchian, 2020). After an offer is accepted, contract negotiation begins with a new round of adjusting the final product's criteria. During the final follow-up phase, the procurer checks whether the set criteria have been met (Langseth & Similä, 2021). As specifications are normally provided in a formal, executable language, they are not suitable as a form of communication with users (Bødker & Grønbæk, 2020).

4.3 Pilot Case - Aktiv Fritid

Aktiv Fritid (2019–2020) was a project aiming at creating a website with an overview of all recreational activities in Trondheim municipality and promoting physical health. The project aimed at mapping activities offered by private, public, and voluntary organizations while also facilitating communication and booking options for municipal venues. The initiation of the project was linked to the EU proposal for increased physical activity, which led to measures at the municipal level.

Trondheim municipality is divided into units that provide services directly to citizens or that have a supportive function for the rest of the work done in the municipality. The project manager for Aktiv Fritid in 2019–2020 was part of the unit for physiotherapy, while other project members came from occupational therapy, culture, and communication. Additionally, two consultants working at the library and a manager at a voluntary center joined the project.

This project was seen as a piece of an ecosystem of other development projects related to health in the region. The solution would likely be a web page connected to existing municipal homepages that citizens can log into to access personal information from the municipality. The starting point for the design process of this new digital service was an existing solution developed and implemented in a smaller Norwegian municipality, Modum, that had been designed with the involvement of citizens. In early meetings, the project manager expressed a wish for broad citizen participation when adapting this solution and implementing it in Trondheim.

Unfortunately, the project received funding only for the planning stage conducted in 2019, and funding for the design and development stage of the project was not secured as other projects were prioritized. However, the project provided insight into the issues the municipality faced in developing digital solutions. Based on this access, I had the opportunity to interview municipal workers in different units and at different organizational levels.

4.4 Main case - Digibarnevern

Generally speaking, CWS's goal in Norway is to ensure children's welfare and protect them from detrimental care (Falch-Eriksen & Skivenes, 2019). Municipal CWS have several responsibilities, from assessing incoming notices of concern and conducting examinations to initiating and evaluating various measures. The history of the Norwegian CWS has been punctuated with friction (Langford & Kirkebø, 2019), in part due to a perceived lack of transparency concerning decisions about citizens' cases. Project management mentioned this as one of the difficulties with contextualizing legal and system reform. Norwegian CWS case management practices have traditionally been quite fragmented, resulting in a lack of documentation describing which assessments were made in cases that deeply influenced the lives of children and their guardians (Falch-Ericsen & Skivenes, 2019).

Legacy systems have mostly been used to archive and share documents with other governmental agencies, not citizens. Additionally, caseworkers have used language that contains legal and developmental psychology jargon, which can alienate and confuse parents (Picot, 2014; Stang, 2018). Caseworkers play a central role and are afforded a great deal of discretion in decision-making and documentation (Aasback, 2022; Holten Møller, 2019; Gillingham et al., 2017). As a result, they are central users to be considered in

designing future digital systems for CWS. In contrast to other domains like city planning (Falleth & Hansen, 2012), there are no laws that ensure an adequate amount of CWS caseworker participation in system development.

In addition to new technical systems, CWS has to contend with a reform of the Norwegian Child Welfare Law from the start of 2022. Prior to this reform, the law had not been updated since 1992. The basis for the reform is to clarify the role division between municipalities and the state better and to adapt help to the needs of children and families (Norwegian Office for Child, Youth, and Family Affairs, 2022). These changes to the law will also affect working practices, transferring more professional and economic responsibility to the municipalities. By implementing new technological solutions, the Norwegian government intends to increase CWS's transparency and more clearly show the reasons for decisions made in their case. Municipalities view the process of enhancing case management systems as an opportunity to both streamline case management and enhance the Norwegian CWS's reputation in this context (The Norwegian Association of Local and Regional Authorities, 2023). The municipal CWS's way of working will be drastically changed in the coming years because of changes in practices and legal reform.

The DigiBarnevern project began officially at the end of 2016 as a collaboration between several Norwegian municipalities, the Norwegian Association of Local and Regional Authorities (KS), and the state, represented by the Office for Child, Youth, and Family Affairs (Bufdir). Seven Norwegian municipalities are represented in the project, namely Trondheim, Oslo, Bergen, Stavanger, Kristiansand, Bærum, and Asker. The project management team consisted of several subject experts from Trondheim and Oslo with experience as CWS social workers, as well as IT experts (i.e., a service designer, a systems architect, and a systems procurement expert). These Norwegian municipalities started the DigiBarnevern project after realizing that the current case management systems were not meeting the needs of the public or caseworkers. These legacy systems lack a professional foundation in relevant social service practices and have been used as mere archival repositories. Additionally, little to no information is available for citizens about how CWS operates, and communication between CWS and the citizen includes many obstacles, making participating in one's own case cumbersome and time-consuming to explore. These limitations have resulted in considerable uncertainty and may have helped the spread of misinformation about CWS's role in Norway.

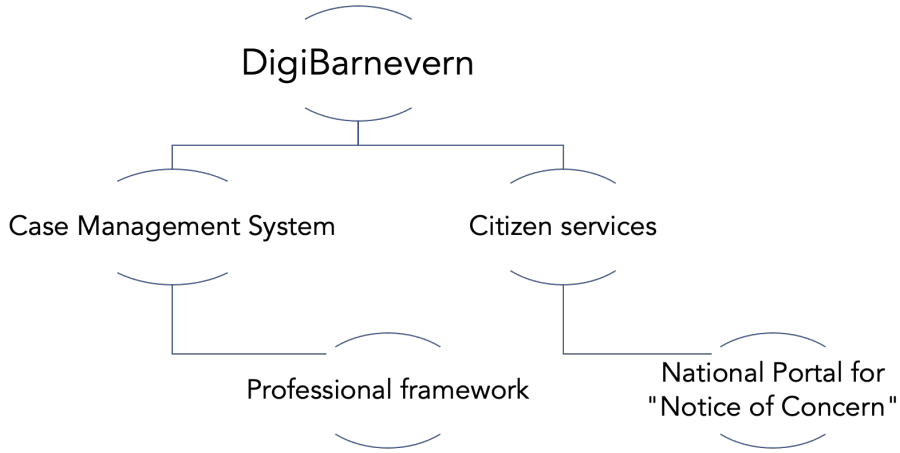

Figure 4: A simplified illustration of subprojects and components in the DigiBarnevern project.

The project was divided into two subprojects: 1) the procurement of a case management system and 2) the development of citizen services, a solution for citizens to communicate with CWS caseworkers and receive information related to their cases. Additionally, there are other components that connect to these subprojects: i) a national portal for sending a notice of concern about a family that has been implemented in Norwegian municipalities and ii) a professional framework developed by Bufdir that will be integrated into the researched case management system. These are illustrated in Figure 4.

5. Research methods

With this thesis, I aim to investigate ongoing practices and discourses related to end-user participation in municipal development projects. This required a considerable understanding of the context and organizational structure that informed these practices and decision-making. In order to accomplish this, I decided to do a qualitative study of existing municipal projects and conduct an interpretive, embedded case study following projects in Trondheim municipality from 2019 to the end of 2022.

In this chapter, I describe the reasoning for choosing a case study as a research method and the methodological approaches that I have used to conduct the data collection and analysis. First, I will explain how I negotiated access to the two development projects and contacts in the municipality and reflect on the possibilities and challenges of doing research on ongoing projects in the public sector. Then, I will describe the overall research strategy, which in turn motivated my approach to data collection and analysis. Lastly, I discuss the ethical aspects of data collection and the limitations of the study.

5.1 Research Setting and Accessing the Research Domain

This thesis is part of a larger research project called Digital Infrastructures and Citizen Empowerment (DICE[1]), an interdisciplinary project that was a collaboration between the Department of Sociology and Political Science, the Center for Care Research, and the Department of Computer Science. The goal of the overarching project was to investigate the social impacts of digitalization, assessing the risks and benefits brought by the implementation of new digital infrastructures. I joined the research project at the start of 2019 with the goal of researching the inclusion of end users in public sector development projects.

Conducting research in the public sector presents unique challenges. However, initial access to the pilot case, Aktiv Fritid, proved fairly easy, as the project manager for the case contacted a professor at the department directly about including researchers in the project. I was available to follow the project directly and was invited to all of their joint meetings. As

[1] https://www.ntnu.no/iss/dice

I had just begun my Ph.D., I quickly realized that the project was too small to be my sole source of data collection for my thesis. At the same time, it provided a way to get in contact with people in different units within the municipality and at different organizational levels. Through interviews in the spring of 2019, I got an introduction to all the ongoing and planned digital projects within the municipality, including DigiBarnevern.

The municipality must approve all research projects. Having contacts within the municipality, especially at the councilor level ("rådmanns fagstab"), proved a substantial benefit in getting approval for conducting research within the pilot case as I could reach out to my contacts to hear about where in the pipeline my application was. The explanation for the processing delay given was the number of applications the municipality received; however, I was assured that approval would be given as participation in development projects aligned well with the political interests of the municipal leadership. Attending municipal workshops and seminars were effective places to meet key contacts, and I used my connection to the Aktiv Fritid project to advocate for my research topic while citing interest in the topic within the municipal units.

As an added bonus, I became acquainted with a Ph.D. candidate at the Department of Social Work who had personal experience working as a social worker and a similar interest in digitalization and end-user participation. Based on this shared interest, we decided to apply to research another municipal digitalization project, DigiBarnevern. We attended two meetings with a program manager working directly with the councilor and two advisors from the municipality who work on research collaboration between NTNU and Trondheim Municipality. Together, we agreed on topics that were then detailed in a project plan we sent for approval in October of 2019. Approval and access to do research on DigiBarnevern were not given before June 2020. This is likely in part due to the COVID-19 pandemic, which stopped physical meetings from March 2020 onwards.

When the project was finally approved, I began interviewing the project management team in Trondheim together with the Ph.D. candidate from Social Work, and the collaboration went quite smoothly from then on. Several other researchers from other universities tried to get access to the DigiBarnevern project; however, no other researchers got approval to follow the project from within the project. Due to the longevity of the project and the number of sub-projects and components, we were not able to follow all the parts of the project and, therefore, followed the project management team located in Trondheim for the most part.

Nevertheless, we interviewed stakeholders in other parts of the project. During the spring semester, I helped two master's students in Cooperation Technology access the project. They focused on the implementation of the case management system.

The project management team was helpful in suggesting others to interview while we followed the progress of the project in project meetings. The largest obstacle was collecting data from citizen representatives. From the beginning, we had expressed an interest in talking to participants representing caseworkers in Child Welfare Services and those representing citizens. Before we began data collection in 2020, project members from Trondheim and Oslo municipalities had held workshops with citizen representatives recruited from interest organizations through Bufdir. In talking with people from Bufdir about interviewing workshop participants, concerns were raised about having researchers attend and that having non-caseworkers observe workshops or conduct interviews might be uncomfortable for participants as they may share personal experiences with CWS. After project management became more familiar with us, we were told that when they conducted new workshops during prototyping, we could observe, but these workshops were never held. We did observe two online sessions with user testing with citizen participants.

We were able to interview a broad spectrum of caseworkers involved in the project at different levels, from three different municipalities, and in different phases of the project. As we were not able to interview citizen representatives directly, we changed the focus to how citizens were talked about and what challenges existed within the project's design context that impacted citizen participation.

5.2 Research Design

The research that formed the basis of this thesis followed an interpretive case study with the aim of understanding the phenomenon of end-user participation within a municipal context with its own culture and language. Following the interpretivist paradigm, participants' understanding and knowledge are seen as socially constructed through the interactions of actors (Walsham, 2006). Ontologically, one's understanding of the world is acquired through social interactions, and one's "knowledge of reality is gained only through social constructions such as language, consciousness, shared meaning, documents, tools, and other artifacts" (Klein & Myers, 1999, p. 69). This necessitates having an understanding of the social context of the processes of design and development in order to describe the studied

phenomenon and explain the main factors impacting it (Bass et al., 2018). This approach is particularly appropriate for describing complex organizational structures, collaborative efforts, and the processes that happen within them.

The same can be said for the chosen strategy, i.e., the case study, which provides a way of systematically investigating events and conducting data collection and analysis (Verner et al., 2009; Flyvbjerg, 2006). In doing the case study, I aimed to provide a detailed examination of an example of a type of phenomenon with all its complexities that cannot be isolated from human actors' interactions within a specific context (Flyvbjerg, 2006). Doing a case study was appropriate as I wanted to describe a particular phenomenon, i.e., how participation was described and practiced in public service development within a municipal context.

Specifically, I used an embedded case strategy approach (Scholz & Tietje, 2011; Bass et al., 2018), as I used differing units of analysis (i.e., practices, understandings of participation, contextual conditions, etc.) and data collected from two cases but within the same municipal context. Insights collected from both Aktiv Fritid and DigiBarnevern informed each other. The first paper in this thesis presents findings from the pilot case, while papers 2 and 3 present findings from different sub-projects within the main case. The last paper uses data collected from both cases. Therefore, different aspects and concepts have been used and developed within, but also across, the two cases. Additionally, the data collection was done over several years, from 2019 to 2022, meaning I could see how things developed over time within the projects and approaches to participation in service design. Figure 5 illustrates the connection between the research strategy, embedded cases, data collection, and analysis.

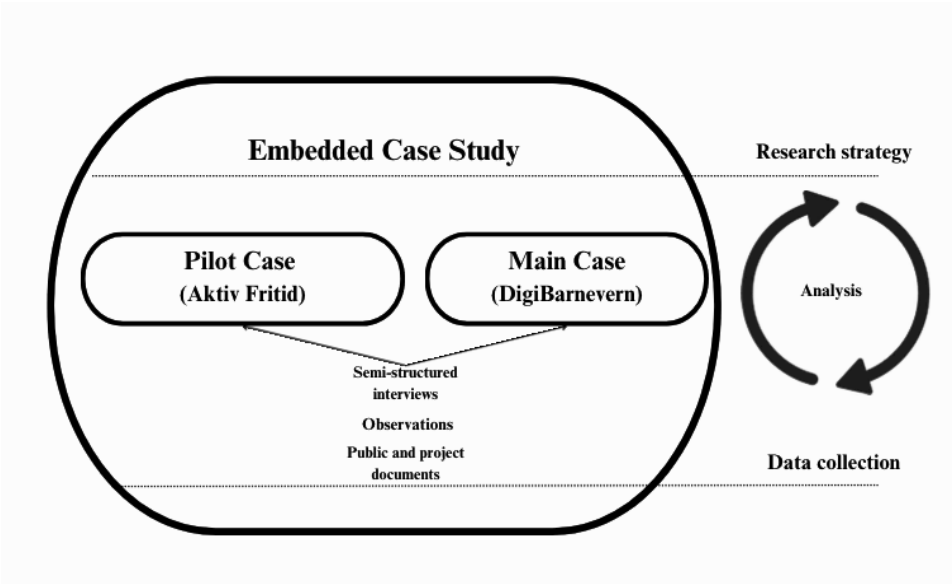

Figure 5: Illustration of data strategy and data collection

Due to the highly contextual nature of this type of research and phenomenon, I do not aim for generalizability in the traditional sense, but nonetheless, I see the cases as indicative of a larger trend as many different forms of welfare services in countries across the globe are increasingly integrating digital solutions. Through the research presented in this thesis, I present context-dependent knowledge (Flyvbjerg, 2006) by describing the cases in detail and thereby contributing to a building block built upon previous research findings about a phenomenon with the purpose of informing future research and practice.

5.3 Data Collection

The interpretive paradigm underpinning this research meant having an open and exploratory approach to data collection in terms of lines of questioning during interviews and opportunities for observations. The main data collection activities were semi-structured interviews and passive observation of meetings. Secondary data in the form of project documents supported my understanding of the projects, as strategies and aspects were concretized and made explicit. The variety of sources enabled triangulation. Data collection began in 2019, following the pilot case, while data collection on the main case was done from mid-2020 to the end of 2022, with varying intensity depending on what was happening in the project. Most interviews were done in the spring of 2019 and the fall of 2020, as it required understanding what had happened previously in the projects and the municipality,

as well as getting acquainted with all the different stakeholders. This enabled me to hear differing perspectives on the challenges and goals of each project before getting to know the project management teams through observations in meetings.

My colleague from the Department of Social Work and I were alone in carrying out data collection within DigiBarnevern, which turned out to be a larger project than we first anticipated. As a result, taking my cue from Latour (1987), I made an effort to follow the actors as they discussed and made decisions regarding crucial aspects of the two projects' goals and processes. I chose to focus on the human actors engaged in the design of digital systems for public services while also assessing artifacts created through the design process, such as system recruitments, tender documents, personas, and prototypes. However, I give less attention to the artifacts themselves and more emphasis on the human-centered aspects of the design process. Beginning with project management teams, I conducted observations of project meetings and interviewed the members of the teams separately.

From there, I used a combination of snowball sampling and purposive sampling to recruit informants for semi-structured interviews (Oates, 2006). I aimed to reach a diverse group of stakeholders, both those working directly with design and some that worked with parts or peripherally as a representative or consultant; however, all had a form of public sector affiliation. All the interviews done in 2019 were physical, while all but two interviews were conducted online through Microsoft Teams in 2020 due to the COVID-19 pandemic and restrictions. Meeting observations followed the two project management teams at the center of each case. In these observations, I remained a passive observer for the most part, though participants in meetings would sometimes refer to me or ask for updates on data collection. In addition, I observed three user tests online and also observed and took field notes from public sector gatherings about digitalization in the public sector.

During meeting observations, I wrote detailed field notes, noting who said what and usually including their exact phrasing. Documents were gathered and accessed continuously and were used as a secondary data source to supplement and add to data from interviews and meeting observations. Reviewed documents consisted of public documents, i.e., project proposals, tender documents, project websites, and strategy documents referred to by informants, and internal documents, i.e., meeting agendas, presentations, illustrations, and unfinished documents. For a full overview of data collection, see Table 2.

The breadth and depth of data collection, from one-to-one interviews to observations of public sector gatherings and public documents, were important scalar mechanisms to access and make sense of a phenomenon (participation in the public sector) that might be difficult to grasp for one researcher alone during a relatively limited amount of time (Ribes, 2014). In the process, my assumption was that my informants were grappling with practical problems that resonated with my research questions (ibid.)

Data Sources	**Aktiv Fritid (Feb 2019 – Sep. 2019)**	**DigiBarnevern (Aug. 2020 – Feb. 2023)**	**Duration**
Interviews	7 municipal workers at different units	25 interviews with 21 unique people involved in different parts of the DigiBarnevern project. Including: - 5 CWS experts - 5 external CWS workers - 4 designers and developers - 3 managers in Trondheim municipality - 3 managers in Bufdir	1-1,5 hours
Observations	5 project management meetings	15 project management meetings	1 – 2 hours
		3 user-testing sessions, with: - 1 caseworker - 2 citizen representatives	30 – 45 min
Documents	- Website drafts - Public reports - Internal public meeting summaries - Funding applications	Public reports: - Political consultation reports - Summary reports from workshops and supplier conference - Tender documents - Summary of user mapping work - Description of citizens needs - Socio-economic analysis	

Table 2: Data collection

5.4 Data Analysis

With the goal of answering the research questions for this thesis, I analyzed the data at different stages. After collecting the data connected to the Aktiv Fritid project, I transcribed and analyzed it immediately. As data collection connected to DigiBarnevern went over several years, I would sometimes wait to transcribe and analyze the interviews, leading to me being more discerning about whether parts of the interview would be coded or not. I would also note impressions of relevant themes arising during interviews and discuss these with my main supervisor in order to have an outside perspective on the relevance of my impressions.

Though I remained concerned with having an interpretive approach, waiting to see whether topics would come up again or become irrelevant to posed research questions, I progressed in my understanding of analysis based on domain experience and engagement in the research literature. My understanding of the domain led to more precise data collection, questions, and, therefore, less coding work. As the scope of my research narrowed, so did the number of interviews. The number of codes and notations also diminished, as I no longer needed to add codes as reminders of project deliverables, organizational structures, or other project elements not related to my research objective. The inverse was true for the depth of the analysis. As I understood more about the field, I could see new connections between utterances and decisions, expanding my view of the issues the public sector deals with in facilitating participation in the design of public services. This analytic process uses the hermeneutic circle as a principle of interpretive studies (Klein & Myers, 1999). This means that through analysis, one moves from "a precursory understanding of the parts," i.e., interpreting a specific sentence, to a global understanding, and "from a global understanding of the whole context back to an improved understanding of each part" (ibid., p. 71). Since I conducted a longitudinal embedded case study, this gave me the opportunity to revisit data, see findings in a new light, and build on my understanding of ‘the whole’ iteratively.

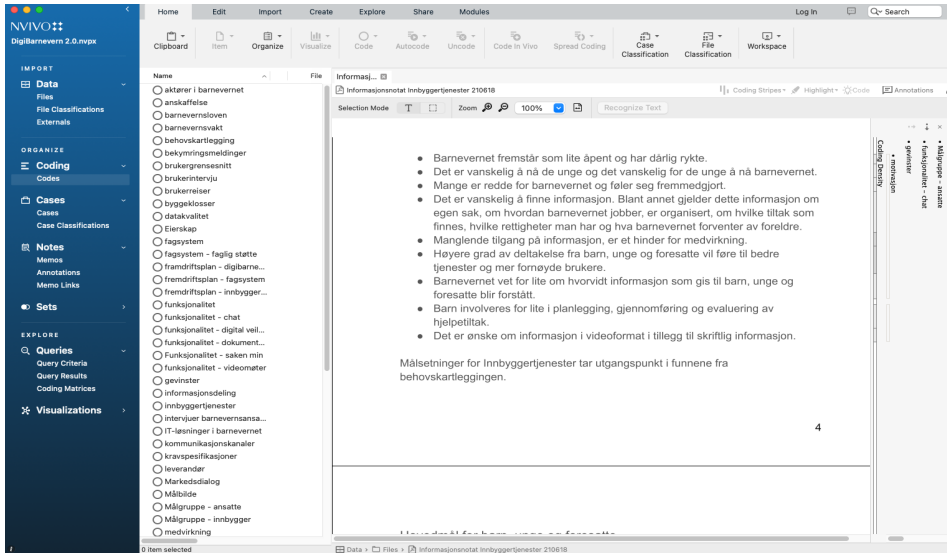

Figure 6: Screenshot of coding in Nvivo

In transcribing interviews and rewriting handwritten field notes into digital documents, I anonymized informants, giving each of them a pseudonym. I added all the transcribed interviews, field notes, and documents in the qualitative analysis program Nvivo (see Figure 6). I analyzed the data in stages based on Tjora's (2018) Stepwise Deductive Induction. My main goals when doing the analysis were to reduce and systematize the material, extract the essential themes to answer the research questions for each paper and generate ideas based on the empirical data. This was done through three main processes synthesizing Tjora's multi-step approach (ibid.): 1) coding inductively; 2) categorizing codes based on concepts that fit both the coded data and the research question; and 3) connecting categories to theory and conceptual understandings related to the investigated phenomena (illustrated with numbers in Figure 7).

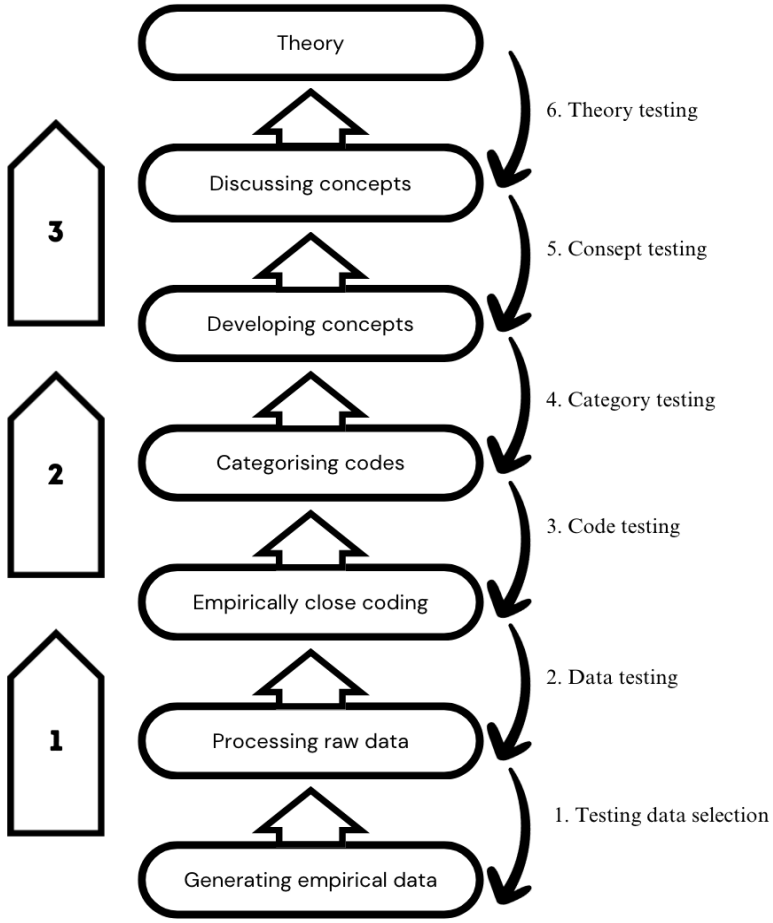

Figure 7: Adaption of Stepwise-deductive inductive method (Adapted based on Tjora, 2018)

Working from data in stages, I began with raw data to the development of concepts, finally applying it to theory (represented by the middle section of Figure 7). This analysis method includes working both inductively, working from the data (represented by the upward moving arrows on the left side), but also deductively in quality testing a more theoretical level up against a more empirical level (represented by the downward moving arrows on the right side). Tjora (2018) states that this is not meant to be construed as a linear process but as an iterative approach to analysis with the goal of conceptual generalization, i.e, a general expression of phenomenon studied.

This led to me conducting analysis first inductively and 'empirically close', trying to retain the words used by informants, leading to between 25 and 58 unique codes per interview. A

second process of coding would try to link these unique codes, while excluding others, and connect them to a specific unit of analysis. In paper 1, the second process was more deductive than for the other papers' coding, the second round of coding connected to the concepts used (participation, scaling, and platformization). For paper 2, I coded the main practices of informants then seeing how they connected to the research question, reworking them till there was conformity. For paper 3, it consisted of coding the contextual conditions that impacted participation in design. For paper 4, the empirically close coding was selected and categorized based on how they related to the concept of participation.

As described by Tjora, the process of producing final coding was not as linear as explained here but emerged iteratively and through reflection with supervisors, co-authors, and - in the case of paper 2 - informants.

5.5 Research ethics, reflexivity, and sustainability

In concluding this chapter, I will present some of the ethical considerations of conducting the research presented in this thesis. Specifically, I will be addressing some of the ethical aspects of doing data collection within Trondheim municipality, reflexivity in presenting findings, and the sustainability aspects of doing research on the design of public services.

The first step of the data collection process was defining the scope of the research and who the relevant research subjects were, i.e., those involved in the development of new digital solutions in the public sector. This was an important step in gaining the necessary approval for conducting the research. First, I applied for approval from the municipality to follow Aktiv Fritid project meetings. This was not a lengthy process, as the project manager for Aktiv Fritid was the one who invited me into the project. In May 2019, my co-supervisor, Dag Svanæs, applied for approval from the Norwegian Center for Research Data (NSD*, now SIKT[2]) based on the project proposal I wrote and was approved by the university. In the application, until approval from NSD, the meetings were recorded and held by the project manager. Interviews were arranged after the approval was granted, and I had gotten insight into the organizational and decision-making structure of the municipality, making

[2] https://sikt.no/en/about-sikt

gaining access to relevant informants easier as I made myself and my research interests known.

For data collection for DigiBarnevern, as mentioned in the description of the case (4.3), we were asked to provide a project proposal for the specific project, specifying our interest, the number of informants, and the amount of time we expected to interview and observe. This project proposal emphasized our interest in informing practices and collaborating closely with the municipality in framing the research objectives.

All informants were given consent to include an overview of the main objective of the Ph.D. study, i.e., participation in the design of public digital services and systems. In addition, this form gave details on the secure storage of data, anonymizing practices, and who to contact if one wanted to withdraw consent, all of which are central aspects of giving informed consent (Oates, 2006). As the COVID-19 pandemic led to physical meetings being limited starting in March 2020, it became more difficult to have informants remember to sign them. Therefore, I began sending the forms and asking informants to review the forms before meeting them online. Then, at the start of meetings, I would ask if they agreed to be recorded and then ask if they had read, understood, and approved of the details of the study as explained in the forms. I would also reiterate parts of the forms related to data storage, anonymization, and withdrawal of consent. Some would still send a signed copy of the forms, but this was difficult to receive from those we only interviewed once.

As a researcher, trust and relationship building became crucial aspects of gaining access and allowing informants to talk about issues they were dissatisfied with in their work and in collaboration with others. Many informants described being worried about being honest about their dissatisfaction as it may impact their working relationships in the future; however, others were not as concerned and, therefore, might reflect a difference in personality more than a cultural issue.

As I focused this study within the interpretive paradigm and drew on PD in my understanding of participation as a main concept, I felt compelled to address reflexivity in researching the design of public services. Reflexivity in PD has been emphasized, as has viewing design as a reflective practice (Pihkala & Karasti, 2013). Project team meetings for DigiBarnevern provided a space for reflection-on-action (Blomberg & Karasti, 2012), both for the project management team and, in some instances, for me, where we could reflect on

practices and activities in the project. Therefore, in researching design and urging informants conducting design to reflect on their practices, it is warranted to reflect on my own practices.

Based on this goal, I would present some of my preliminary categories to project management and ask for their feedback on the significance of my findings after some of the project management team meetings. This process aided in validating my interpretations of activities and analysis, specifically for papers 1 and 2. For paper 2, the project management team sat with me for two 1-hour-long meetings, going through quotes I had marked as of importance to make sure that I had retained their meaning when translating from Norwegian to English. For those not able to meet in person, I sent their translated quotes to them for approval before publishing. Another meeting with the project management team was held after the first round of major revisions for paper 2 to help me fill in the information gaps that reviewers had highlighted.

After this last session, I received a positive response from one of the informants, who compared it favorably to an experience of being quoted by a newspaper journalist who had misrepresented what they had said. Validating findings with informants was more difficult when submitting to conferences, as there is a significant chance of rejection, and if the paper is accepted, there is usually a short turnaround time for submitting revisions.

The relationship-building process and longitudinal aspect of the research also introduce a certain risk. The length of the study poses a threat to my objectivity as a researcher, as I have cultivated a relationship with the project management team. I discussed ethical considerations with supervisors and coauthors throughout to get an outside perspective on my analysis, along with presenting quotes to informants before publication. Therefore, some of the issues of my subjectivity and bias as a researcher were mitigated.

6. Summary of papers

This thesis contains the following papers:

1. Dahl-Jørgensen, T. C. and Parmiggiani, E. 2020. Platformization of the public sector: Assessing the space of possibility for participation. In Proceedings of the 16th Participatory Design Conference 2020- Participation(s) Otherwise - Vol. 2 (PDC'20: Vol.2), June 15-20, Manizales, Colombia

2. Dahl-Jørgensen, T. C. and Parmiggiani, E. 2023. Caseworkers' participation in procurement: Infrastructuring Child Welfare Services in Norway. Journal of Computer-Supported Cooperative Work, ECSCW 2023 paper.

3. Dahl-Jørgensen, T. C. and Aasback, A. W. 2023. The role of contextual conditions in systems development: The impact of design context on participation in Norwegian Welfare Services. Proceedings of NIKT/NOKBIT 2023, November 27-30, Stavanger, Norway.

4. Dahl-Jørgensen, T. C., Dahl, Y., Svanæs, D. and Parmiggiani, E. (2023, submitted to journal). The discourse of user involvement in the design of digital public services: A case study of two municipal projects in Norway

These papers were written at different stages throughout my Ph.D. research; therefore, they cover differing data material but also maturity in analysis and understanding of the research domain. These papers aim to answer the research questions framing the whole thesis:

RQ 1: How is end-user participation constructed in the planning of digital public services?

RQ 2: How is participation practiced in designing digital public services?

RQ 3: What challenges and opportunities exist for participation in the design of digital public services?

The subchapters correspond to the papers and explain how they address the main research questions, which are also detailed in Table 3. Paper 1 is written based on data collection from the Aktiv Fritid project and discusses aspects of planning for participation linked to

scaling, specifically platformization and infrastructuring, and the challenges that arise. Paper 2 is based on data collection on DigiBarnevern and focuses on the procurement of a new case management system for Child Welfare Services. The paper addresses how the participation of caseworkers was facilitated in the process of planning the procurement and subsequent design of the system, including practices connected to infrastructuring. Paper 3 uses data collected from DigiBarnevern following the subproject Citizen Services, designing a digital solution for vulnerable citizens in contact with Child Welfare Services. The paper discusses the contextual conditions that challenged the direct involvement of citizen users. Paper 4 uses data from interviews and observed meetings collected in connection with both design projects, Aktiv Fritid and DigiBarnevern. In this paper, we present how participation was talked about in relation to the planning and design of digital public services. This paper unpacks how citizen participation is constructed and described by public officials and touches upon perceived practices and barriers in facilitating the inclusion of citizens in design projects.

Table 3: List of papers and their contribution to answering the research questions.

Title	**RQ 1**	**RQ 2**	**RQ 3**
Paper 1 – Platformization of the public sector: Assessing the space of possibility for participation	X		X
Paper 2 – Caseworkers' participation in procurement; Infrastructuring Child Welfare Services in Norway	X	X	
Paper 3 - The role of contextual conditions in systems development: The impact of design context on participation in Norwegian Welfare Services	X		X
Paper 4 – The discourse of user involvement in the design of digital public services: A case study of two municipal projects in Norway	X	X	X

In addition to the thesis publications, I have contributed to other publications and dissemination of research:

- Morsund, E., Spilker, H., Reutter, L., Røyrvik, E.A., Bye, T.A., Tjora, A, Dahl-Jørgensen, T.C., & Svanæs, D. (2019) Digital Infrastructures and Citizen Empowerment. Poster at NTNU's Digital Transformation seminar, March 2019.
- Spilker, H. S., Reuter, L., Broomfield, H., Aasback, A., & Dahl-Jørgensen, T. C. (2020). DATAFICATION IN THE PUBLIC SECTOR: EXPLORING THE BORDERS BETWEEN PUBLIC SERVICES AND CITIZENS. *AoIR Selected Papers of Internet Research*, *2020*. https://doi.org/10.5210/spir.v2020i0.11149
- Farshchian, B.A., Parmiggiani, E, Dahl-Jørgensen, T.C., & Quayyum, F. (2021). "How to Teach Empirical Research Methods in Information Systems? Report from a SCIS/IRIS 2019 Workshop," *Scandinavian Journal of Information Systems*: Vol. 33: Iss. 1, Article 3. Available at: https://aisel.aisnet.org/sjis/vol33/iss1/3

6.1. Paper 1 - Platformization of the public sector: Assessing the space of possibility for participation

This paper explores issues of scaling and how it relates to local practices of participation, specifically how platformization, as a global trend, impacts participation generally within a local design context. My co-authors and my understanding of participation remained a consistent theoretical anchor throughout all the papers. We draw on Bratteteig and Wagner's (2016) description of participation as a theoretical concept and understand participation as having an impact on decision-making in a design project. Further, their concept of decision linkages, surfacing how decision-making impacts subsequent choices and the opening and closing of possible choices, provided a basis to unpack the process through which a digital platform is chosen as a solution. Additionally, the concept of decision linkages highlights the significance of investigating the early stages of design and development that impact all subsequent ones. Considering the rigidity of the installed base in a municipal context, large and early decisions have long-lasting repercussions.

In this paper, we see the concepts of platformization and existing infrastructure,i.e., installed base, in relation to the theoretical framing of scaling participation. Originally, I envisioned platforms as a central concept in this thesis. However, after conducting data collection within the municipality, I realized there was a considerable discrepancy in the way different actors understood the concept. Surprisingly, the term platform became very popular not only in research but also among practitioners, including public officials. It seemed to be used to describe any form of collaborative digital system. Therefore, I did not continue building on

the concepts of platforms and platformization in order to avoid confusion when interacting with informants. Instead, I decided to view platformization within the larger concept of scaling. Through engaging with the research setting, infrastructure and infrastructuring seemed more appropriate in describing the explored phenomena, particularly those addressed in paper 2.

This paper adds to this thesis by focusing on three findings that show the challenges and chances (RQ3) that come with planning for end-user participation through scaling and platformization. First, we point to the importance of public officials' views on participation within municipalities, which is expanded upon in paper 4. Second, the role of the installed base (Aanestad et al., 2017), the existing technical, social, and organizational infrastructure that requires cultivating, i.e., careful tending and preparing, in order to allow for change. The governance of municipalities as small, self-directed administrative and political entities raises issues about how much municipalities can participate in change.

The organizational and governmental structure of municipalities was also an issue for facilitating participation within the DigiBarnevern project, detailed in papers 2 and 3. Third, we discuss challenges related to scalability. As Roland et al. (2017) suggested, platformization can be leveraged to include end-user participation in the add-ons while the platform core stays consistent, therefore allowing for participation and customization of aspects of the platform. We identified examples of adopting and adjusting existing solutions. However, deciding on a specific digital solution or platform required significant effort as it impacted existing work practices and the installed base. Also, it is questionable whether small municipalities are able to make changes and facilitate participation when implementing ready-made solutions, for example, from a global platform owner.

I conducted the data collection for this paper and analyzed and categorized the findings. Elena Parmiggiani and I came up with the premise and agreed on the conceptual framing of the paper together. We co-wrote parts of the paper in collaborative sessions.

6.2. Paper 2 - Caseworkers' participation in procurement; Infrastructuring Child Welfare Services in Norway

This journal paper explores the concept of participation within the context of the procurement of a future digital system, meaning that the procured system will be developed through public-private collaboration after a vendor is chosen. A group of Norwegian municipalities chose the vendor based on how potential vendors described meeting the requirements outlined in a published tender. We investigated how the participation of caseworkers was practiced (RQ 2) by the municipalities in the process of writing and publishing the tender, i.e., the planning stages of design (RQ 1).

Drawing on infrastructuring literature (Star & Bowker, 2002; Monteiro et al., 2013; Parmiggiani & Karasti, 2018;), we describe how stakeholders shape systems across geographic and temporal boundaries, in addition to noting the scale of the project. We connect the concept of infrastructuring to practices, as infrastructures both "shape and are shaped by daily work practices" (Dahl-Jørgensen & Parmiggiani, 2023, p. 8). Further, we build on participatory infrastructuring as a theoretical concept introduced by Bødker et al. (2017) in describing how caseworkers were represented throughout the procurement process. As in the previous paper, we draw on Bratteteig and Wagner (2016) in introducing participation as a concept but using a broader view of participation, not just through direct involvement but also through how end-users' (i.e., caseworkers') interests are represented and impact decision-making. The concept of knotworks (Bødker et al., 2017; Engeström et al., 2008) encapsulated the temporary constellations of actors that work on integrating the process of facilitating participation into the existing infrastructure and municipal context.

In the DigiBarnevern project, caseworkers were represented in interdisciplinary collaborations (i.e., knotworks) in establishing requirements in tender documents, the requirements themselves, and in collaboration with developers after the procurement, as stipulated in the tender requirements. Issues with governance and scaling had an impact on the type of procurement and the flexibility necessary to facilitate actual changes in the procured system through participation. Based on these findings, we see procurement as a significant but under-researched process that forces important decisions to be made early in the design process and has significant implications for how participation is practiced. With this paper, we contribute to expanding upon the concept of participatory infrastructuring as

a way in which participation is practiced in scaled-up projects and traditionally non-participatory processes such as procurement.

Anne Aasback and I collected the data on which this paper is based. I analyzed the data and discussed the preliminary findings with Elena Parmiggiani. Parmiggiani provided part of the conceptual focus, especially on infrastructuring, while theory related to participation and participatory infrastructuring was developed through continuous discussions. I wrote sections 2, 4, 5, 6, and 7. Parmiggiani and I wrote the introduction (section 1) and the theoretical background (section 3). The paper underwent two rounds of revisions that were discussed by the two authors in dialogue.

6.3. Paper 3 - The role of contextual conditions in systems development: The impact of design context on participation in Norwegian Welfare Services

In this conference paper, we again draw on data collected within the DigiBarnevern project, focusing on the subproject called Citizen Services, which aims to design a solution to be used by citizens. Municipal workers involved in the project envision this digital solution to ease communication between caseworkers and citizens and include general and specific information that citizens could access about the processing of cases in Child Welfare Services. We observed how the design context influenced the involvement and representation of citizens while following the workers who were driving the solution's design in the municipality.

This paper is grounded within an empirical setting, and findings emerged through an inductive coding process. Nevertheless, as the findings were grounded within the context of the project, we drew on user-centered design and PD literature that highlighted the importance of context in design practices. Using empirical findings from the case study, we build on the work of Svanæs and Gulliksen (2008) in emphasizing the contextual nature of design work. Given that deeply ingrained notions of participation within the existing context shape design practices, Dittrich et al.'s (2002) influential work called for investigating design practices "in the wild."

We discovered that the project's decision-making structure shaped design practices. The project management team had mentioned wanting to facilitate the participation of citizens. However, as there were many municipalities involved in the project, each with their own

issues with communication and organization of decision-making, and a separate public organization developing the solution, the inclusion of citizens ended up being crowded out by the many other actors and considerations.

The representation of citizens' needs and interests was limited to the inclusion of representatives from invited interest organizations that were used to set requirements for the system and as foundations for personas and customer journeys later used by a municipal project management team in designing prototypes with the public developer organization. Additionally, we saw that the vulnerability of the user group (citizens in contact with CWS) and the power dynamics at play led to tensions in the design. Based on the vulnerability of the user group, the project management team argued for the importance of citizen-users having a say in the design, but at the same time, this led to citizen-users being shielded from most of the design work as it would require them to be exposed to other actors. In this way, the project management team was the one that advocated for the needs of citizen users.

The key contribution of this paper is the significant role that design context plays when planning how to facilitate participation. Though all parties can agree that including end users is important, the contextual conditions put forth by complicated organizational and governance structures and the power relations embedded in them require tailoring participatory practices to the specific design context.

Anne Aasback and I collected the data on which this paper is based. The idea for the paper emerged through discussions in between data collection sessions with Aasback. As the publication aimed to contribute to design theory, I wrote most of the paper with input from Aasback. The findings section was largely co-written.

6.4 Paper 4 - The discourse of user involvement in the design of digital public services: A case study of two municipal projects in Norway

In this paper, we go further in describing how local public officials talked about user involvement. We use the term user involvement instead of participation, as in the other publications, as the involvement of users is more easily understood and encompasses a broader array of activities. We unpack how the involvement of users is constructed through language in discussing their understanding of what participation is, their practices connected to participation, and the motivations for participation.

As the participation of end users has been highlighted as instrumental for the success of public services and is increasingly addressed in political strategy documents (Anthopoulos et al., 2007; Lindgren et al., 2019; Broomfield & Reutter, 2022), it is imperative to investigate how public officials designing public services relate to and conceptualize the participation of citizens. This is of special significance considering the unique challenges within the public sector that have led to citizen participation often being limited. We draw on social constructivist theory and on the role of discourse and language in shaping actors' understanding of a phenomenon.

We found that in describing what participation is, public officials tend to focus on the activities associated with participation, such as workshops, interviews, and questionnaires. Informants based their understanding of participation on their previous experience and found policy documents that emphasized participation unclear in what steps should be included. This indicates a lack of maturity in public officials' understanding of participation, which, in describing practices, led to few examples of the inclusion of citizens in participatory activities and the use of proxies.

I gathered the data on which this paper is based. Dag Svanæs suggested the premise of the paper and the theoretical framework. I conducted the analysis and categorized the findings with input from all co-authors through meetings. I wrote the first draft of the background, findings, and discussion. These were revised with the input of all authors. Yngve Dahl aided in narrowing the scope of the paper and provided much of the structure of the paper, co-writing the introduction and discussing central points in the paper. Elena Parmiggiani provided continuous comments and discussions throughout the entirety of the paper and writing process and co-wrote the introduction.

7. Discussion and implications

In this section, I first present the central theoretical concepts this thesis contributes to and builds on with empirical examples stemming from the embedded case study. Further, I discuss how this thesis answers the posed research questions. Each subsection corresponds to a research question.

Table 4: Use of main concepts across papers

Title	Participation	Scaling	Context
Paper 1	- Decision-linkages	- Platformization - Infrastructure	- Digital public service design - Early design stage.
Paper 2	- Decision-making - Decision-linkages - Knotworks	- Infrastructuring	- Digital public service design - Early design stage - Procurement
Paper 3	- Representations		- Digital public service design - Power dynamics - Collaboration between public organization
Paper 4	- Social construction		- Digital public service design - Public officials' discourses on user involvement

Within the publications included in this thesis, there are recurring concepts which I have also reviewed in Chapters 2 and 3. Though the papers present different degrees of thoroughness in explaining concepts, they all touch upon elements of participation. The main concepts used in this thesis are participation, scaling, and design context. All other concepts used can be seen in relation to these three core concepts, as detailed in Table 4. Following Bratteteig and Wagner's (2016) framework for participation explained in the theory chapter (see subchapter 3.2), in addition to attempting to understand what is meant by participation, I have investigated what shapes participation. This led me to delve into the other concepts of scaling and design context.

7.1 RQ1: How is end-user participation constructed in the planning of digital public services?

In this thesis, I have investigated how major decisions have been made and by whom. I have perceived participation as having an impact on decision-making in line with Bratteteig and Wagner's (2016) understanding of participation. This perspective has informed my interest in processes of decision-making, especially in the early stages, as early decisions open for important subsequent decisions to be made, while closing the door on others. I elaborate on my use of this framework in papers 1 and 2 by using Bratteteig and Wagner's concept of decision linkages to describe the process of decision-making and what decisions end users can participate in.

Based on this, much of the data presented in this thesis is connected to the early stage of design to understand why certain early decisions were made. The planning stages of the design made up most of the data collected from the studies. In the planning stage of the DigiBarnevern project (see papers 2 and 3), workshops with citizen representatives were conducted along with dialogue seminars with potential vendors of the case management system.

This, consecutively, shaped how participation was executed in designing the new digital solutions for CWS. For the Aktiv Fritid project, the project management team never moved beyond the planning stages. Therefore, the findings from this project only encompass how the participation of citizens was discussed and what issues they envisioned as challenging a higher level of participation (papers 1 and 4). Therefore, all papers touch upon how participation was planned and constructed through interactions and negotiation between actors while considering the existing infrastructure.

In the theory chapter, I presented the theoretical and foundational epistemology of social construction that this thesis draws on (Berger & Luckmann, 1966). Though social construction as a concept is not unknown to PD literature (see, for example, DiSalvo et al., 2012; Spinuzzi, 2005), it has received little attention, even in light of PD researchers calling for increased clarity in unpacking understandings of participation (Halskov & Hansen, 2015; Bratteteig & Wagner, 2016). This thesis contributes to this theme by investigating how user involvement is talked about. In paper 4, we emphasize the importance of how public officials describe and understand it. As we found indications that public strategy

documents highlighting the importance of participation did not resonate within the context in which design actually takes place, we see that the public officials engaging in design work established a way of practicing "involvement" that worked within the confines of the public context.

7.2 RQ 2: How is participation practiced in designing digital public services?

I answer this question by drawing on and extending the literature highlighting the contextual nature of participation (Gartner & Wagner, 1996; Dittrich et al., 2002; Svanæs & Gulliksen, 2008; Brereton & Buur, 2008). The fact that participation practices were context-dependent is implicit across all the papers but was made explicit in paper 3. In paper 3, we emphasize the complexity of the way the DigiBarnevern project is organized. We discuss the embedded power dynamics in the design context that significantly impacted how the participation of citizens was practiced, leading to a reliance on representative participation. Since being investigated or in contact with CWS is a sensitive and largely unwanted situation for most families, issues related to the power dynamics prevalent within the design context were highlighted by informants. This led to tensions in design that are unique to stigmatizing services. Particularly the tension that arose as project management argued for the participation of citizens that could represent those in contact with CWS due to the uniqueness of their situation, but at the same time, they would argue for not including them directly in design practices with other organizations. Therefore, citizens were first represented by proxies, that is, participants from interest organizations in workshops with CWS and IT experts, in order to map their needs, and thereafter, they were represented through personas and user journeys.

In this thesis, I contribute to the concept of infrastructuring participation by investigating the blending of existing practices and new practices as a process of infrastructuring participation (Bødker et al., 2017; Mikalsen et al., 2018). I mapped this process first by seeing how existing practices in CWS shaped the definition of the requirements for a new digital solution (see paper 2). Further, my coauthor and I mapped the process of infrastructuring by illustrating how the new digital solution was planned through system requirements and the direct participation of caseworkers in collaboration with potential suppliers, with the goal of supporting the work of caseworkers and empowering citizens. Additionally, we described the project management teams' practices in integrating the participation of caseworkers in different aspects of the procurement processes as

infrastructuring practices conducted by constellations of interdisciplinary groups or knotworks.

This thesis also contributes to linking the concept of social construction to that of participation by emphasizing the role of language in constructing public officials' approaches to involving citizens. Further, I argue that the way user participation is talked about has implications for practice (see paper 4). By drawing on social construction (Berger & Luckman, 1966), this thesis places an emphasis on the role of language in shaping public officials' understanding and actions in including or not including citizens when designing services. Though public officials describe a change in perceptions of participation as having merit, their practices did not follow suit. In this paper, we found that many of the practices connected to participation were limited and used proxies, such as design experts. This was thought to be especially prevalent in design projects where the citizen is not easily distinguished from the public official. This gap between best practice and actual practice remains a challenge for designing public services.

7.3 RQ 3: What challenges and opportunities exist for participation in the design of digital public services?

In this thesis, I identify several challenges to participation connected to three main concerns related to participation: scaling, public officials' understanding of participation, and a lack of competencies and resources.

First, I describe scaling in digital public services projects as the expansion of a digitalization project through collaboration across diverse actors and organizations across locals and time in the design of connected digital solutions. As a result, I define scaling in this thesis as the inclusion of several private and public organizations to collaborate on public design initiatives, in addition to the expansion of a project to include several interconnected components or digital systems (see paper 2). Based on this understanding of scaling, I discern certain implications for what end users can participate in and how participation unfolds.

I connect the challenges in facilitating participation to the influence of global platforms and related concerns such as vendor lock-in (see paper 1). When considering participation as engaging in a series of choices, I conclude that the choice of which platform or solution to

acquire encompasses most of the significant decisions, thus leaving the question of what one can participate in unclear (papers 1 and 2). I found scaling to lead to both challenges and opportunities (see paper 2). The challenges are attributed to the extensive collaboration necessary in design with multiple organizations. Organizational complexity was especially challenging in facilitating citizen participation. However, the researched municipality would be unable to establish a new system unless the initiative was scaled up. They are able to specify requirements and collaborate in creating the acquired system by scaling up through collaboration.

Second, this thesis foregrounds public officials' understanding of participation as a crucial element driving the planning and design of digital public services. The papers discuss different facets of this aspect. In the previous section, I mentioned challenges associated with the vulnerability of citizens in contact with CWS and how this had implications for how participation was practiced (paper 3). This finding connects to paper 4, where we found that certain sectors, like health, were described as having made more progress in addressing the need to facilitate participation. Further, we theorized that the similarity between the citizens is not only in relation to the designer but also to the inherent power dynamics that are at play. Therefore, it is easier for the designer or public official engaging in design to forgo the inclusion of external representatives and decide to represent the citizens themselves. This decision to represent the needs and wishes of citizens themselves can perpetuate existing power imbalances and limit the diversity of perspectives and experiences that are brought into the design process. Additionally, it raises questions about the legitimacy and accountability of decision-making in the design of public digital services.

Lastly, the lack of internal resources and competencies in the public sector emerged as a recurrent challenge (Papers 1 and 4). Public officials I interviewed stated that they wanted to do more to facilitate the participation of citizens but did not know how or did not receive support to do so. Based on these findings, I argue for improved integration of knowledge and support for facilitating end-user participation, especially for vulnerable citizen groups. Public officials lack the necessary skills and knowledge to engage with citizens and facilitate their participation in decision-making processes.

7. 4 Implications for practice

Based on the findings presented in this thesis, there are some implications for practice and for research. For public officials designing services and digital solutions, there is a need for better integration of frameworks and knowledge about how to facilitate participation that is specific to the municipal setting and address issues related to the specific user that go beyond the sporadic inclusion of user representatives already known to the practitioner. Public officials who have a contextual understanding of practices and knowledge about the organizational structure of the public sector require relatable examples of how to facilitate participation that does not take advantage of the citizens. Such examples should include an awareness of the potential power dynamics and measures to ensure that citizens are able to participate in the design and development of services in a way that does not exploit or leave them more vulnerable while making their contributions matter. Improved facilitation of end-user participation could be achieved and built upon through feedback loops throughout the design process. These feedback loops allow for continuous improvement and accountability in the design of public services.

For researchers, there is a need for more investigation of participatory practices in an exploratory way within the context that we wish to contribute to, especially in complex and large-scale projects. As there are many examples of best practices based on action research where the researcher takes a central role in the design, there is a marked difference when actors in the public sector oversee the design. This points to a need for researchers to be better at engaging with policymakers and other public officials to ensure that the research being done is related to the actual needs, challenges, and priorities of the public sector. This seems to be particularly critical for the inclusion of vulnerable citizens as this presents specific challenges, but at the same time, there are still obstacles for the participation of frontline workers and ‘regular’ citizens.

8. Conclusions

This thesis builds on an existing body of work that highlights the importance of engaging end users in decision-making processes when designing public services. Through an embedded case study, I identified challenges that arose from the public design context as well as some of the major trends that affect design practice in this domain, specifically scaling, power dynamics, collaboration, and procurement. I believe that the identification of these real-world challenges and trends that the public sector is dealing with can help inform future improvements in public service design.

The main limitation of this research is the limited access I had to the perspectives of citizen representatives and how they experienced practices around participation. An explanation for this is given in the method chapter. Therefore, I had to rely on the perspectives of public officials. By interviewing and engaging with citizen representatives, I would be able to highlight their experiences and reflections on how participation could best be facilitated. Additionally, there is, as always, a limitation in terms of time and capacity. As there are many components included in the DigiBarnevern project, and it spans so many years (from 2016 and is ongoing), a limitation remains related to the capacity for data collection. Ideally, I would have been involved from the project's beginning to observe early workshops and dialogues with citizen representatives and potential suppliers.

Future work will elaborate on some of the findings presented here. As I was not able to research the implementation of the case management system and the development of Citizen Services, future publications will address these aspects as I still maintain an amicable relationship with Trondheim Municipality. Findings from researching digitalization efforts in CWS can also be seen in comparison to initiatives in the Norwegian Labor and Welfare Administration, as they both serve vulnerable citizens. After defending this thesis, I will be working closely with officials in the Norwegian Labor and Welfare Administration and hope to continue researching the participation of end users in the design of public services within a new organizational context.

References

Aanestad, M., Grisot, M., Hanseth, O., & Vassilakopoulou, P. (2017). Information Infrastructures and the Challenge of the Installed Base. In M. Aanestad, M. Grisot, O. Hanseth, & P. Vassilakopoulou (Eds.), *Information Infrastructures within European Health Care* (pp. 25–33). Springer International Publishing. https://doi.org/10.1007/978-3-319-51020-0_3

Aasback, A. W. (2022). Platform social work—A case study of a digital activity plan in the Norwegian Welfare and Labor Administration. Nordic Social Work Research, 12(3), 350–363. https://doi.org/10.1080/2156857X.2022.2045212

Adnan, M., Ghazali, M. & Othman, N.Z.S. (2022). E-participation within the context of e-government initiatives: A comprehensive systematic review, *Telematics and Informatics Reports,* Vol. 8, 2022, 100015, ISSN 2772 5030

Agamben, G., (1998). *Homo Sacer: Sovereign Power and Bare Life*. Translated by D. Heller-Roazen. Stanford, California: Stanford University Press.

Ahlgren, P. C., Lind, J.; & Nyland, K. (2019) Styring av samarbeid i offentlig sektor. Fagbokforlaget, Oslo.

Akoglu, C., & Dankl, K. (2021). Co-creation for empathy and mutual learning: A framework for design in health and social care. *CoDesign,* 17(3), 296–312. https://doi.org/10.1080/15710882.2019.1633358

Andersen, L. B., Danholt, P., Halskov, K., Hansen, N. B., & Lauritsen, P. (2015). Participation as a matter of concern in participatory design. *CoDesign*, 11(3–4), 250–261. https://doi.org/10.1080/15710882.2015.1081246

Anthopoulos, L. G., Siozos, P., & Tsoukalas, I. A. (2007). Applying participatory design and collaboration in digital public services for discovering and re-designing e-Government services. *Government Information Quarterly,* 24(2), 353–376. https://doi.org/10.1016/j.giq.2006.07.018

Arendt, H. (1958). The Human Condition. University of Chicago Press. ISBN 978-0-226-92457-1.

Arendt, H. (1967). Truth and Politics. In *The New Yorker,* February 25 issue, 1967. Retrieved from https://www.newyorker.com/magazine/1967/02/25/truth-and-politics

Arendt, H. (1970) *On Violence*. Harcourt Publishers, New York.

Aristotle. (2007). *Politikk* (T. Eide, Trans.) Vidarforlaget, Oslo. (Original work published in the 4th century BCE)

Sherry R. Arnstein (1969). A Ladder Of Citizen Participation, Journal of the American Institute of Planners, 35:4, 216–224, DOI: 10.1080/01944366908977225

Bannon, L. J. & Ehn, P. (2012) Design: design matters in Participatory Design. In Simonsen & Robertson (eds.) *Routledge International Handbook of Participatory Design*, pp. 37-63.

Bass, J. M., Beecham, S., & Noll, J. (2018). Experience of industry case studies: A comparison of multi-case and embedded case study methods. In *Proceedings of the 6th International Workshop on Conducting Empirical Studies in Industry* (pp. 13–20).

Bassetti, C., Sciannamblo, M., Lyle, P., Teli, M., De Paoli, S., & De Angeli, A. (2019). Co-designing for common values: Creating hybrid spaces to nurture autonomous cooperation. *CoDesign,* 15(3), 256–271. https://doi.org/10.1080/15710882.2019.1637897

Beck, E. E. (2001). Research report. On participatory design in Scandinavian computing research. Oslo: University of Oslo, Department of Informatics. ISSN 0806-3036

Berger, B. K. (2005). Power Over, Power With, and Power to Relations: Critical Reflections on Public Relations, the Dominant Coalition, and Activism. *Journal of Public Relations Research*, 17(1), 5–28. https://doi.org/10.1207/s1532754xjprr1701_3

Berger, P., & Luckmann, T. (1966). *The social construction of reality*. Harmondsworth: Penguin Book.

Bjerknes, G., & Bratteteig, T. (1995). User Participation and Democracy: A Discussion of Scandinavian Research on System Development. *In Scandinavian Journal of Information Systems:* vol. 7(1), pp. 73-98

Bjögvinsson, E., Ehn, P., & Hillgren, P.-A. (2012). Design Things and Design Thinking: Contemporary Participatory Design Challenges. *Design Issues,* 28(3), 101–116. https://doi.org/10.1162/DESI_a_00165

Borchorst, N. G., & Bødker, S. (2011). "You probably shouldn't give them too much information" – Supporting Citizen-Government Collaboration. In S. Bødker, N. O. Bouvin, V. Wulf, L. Ciolfi, & W. Lutters (Eds.), ECSCW 2011: Proceedings of the 12th European Conference on Computer Supported

Cooperative Work, 24-28 September 2011, Aarhus Denmark (pp. 173–192). Springer London. https://doi.org/10.1007/978-0-85729-913-0_10

Borum, F. & Enderud, H. (1981). *Konflikter i organisationer - belyst ved EDB systemarbejde.* (Conflicts in Organizations - Illustrated by Cases of Computer Systems Design). Nyt Nordisk Forlag Arnold Busck, Copenhagen.

Boyd, J., Lee, C. C., Ennis, H., O'Leary, J., & Agarwal, S. (2023). *Tailored public services*. Deloitte Report. Retrieved from https://www.deloitte.com/global/en/our-thinking/insights/industry/government-public-services/government-trends/2023/tailored-government-services.html

Blomberg, J. & Karasti, H. (2012). Ethnography: positioning ethnography within Participatory Design. Simonsen, J. & Robertson, T. (eds.) *Routledge International Handbook of Participatory Design*, pp. 37-63.

Braa, J. & Sahay, S. (2012). Health Information Systems Programme, Participatory Design within the HISP network. In Simonsen, J. & Robertson, T. (eds.) *Routledge International Handbook of Participatory Design*, pp. 37-63.

Brandsen, T., Steen, T., & Verschuere, B. (eds.). (2018). *Co-Production and Co-Creation – Engaging Citizens in Public Services*. Routledge Critical Studies in Public Management, Taylor and Francis, London/New York.

Bratteteig, T., & Wagner, I. (2012). Disentangling power and decision-making in participatory design. *Proceedings of the 12th Participatory Design Conference: Research Papers* - Volume 1, 41–50. https://doi.org/10.1145/2347635.2347642

Bratteteig, T., & Wagner, I. (2014). *Disentangling Participation*. Springer International Publishing. https://doi.org/10.1007/978-3-319-06163-4

Bratteteig, T., & Wagner, I. (2016). Unpacking the Notion of Participation in Participatory Design. *Computer Supported Cooperative Work* (CSCW), 25(6), 425–475. https://doi.org/10.1007/s10606-016-9259-4

Brereton, M., & Buur, J. (2008). New challenges for design participation in the era of ubiquitous computing. *CoDesign*, 4(2), 101–113. https://doi.org/10.1080/15710880802098099

Broadbent, J. & Laughlin, R. (2002). Public service professionals and the New Public Management – control of the professions in the public services. In McLaughlin, K., Osborne, S. P., & Ferlie, E. (n.d.). New Public Management: Current trends and future prospects. Routledge, London, pp. 95-108

Broomfield, H., & Reutter, L. (2022). In search of the citizen in the datafication of public administration. In Big Data & Society, 9(1), 205395172210893. https://doi.org/10.1177/20539517221089302

Brown, A., Chouldechova, A., Putnam-Hornstein, E., Tobin, A., & Vaithianathan, R. (2019). Toward Algorithmic Accountability in Public Services: A Qualitative Study of Affected Community Perspectives on Algorithmic Decision-making in Child Welfare Services. *Proceedings of the 2019 CHI Conference on Human Factors in Computing Systems,* pp. 1–12. https://doi.org/10.1145/3290605.3300271

Bødker, S., & Greenbaum, J. (1992). Design of Information Systems: Things versus People. *DAIMI Report Series*, Volume 387, Article 387. https://doi.org/10.7146/dpb.v21i387.6620

Bødker, S., & Grønbæk, K. (2020). Design in Action: From Prototyping by Demonstration to Cooperative Prototyping. In J. Greenbaum & M. Kyng (Eds.), Design at Work (1st ed., pp. 197–218). CRC Press. https://doi.org/10.1201/9781003063988-12

Bødker, S., Dindler, C., & Iversen, O. S. (2017). Tying Knots: Participatory Infrastructuring at Work. Computer Supported Cooperative Work (CSCW), 26(1–2), 245–273. https://doi.org/10.1007/s10606-017-9268-y

Bødker, S., Dindler, C., Iversen, O. S., & Smith, R. C. (2022). Participatory Design. Springer International Publishing. https://doi.org/10.1007/978-3-031-02235-7

Børmer, Ø. (2014). Gevinstrealisering - planlegging for å hente ut gevinster av offentlige prosjekter. Report for the Norwegian Agency for Public and Financial Management. Retrieved from https://dfo.no/sites/default/files/fagomr%C3%A5der/Gevinstrealisering/Veileder-i-gevinstrealisering.pdf

Callinicos, A., Kouvelakis, S., and Pradella, L. (2021). *Routledge Handbook of Marxism and Post-Marxism.* Taylor & Francis, Routledge, New York.

Casady, C. B., Eriksson, K., Levitt, R. E., & Scott, W. R. (2019). (Re)defining public-private partnerships (PPPs) in the new public governance (NPG) paradigm: an institutional maturity perspective. Public Management Review, pp. 1–23. https://doi.org/10.1080/14719037.2019.1577909

Clement, A., & Van den Besselaar, P. (1993). A retrospective look at PD projects. Communications of the ACM, 36(6), 29–37. https://doi.org/10.1145/153571.163264

Clement, A., McPhail, B., Smith, K. L., & Ferenbok, J. (2012). Probing, mocking and prototyping: Participatory approaches to identity infrastructuring.

Clement, Andrew; Brenda McPhail; Karen L. Smith; and Joseph Ferenbok (2012). Probing, Mocking and Prototyping: Participatory approaches to identity infrastructuring. In Proceedings of the 12th Participatory Design Conference: Research Papers - Volume 1 (PDC '14), Vol. 1, New York: ACM Press, pp. 21–30.

Cornwall, A. (2008). Unpacking "Participation": Models, meanings and practices. Community Development Journal, 43(3), 269–283. https://doi.org/10.1093/cdj/bsn010

Dahl, R.A. (1957). The concept of power. Behavioral Science, 2(3), 201–215. https://doi.org/10.1002/bs.3830020303

Dahl-Jørgensen, T. C. (2017). *Medvirkning og motvirkning av byutviklingsplaner på Facebook*. [Master thesis, University of Oslo]. Retrieved from http://urn.nb.no/URN:NBN:no-63454

Dahl-Jørgensen, T. C., & Parmiggiani, E. (2023). Caseworkers' participation in procurement: Infrastructuring Child Welfare Services in Norway. Computer Supported Cooperative Work (CSCW), 32(4), 781–823. https://doi.org/10.1007/s10606-023-09469-4

Dalsgaard, P. (2010). Challenges of participation in large-scale public projects. Proceedings of the 11th Biennial Participatory Design Conference, 21–30. https://doi.org/10.1145/1900441.1900445

Dalsgaard, P. (2012). Participatory Design in Large-Scale Public Projects: Challenges and Opportunities. Design Issues, 28(3), 34–47. https://doi.org/10.1162/DESI_a_00160

Dalsgaard, P., & Eriksson, E. (2013). Large-Scale Participation: A Case Study of a Participatory Approach to Developing a New Public Library. Conference on Human Factors in Computing Systems - Proceedings. https://doi.org/10.1145/2470654.2470713

DESI report. Norway #2 on digitalization in Europe. Accessed February 22, 2022, from https://www.norway.no/en/missions/eu/about-the-mission/news-events-statements/news2/desi-report-norway-2-on-digitalization-in-europe/

Dittrich, Y., Eriksen, S., & Hansson, C. (2002). PD in the Wild; Evolving Practices of Design in Use. Proceedings of the Participatory Design Conference, Malmö, Sweden, 23-25 June 2002, Palo Alto.

DiSalvo, C., Clement, A., & Pipek, V. (2012). Communities: Participatory Design for, with and by communities. In Simonsen, J. and T. Robertson (Eds.) Routledge International Handbook of Participatory Design. Routledge: New York, 182--209.

Dixon, B., McHattie, L. S. & Broadley, C. (2022). The imagination and public participation: a Deweyan perspective on the potential of design innovation and participatory design in policy-making. CoDesign, 18:1, pp. 151–163, DOI: 10.1080/15710882.2021.1979588

Ehn, P. (1988). Work-Oriented Design of Computer Artifacts. Hillsdale, NJ. Lawrence Erlbaum Associates.

Ehn, P. (2008). Participation in design things. In Participatory Design Conference (PDC), Bloomington, Indiana, USA (2008) (pp. 92–101). ACM Digital Library.

Ehn, P., Brattgård, B., Dalholm, E., Davies, R. C., Hägerfors, A., Mitchell, B., & Nilsson, J. (1996, November). The Envisionment Workshop-from visions to practice. In Proceedings of the Participatory Design Conference (pp. 141-152). MIT Boston.

Engeström, Y. (2008). From teams to knots: Activity-theoretical studies of collaboration and learning at work. Cambridge University Press.

Falch-Eriksen, A., & Skivenes, M. (2019). Right to Protection. In Children's Rights in Norway (pp. 107–135). Universitetsforlaget. https://doi.org/10.18261/9788215031415-2019-04

Falleth, E. & Hanssen, G. S. (2012) Medvirkning i planlegging. N. Aarsæther, E. Falleth, T. Nyseth & R. Kristiansen (Red.): *Utfordringer for norsk planlegging – kunnskap, bærekraft, demokrati* (pp. 187-203). Kristiansand: Cappelen Damm

Fledderus, J., Brandsen, T., & Honingh, M. E. (2015). User co-production of public service delivery: An uncertainty approach. Public Policy and Administration, 30(2), 145–164. https://doi.org/10.1177/0952076715572362

Flyvbjerg, B. (2006). Five misunderstandings about case-study research. Qualitative inquiry, 12(2), pp. 219-245.

Foucault, M. (1980). Language, counter-memory, practice: Selected essays and interviews. Cornell University Press.

Frauenberger, C., Good, J., Fitzpatrick, G., & Iversen, O. S. (2015). In pursuit of rigour and accountability in participatory design. International journal of human-computer studies, 74, 93-106.

Gallagher, M. (2008). Foucault, Power and Participation. The International Journal of Children's Rights, 16(3), 395–406. https://doi.org/10.1163/157181808X311222

Gartner, J., & Wagner, I. (1996). Mapping Actors and Agendas: Political Frameworks of Systems Design and Participation. Human–Computer Interaction, 11(3), 187–214. https://doi.org/10.1207/s15327051hci1103_1

Gillingham, P., Harnett, P., Healy, K., Lynch, D., & Tower, M. (2017). Decision Making in Child and Family Welfare: The Role of Tools and Practice Frameworks. Children Australia, 42(1), 49–56. doi:10.1017/cha.2016.51

Gillingham, P., & Graham, T. (2017). Big Data in Social Welfare: The Development of a Critical Perspective on Social Work's Latest "Electronic Turn." Australian Social Work, 70(2), 135–147. https://doi.org/10.1080/0312407X.2015.1134606

Greenbaum, J. & Kyng, M. Epilogue: Design by Doing. Greenbaum, J., & Kyng, M. (Eds.). (1991). Design at work: Cooperative design of computer systems. CRC Press, pp. 269-279

Grisot, M., & Vassilakopoulou, P. (2017). Re-Infrastructuring for eHealth: Dealing with Turns in Infrastructure Development. *Computer Supported Cooperative Work* (CSCW) (2017) 26:7–31. DOI 10.1007/s10606-017-9264-2

Habermas, J. (1977). Hannah Arendt's communications concept of power (T. McCarthy, Trans.) *Social Research*, 3–24.

Halskov, K., & Hansen, N. B. (2015). The diversity of participatory design research practice at PDC 2002–2012. *International Journal of Human-Computer Studies*, 74, 81–92. https://doi.org/10.1016/j.ijhcs.2014.09.003

Hanseth, O., & Monteiro, E. (1998). *Understanding information infrastructure. Unpublished Manuscript,* Retrieved from http://heim. ifi. uio. no/~ oleha/Publications/bok. pdf.

Hatling, M., & Sørensen, K. H. (1998). The construction of user participation. In *The specter of participation*, Knut H. Sørensen (ed.), Scandinavian Univ. Press.

Hashim, W. N. W., Noor, N. L. M., & Adnan, W. A. W. (2009). The design of aesthetic interaction: towards a graceful interaction framework. In *Proceedings of the 2nd International Conference on Interaction Sciences: Information Technology, culture and Human* (pp. 69–75).

Haug, N., Dan, S. & Mergel, I. (2023). Digitally-induced change in the public sector: a systematic review and research agenda, Public Management Review, DOI: 10.1080/14719037.2023.2234917

Hendersen, A. and Kyng, M. (1991). There's No Place Like Home: Continuing Design in Use. Greenbaum, J., & Kyng, M. (Eds.). *Design at work: Cooperative design of computer systems*. CRC Press, pp. 219-240.

Holten Møller, N. L., Fitzpatrick, G., & Le Dantec, C. A. (2019). Assembling the Case: Citizens' Strategies for Exercising Authority and Personal Autonomy in Social Welfare. *Proceedings of the ACM on Human-Computer Interaction*, 3(GROUP), 1–21. https://doi.org/10.1145/3361125

Issa, T., & Isaias, P. (2022). User Participation in the System Development Process. In: *Sustainable Design*. Springer, London. https://doi.org/10.1007/978-1-4471-7513-1_3

Iversen, O. S. & Dindler, C. (2014). Sustaining participatory design initiatives, CoDesign, 10:3-4, 153–170, DOI: 10.1080/15710882.2014.963124

Jessop, B. (2012). Marxist approaches to power. *The Wiley-Blackwell companion to political sociology*, pp. 1–14.

Karasti, H. (2014). Infrastructuring in participatory design. *Proceedings of the 13th Participatory Design Conference on Research Papers* - PDC '14, pp. 141–150. https://doi.org/10.1145/2661435.2661450

Karlsson, F., Holgersson, J., Söderström, E., & Hedström, K. (2012). Exploring user participation approaches in public e-service development. *Government Information Quarterly*, *29*(2), 158-168.

Kensing, F., & Blomberg, J. (1998). Participatory Design: Issues and Concerns. *Computer Supported Cooperative Work* (CSCW), 7(3–4), 167–185. https://doi.org/10.1023/A:1008689307411

Kensing, F., & Greenbaum, J. (2012). Heritage: Having a say. In Routledge International Handbook of Participatory Design (pp. 21-36). Routledge.

Klein, H. K., & Myers, M. D. (1999). A set of principles for conducting and evaluating interpretive field studies in information systems. *MIS Quarterly*, pp. 67–93.

Korsgaard, H., & Ludvigsen, J. (2019). *Rapport - den digitale borger. En kvalitativ studie av den digitale hverdagen - for Kommunal- og moderniseringsdepartementet.* Retrieved from https://www.regjeringen.no/contentassets/9265ea2cbfde47e09d43c1b863e2c5bf/den_digitale_borger.pdf

Langford, Malcolm; and Tori Loven Kirkebø (2019 Children's Rights' Indexes: Measuring Norway's Performance. *in Children Rights in Norway: An Implementation paradox?* Langford, Malcolm; Marit

Skivenes; and Karl Harald Søvig (eds.) Universitetsforlaget. 2019 DOI: 10.18261/9788215031415-2019-03
Langseth, M., & Similä, J. O. (2021). *Å kjøpe for Norge* (p. 273). Cappelen Damm Akademisk/NOASP (Nordic Open Access Scholarly Publishing)
Latour, B. (1987). Science in action: How to follow scientists and engineers through society. Harvard University Press.
Lindgren, I., & Jansson, G. (2013). Electronic services in the public sector: A conceptual framework. *Government Information Quarterly*, 30(2), 163–172. https://doi.org/10.1016/j.giq.2012.10.005
Lindgren, I., Madsen, C. Ø., Hofmann, S., and Melin, U. 2019. Close encounters of the digital kind: A research agenda for the digitalization of public services, Government Information Quarterly, Volume 36, Issue 3, pp. 427-436.
Marmaras, N., Poulakakis, G., & Papakostopoulos, V. (1999). Ergonomic design in ancient Greece. *Applied Ergonomics,* 30(4), 361–368. https://doi.org/10.1016/S0003-6870(98)00050-7
Marx, K. (1978). Originally published in 1852 in *Die Revolution*, New York, 1852. Retrieved from https://www.marxists.org/archive/marx/works/1852/18th-brumaire/ch01.htm
Menge, T. (2022). Violence and the materiality of power. Critical Review of International Social and Political Philosophy, 25(6), 761–786. https://doi.org/10.1080/13698230.2019.1700344
Midtgård, T. M., Sand, K., Thun, S., Hilland, G. H., & Ose, S. O. (2022). Digital ekskludering i NAV—Hvem, når, hvorfor?. *SINTEF Rapport*.
Mikalsen, M., and Farshchian, B. (2020). Can the Public Sector and Vendors Digitally Transform? A Case from Innovative Public Procurement. European Conference on Information Systems (ECIS), proceedings, research-in-progress papers June 2020 Marrakech https://aisel.aisnet.org/ecis2020_rip/62
Mikalsen, M., Farshchian, B. A., & Dahl, Y. (2018). Infrastructuring as ambiguous repair: A case study of a surveillance infrastructure project. *Computer Supported Cooperative Work (CSCW)*, *27*(2), 177-207.
Ministry of Local Government and Regional Development. (2019). *Én digital offentlig sektor: Digitaliseringsstrategi for offentlig sektor 2019-2025.* Retrieved from https://www.regjeringen.no/no/tema/statlig-forvaltning/it-politikk/digitaliseringsstrategi-for-offentlig-sektor/id2612415/
Ministry of Local Government and Regional Development. (2020). *The Norwegian Digitalisation Agency.* Retrieved from https://www.regjeringen.no/en/dep/kdd/organisation/etater-og-virksomheter-under-kommunal--og-distriktsdepartementet/Subordinate-agencies-and-institutions/digitaliseringsdirektoratet/id2684200/
Ministry of Local Government and Modernization. (2016). Meld. St. 27 (2015-2016). *Digital agenda for Norge – IKT for en enklere hverdag og økt produktivitet.* Retrieved from https://www.regjeringen.no/no/dokumenter/meld.-st.-27-20152016/id2483795/?ch=1
Moe, C. E. (2014). Research on Public Procurement of Information Systems: The need for a process approach. *In Communications of the Association for Information Systems,* 34(1), 1319–1335. https://doi.org/10.17705/1cais.03478
Monteiro, E., Pollock, N., Hanseth, O., & Williams, R. (2013). From artefacts to infrastructures. *Computer supported cooperative work (CSCW)*, pp. *22*, 575–607.
Mulvale, G., Moll, S., Miatello, A., Robert, G., Larkin, M., Palmer, V. J., ... & Girling, M. (2019). Codesigning health and other public services with vulnerable and disadvantaged populations: Insights from an international collaboration. *Health Expectations*, *22*(3), 284–297.
Nesse, P.J., Erdal, O.B. (2022). Smart Digitalization in Nordic Cities and Municipalities Through Internet of Things. In: Lau, E., Makin, A.J., Tan, L.M. (eds) Economics and Finance Readings. Springer, Singapore. https://doi.org/10.1007/978-981-19-1720-2_2
Neumann, L. J., & Star, S. L. (1996). Making infrastructure: The dream of a common language. In Participatory design conference, *PDC*, Vol. 4, pp. 231-240.
The Norwegian Agency for Public and Financial Management. (2023) Anskaffelsesordbok. Fagsider om offentlige anskaffelser. Retrieved from https://anskaffelser.no/sporsmal/anskaffelsesordbok#anskaffelse
Norwegian Association of Local and Regional Authorities. (2023). *DigiBarnevern*. Retrieved from https://www.ks.no/fagomrader/digitalisering/felleslosninger/digibarnevern/
Norwegian Law on Public Procurement, (1999). LOV-1999-07-16-69. Retrieved from https://lovdata.no/dokument/NLO/lov/1999-07-16-69
Norwegian Office for Child, Youth, and Family Affairs. (2022). *Hva er barnevernsreformen?* Retrieved from https://www.bufdir.no/fagstotte/barnevern-oppvekst/barnevernsreformen/hva-er-barnevernsreformen/

Nygaard, K., & Bergo, O.T. (1975). The Trade Unions - New users of research. *Personnel Review,* 4, 5-10.
Oates, B. J. (2006). Researching information systems and computing. London, UK: Sage Publications.
OECD (2017) Digital Government Review of Norway—Boosting the Digital Transformation of the Public Sector. Retrieved from https://www.oecd.org/gov/digital-government/digital-government-review-norway-recommendations.pdf.
Oostveen, A.-M., & van den Besselaar, P. (2004). From Small Scale to Large Scale User Participation: A Case Study of Participatory Design in E-Government Systems. SSRN Electronic Journal. https://doi.org/10.2139/ssrn.1432508
O'Leary, J., Welle, A., & Agarwal, S. (2021). Improving trust in state and local government - insights from data. Deloitte Articles. Retrieved from https://www2.deloitte.com/uk/en/insights/industry/public-sector/trust-in-state-local-government.html
Osborne, S. P. (2018). From public service-dominant logic to public service logic: are public service organizations capable of co-production and value co-creation?. *Public Management Review*, *20*(2), 225–231.
Osborne, S.P. & McLaughlin, K. (2002). The New Public Management in context. K. McLaughlin, S. Osborne and E. Ferlie (eds.) *New Public Management - current trends and future prospects.* Routledge, Taylor & Francis Group, London and New York
Osborne, S. P., Radnor, Z., & Strokosch, K. (2016). Co-production and the co-creation of value in public services: a suitable case for treatment? *Public Management Review*, *18*(5), 639-653.
Pansardi, P., & Bindi, M. (2021). The new concepts of power? Power-over, power-to and power-with. *Journal of Political Power*, *14*(1), 51-71.
Parmiggiani, Elena; and Helena Karasti (2018) Surfacing the Arctic: Politics of Participation in Infrastructuring. In PDC´18: Proceedings of the 15th Participatory Design Conference Volume 2, August 20-24, 2018, Hasselt and Genk, Belgium. https://doi.org/10.1145/3210604.3210625
Parmiggiani, E., Mikalef, P. (2022). The Case of Norway and Digital Transformation over the Years. In: Mikalef, P., Parmiggiani, E. (eds) Digital Transformation in Norwegian Enterprises. Springer, Cham. https://doi.org/10.1007/978-3-031-05276-7_2
Picot, A. (2014). Transforming child welfare: from explicit to implicit control of families, European Journal of Social Work, 17:5, 689–701, DOI: 10.1080/13691457.2014.932273
Pihkala, S., & Karasti, H. (2013, July). Reflexive Engagement–Reflexive Orientation for Participatory Design. In *Proceedings of the IADIS International Conference ICT, Society and Human Beings* (pp. 85-92).
Pinch, T. J., & Bijker, W. E. (1984). The social construction of facts and artefacts: Or how the sociology of science and the sociology of technology might benefit each other. *Social studies of science*, *14*(3), 399-441.
Pinto, D. J. A., & Pereira, C. M. (2017). The Concept of Power in Hannah Arendt and Michel Foucault: A Comparative Analysis. *Brazilian Journal of International Relations*, 6(2), 344–359. https://doi.org/10.36311/2237-7743.2017.v6n2.07.p344
Pitkin, H. F. (1973). Wittgenstein and justice: On the significance of Ludwig Wittgenstein for social and political thought. Univ of California Press.
Plantin, J. C., Lagoze, C., Edwards, P. N., & Sandvig, C. (2018). Infrastructure studies meet platform studies in the age of Google and Facebook. *New media & society*, *20*(1), 293-310.
Poderi, G. (2019). Sustaining platforms as commons: perspectives on participation, infrastructure, and governance. *CoDesign*, *15*(3), 243–255.
Ribes, D. (2014). Ethnography of scaling, or how to fit a national research infrastructure in the room. *Proceedings of the 17th ACM Conference on Computer Supported Cooperative Work & Social Computing,* pp. 158–170. https://doi.org/10.1145/2531602.2531624
Redström, J. (2008). RE: Definitions of use. *Design studies*, *29*(4), 410–423.
Robertson, T. and Simonsen, J. (2012). Participatory Design: an introduction. J. Simonsen & T. Robertson (Eds.). (2012). *Routledge international handbook of participatory design*. Routledge.
Robertson, T. and Wagner, I. (2012). Engagement, representation and politics-in-action. J. Simonsen & T. Robertson (Eds.). (2012). *Routledge international handbook of participatory design*. Routledge.
Roland, L. K., Sanner, T. A., Sæbø, J. I., & Monteiro, E. (2017). P for Platform. Architectures of large-scale participatory design. *Scandinavian Journal of Information Systems*, *29*(2), 1.
Royce, W. (1970). 'Managing the development of large software systems,' *Proceedings of IEEE WESCON* 26 (August): 1–9.

Rybalka, M., Røgeberg,O., & Dyngen Ø.Å. (2019) Digitalisering i kommunene - overblikk over tilstanden 2018. Report for Statistics Norway 2019/14 Retrieved from https://www.ssb.no/teknologi-og-innovasjon/artikler-og-publikasjoner/_attachment/388777?_ts=16b457fdd00

Thai, K.V. (2008). International public procurement: Concepts and practices. In K. V. Thai (Red.), *International handbook of public procurement,* Routledge, pp. 1–24.

Tilson, D., Lyytinen, K., & Sørensen, C. (2010). Research commentary—Digital infrastructures: The missing IS research agenda. Information Systems Research, 21(4), 748–759. https://doi.org/10.1287/isre.1100.0318.

Tiwana, A. (2013). Platform ecosystems: Aligning architecture, governance, and strategy. Newnes.

Tjora, A. (2018). Qualitative research as stepwise-deductive induction. Routledge.

Tractinsky, N., & Hassenzahl, M. (2005). Arguing for aesthetics in human-computer interaction. *I-com*, *4*(3), 66-68.

Trigg, R. H., & Bødker, S. (1994). From implementation to design: Tailoring and the emergence of systematization in CSCW. In *Proceedings of the 1994 ACM conference on Computer supported cooperative work* (pp. 45-54).

Trondheim Municipality. (2022). *Trondheimsløftet. Kommuneplanens samfunnsdel 2020-2032.* Retrieved from https://sites.google.com/trondheim.kommune.no/kommuneplanen/samfunnsdelen?authuser=0

Tuikka, AM. (2020). Evaluating Digitalization of Social Services from the Viewpoint of the Citizen. In: Pappas, I., Mikalef, P., Dwivedi, Y., Jaccheri, L., Krogstie, J., Mäntymäki, M. (eds) *Digital Transformation for a Sustainable Society in the 21st Century. I3E 2019. IFIP Advances in Information and Communication Technology*, vol 573. Springer, Cham. https://doi.org/10.1007/978-3-030-39634-3_3

Saad-Sulonen, J., Eriksson, E., Halskov, K., Karasti, H., & Vines, J. (2018). Unfolding participation over time: temporal lenses in participatory design. *CoDesign*, *14*(1), 4-16.

Sangiorgi, D. (2011). Transformative services and transformation design. *International Journal of Design*, *5*(2), 29-40.

Sangiorgi, D., & Prendiville, A. (Eds.). (2017). *Designing for Service: Key issues and new directions*. Bloomsbury Publishing.

Scholz, R. W., & Tietje, O. (2002). Embedded case study methods: Integrating quantitative and qualitative knowledge. Sage.

Schön; Donald A. (1983). *The Reflective Practitioner.* New York: Harper Collins.

Shapiro, D. (2005, August). Participatory design: the will to succeed. In Proceedings of the 4th decennial conference on Critical computing: between sense and sensibility, pp. 29–38.

Simonsen, J., & Robertson, T. (Eds.). (2012). *Routledge international handbook of participatory design*. Routledge.

Sjövaall, I. (2021). Designfulness: How brain research is revolutionizing the way we live and work. Bokförlaget Langenskiöld, Stockholm.

Spinuzzi, C. (2003). Tracing genres through organizations: A sociocultural approach to information design (Vol. 1). MIT Press.

Spinuzzi, C. (2005). The methodology of participatory design. *Technical communication*, *52*(2), 163–174.

Spinuzzi, C. (2008). Network: Theorizing knowledge work in telecommunications. Cambridge University Press.

Smith, R.C., Bossen, C. & Kanstrup, A.M. (2017). Participatory design in an era of participation, CoDesign, 13:2, 65–69, DOI: 10.1080/15710882.2017.1310466

Stang, E. (2018). Resistance and protest against Norwegian Child Welfare Services on Facebook - different perceptions of child-centring, In *Nordic Social Work Research*, 8:3, 273–286, DOI: 10.1080/2156857X.2018.1427139

Star, S. L., & Bowker, G. C. (2002). How to Infrastructure. In L. A. Lievrouw & S. Livingstone (Eds.), Handbook of new media. Social shaping and consequences of ICTs, pp. 151–162,. SAGE.

Star, S. L., & Ruhleder, K. (1996). Steps Toward an Ecology of Infrastructure: Design and Access for Large Information Spaces. In Information Systems Research Vol. 7, No. 1, March 1996.

Starostka, J., de Götzen, A., & Morelli, N. (2022). Design thinking in the public sector – a case study of three Danish municipalities, Policy Design and Practice, 5:4, 504–515, DOI: 10.1080/25741292.2022.2144817

Støkken, A. M. (2019). Fra oppdrag til samarbeidsforskning. Tjenesteutvikling ved ulike former for samarbeid. ISBN: 9788245033434. Fagbokforlaget, Norway, pp. 23 - 41.

Suchman, L. A. (1987). Plans and situated actions: The problem of human-machine communication. Cambridge University Press.

Svanæs, D. & Gulliksen, J. (2008). Understanding the Context of Design – Towards Tactical User Centered Design. In Proceedings: NordiCHI 2008: Using Bridges, October 20-22, 2008

Verner, M., Sampson, J., Tosic, V., Bakar, N. A. A., & Kitchenham, B. A. (2009). Guidelines for industrially-based multiple case studies in software engineering. In 2009, Third International Conference on Research Challenges in Information Science, pp. 313–324. https://doi.org/10.1109/RCIS.2009.5089295

Walsham, G. (2006). Doing interpretive research. *European journal of information systems*, *15*(3), 320–330.

Wetter-Edman, K. (2014). *Design for Service: A framework for articulating designers' contribution as interpreter of users' experience*. [Doctoral thesis, University of Gothenburg]. GUPEA. http://hdl.handle.net/2077/35362

Williams, R., & Edge, D. (1996). The social shaping of technology. *Research Policy*, *25*(6), 865–899.

Winthereik, B.R. (in press). The Citizen from hell: Experiencing digitalization. Kjaer, K. & Perriam, J. (eds.) *The Digital State in Practice: Intersections, Implications, Interventions*. De Gruyter Contemporary Social Sciences 14. Forthcoming 2024.

Winthereik BR, Langstrup H. When Patients Care (Too Much) for Information. In Mol AM, Moser I, Pols J, editors. *Care in Practice: On Tinkering in Clinics, Homes and Farms.* Bielefield:Transcript Verlag; 2010. pp. 195–213.

White, S. C. (1996). Depoliticising development: The uses and abuses of participation. *In Development in Practice*, 6:1, pp. 6–15, DOI: 10.1080/0961452961000157564

Wärnestål, P., Svedberg, P., & Nygren, J. (2014). Co-constructing child personas for health-promoting services with vulnerable children. In Proceedings of the SIGCHI Conference on Human Factors in Computing Systems, pp. 3767-3776.

Zahlsen, Ø. K., Parmiggiani, E., & Dahl, Y. (2022). Challenges of Scaling Participatory Design: A Systematic Literature Review. In Proceedings of the 34th Australian Conference on Human-Computer Interaction, pp. 143–159.

Part II – Research papers

Paper 1

Platformization of the public sector: Assessing the space of possibility for participation

Authors: Dahl-Jørgensen, Tangni Cunningham and Parmiggiani, Elena

Presented at the Participatory Design Conference August 2020

Platformization of the public sector: Assessing the space of possibility for participation

Tangni C. Dahl-Jørgensen
Department of Computer Science, Norwegian University of Science and Technology, Trondheim, Norway
tangni.c.dahl-jorgensen@ntnu.no

Elena Parmiggiani
Department of Computer Science, Norwegian University of Science and Technology, Trondheim, Norway
parmiggi@ntnu.no

ABSTRACT

Digitalization processes are emerging as a promising avenue to elicit participation in large-scale platforms. In the public sector, platformization efforts call for deeper insight into how they shape the space of possibility for citizen involvement through decision linkages. Based on an ongoing exploratory study of the early-stage development of a digital platform at a Norwegian municipality, we identify three core challenges to participation in platformization processes: the municipality experts' views on participation, the cultivation of the installed base on the governance and technical level, and opportunities for scaling up the platform. We analyze how these core challenges impact the space of possibility for participation.

CCS CONCEPTS

• **Human-centered computing** → Participatory Design.

KEYWORDS

Platformization, scaling up, citizen participation

ACM Reference Format:
Tangni C. Dahl-Jørgensen and Elena Parmiggiani. 2020. Platformization of the public sector: Assessing the space of possibility for participation. In *Proceedings of the 16th Participatory Design Conference 2020- Participation(s) Otherwise - Vol. 2 (PDC '20: Vol. 2), June 15–20, 2020, Manizales, Colombia.* ACM, New York, NY, USA, 5 pages. https://doi.org/10.1145/3384772.3385154

1 INTRODUCTION

The participatory design (PD) tradition has been going through changes alongside digitalization trends [3, 4, 11]. Recently, platforms are emerging as tools to foster service innovation by eliciting the participation of external stakeholders such as users and app developers to innovate on top of a set of shared resources [20]. Given the success of this paradigm, *platformization* is increasingly used to describe the emergence of the platform model over time at the organizational and technical level [16].

Many digital platforms are typically owned by large private IT companies with subsidiaries creating applications or add-ons that adhere to certain specifications set by the platform owners [20]. Interestingly, platformization processes are increasingly prevalent in the public sector as well. As a result, public organizations are becoming not only consumers, but also designers and providers of digital platforms that emerge as common goods offering a variety of services to citizens [23]. In the public sector, the existing technical and governance infrastructure, delineated here as the *installed base* [1], poses both possibilities and challenges for change. In other words, large-scale systems such as digital platforms are embedded and interact with existing infrastructures comprising of governance structures, existing systems and practices, and user categories. The installed base, however, tends to remain invisible in design processes and "taken for granted, and its crucial role is often only realized when disturbances occur, e.g. when a digitalization project is initiated" [[1]:26].

Platformization processes in the public sector have particular characteristics due to the regulations and structures that public organizations must adhere to. However, it is common for parts of the public sector to incorporate platform services created by large private companies such as Google or Facebook [16, 22]. These processes impact citizen inclusion and civic participation in ways that deserve to be further explored because they shape how citizens can engage with democratic processes of decision making [17].

The creation of choices while facilitating the participation of citizens in the design phase of systems is central to the PD agenda [2, 7]. The choices that are opened during design connect in decision linkages expressing the interrelationship between decisions [3]. As such, decisions cannot be seen as separate. Decisions made in the design phase predetermine the space of possibility for subsequent participation in decision making, and thereby which design activities are pertinent. Here we consider participation by exploring the decision linkages that are created through the opening and closing of choices "that users participate in as co-producers of design ideas and as 'evaluators'" [[3]:427]. PD has been explicit about the possibility for engaging citizens as end users [8, 12, 19], but has been criticized for taking a narrow perspective on the scope of participation [10, 14, 15, 18].

Platformization as an emerging form of citizen involvement calls for a broader perspective that embraces the varying social, technical, and temporal scales of participation [10]. Based on the results of an exploratory case study of a digitalization process in a Norwegian municipality, we ask the following question: *What are the implications of early-stage platformization processes on citizen participation in the public sector?*

We describe an early-stage platformization process in a specific branch of the public sector, municipalities, contending with the tension between an array of citizen needs as end users and strict governance and funding structures. Specifically, we consider how platformization and the installed base impact the space of possibility

PDC '20: Vol. 2, June 15–20, 2020, Manizales, Colombia

ACM ISBN 978-1-4503-7606-8/20/06…$15.00
https://doi.org/10.1145/3384772.3385154

for citizen participation in digitalization projects in a municipality in Norway.

2 THEORETICAL FRAMEWORK

In the PD literature there have been several attempts at defining and dissecting participation, resulting in a call for expanding PD in accordance with the corporate interests that permeate the public sphere and in turn creates a concern for participation [5]. One call for action is that PD must examine larger scales [5, 18].

The exceptions pinpointed are efforts of scaling PD in the municipality sector [5, 6]. Unfortunately, findings from these studies generate new questions due to the tension municipalities face and the focus on technical improvement, similar to commercial efforts [5]. Therefore, researching the scaling of participatory design in a Norwegian municipality considered to be leading in digitalization initiatives aids in answering some of these questions.

The problem of scale is still an open challenge to the sustainability of PD interventions [11, 13, 18]. In principle, scale in PD has been discussed in terms of the distribution of heterogeneous settings, developers, users, and uses of (software) products over time [18]. However, successful PD interventions have so far mostly been done in small-scale and local technological development. Larger-scale interventions for the private sector and at a regional level have been largely unsuccessful. Oostveen & van Den Besselaar [14] present a case study endeavoring to include citizens and administrative users in designing a prototype for a large-scale system at municipality level. Combining PD and other approaches, the authors identified several tensions related to the context variety. Among the challenges that they identify, is a tension between openness to future user categories and clear definitions of end users in the design phase. Moreover, technical standards sometimes directly conflicted with emerging citizens interest. Other issues that occurred during the project were time constraints and miscommunication due to interdisciplinary and asymmetric relationships between citizens, municipalities, researchers, and designers.

Taking the installed base into careful consideration is a fundamental yet often overlooked phase in the design of large-scale systems, particularly in the public sector. The metaphor of 'cultivation', drawn from information infrastructure literature [1], is a useful one in this sense. It promotes incremental and organic expansion of new systems that consider the installed base as the foundation for the design of additions. Over time, cultivation practices allow for frictions to emerge, requiring changes to the existing practices, technologies, and regulatory frameworks [9].

A prominent approach of facilitating the scalability of technological solutions via cultivation strategies, is the digital platform [18, 20]. In digitalization processes, reusable and generic functions are bundled within the platform core, while tailored services are developed as complementary to target specific needs, often called apps, that connect to the core by means of standardized interfaces such as application program interfaces (APIs). As Roland et al. points out, "platform architectures may allow PD practitioners to address the age-old challenge of catering for new users that were not part of early design process and allow them to adapt software in unforeseen ways" [[18]:8]. Platformization processes have therefore the potential to scale up participation.

As we will demonstrate in our empirical study, it is through decision-making processes along platformization new spaces of possibility are opened or prohibited. This happens through decision linkages in the platformization processes.

3 EMPIRICAL CASE AND RESEARCH METHODS

Our study is based on an ongoing longitudinal case study [24] of a digitalization process carried out in a municipality in Norway. Municipalities in Norway are made up of units, each of which focuses on the provision of different services for citizens. Though connected to systems at the state level, the organizational and funding structure in the Norwegian municipalities enables a high level of distributed governance. This means that in large part, municipalities are in charge of initiating their own digitalization projects or whether to be a part of intermunicipal projects.

The municipality we have studied corresponds to one of the largest Norwegian cities and is seen as leading within digitalization initiatives. We conducted 7 interviews with officials who are decision-makers within different units working on digitalization projects, 4 observations of project meetings as passive observers, and attended 3 seminars for public officials about digitalization and innovation. Informants were recruited through a snowballing strategy and were briefed during interviews that citizen participation in public digitalization projects was the central focus of our research. All data collection sessions were either recorded or detailed notes were taken when voice recording was not appropriate. The qualitative data were analyzed through an iterative inductive-deductive approach [21] in order to identify the emerging implications of early-stage platformization processes for the shaping of citizen participation.

In the next section, we illustrate the early-stage findings of our analysis with three vignettes pertinent to the research question. Citations have been translated from Norwegian.

4 EARLY FINDINGS

When talking with municipality officials, a general interest and enthusiasm for citizen participation was expressed both in isolated design activities and in the creation of platforms but there was a lack of systematic follow-through. With these vignettes, we show what those working for the municipality view as contemporary challenges for participation. The first vignette shows the municipality's views on citizen participation, the second gives insight in the impact of the installed based at the governance and technical level, and the third highlights emerging scalability challenges. In the vignettes, informants often refer to citizens as users of designed systems due to the outlined premise of our study. They do not refer to themselves or their colleagues as users.

4.1 Vignette 1 – Citizen participation in platformization

Our research objective is to investigate how the stipulated Norwegian municipality relates to citizen participation in digitalization projects both their rhetoric and in practice. Our findings point to a lack of systematization of participatory mechanisms throughout all stages of decision making in digitalization processes. Overall, our

informants agree that citizen participation is important but that it is ill-defined and is sporadic.

David, a designer and general IT specialist in the municipality, highlighted the contemporary concerns of experts when developing digital artefacts. David concedes that citizen participation in his work is mainly seen from his perspective as an IT expert:

"I feel kind of guilty about how often we involve the user. We use too little time on it, though it is better than before."

He states that even though there has been a shift the past five years that has led to more citizen participation and a rise in the quality of collaboration between different experts in design processes, he still only conducts design activities with citizen participation once a year.

Leo is a service designer who has worked both in academia and in different branches of the public sector, now mainly with health informatics. He has the same concern as David:

"There is so much happening, but we haven't really gotten good enough user participation in my opinion. So far, there is a lot in the initial stages of projects. (. . .) We haven't worked proactively enough, simply put."

Even though there are real attempts at nurturing citizen participation and understanding its value, those in the municipality acting as experts do not feel like there are enough resources allocated to citizen engagement.

4.2 Vignette 2 – Platformization as cultivation of the installed base

Despite the challenge presented in the first vignette, we observe that when participation is achieved, it is by gradual integration of participation throughout the installed base. In this vignette we look at the installed base as the sociotechnical foundation into which digitalization projects are integrated. There are two mechanisms included in this segment: the political organization of the municipality and the technical architecture. Such integration happens through cultivation, due to the particular financial and governance constraints in the municipality sector.

David sees the organization of the public sector in Norway as having a large impact on digitalization projects in the municipality. Norwegian municipalities are decentralized and self-directed in terms of prioritizing digitalization. While encouraging broad local participation, this becomes an issue when aiming at creating civic platforms. The lack of central backing and creating standardized systems that link systems beyond the municipality becomes problematic. Moreover, there is a difference in the amount of funding available for digitalization initiatives for each unit. The units paying the bills during the initial stage are not always the ones that will benefit from the initiative. This reality creates a tension between who owns the digital artefact and who is in charge of maintaining it. In discussing the implementation of new systems, David remarks that the opportunity for innovation is limited.

"We can't change too much at the same time. (. . .) I think that we don't have to innovate everything. We can be early adapters of some things, but I think that most things will come from the outside and that we rather adjust them."

Clara is a high-level official working in a faction of the municipality that consults officials on how to conduct digitalization projects while providing funding. Clara points to the difficulty of creating new IT services because they are required to build on top of older computer systems. This also creates challenges, as it is difficult to create new services if you are required to use what is available in the installed base.

"There are no new IT projects that have started without thinking about the whole lifecycle of the function, or the service that is being provided, and that it starts with the citizens. Now everything begins with the citizens. But it wasn't like that at one point in time. There are also many of the data systems we have today that are so old that we didn't have that (i.e. citizen participation). And if you try to build it on top afterward, then you don't have the same consistently good functionality as if you are thinking about it (i.e. participation) from the design stage."

Decisions made at least a decade earlier impact the way citizens and officials can contribute in design decisions currently. Here the installed base reveals itself in terms of the way development is required to fit into the existing base. The change or innovation cannot be achieved through overhauling but by iterative curation of the installed base.

4.3 Vignette 3 – Scalability challenges

In this vignette, we illustrate the effects of platformization on digitalization projects in terms of creating reusable, generic digital solutions, and how citizens can participate in design activities. For the majority of Norwegian municipalities, scalability happens largely by reselling digital platforms. However, this effort leads to challenges in the form of vendor lock mechanisms and heavy reliance on large, private platforms owners such as Google.

Anna is a municipality official working for the physical therapy unit. By her own admission, she does not have much experience with digitalization projects. She is nevertheless in charge of a small but interdepartmental digitalization project in the municipality. Her team plans to buy an existing website for recreational activities that has been developed by another municipality. The plan is to adapt it by partially re-designing the website with citizen participation. There are plans to repurpose the website for other municipalities too.

Though, there are consequences to scaling up through reselling. Firstly, there is the vendor lock issue mentioned by David. He has been involved in a few IT acquisition projects, and relays concerns related to the issue of vendor lock.

"Many solutions have a vendor lock so that you bind yourself to just that provider because they are the only ones that provide that functionality, software or solution. They do it this way because they are going to sell it to another municipality and then it will influence the whole solution if you want any changes".

Secondly, there is an overreliance on the platform owner. As illustrated in the previous vignette, at the state level there is often a greater possibility for creating internal and customized solutions. For the most part, municipalities have to settle for purchasing private solutions and adjusting them in-house. As in the model of decision linkages, the acquisition process, where municipalities purchase solutions, has implications for what choices are open for participation. When solutions are standardized and resold, even though they may have a foundation in participatory design, the

question remains; what are the remnants of citizen participation in the end product?

5 DISCUSSION AND CONCLUSION

In this paper we have illustrated three challenges that characterize municipality digitalization projects and their influence on participation. In terms of assessing the possibility of participation in platformization, these are: 1) the experts' views on citizen participation at the municipality level; 2) the role of the installed base; and 3) opportunities for scaling up.

1) In terms of decision linkages, how participation is understood and enabled shapes the quality of how participation is performed in practice.

As we show in vignette 1, the foundational view of those working with municipal digitalization predetermines the level of participation in design activities. In terms of decision linkages [3], their view constitutes an important mechanism for opening or closing citizens space for decision making.

Platformization has further implications for the way in which choices are opened to the influence of both the officials in the public sector and the citizens. These processes are shaping the space of possibility for participation. For example, those who are involved with setting up this participatory process, such as municipality employees, struggle to find tools and frameworks to implement it. As a result, despite the benefits, as Clara in vignette 2 asserts, the space of possibility for participation is limited by existing tools and systems. Platformization as cultivation creates a tension between design and tangible implementations.

2) Vendor lock mechanisms constrain the spaces of possibility for participation.

The lock-in mechanisms mean that municipalities are required to bind themselves to the vendor that can provide a certain functionality or software [16]. As shown in vignette 2, this is especially true if the vendor has plans of scaling up the solution so they can sell it to other municipalities. Provided that municipalities lock themselves to a particular private provider, this is a vital choice in the decision linkages related to participation. The acquisition of a platform resulting in a vendor lock shapes the platformization process and has major implications by constituting a large part of the installed base. As innovation in the installed base can only be achieved through careful cultivation [1], such a decision impacts all subsequent design choices.

3) Scaling processes make participation embedded in decision linkages difficult to trace.

Platformization has been suggested as a useful way to scale up systems and possibly also participation [18], but by locking oneself to a certain provider it also shapes the forms and quantity of design choices available. Thus, scale has implications for participation. Assessing the design choices participants are contributing in is difficult to follow, especially when contending with a large platform owner, or when systems are resold. It is difficult to predict repercussions and decision linkages become opaque.

To conclude, the impeding factors for participation in platformization processes in the public sector are the municipality experts' views on participation, the constraints set by the installed base, and factors related to the scaling of systems. There is a need for an analytical framework to follow decision linkages in the public sector in terms of participation, especially while assessing the impact of the installed base, i.e. governmental constraints, technical limitations, and issues raised by the relationship between private global platform owners and local public clients. The findings in this early-stage study provide a valuable foundation for subsequent research when connecting with a broader range of public officials. In our future research, we will continue following digitalization and platformization processes in the mentioned Norwegian municipality.

ACKNOWLEDGMENTS

This paper is part of the interdisciplinary research project *Digital Infrastructures and Citizen Empowerment* (DICE) anchored in the research group *Digitalization and social life* and is funded by the Norwegian University of Technology and Science (NTNU) as a part of the *Digital Transformation* initiative.

REFERENCES

[1] Margunn Aanestad, Miria Grisot, Ole Hanseth and Polyxeni Vassilakopoulou. 2017. Information infrastructures and the challenge of the installed base. Information Infrastructures within European Health Care. Springer, Cham. (May 2017), 25-33. https://doi.org/10.1007/978-3-319-51020-0_3

[2] Erling Björgvinsson, Pelle Ehn, and Per-Anders Hillgren, 2012. Agonistic Participatory Design: Working with Marginalised Social Movements, in CoDesign (8:2–3), (June 2012), 127–144. (https://doi.org/10.1080/15710882.2012.672577).

[3] Tone Bratteteig and Ina Wagner. 2016. Unpacking the Notion of Participation in Participatory Design. Computer Supported Cooperative Work (CSCW) 2016 25:425-475

[4] Margot Brereton and Jacob Buur. 2008. New Challenges for design participation in the era of ubiquitous computing, in CoDesign 4(2) (June 2008) https://doi.org/10.1080/15710880802098099

[5] Susanne Bødker and Morten Kyng. 2018. Participatory Design that Matters – Facing the Big Issues. ACM Trans. on Comput. -Hum. Interact. 25, 1, Article 4 (February 2018), 31 pages. https://doi.org/10.1145/3152421

[6] Susanne Bødker and Pär-Ola Zander. 2015. Participation in design between public sector and local communities. Proceedings of the 7th International Conference on Communities and Technologies, (June 2015) 49-58.

[7] Andrew Clement, Brenda McPhail, Karen L. Smith, and Joseph Ferenbok. 2012. Probing, Mocking and Prototyping: Participatory Approaches to Identity Infrastructuring, in Proceedings of the 12th Participatory Design Conference: Research Papers, (PDC '12), vol. 1 New York, NY, USA: ACM, (August 2012) 21–30. https://doi.org/10.1145/2347635.2347639

[8] Pelle Ehn. 2008. Participation in design things. In: Proceedings of the Tenth Anniversary Conference on Participatory Design (PDC'08), J. Simonsen, T. Robertson and D. Hakken (eds.), ACM Press, New York, (January 2008) 92–101. https://doi.org/10.1145/1795234.1795248

[9] Maria Grisot and Polyxeni Vassilakopoulou. 2017. Infrastructuring for eHeltch; Dealing with Turns in Infrastructure Development. In Computer Supported Cooperative Work (CSCW) 26(1-2), (April 2017) 7-31. https://doi.org/10.1007/s10606-017-9264-2

[10] Helena Karasti. 2014. Infrastructuring in Participatory Design. Proceedings form the 13th Participatory Design Conference: Research Papers – Vol. 1 (PDC '14), Vol. 1, New York: ACM Press, (October 2014) 141-150.

[11] Morten Kyng. 2010. Bridging the Gap Between Politics and Techniques: On the nest practices of Participatory Design, in Scandinavian Journal of Information Systems, 22(1) article 5 (June 2010),49-68. http://aisel.aisnet.org/sjis/vol22/iss1/5

[12] Christopher A Le Dantec and Carl DiSalvo. 2013. Infrastructuring and the Formation of Publics in Participatory Design. Social Studies of Science, 43(2), (February 2014), 241-264. https://doi.org/10.1177/0306312712471581

[13] Laura Neumann and Susan Leigh Star. 1996. Making Infrastructure: The Dream of a Common Language. In Proceedings of the 4th Biennial Participatory Design Conference (PDC '96), 231-240.

[14] Anne Marie Oostveen and Peter Van den Besselaar. 2004. From Small Scale to Large Scale User Participation: A Case Study of Participatory Design in E-Government Systems. In Proceedings of the 8th Conference on Participatory Design: Artful Integration: Interweaving Media, Materials and Practices (PDC '04). SSRN Electronic Journal. 173-182. http://dx.doi.org/10.2139/ssrn.1432508

[15] Elena Parmiggiani and Helena Karasti. 2018. Surfacing the Arctic: Politics of Participation in Infrastructuring. In PDC '18: Proceedings of the 15th Participatory

Design Conference - Volume 2, August 20-24, 2018, Hasselt and Genk, Belgium. https://doi.org/10.1145/3210604.3210625

[16] Jean-Christophe Plantin, Carl Lagoze, Paul N. Edwards and Christian Sandvig. 2016. Infrastructure studies meet platform studies in the age of Google and Facebook. New Media Society 1-18. ISSN 1461-4448. (August 2016) 1-18. https://doi.org/10.1177/1461444816661553

[17] Jean-Christophe Plantin and Aswim Punathambekar. 2018. Digital media infrastructures: pipes, platforms, and politics. In Media, Culture & Society, 41(2), (December 2018) 163–174.

[18] Lars Roland, Terje Aksel Sanner, Johan I. Sæbø, and Eric Monteiro. 2017. P for Platform. Architectures of large-scale participatory design, in Scandinavian Journal of Information Systems, 29(2), article 1. (December 2017) 3-34. http://aisel.aisnet.org/sjis/vol29/iss2/1

[19] Jesper Simonsen and Toni Robertson. 2012. International Handbook of Participatory Design. London/New York: Routledge.

[20] Armit Tiwana. 2014. Platform Ecosystems: Aligning Architecture, Governance, and Strategy. Amsterdam, Morgan Kaufmann publishers. https://doi.org/10.1016/C2012-0-06625-2

[21] Aksel Tjora. 2018. Qualitative Research as Stepwise-Deductive Induction, Routledge Advances in Research Methods

[22] José van Dijck, Thomas Poell, and Martijn de Waal. 2018. The Platform Society: Public values in a connective world. Oxford University Press.

[23] Polyxeni Vassilakopoulou, Miria Grisot, Tina B. Jensen, Nina Sellberg, Johan Eltes, Anne Thorseng, and Margunn Aanestad. 2017. Building National EHealth Platforms: The Challenge of Inclusiveness. In ICIS 2017 Proceedings. (December 2017) https://aisel.aisnet.org/icis2017/DigitalPlatforms/Presentations/11

[24] Geoff Walsham. 2006. Doing interpretive research. In European Journal of Information Systems (2006) 15, pp. 320-330

Paper 2

Caseworkers' participation in procurement: Infrastructuring Child Welfare Services in Norway

Authors: Dahl-Jørgensen, Tangni Cunningham and Parmiggiani, Elena

Published in Computer Supported Collaborative Work, The Journal of Collaborative Computing and Work Practices (ECSCW contribution)

Computer Supported Cooperative Work (CSCW) (2023) 32:781–823
https://doi.org/10.1007/s10606-023-09469-4

ECSCW CONTRIBUTION

Caseworkers' participation in procurement: Infrastructuring Child Welfare Services in Norway

Tangni C. Dahl-Jørgensen*[1] & Elena Parmiggiani[1]

*[1] *Department of Computer Science, Norwegian University of Science and Technology, Trondheim, Norway (E-mail: tangni.c.dahl-jorgensen@ntnu.no; E-mail: parmiggi@ntnu.no)*

Accepted: 27 March 2023

Abstract. Procurement is a widely adopted collaborative approach for acquiring new systems in the public sector. It exemplifies a situation in which the early stages of digital system design define the boundaries and constraints of a new system that must be specified in the tender document (i.e., a binding offer). Researchers and government officials have long recognized the benefit of end-user participation in system design. Given the central role of the pre-tender phases in procurement processes, however, there is a need to better understand what affects user participation in such early stages. In this paper, we research a procurement process in municipal Child Welfare Services in Norway. We focus on caseworkers' participation in procuring a future case management system. We build on the concept of participatory infrastructuring to characterize how the meaning of participation was shaped through three overarching participatory infrastructuring practices of decision-making within a rigid procurement process: (i) scaling up the project, (ii) negotiating participation in meetings with potential suppliers and in tender documents, and (iii) positioning caseworkers as subject experts. The analysis of these practices reveals that the definition of user needs in the tender documentation and the creation of knotworks define both the boundary conditions and the modalities of participation. We contribute to the conversation on participatory infrastructuring in Computer-Supported Cooperative Work by discussing how participatory infrastructuring provides a conceptual understanding of participation in the context of municipal systems procurement.

Keywords: Infrastructuring, procurement, participation, local government, public sector

1 Introduction

The early stages of digital systems development have been found to be crucial for creating the conditions for maintaining active user participation. Decisions made in the early phases define the boundary conditions for future user involvement possibilities (Svanæs and Gulliksen, 2008) as the systems begin to entangle with existing ones (Parmiggiani et al., 2015). The most expensive mistakes and

shortcomings in system development are those made in the early phases, focusing on analysis and design (Bødker and Grønbæk, 1991). Additionally, early decisions regarding who is involved in developing a new system impact, andare often detrimental to, the quality of use (Bratteteig and Wagner, 2016). This tendency is particularly visible in the public sector, where innovation typically happens through procurement processes that must accommodate upfront bureaucratic procedures, legal frameworks, political agendas, cost-benefit analyses, and citizens' and officials' uneven digital literacy (Aanestad et al., 2017; Mikalsen et al., 2018; Shapiro, 2005).

User participation is generally considered important in digital public service development (Anthopoulos et al., 2007; Karlsson et al., 2012; Shapiro, 2005). However, active user inclusion and participation in the design of new systems has proved challenging, resulting in participatory design (PD) approaches not being widely adopted in the public sector (Saad-Sulonen et al., 2020). Computer-Supported Cooperative Work (CSCW) has investigated collaborative practices promoting various forms of user participation in public settings, such as consultation processes (Weise and Chiasson, 2020), educational contexts (Bødker, 2017), and the prevention of social isolation in rural settings (Hayes et al., 2021). These studies show that active user involvement and participation in system and service development are difficult to maintain beyond the initial phases. However, questions remain regarding what participation entails, who participates in what, and how (Andersen et al., 2015; Saad-Sulonen et al., 2018) in the context of procurement in the public sector, which is still characterized by a rigid division between system requirement specification and actual design.

Procurement is the acquisition of supplies or services through purchase or leasing through a *tender* agreement (Lloyd and McCue, 2004). Research within CSCW has long demonstrated that the participation of stakeholders in general, and future users specifically, has significant positive effects on the quality of systems acquired and developed through procurement (Bowers, 1994; Møller et al., 2020; Pollock and Williams, 2010). Meanwhile, public procurement is heavily regulated to ensure fair competition. Important decisions are typically made early on due to the constraints associated with external sources, e.g., tenders and contracts, the internal structure of supplier and customer organizations, and political interests. These constraints amplify the tension between the need to specify systems requirements upfront and a lack of knowledge about what new systems should look like (Langseth and Similä, 2021; Mikalsen and Farshchian, 2020). As this tension is solved in practice, user involvement tends to be reduced or hindered, resulting in users being understood as merely a source for testing system requirements. More research is needed to understand how early-stage decisions impact user participation in public procurement processes and in what ways - if at all - user participation is possible. Therefore,

we ask: *what affects participation in early-stage procurement processes in the public sector?*

We answer this question by identifying opportunities for caseworkers to participate in the procurement of a new digital infrastructure for delivering services to citizens at the municipal level in Child Welfare Services (CWS) (DigiBarnevern, or DigiChildProtection in English). We unpack caseworkers' participation in the work of writing the tender report in the process of procuring a new case management system. In addition to caseworkers, the stakeholders in the DigiBarnevern-project consist of municipal officials and citizens involved in ongoing CWS cases. The project aims to develop systems that will facilitate better relationships between caseworkers and citizens, allowing the latter to have more influence over the management of their cases. We chose the caseworkers' perspective because they have been found to have precious professional expertise acquired through their daily work practices that should be leveraged to develop better digital welfare systems (Boulus-Rødje, 2018). Therefore, caseworkers' role as users and co-designers in collaboration with IT professionals continues to interest the CSCW community. As a separate system used by citizens will be developed internally and not procured, its development and citizen participation will be the focus of a later paper. However, citizen participation is mentioned here as it came up in discussions related to caseworkers' needs.

We adopt the concept of infrastructuring as a lens to describe system development that overcomes traditional boundaries between initial design, implementation, and use, toward a more fluid understanding of the way heterogeneous stakeholders shape the system over time and across locales building on existing technologies and competencies (Parmiggiani et al., 2015; Star and Bowker, 2002). Against this backdrop, though the case is not a PD project - in that those driving the development are not rooted in the PD tradition - we take inspiration from PD as a lens to uncover challenges and practices with the goal of framing caseworkers' participation in the procurement of a case management system for municipal CWS. From this perspective, we view participation broadly as the power to shape action in decision-making practices (cf. Bratteteig and Wagner, 2016). We find that the participation of CWS caseworkers is a function of how they are recruited in positions of decision-making and influence, the mapping of end-users' needs, and how users' needs are translated and negotiated when writing requirements in the tender report. Through this process, the tender report becomes a critical artifact that defines users' needs and how participation will be framed and organized in the subsequent development in collaboration with the supplier.

This study contributes to the CSCW literature in two ways. First, at the empirical level, we analyze how caseworkers' interests are addressed along three sets of recurring practices: (1) managing project scalability—deciding a project's content and limitations; (2) negotiating participation—how caseworkers will

participate; and (3) positioning CWS experts in key positions in procurement. These practices are forms of *participatory infrastructuring* in which possibilities for participation are opened and closed as caseworkers are engaged in processes to accommodate emerging tensions while expanding the existing infrastructure, i.e., the network of stakeholders and systems across organizations (cf. Bødker et al., 2017).

Second, at the theoretical level, we describe how the procurement phase defines the boundary conditions and modalities of participation. We believe that embracing the big issues associated with digital innovation processes in the public sector is important, calling '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' (Bødker and Kyng, 2018, p. 1). We further the discussion of how public procurement influences participation in system design by focusing on (i) how users' needs are embedded in the procurement through requirement specification, (ii) how user representatives can be organized in such a process, and (iii) how infrastructuring can help us conceptualize participation on the conceptual level.

2 System procurement in the public sector

Procurement is generally defined as an activity with the goal of meeting a need for products or services (Børmer, 2014; Lloyd and McCue, 2004). In public contexts, procuring new systems aims to satisfy a public, governmental, or societal need for government services. System procurement projects are often characterized by fragmented responsibility between customer and supplier in different phases (Artman, 2002; Svanæs and Gulliksen, 2008) and present significant planning and organizational challenges for commercial suppliers to facilitate stakeholder involvement, usually with the end goal of increasing system usability (Artman, 2002). CSCW researchers have been interested in system procurement since the field's early days (Bowers, 1994). Based on a long-term study of Enterprise Resource Planning systems, Pollock and Williams (Pollock and Williams, 2010) argued that procurement deserves closer scrutiny because it lays the foundation for subsequent extensions of the systems' scope. The signing of a contract between an organization, such as a public agency, and one or more suppliers represents a watershed moment between a more open exploratory phase when the focus is identifying the right problem to solve, and a more defined phase when attention shifts to solving the problem 'right' (Mikalsen et al., 2018). However, without appropriate user involvement strategies, users tend to resist the integration of digital systems that do not align with their work practices and mental models (Orlikowski, 1992).

Unfortunately, it is already at the stage of identifying the right problems - and thus translating them into system requirements - that user participation is often downplayed to a series of meetings with a selection of subject experts from which system

requirements must be elicited (Mikalsen and Farshchian, 2020; Zahlsen et al., 2020). Studies on requirement engineering in CSCW illustrated the dangers of this tendency and showed, for example, that plans made at this stage often clash with actual, situated system use (cf. Dittrich et al., 2009; Suchman, 2006). In a study of a classification scheme for system requirements during the redevelopment of a nationwide information system, Hertzum (Hertzum, 2004) showed that: 'The vast majority of functional requirements are not accompanied by any description of the context in which they occur—neither in terms of goals, constraints, and priority measures nor in terms of real-world examples or other detailed descriptions of typical or exceptional cases. It is left to the readers to supply this information, and unless they can do that, they will be unable to make much sense of the requirements' (Herzum, 2004, p. 58).

While not all system requirement elicitation happens in the context of procurement processes, these studies are nevertheless indicative of the need to pay closer attention to the early-stage context of design, including, among other aspects, 'the internal structure of the developer and the client organizations, contractual and tender issues, software engineering tools, and stakeholder agendas and relations' (Svanæs and Gulliksen, 2008, p. 353). As a result, we are interested in investigating the context of design in early-stage procurement processes up until the tender documentation was issued because, as the studies cited above more or less explicitly illustrate, this phase paves the way for present and future possibilities - or lack thereof - of active user involvement and engagement in systems that matter in work, everyday life, and society (Bødker and Kyng, 2018).

Against this backdrop, we intend participation as 'the fundamental transcendence of the users' role from being merely informants to being legitimate and acknowledged participants in the design process' (Simonsen and Robertson, 2012, p. 5). While procurement processes in the public sector seldom, if ever, follow PD principles by the book, we believe it is relevant to leverage the PD tradition and discourses to propose a conceptual apparatus to investigate forms of participation in which users act as not only source for defining requirements but influential voices in design in public service development.

3 Theoretical background

3.1 End-user participation

Different research domains have sought to define participation by describing what participation is and what it is not. These descriptions range from the motivation behind user participation (Beck, 2002; Bjerknes and Bratteteig, 1995; Ehn, 2008), practices of participation (Cornwall, 2008; Halskov and Hansen, 2015; Kyng, 2010), levels and typologies of participation (Arnstein, 1969; Cornwall, 2008) and outcomes of user participation (Bratteteig and Wagner, 2016). The research tradition of PD informs our conceptual view of participation. Since

its advent in Scandinavian research communities in the 70s and 80s, PD has been motivated by democratizing work life. Early PD sought to empower workers to have a say when new systems were being developed and introduced into their place of employment (Simonsen and Robertson, 2012). Many of these initiatives were spurred on by trade unions which, since the 90s, have concerned themselves less with system development and implementation. More recent PD projects are initiated by PD researchers in varied but small projects in and outside workplaces (Kyng, 2010). Since its emergence, PD has built on an ideal of democratic decision-making and facilitating 'genuine participation' through a collaborative design process (Greenbaum and Kyng, 1991; Simonsen and Robertson, 2012).

PD researchers have argued for participatory practices in systems design and development, such as mapping users' needs through dialog and prototyping activities and continuous user testing using prototypes (Bødker and Grønbæk, 1991; Svanæs and Seland, 2004). User participation is seen as necessary throughout, especially when deciding what to develop and as quality control ensuring that a system fulfills its intended purpose (Simonsen and Robertson, 2012). Envisioning the system in context becomes crucial as 'to find out how the computer application functions in the use situation users must be able to somehow experience this' (Bødker and Grønbæk, 1991, p. 4). User participation in decision-making requires a division of power through negotiation and the agency to 'shape action' (Bratteteig and Wagner, 2016). This agency relates to who makes or influences decisions, when they do so, and what these decisions concern. Defining participation during a system development project's early phase is essential for understanding how participation will be practiced throughout the project.

In the municipal sector, decisions made over a decade ago affect how users (municipal employees and citizens) can participate in system development today (Bratteteig and Wagner, 2016; Dahl-Jørgensen and Parmiggiani, 2020). It is necessary to follow decision-making through different levels and contexts to distinguish between participatory rhetoric and participation in action. Bratteteig and Wagner (Bratteteig and Wagner, 2016) explained design persuasively as a process of creating choices and decision-making. Further, seeing decision-making as a complicated process in which 'moves of opening and closing choices in the process of making are driven or modified by decisions that users participate in' (Bratteteig and Wagner, 2016, p. 427). Participation in design is seen as the sharing of power in decision-making. Inspired by Schön (Schön, 1983; Schön and Wiggins, 1992), decision-making is illustrated as a process of seeing what choices or 'moves' one could make, 'moving' by making a choice, and after that, seeing what new moves are possible. When making design choices, some possibilities are opened while others close, revealing decision-making's contingent nature. Bratteteig and Wagner (Bratteteig and Wagner, 2016) also point out that some decisions have more significant repercussions on the result and strongly impact later choices.

Though PD research has provided rich empirical examples of collaborative design projects, researchers in the field have pointed out that paradoxically there remains a need for conceptualizing what participation is (Andersen et al., 2015; Halskov and Hansen, 2015). Halskov and Hansen (Halskov and Hansen, 2015) reviewed ten years of PD research to uncover previous definitions of *participation*. Their review revealed a broad range of definitions of participation, categorized as implicit involvement of users, full participation of users in a design process, and mutual learning between users and designers. Andersen et al. (Andersen et al., 2015) argue for a broader view of what participation is than the typologies offered by, for example, Arnstien (Arnstein, 1969). According to Andersen et al. (Andersen et al., 2015), participation cannot be seen as limited to isolated instances of design activities. They see participation as mediated through time and space, inferring that the voices of participants are 'translated and overtaken by policy reports, evaluations, and prototypes before they are manifested in action' (Andersen et al., 2015, p. 6). This broader view on participation leads the authors to view users as not stand-alone participants representing only themselves but as networks. In the instance mentioned in their paper on the design of digital communication between social workers and children, children were represented not directly as individuals but through networks of other people, governmental institutions, and reports. In addition to viewing participants as network configurations, they argue for viewing participation as a characteristic of all project-related activities. This broader view of participation as something that permeates the entirety of the project and is enacted by a network of actors is a view we draw on in this study.

A key aspect of PD is that end-users are involved in the design work, such as through cooperative prototyping. However, this entails practices connected to the recruitment of end-user representatives and creating common understanding. Bødker and Grønbæk (Bødker and Grønbæk, 1991) discuss both these aspects of cooperative prototyping. Generally, they found that participants were recruited based on their role or experience within an organization or by being elected by coworkers or self-elected based on their own interest in development projects. They found that 'establishing a working group together with competent user representatives' to be the most important to support a continual mutual learning process (Bødker and Grønbæk, 1991, p. 17). A mutual learning process also requires understanding that goes both ways; users must put their work practices into words that can be translated into a language suitable for designing specific functionality that supports their work. The same applies to designers: the language they use when prototyping is not usually suitable when communicating with users. The work of joint prototyping becomes an act of fostering common understanding and mutual learning between the designer and the user. Recruiting user representatives is also an issue of resource allocation. To ensure active user participation, they must 'be freed from parts of their daily work' (Bødker

and Grønbæk, 1991, p. 23). Though it is important for users not to be completely severed from their work tasks, they should not be expected to do additional work, and their contribution to development and design work should be recognized.

3.2 Infrastructuring

One aspect of end-user participation that has recently been questioned is, does it scale? (Roland et al., 2017). Halskov and Hansen (Halskov and Hansen, 2015) found that PD research often addresses a single design activity and rarely large-scale projects over several years. There is a lack of descriptions in existing PD research on the decision-making in-between design activities (Andersen et al., 2015). Therefore, open questions remain in terms of how participation should be practiced when creating large, interlinked systems and infrastructures (Oostveen and Van Besselaar, 2004). This is unfortunate as digital innovation projects - particularly in the public sector - are often characterized by extended design, i.e., they span several years, stakeholder groups, and locales (Monteiro et al., 2013). Several researchers have identified the issue of scaling participation as important to an extended design perspective and the heterogeneous dimensions it covers (Bødker and Kyng, 2018; Dahl-Jørgensen and Parmiggiani, 2020; Hochwarter and Babak, 2020; Oostveen and Van Besselaar, 2004; Roland et al., 2017). In line with Parmiggiani and Karasti (Parmiggiani and Karasti, 2018), we use the term 'scaling' to refer to participation in a political sense, emphasizing that different concerns and phenomena are revealed as projects extend along different dimensions, such as the dimensions of space, time, use, and policy. Importantly for this current study, some CSCW and Information System (IS) scholars have specifically addressed the scaling of participation through the process of 'infrastructuring.'

Notably, already in the 1990s, Ruhleder, Star, and Bowker's idea of infrastructure viewed technologies as appropriated and reappropriated as part of interlinked socio-technical networks and use situations over time (Bowker, 2015; Star and Ruhleder, 1996; Star and Bowker, 2002). This perspective supplemented the local view of system design as confined to situated encounters with technology from an 'extended design' perspective that scales, i.e., captures how technologies are shaped across different contexts and periods (Monteiro et al., 2013). Infrastructuring, as a verb, denotes work to accommodate the infrastructures' dynamic complexity by temporarily resolving tensions between human and non-human stakeholders over time (Karasti, 2014; Lodato and DiSalvo, 2018; Parmiggiani and Karasti, 2018; Star and Bowker, 2002) while providing interfaces for coordinating work at scale (Scott and Orlikowski, 2021). From this perspective, infrastructures shape and are shaped by daily work practices (Star, 1999), including practices facilitating participation in design (Neumann and Star, 1996).

Building on this, (Bødker, 2017), p. 246) defined the concept of participatory infrastructuring as 'infrastructuring activities that engage users in processes of

design and use'. They also expanded on an existing understanding of participation as typical front-stage design activities, seeing participation as a continuous process that ties 'into existing networks and systems across organizations' (Bødker, 2017, p. 248). Infrastructures are seen as significant in innovation processes, requiring collaboration between many actors over time (Björgvinsson et al., 2010). Participatory infrastructuring encompasses not only the front-stage activities that PD research often focuses on but also what happens at several levels - namely at technical, decision-making, competency, and policy levels (Bødker, 2017). Le Dantec and DiSalvo (2013) illustrate how infrastructuring processes are central to constituting publics as they can be used to engage with authorities and problematize future scenarios. It also encompasses participatory processes in political arenas, the backstage of design work, and the work of tying participatory processes into existing networks (Bødker, 2017). In integrating participation processes into an existing infrastructure, the concept of knotworking by Engeström et al. (Engeström et al., 1999) describes the work performed by social constellations of members with diverse backgrounds and agendas that emerge temporarily during design phases. These temporary *knotworks* are seen as instrumental during an infrastructuring process.

In sum, although system procurement has received some attention in the CSCW literature (see e.g., Bowers, 1994; Møller et al., 2020; Pollock and Williams, 2010), little has been written about user participation in pre-tender procurement processes and how knotworking during this stage defines and shapes user participation. This paper contributes to filling this gap in the literature by presenting a case of new system procurement through an infrastructuring lens and analyzing the practices that shape caseworkers' participation.

4 Empirical case: systems procurement in child welfare services

CWS's goal in Norway is to ensure children's welfare and protect them from detrimental care (Falch-Eriksen and Skivenes, 2019). Municipal CWS have several responsibilities, from assessing incoming notices of concern and conducting examinations to initiating and evaluating various measures. The history of the Norwegian CWS has been punctuated with friction (Langford and Kirkebø, 2019), in part due to a lack of transparency concerning decision-making processes related to citizens' cases. Legacy systems have mainly been used to archive and share documents with other governmental agencies, not citizens. Caseworkers play a central role and are afforded discretion in decision-making and documentation. As a result, they are primary users to be considered in designing future digital systems for CWS. By implementing new technological solutions, the Norwegian government intends to increase CWS's transparency and more clearly show the reasons for decisions made in their case (Bøhmer, 2020). In this context, the process of improving case management systems

is seen by municipalities as an opportunity to both streamline case management and improve the Norwegian CWS's reputation. Due to digital innovation and legal reform, the municipal CWS's work practices will likely change drastically in the coming years.

4.1 Public procurement in the municipal sector

Considering the prevelance of small municipalities in Norway and the decentralization of services, municipalities may join forces during formal system procurement processes by inviting suppliers to develop new products or services (Ahlgren et al., 2019). This process can be precarious for the customer, requiring them to balance 'between the innovation's need for informal dialogical processes, and adherence to formal procurement processes regulated by laws' (Mikalsen and Farshchian, 2020, p. 1). In our study case, the procured system will be embedded in an existing CWS infrastructure. Thus, the procurement process must engage with 'a mature infrastructure during a turn in its life which happens when strategically mandated adjustments to existing arrangements are pursued' (Grisot and Vassilakopoulou, 2017, p. 11).

Public procurement requires a *tender*, meaning a competition resulting in a binding, public offer (Langseth and Similä, 2021; Mikalsen and Farshchian, 2020). The procurement process can be divided into three general phases, according to Langseth and Similä (Langseth and Similä, 2021): the mapping phase, competition phase, and contract follow-up phase. All these phases center around the tender as 'the starting point for a potentially broad dialogue with several vendors' (Mikalsen and Farshchian, 2020, p. 6). The tendering process is subject to regulations and includes a *tender report* with specific requirements of what the public entity, acting as procurer, wants—as well as a deadline for submitting an offer (Langseth and Similä, 2021). As suppliers of a system or service, bids from companies on the needs outlined in the tender report. Therefore, adequately mapping end-users' needs is vital for ensuring the quality of the procured system or service.

Additionally, early and continuous dialogue with suppliers is important in creating a shared understanding of technical limitations and opportunities (Langseth and Similä, 2021) through conversations with potential suppliers during the competition phase (Mikalsen and Farshchian, 2020). After an offer is accepted, contract negotiation begins with a new round of adjusting the final product's requirements. During the final follow-up phase, the procurer checks whether the set requirements have been met (Langseth and Similä, 2021). Similar phases were described in the International Handbook of Public Procurement (Thai, 2008), covering international and EU (European Union) procurement legislation, with determining requirements as the first phase.

As requirements are usually provided using formal, executable language, they are unsuitable when communicating with users (Bødker and Grønbæk, 1991). Additionally, decisions connected to procurement are made early on,

when requirements are often uncertain (Moe and Päivärinta, 2011). This presents a clear challenge for end-user participation in public procurement. Since public procurers tend not to have a complete understanding of the needs of clients, including end-users to a greater extent in the procurement process has been suggested, as early pinpointing of requirements that correspond with user needs 'guides the procurement initiative towards better usability, efficiency, and innovativeness from day one' (Torvinen and Ulkuniemi, 2016, p. 60). A significant problem in public procurement is writing good enough requirements, as a supplier is only legally required to deliver what the tender specifies (Moe, 2006). Tender requirements vary depending on a project's complexity and procurement type. These can range from high-level and flexible requirements that necessitate negotiations between customer and supplier to exact requirements detailing specific functionality the supplier must include in the procured system (Moe, 2006).

4.2 DigiBarnevern

In this paper, we focus on the infrastructuring practices leading up to the publication of the tender. To unpack how caseworkers participate during the procurement process, we draw on an empirical study of an inter-municipal project aimed at digitalizing CWS in Norway called DigiBarnevern. This project is a collaboration between the municipal sector, represented by a few municipalities, the Norwegian Association of Local and Regional Authorities (KS), and the state, represented by the Office for Child, Youth, and Family Affairs (Bufdir).

The DigiBarnevern-project officially began at the end of 2016 with seven Norwegian municipalities: Trondheim, Oslo, Bergen, Stavanger, Kristiansand, Bærum, and Asker. Thus, these municipalities became the *customer*, represented by a project management team, publishing a tender to procure a case management system for their CWS. From the beginning, the project management team situated in Trondheim was composed of two subject experts with experience as CWS caseworkers from Trondheim (defined as CWS experts in findings), as well as three systems development experts (defined as IT experts in findings). The members of the project management team were consistent throughout the procurement process but took on different roles in the development and implementation in later stages, mainly working on the *citizen services* subproject. The project was initiated by these Norwegian municipalities alleging that the current case management systems were not meeting the needs of citizens or caseworkers. These legacy systems lack a professional foundation in relevant social service practices and have been used as mere archival repositories. Additionally, little to no information is available for citizens about CWS generally and does not facilitate simple communication between CWS and the citizen, making participating in one's case cumbersome and time-consuming. These limitations have resulted in considerable uncertainty and may have helped spread misinformation about CWS's role in Norway. From the stakeholders' perspective in CWS, citizens lack

an overview of their cases and opportunities to participate, and caseworkers lack support in their work tasks.

To address issues of inefficiency and the need for clearer communication channels, DigiBarnevern includes two main sub-projects, including (a) the development of a new case management system and (b) citizen services. In this paper, we only focus on the procurement of (a): employees and managers in CWS will use the case management system as their primary work tool. A private supplier will develop this system through a procurement process initiated by the participating municipalities, and Trondheim municipality will act as a pilot for both main deliverables. This system will receive all notices of concern and present prompts for descriptions of measures taken in each case based on a professional framework. Citizen services (b) will be used by citizens with an ongoing case as an additional communication channel with caseworkers for receiving information about their case and to comment on case documentation. Since the Norwegian CWS infrastructure exists and is governed at the state and municipal levels, the project also seeks to integrate guidelines and prompts as a professional framework based on social work expertise developed at the state level. The project management team situated in Trondheim municipality defined the requirements of the new case management system, consulting CWS caseworkers and managers from other municipalities and other public entities (KS and Bufdir).

5 Research methods

This paper adopts a case study as a strategy (Flyvbjerg, 2006; Walsham, 2006) to research the early stages of the procurement process, that is, the phase leading up to the definition of the tender documentation, which crystallizes users' needs and how participation is envisioned in the development. Our aim was to investigate how the inclusion of caseworkers in the early stages of the system procurement process happened in practice by flashing out the perceptions, motivations, and actions of the actors involved during day-to-day activities of making decisions. Access to the case was negotiated by the first author who carried out the data collection for two years between September 2020 and September 2022 (see Table 1 for a comprehensive overview). The data collected for this study is solely qualitative. To gain a better understanding of the context and impact of the procurement, the period for data collection extended beyond the tender stage.

Our primary data source consisted of interviews. Twelve (12) informants were interviewed in total. These interviews were crucial to gain an in-depth understanding of experiences of practices related to participation and allowed informants to reflect (Rubin and Rubin, 2011) on choices made about end-user involvement over time. This was important to compensate for the fact that we had no access to the workshops and hearings that had happened before we began the study.

Table 1 Data collection overview.

Data Collection	Sources	Nr.	Period
Status meetings (1 hour each)	Project manager for DigiBarnevern	7	Aug. 2020 – Aug. 2022
Status meetings (1 hour each)	Project management team in Trondheim	7	Apr.–Oct. 2022
Research validation meetings (1,5-2 hours each)	Project management team in Trondheim	3	Sept.-Oct. 2022
Interviews (1 hour each)	CWS experts from Trondheim	3	June 2020 - Feb. 2022
	CWS experts from Oslo	2	Aug. 2020
	CWS expert from Stavanger	1	Nov. 2021
	IT experts (service designer and IT architect)	2	June 2020 and Feb. 2021
	Procurement expert	2	June 2020 and Sept. 2021
	Group interview with IT expert and CWS expert	1	Feb. 2021
Observations (45 minutes to 1 hour each)	User testing of case management systems	1	Oct. 2020
	Feedback meetings with other municipalities on DigiBarnevern's functionality	2	Sept. 2021
	User testing of citizen services	1	June 2022
Official documents	Tender report and other official documents about the project	16	

We adopted a snowballing strategy to identify relevant informants who were or had been involved in the procurement process. Interviews happened in two main phases. In the first phase, we design interviews following a storytelling approach to obtain deep insight into the context where participation unfolded (Lutters and Seaman, 2007). In the second and concluding phase, we used interviews to validate our findings and invited informants to reflect on our reconstruction of three practices affecting caseworkers' participation over time. In doing so, we were inspired by Karasti et al.' (Karasti et al., 2021) approach to devising timelines as a visualization tool to help informants reconstruct their perception of the temporality of infrastructuring work (see also Bowker, 2015). Observations of meetings and documentation constituted a secondary source to further nuance our findings and identify additional informants. Interviews were documented using voice recordings that were transcribed and anonymized and extensive field notes were taken during observations.

Using the qualitative data analysis software Nvivo, our analysis involved coding in stages based on Tjora's (Tjora, 2018) stepwise-deductive induction. Though the analysis process devised by Tjora (Tjora, 2018) comprises seven distinct steps, these steps were simplified into three stages. In the first stage, the first author coded data inductively in vivo, keeping the codes close to the original utterance to avoid misunderstandings. At the same time, extensive memos were written to identify quotes that stood out while noting related concepts. This inductive phase of empirically close coding resulted in over 150 unique codes, while memos kept a log of overarching themes in our data as they emerged. In the second stage, both authors reviewed codes and memos linking them with concepts from the CSCW literature, thus inverting the coding process and organizing the in vivo codes under abductively produced, theory-based categories. Finally, codes were combined into three overarching practices. This analysis method aimed to build our conceptual understanding from the ground up through detailed empirical analysis, testing our conceptual framework's robustness in the later stages of our analysis to enable generalized concepts. Table 3 in the appendix describes the stages of our analysis and the coding categories are presented in Figure 1.

The coding revealed a trend in the data that resulted in three *infrastructuring practices* affecting participation, as illustrated in Figure 1. These *infrastructuring practices* capture continuous work to temporarily accommodate emerging tensions over time, space, and political concerns in the emerging infrastructure (Star and Bowker, 2002). Initially, procurement emerged as an overarching narrative theme of the data, providing the context of this study. Our analysis revealed that the procurement process defined much of the narrative during interviews regarding their content and temporality (i.e., what practices were taking place in the procurement process). We further characterize the procurement process through three practices, 1) scaling, 2) positioning

Figure 1. Hierarchy of coding categories.

representatives, and 3) negotiating participation. Though the whole case was seen through a participatory lens, how participation was discussed and negotiated was also explicitly reflected in the collected data and was the focus of the analysis. We called the resulting sets of practices *infrastructuring practices* because, as we shall illustrate, they aimed at opening or closing possibilities for users to participate in the design and, therefore, the use of the new infrastructure (Bødker, 2017). These infrastructure practices shaped the character of participation, i.e., who could participate, in what ways, and when, during the procurement process.

The quotes presented in this paper were all translated from Norwegian and quotes from field notes were reviewed by the informants to ensure accuracy and validity. Informants are represented by an initial in the findings section.

6 Findings

In this chapter, we present the findings from our analysis. First, we provide some context for the Digibarnevern-project and the motivation for procuring a new case management system. In the sections below, we illustrate three main practices enacted by the project management team that affected the participation of caseworkers in the procurement process i.e., the scaling up of the project, negotiating participation, and positioning of CWS representatives.

Caseworkers and managers in Trondheim CWS are currently using one of the two case management systems supplied by private companies in Norway for archiving case documents and financial management.

> [The project] began with an investigation and mapping of needs in the Trondheim region in the autumn of 2015. [...] The need for a new case manage-

> ment system was identified based on interviews with employees with frontline workers in different roles in CWS. (Informant 'G,' CWS expert, Trondheim municipality, interview).

Caseworkers and managers felt that the existing case management systems did not facilitate easy communication with citizens and were inefficient. In their day-to-day work, caseworkers still used physical documents and archives. This resulted in a lot of time being spent plotting the same information in different systems.

> Current internal mailing systems [in municipal CWS] and communication are slow. [This system] requires that you send physical letters as this is considered the safest [form of communication]. Right now, there is a lot of information in the systems, but in the case assessment process, there is often missing information about why holdups in a case occur and a lack of explanations for decisions being made (Informant 'T,' project manager, Trondheim municipality, meeting).

In a project management team meeting, former caseworker and subproject manager 'G' describes a typical experience trying to communicate with one of their clients during a workday:

> So, I've had a meeting with a child or a parent with a case with us, I write a report based on that meeting. If they want to contact me between appointments, they have to call. My day also consists of other meetings, so if a parent calls while I am in a meeting, I would have to wait until [it] is over before calling them back, and then they often don't respond and call again when I am in another meeting. So, we go back and forth like this. (…) The fact that we have to physically archive documents, stamp, copy, and number them is a big time-stealer for the municipalities that still do it that way. (Informant 'G,' CWS expert, Trondheim Municipality, meeting).

In 2016 Trondheim municipality concluded that procuring an off-the-shelf system was not an option. This realization came from the interviews of CWS workers conducted by Trondheim municipality highlighted the many deficiencies of the two current case management systems available. 'We needed to go through a procurement anyways [due to public sector regulations], so it might as well be something new that supports the caseworkers and the citizens.' (Informant 'T,' project manager, Trondheim municipality, interview). The project management team saw this change as an opportunity to design a new, tailored case management system that allows better communication with citizens, resulting in the initiation of a larger project lasting several years (see Figure 2). The envisioned result was thus a system in which citizens and caseworkers could experience increased

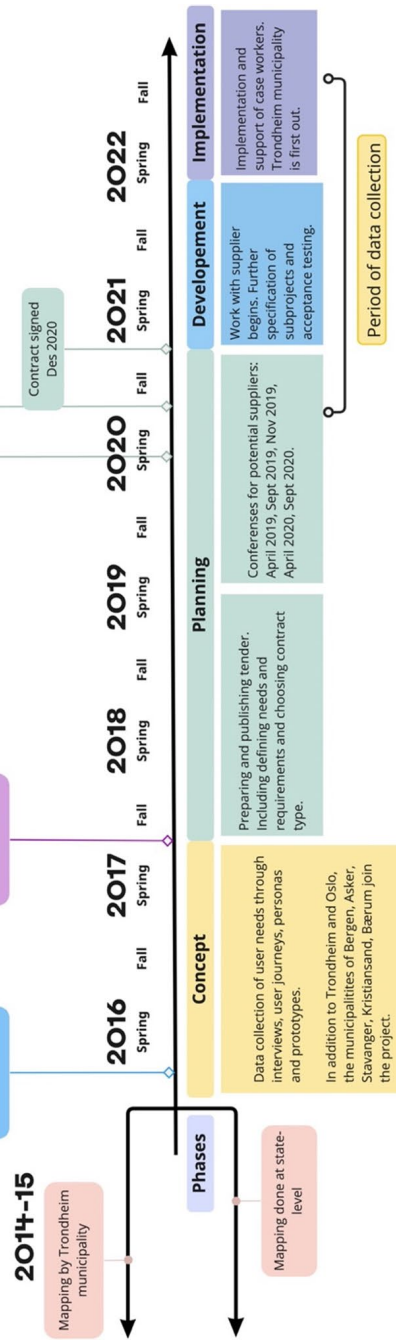

Figure 2. Timeline of the DigiBarnevern-project.

ownership and collaborate in creating documents related to a case. The project management team described the participation of end-users in interviews and in the tender documents, as we will present in the following sections.

6.1 Scaling up the project

Since the project management team decided in 2016 that Trondheim municipality would procure a new case management system, the scale of the project has grown in two ways. Firstly, the project scaled up with multiple municipalities collaborating and, secondly, through establishing subprojects. The project's scale evolved since other municipalities identified the same needs and frustrations with existing case management systems as Trondheim municipality.

> In a conversation with IT expert 'Y' and CWS expert 'G' at DigiBarnevern's offices, they describe collaboration across municipalities and with Bufdir [the Norwegian Directorate for Children, Youth, and Family Affairs] state level. Informant 'Y' told the first author, '[W]e decided in the fall of 2016 that we should collaborate with others in procuring something entirely new.' 'G' added, 'After caseworker's needs were identified in Trondheim, we found out from [the municipal interest organization] KS that other municipalities had the same experience with the current case system. So, there was an opportunity here not just to improve the situation in Trondheim but for other smaller municipalities as well.' 'Y,' 'From there, I think KS took the initiative to connect with Bufdir to develop the professional framework that will be integrated into the case management system. So that's when the project expanded into two projects, one at the state level and one across municipalities.' (Project management team, Trondheim municipality, meeting).

KS encouraged collaboration across municipalities and with Bufdir. Since KS and Bufdir had found similar needs for a new case management system across Norway, the municipal and state-led projects converged to create CWS systems addressing these needs, including a built-in professional framework for decision-making aimed at caseworkers. In a meeting, informant 'B,' who was heading the state-level project at Bufdir, mentioned the parallel work they were involved in:

> They [Trondheim and Oslo municipalities] were talking to smaller municipalities about their needs early. From the state side, we started independently and in parallel with the municipal project DigiBarnevern. It began with a dialogue between the ministry and directorate to ask if there was any need among municipalities. [...] We found the same need as Trondheim municipality. (Informant 'B,' project manager, Bufdir, group interview).

Trondheim municipality also decided to collaborate with other municipalities after discussing the procurement of a new case management system with potential suppliers:

> It turned out that it was not possible to find a supplier who would deliver what was desired and to adapt a professional case management system just for 'little Trondheim.' Trondheim does not constitute a large enough demand, so there was a need to merge with other municipalities in the form of the [inter-municipality collaboration] project, which is DigiBarnevern. (Informant 'G,' CWS expert, Trondheim municipality, interview).

This interaction with suppliers led the project team to decide they needed to join forces with other municipalities. Trondheim municipality along with Oslo, Bergen, Stavanger, Kristiansand, Bærum, and Asker i.e., municipalities of varying sizes came together as a customer who published the tender. During the first phase of the project, former CWS caseworkers from Trondheim and Oslo took the initiative to interview fellow caseworkers around the country, especially focusing on the needs and participation of smaller municipalities. Former caseworker and system administrator for CWS in Oslo, informant 'N,' told us about the mapping they had done with 'G' from Trondheim.

> I've been involved in the [DigiBarnevern] project ever since Oslo first got involved in the project at the end of 2016. [...] Interviews were done in the fall of 2017, where we interviewed workers in CWS in smaller municipalities all around Norway [...] about case management systems and their need for digital solutions. We wanted to see if there was a big difference in that most of the DigiBarnevern municipalities are big, and KS was very concerned with us creating something that everyone could use. So, yes, we made an effort in talking with smaller municipalities as there are differences in whether or not they have collaboration agreements with other municipalities around CWS. (Informant 'N,' CWS expert, Oslo municipality, interview)

With Trondheim being the third largest municipality in Norway, smaller municipalities had seemingly less expertise when procuring new systems and services. Informant 'J' who was leading the procurement process speculated that a lack of expertise in procurement and digitalization processes led to municipalities missing opportunities to participate.

> There are clear municipal differences. The other municipalities can make comments and come up with input through hearings. But it varies, some municipalities did not comment on the descriptions of needs and the specification of requirements at all, which suggests that they have not taken the time

> to look at it as there is always something to comment on in such documents. The other smaller municipalities probably lack a certain amount of expertise in the development of digital services since they were involved to a minimal extent. They also do not have enough ownership of what is being developed as a professional system. (Informant 'J,' procurement consultant, Trondheim municipality, interview).

During the concept phase, all Norwegian municipalities were invited by project management to contribute to hearings during the procurement process. However, smaller municipalities contributed less when writing requirements for the tender. Unless the municipalities have in-house expertise, this lack of power greatly limits digital system innovation. Notably, Oslo (Norway's largest municipality) and Trondheim contributed the most to the procurement mapping phase. According to informants, this was due to their lack of expertise in system development.

> Oslo has a large professional environment already. We have a professional system department that has reasonable support for all districts and child welfare programs and other types of programs. [...] So, it was quite natural to think that Oslo could invest resources in such a project. (Informant 'N,' CWS expert, Oslo municipality, interview).

The larger municipalities involved in the procurement had more experience and CWS-related resources and could participate to a greater extent in the project. By collaborating with all the municipalities involved in the procurement, a lot of the project management team's time was spent coordinating with all the different stakeholders. This effort was mentioned by several of the project management team members:

> It is quite rare that the municipalities go together like this on a procurement. This is because the municipalities are autonomous in the systems they choose. [...] So, the challenge has been to collaborate with other municipalities in procurement while considering their individual organizational structure. (Informant 'Y,' IT expert, Trondheim municipality, meeting).

G also brings up the possibility of challenges during development arising from inter-municipal collaboration in the procurement process:

> The municipalities have their own organizational structures that add uncertainties when collaborating on a larger development project like this. For example, Oslo municipality is more politically governed which could lead to restructuring and changes in management. Also, we have seen that even

> though the municipalities can have the same needs but different ideas about how to complete the procurement. (Informant 'G,' CWS expert, Trondheim municipality, interview).

The project management team suggested that changes in the political and structural organization for single municipalities could possibly lead to changes in the priorities of financial allocation as well as who would be the project's contact person within a given municipality. On the one hand, collaboration allowed the municipalities to pool their resources and expertise but brought on challenges related to the participation of each municipality. Smaller municipalities with less expertise from similar development projects had fewer opportunities to send caseworkers to participate in hearings and meetings on writing requirements. On the other hand, without collaborating with other municipalities, a single municipality would not be able to contribute at all to such a project.

In addition to collaboration at municipal and state-level, the project scaled as KS and the Digibarnevern municipalities made the joint decision to develop a second system for children, parents, and foster parents to communicate with caseworkers and follow information about their case with CWS if a notice of concern has been issued.

> In an in-person meeting with the project management team after the procurement process had ended the question was posed of how the project was separated into two subprojects. Y recalled; 'The topic of creating citizen services came up during the concept phase. Everyone [KS, Bufdir, and municipalities] saw the need for establishing a good dialogue with the citizen.' G elaborated; 'The idea was always to have better collaboration with the citizen.' (Project management team, Trondheim municipality, meeting).

The division of the project into subprojects also served to center two different main user groups; one project focusing on caseworkers and the other on citizens in contact with CWS. As the citizen services subproject would be developed by the municipalities in conjunction with KS, this was not part of any procurement and therefore out of the scope of this paper. However, though the two systems are divided into subprojects, their development processes were linked, just as the systems themselves will be linked through a joint content base.

Project leader 'T' describes how one subproject, citizen services, depends on the other, i.e., the development of the case management system. Making decisions about the content and development timeline of the case management system, and therefore also citizen services is an outcome of writing the tender report.

> The content and timetable for citizen services depend on the case management system. Thus, it must be viewed in part according to the outcome of the

> tender process. In the process of mapping needs, a lot will happen. [...] What happens when announcing a public procurement is that the tender specifies what will be included in the case management system. [Users' needs] must be specified and included in the tender so that the suppliers know the parameters of what they offer. (Informant 'T,' project manager, Trondheim municipality, interview).

In sum, the project management team had to translate users' needs into the requirement also on behalf of citizens in the procurement of the case management system. Mapping of citizen needs had to be done early on during the concept phase of the case management system in parallel with the mapping of caseworkers' needs. As rounds of negotiations between the municipalities and potential suppliers followed in 2021 based on the original tender, many users' needs had to be articulated for both caseworkers and citizens.

6.2 Negotiating participation

Many parameters related to functionality and user needs had already been defined when the tender report was written at the beginning of the procurement process in addition to the project's scale. 'Y' summarized the process of specifying needs in the requirements:

> In writing the requirement specifications, we focused on being user-oriented, listing the needs of users and not specifying a solution. It is the supplier's job to deliver something that aligns with those needs. [...] After the requirements are specified the focus is no longer on dialogue [with potential suppliers]. There might be some clarifications but no dialogue.' (Informant 'Y,' IT expert, Trondheim municipality, meeting).

'G' reflects on how the project management team had to translate the needs of citizens and caseworkers into requirement specifications while writing the tender:

In formulating the needs, we focused on describing the needs from different angles in order to achieve the best possible technical solution. We didn't want to make cool gadgets but something that actually supported practices. [...] I think the focus on user participation in this project is considerably larger than what has previously been done in development projects in CWS. Considering the dialogue with user organizations, the inclusion of CWS experts in the project, and the thorough mapping of users' needs. When mapping the focus was on how they can be supported, not which solutions they want.' (Informant 'G,' CWS expert, Trondheim municipality, interview).

In total, 221 requirements are specified in the tender report distributed across 38 topics related to laws and regulations; security; privacy; supporting work processes; usability, quality of service; system interoperability;

scheduling, planning, and documentation during the development process; and maintenance and further development. These requirements were central to much of the decision-making in procurement as they have two important aims. First, requirements describe the users' needs and the functionality desired for the procured system. Second, they function as a checklist against which suppliers' offers are evaluated. DigiBarnevern's tender report mentions the need for the participation of citizens, citing legal arguments, 'the law shall facilitate local government and a strong and representative local democracy with active citizen participation.' (Section 1: Laws, regulations, standards, and language, Tender report Appendix 1, p. 22).

The participation of caseworkers and others within CWS was grounded in the tender report by specifying that representatives from the different municipalities would work together in reference groups throughout the project. The reference group would consult the project management team in the development. The municipalities also wrote that an interdisciplinary project management team would be established, consisting of subject experts from municipal CWS, service design, and procurement. In addition to ensuring the quality of the system, CWS experts had an important role because they were invested in establishing a good relationship with the supplier. This was seen as necessary for a good collaboration, both during and after the procurement.

> The most important thing for me is that [the supplier has] an idea of how to use us [i.e., CWS experts] in the development, that they can hold out a few years, and that they have an idea of how to further develop things—not just that it should be developed and that it is a struggle every time something else is to be done. That's the experience we are now left with, with what we have [i.e., the current case management system]. (Informant 'M,' CWS manager, Oslo municipality, interview).

The tender specifies many roles that will be filled throughout the project's lifespan and by whom. Additionally, the tender emphasizes end-user participation in any supplier's offer. 'Emphasis will be placed on the extent to which the supplier will involve users [citizens and CWS workers] in idea generation, concept work, detailing, prototyping, and testing of functionality.' (Section 36: Standard upgrades and maintenance, p. 129).

Though the tender included references to desired participation in the later phases of developing case management systems, the language in this section remained somewhat ambiguous regarding how participation was weighted related to other requirements. Procurement consultant 'J' worried that a lack of clarity in what they meant with user participation in the development phase would have ramifications when development began.

> A good enough job has probably not been done to include [end-user] participation as a requirement in the procurement. This will probably have consequences for the degree of involvement of users in the development. (Informant 'J,' procurement consultant, Trondheim municipality; interview).

'J' was worried that if user participation was not described clearly enough in the tender, then suppliers would not prioritize it in the development phase. The DigiBarnevern municipalities' choice of procurement was seen by some of the informants as a threat to good user participation during development. Informant 'M' explained that the traditional procurement process did not facilitate the flexibility that would allow for more user participation:

> We had a description of needs that we were supposed to publicize because we were thinking that we should have a different type of tender than the ones that only contain requirement specifications. Then, we found out that we probably had to go the old-fashioned way with more requirement specifications. We reworked the description of needs so that it became as it is now before it went out on tender this spring. (Informant 'M,' CWS manager, Oslo municipality, interview).

When the municipalities decided to write a more traditional procurement type, many requirements had to be detailed enough not to confuse suppliers when reviewing the tender. However, this meant that user needs had to be translated to specific requirements that could be harder to revise with end-users' participation. Informant 'J' mentions the issues the project management team has dealt with when writing the tender report leading to several rounds of specifying descriptions of requirements and users' needs.

> We received feedback from suppliers about confusion when there is such a large difference between the degree of detail [of requirements]. If it is not detailed on some points, but on others, there is a recipe, then you run the risk that the suppliers will come up with something completely different on the vague parts. [...] Vague descriptions of users' needs lead to less focus on needs in the conversations with suppliers because so many resources are used to navigate the relationship between the project management and suppliers. More resources were used on this than determining the needs in a way that suppliers could relate to. (Informant 'J,' procurement consultant, Trondheim municipality, interview).

'J' underscores the importance of specifying requirements in conjunction with suppliers as this becomes the foundation for a common language

and understanding of users' needs. Additionally, the project management team wanted user participation to be a part of the development of the system after procurement.

The project management team conducted a series of conferences with suppliers from mid-2019 to mid-2020. These meetings aimed to create an understanding of the role of CWS and the different user groups' needs. The project management team put several participatory activities into practice, involving different stakeholder groups in multiple workshops in the four years before the tender was published (see Figure 2). In these meetings, representations of caseworkers and citizen groups were introduced to suppliers by using personas and user journeys:

> Analysis of the target group brings empathy into the mapping of needs. The activities included in the workshops show how decisions affect people. The personas that we used have different degrees of IT knowledge, knowledge of the child welfare service, trust in the child welfare service, and the like. […] Using personas lifts the weaker user groups forward that otherwise are difficult to involve. We've done customer journey workshops using personas and user journeys with caseworkers. The purpose of user journeys is to map the users' needs and experiences of the service from the first to the last point of contact. (Informant 'Y,' service designer, Trondheim municipality, interview).

In sum, the project management team and municipalities involved in writing the tender report engaged in negotiations of what user participation would look like in the development of a new case management system for CWS. This negotiation took place both formally through the work municipalities put in when writing the tender and requirements and more informally through direct dialogue with suppliers in conferences using personas and user journeys to establish a common language around users' needs.

6.3 Positioning representatives

From 2016, representatives from municipal CWS in Trondheim were represented in the project management team as subject experts that worked alongside hired IT consultants in different capacities. This included mapping users' needs, both the needs of CWS in multiple municipalities and citizen representatives. A concrete example of the positioning of CWS representatives is its formalization through the tender report. In the tender, municipal resources in the form of CWS expertise and hired consultants were recruited by the project management team in central roles for the future development phase:

> The Customer [i.e., municipalities leading the procurement] will contribute expertise and capacity within several subject areas in the project implementation. It will be crucial that the Supplier takes advantage of the resources the

> Customer contributes to the success of the project. […] The customer can use their agreements for the purchase of goods and services within ICT and consultancy services to staff roles in the project. (Appendix 1, Section 28 - The Customers competence in the development phase, p. 109).

The tender goes on to specify an estimation of what the customer will provide of resources in the form of experts who will assist in the development phase. This includes 2 to 4 CWS experts working full-time, 1 to 2 full-time service designers and user interaction experts, 2,5 full-time system architecture and security experts' positions, and 3,5 full-time equivalent professional resources. Most experts were repositioned from other roles in the municipality and subsequently inhabited key roles in the project before the contract with the supplier was signed.

In addition to addressing the participation of CWS caseworkers, CWS experts were tasked with mapping the needs of citizen representatives. According to a CWS manager, this decision came because of a shift in views on citizen participation in the past years:

> When I first started working in CWS there was no talk of participation. No, they [the citizens] were allowed to say some things [regarding one's case], and we would get consent, but we all know what consenting meant [=intended as passive consent]. So, this focus on participation is new. (Informant 'M,' CWS expert, Oslo municipality, interview).

As the project scaled up, including several municipalities, deliverables, and functionalities, caseworkers were seen as a resource that would contribute expertise to improve the quality of a new case management system. The scaling up of the project led to the establishment of levels of decision-making in the project. In addition to a steering group, reference groups consisting of CWS experts were formed to focus on specific concerns. These groups' decisions would have much of the final say in the developed systems' quality and functionality and report these to the project management group. Four reference groups, focusing on finance, archive, technical, and organizational, were formed in conjunction with acquiring and developing the envisioned case management system. These would be communicating with the project management group in the process of forming requirements. 'M' and 'N,' from municipal CWS in Oslo were recruited to be part of reference groups based on their unique expertise. CWS expert 'N' has 8 years of experience as a caseworker and from system support in Oslo municipality, thereby having a lot of insight into the inadequacies of the existing case management system they were using:

> Yes, I'm probably what you call a subject expert, then. I know a lot about what they are struggling with in the use of the current case system especially.

> I'm a bit on the side as a professional resource, as I know more about the use of the system, and it is with that perspective I can say something about usability and what is important for employees in their daily work. (Informant 'N,' CWS expert, Oslo municipality, interview).

Informant 'M' also has a wealth of experience from CWS having inhabited different roles in CWS both as a frontline worker and a manager. 'M' had just quit the job as CWS manager at the district level when they were approached by the district manager wondering if they could be a CWS expert for the Digibarnevern-project due to their experience with the implementation of the current data system. As 'M' told us, their recruitment was a result of word-of-mouth and their own interest in systems:

> It turned out that, since I am involved in some things, someone else heard about it and I was asked if I could participate in another part of the project as well… [I am] like a professional expert for those that develop this [case management system]. It is more because they know nothing about child welfare, but we do. So, then, I'm involved because I have knowledge and experience of child welfare but also because I have an understanding of the system that this should go into. (Informant 'M,' CWS manager, Oslo municipality, interview).

As CWS experts they had a great deal of impact on key aspects of the final system as the resource groups they are involved in have the task of evaluating the offers and during the subsequent development stage.

> Several experts in the resource groups are taking part in the evaluation [of the procurement offers]. There are three CWS experts from Trondheim municipality who will be involved in evaluating the functional requirements related to that domain. And then there is someone else who will participate and evaluate archives and finances. And then there are some other [CWS experts], I think, that will also be involved in the technical requirements. Yes, and there are a few more that will be involved in the evaluation than those who have been involved in writing the requirements. (Informant 'N,' CWS expert, Oslo municipality, interview).

Whereas the CWS experts recruited from Oslo had systems expertise, that was not the case for all experts. Caseworker 'A' was hired in Trondheim as a CWS expert in the project management team. Before joining the project, they had worked as a caseworker for unaccompanied child refugees and joined the project through a normal hiring process. 'A' described that they had a detached relationship when using the existing case system before joining the project:

> I had heard about the project and that they needed people. So, I applied, went to an interview, and was hired for the position. […] It is hard to remember now, but I think I got the announcement in an email. When you work in CWS, you don't think about computer systems in this way. You are more like, okay, this is the computer system that we have, and you can be frustrated at it at times, but you don't reflect on it much. So, I was very unsure how I was going to manage this job. […] There are many things I have not done before, like making mockups of what user interfaces could look like. That's something I have never done before but it is very educational. There are many words and expressions I wasn't familiar with. (Informant 'A,' CWS expert, Trondheim municipality, interview).

Despite having doubts about what they could contribute as someone without system development experience, 'A' now saw their expertise in a new light while learning how to contribute to envisioning a new digital system based on users' needs. Before joining the project management team, 'A' felt that a case management system was something that they could not influence.

CWS experts were involved in mapping needs before procurement, from collecting interviews from CWS in smaller municipalities to facilitating user testing of prototypes with caseworkers and citizen representatives. During a meeting in mid-2021, 'A' mentioned work sessions the project management team was conducting with CWS and citizen representatives shortly after the contract was signed with the supplier to gather feedback on how the user needs had been translated to specific functionality. 'A' had experienced the feedback as quite positive:

> Thorough mapping was done a while ago for both citizens and employees and based on that we have arrived at planned functionality for the system. Now we have again presented it to both citizens and employees to hear if we are on the right path or what they think about it. t it. [...] We experienced that everyone was very positive about most things. We've had a lot of good and constructive input, especially on the citizen side. ('A,' CWS expert, Trondheim municipality, interview).

Parallel to these sessions, 'M' was involved in testing the professional framework that would be integrated into the case management system. This included informational texts that were presented and continuously refined in different venues:

> As soon as we have something ready that we think we can test on people, we will do it [...] and they have also been through the user organizations with information about thinking and mindset and received criticism

> and made some small changes. So yes, there is a good deal of user participation both from caseworkers as users of the case system and users of the quality part, but also our end-users who are then children and parents. ('M,' CWS expert, Oslo municipality; interview).

To summarize, by being involved in much of the mapping of needs, CWS experts had the role of advocating for both their own and CWS workers' needs, but also the needs of citizens. Experts that had experience working both in CWS and with current case management systems played a central role in the procurement. Considering their dual expertise, they served as a link between social work as a profession and system development. While working alongside IT architects and service designers, municipal CWS workers can voice their colleagues' needs while being relieved from their casework load to lend their expertise in procuring a new system.

7 Discussion: Infrastructuring participation in procurement

CSCW studies of system procurement and development have revealed that the early phases pose significant challenges for user involvement while they are crucial for shaping future opportunities for participation (Bødker, 2017; Farshchian and Thomas, 2017; Mikalsen et al., 2018). Despite the prevalence of systems procurement in the public sector, there is an evident lack of research in CSCW on how user participation is enacted in such cases. In answering our research question— *what affects participation in early-stage procurement processes in the public sector?* —we pointed to infrastructuring practices that affect participation in procuring a new case management system to be adopted by Norwegian CWS caseworkers; in the initial stages user needs and other requirements had to be defined upfront. The infrastructuring practices we identified correspond to decision-making practices that were collaboratively enacted by the project management team to pragmatically resolve emerging tensions by scaling the project, negotiating participation, and positioning subject experts. The results of these practices were crystallized in the official documentation accompanying the project's tender process, which likely has consequences for subsequent user participation in the new system's development (Table 2).

In discussing our findings, we focus on three distinct but interrelated topics: 1) the concretization of users' needs in the procurement, 2) the practice of participation and creation of knotworks, and 3) elaborating on participatory infrastructuring as a conceptual understanding of participation in the context of municipal systems procurement. Participation in the procurement process was instantiated in different ways; firstly, in writing the tender contract and aligning requirements with user needs; and secondly, regarding how future

Table 2 Summary of infrastructuring practices.

Infrastructuring practices	Effect on participation
Scaling up the project	Scaling up of the project, through collaborating with multiple municipalities and establishing subprojects, enabled access to more funding which allowed for a new system to be developed through procurement and collaboration with a supplier. However, by including more municipalities a more rigid procurement type had to be used which does not allow for much flexibility and participation in design and development. Therefore, the effects of scaling on participation cannot be seen as entirely positive or negative.
Negotiating participation	In writing tender requirements, a lot of work was put into detailing the needs of the end-users (i.e., caseworkers and citizens) which was seen as necessary for ensuring the quality of the system. This led to difficult balancing act between specifying requirements and opening up for participation in development.
Positioning representatives	Caseworkers were represented in many parts of the procurement, from defining the needs of fellow caseworkers in different municipalities, to the recruitment of CWS experts in the project management team and reference groups.

users might be included throughout the development process, in the opening and closing of choices, depending on the chosen suppliers.

7.1 Concretizing users' needs in the specification of requirements

The expressed needs of users were anchored through requirement specifications in the mapping stage, which included workshops and feedback meetings with citizens and CWS workers. Tender requirements should be as detailed as possible when using traditional contracts for public procurement. This is beneficial when evaluating offers and selecting the supplier who will develop the best system. However, the specificity of requirements must be balanced with the flexibility necessary for several stakeholder groups to influence decisions throughout. In the findings, we described that the project management team had to rework and concretize the requirements that specified users' needs to fit with the format of the procurement type. There was concern that in revisions, end-user participation would not be anchored well enough in the requirements. Therefore, the tension between prioritizing highly specified requirements and room for effecting decision-making through participation in the development remained. The step in formulating the tender was considered necessary by the project management team because any subsequent end-user participation would have to be negotiated between the municipalities (the customer) and the chosen system supplier. The supplier is assumed to have significant power over the final product due to their control of the following development phase. At the same time, the development will be based on the requirements set by the DigiBarnevern municipalities, represented by the project management team. Therefore, the division of decision power over what is being developed will depend on which phase the project is in.

According to this analysis, procurement can be seen in relation to the notion of decision-linkages as defined by Bratteteig and Wagner (Bratteteig and Wagner, 2016). Making design decisions is a complex and subtle process in design projects in which choices are opened or closed stepwise in the process of 'seeing-moving-seeing' (Bratteteig and Wagner, 2016; Schön, 1983). Based on the first decisions, some avenues for further decision-making will be opened while others will be closed. These 'moves of opening and closing choices in the process of making are driven or modified by decisions that users participate in as co-producers of design ideas and as evaluators' (Bratteteig and Wagner, 2016, p. 427). However, we found that many major choices about the user's needs were formalized in the tender documentation, limiting the remaining availability of consecutive choices. Therefore, thorough mapping of user needs before the publication of a tender was essential to open avenues for future choices. The DigiBarnevern-project's management team highlighted this in translating users' needs into requirements with which a supplier must comply. These requirements were open enough to describe needs, not technical solutions, but clear enough not to create confusion. The tender defines the scope for further development; thus, it constitutes a pivotal moment because it crystallizes the needs documented in the tender. In sum, procurement involves making decisions that frame all later choices.

The procurement of digital systems warrants more flexible service development approaches compared to what traditional public procurement processes allow (Langseth and Similä, 2021; Mikalsen and Farshchian, 2020). The boundary between how much of the new system is defined based on requirements specified in the tender and how much end-users can influence outcomes can be seen in relation to the flexibility of the contract type. This tension between contract assessment and flexibility was highlighted by Langseth and Similä (Langseth and Similä, 2021), as well as in our findings. The project management team specified that user participation, through reference groups and user testing, should be part of the development phase, requiring some flexibility in the requirements. However, with added flexibility, like continuous user participation also during the development phase, evaluating whether a supplier's proposed solutions become more difficult than creating a list of inflexible requirements. Contending with a traditional procurement became challenging for the project management team as standard requirement specifications prioritize future solutions before needs, as illustrated in the findings (Bødker and Grønbæk, 1991; Shapiro, 2005).

The tender documents required end-user participation in the development phase as a way to circumvent the rigidity of the traditional procurement. The DigiBarnevern-project's management team used the tender report to specify resources in the form of subject experts' time and how these resources should be organized. Though, any effect on decisions or project outcomes must be weighed against the other requirements set in the tender and the existing infrastructure of local CWS with their various organizational constraints. Hence, the tender and

procurement process can provide limitations to participation but also be exploited to facilitate participation in development. However, newer approaches to procurement could offer new ideas and suggestions regarding who should be included in the development process, as well as how and when.

7.2 Establishing knotworks of CWS representatives

Bødker et al. (Bødker, 2017) have drawn on the concept of knotworks to describe the temporary networks that arise during infrastructuring processes, such as development and design work. In the DigiBarnevern-project, we found that experts—such as caseworkers—were recruited into knotworks with decision-making impact during the case management system's ideation and procurement stages. Additionally, the establishment of knotworks was codified in the tender as resource groups. These knotworks were constellations of 'participants with different backgrounds, perspectives, and agendas' (Bødker, 2017, p. 251) who work toward a common goal of obtaining a new case management system. By positioning people with CWS experience alongside IT experts, DigiBarnevern fostered opportunities for mutual learning. CWS experts without previous systems experience previously perceived case management systems as rigid and unmalleable. However, CWS experts saw value in their expertise when collaborating with IT experts in writing requirements. This realization was a byproduct of collecting information about caseworkers' practices in different municipalities and detailing their needs. We see mutual learning as integral to participation in system design and development. Working closely together over time towards a common goal allows for more opportunities to foster a collective understanding of key problems and the work that the new system will support. This increased input from CWS caseworkers in the DigiBarnevern-project intends to improve the procured system's quality while facilitating caseworkers' autonomy in the development. This positive outlook for the system's future resonates with arguments found in the PD discourse (Bratteteig and Wagner, 2016).

The recruitment of CWS experts into the procurement process in the DigiBarnevern-project is reminiscent of, and further extends, the suggestions put forth by Bødker and Grønbæk (Bødker and Grønbæk, 1991). They see a tendency that many are recruited based on power relations within an organization, such as middle management, who might only have an abstract idea of the tasks of frontline workers. They suggest recruiting diverse participants for PD projects based on their tacit knowledge and expertise of daily work practices, either through the election of representatives or by recruiting those most enthusiastic about participating. In the case of DigiBarnevern, both recruitment tactics took

place. CWS experts were either encouraged by management in their municipality to participate or by applying for an official position in the project, thereby having a specific interest. Bødker and Grønbæk (Bødker and Grønbæk, 1991) highlight the resources needed for real or 'genuine participation' in large projects. Representatives cannot be expected to do their normal workload in addition to contributing to systems development and design work. Their contribution to design work should be valued and, therefore, the management must plan to free them from at least part of their day-to-day work. Unfortunately, the number of resources needed to facilitate end-user participation is underestimated in many public sector development projects (Torvinen and Ulkuniemi, 2016). Though the DigiBarnevern-project embedded CWS experts in full-time or part-time positions, it remains to see if there is enough representation to avoid some of the significant issues other public projects have experienced in systems implementation.

Procuring a future system in the DigiBarnevern-project involved negotiations including end-users, CWS management, municipal officials, and potential suppliers, followed by decision-making at multiple organizational levels. Therefore, the effect of user participation on decision-making is difficult to isolate as practices embedded the involvement of CWS workers throughout. In the findings, we presented an example of CWS experts vocalizing the needs of children and families in interviews as they were also involved in mapping citizens' needs. Though the emphasis on citizens' participation was mainly the concern of the citizen services subproject, the interconnectedness of the two systems led to discussions of whether citizen needs were preserved in the procurement process. In this way, the knotworks formed in the procurement project did not only send direct participants but a larger user base as the result of being involved in mapping users' needs. However, that caseworkers and others in CWS represent citizen perspectives is not a fully unproblematic practice. In a qualitative study of parents with minority backgrounds in contact with Norwegian CWS, some reported countering narratives to caseworkers and the experience of being 'othered' by caseworkers and CWS (Fylkesnes et al., 2018). How well citizen perspectives have been cared for in the development of systems remains to be seen.

This finding aligns with those of Andersen et al. (Andersen et al., 2015), where participants' perspectives were translated and represented through policy reports, evaluations, and prototypes that informed decision-making in design. Specifically for social work, they state that children 'thus bring with them a network of people, institutions, reports, histories, problems, and concerns. These elements constitute children as participants, they mediate and form the participation of children' (Andersen et al., 2015, p. 257). Participants are seen not as

isolated subjects representing only themselves but as network configurations (Andersen et al., 2015). This is a similar view of participation as described by Bødker et al. (Bødker, 2017), where they view networks of people as the constellations that emerge through infrastructuring, with knotworks being more temporary forms of networks that are formed, for example, in development projects. The following subsection will expand on the network perspective and participatory infrastructuring.

7.3 Building on Participatory Infrastructuring

We view the case of procurement in DigiBarnevern as participatory infrastructuring as defined by Bødker et al. (Bødker, 2017), that is, the situated, day-to-day, and often seemingly mundane decisions that are made behind the scenes in creating official documentation that shapes the project's future outcomes. Since the DigiBarnevern-project presents a major shift not only in terms of digital systems but also in CWS work practices, we allege that decisions related to who gets to participate in writing systems requirements in the procurement process will have implications later. The reason for this is that municipal CWS will have to contend with administrative tensions that need to be resolved at the local level in the implementation phase and beyond. This infrastructuring work will require the commitment of local CWS management in the affected municipalities focusing on long-term sustainability and embeddedness in existing social structures (cf. Bødker, 2017; Karasti and Syrjänen, 2004).

As described in the findings, early decisions related to the project's scale also affected how participation was practiced in the procurement processes. The scaling-up of development projects has been regarded as a major challenge to participation (Neumann and Star, 1996; Roland et al., 2017). This is due to the increased complexity of, for example, practicalities related to organizational structures, the allocation of funding, and, most importantly, where the main authority for decision-making lies (Blomberg and Karasti, 2012). In our study, we found that larger municipalities with greater access to resources were responsible for much of the preparation work, leading to a power imbalance as smaller municipalities did not engage much in the decision-making process. Despite an attempt to address this imbalance by interviewing caseworkers from smaller municipalities and invitations to public hearings, this problem mainly remained unresolved since smaller municipalities lacked the resources to participate directly in the procurement from start to finish. These findings reflect the issues of spatial scaling of participation in that new infrastructure will be implemented at several municipalities, all with their own

existing sociotechnical structures. Though spatial scaling issues have, thus, been described, empirical research on these issues is still lacking (Bødker and Kyng, 2018; Karasti, 2014).

Infrastructuring provided a useful lens through which to understand the procurement of DigiBarnevern's case management system as part of a larger process that not only created new systems but also will shape new work practices for municipal CWS caseworkers. Viewed as infrastructuring, the practices performed in the context of procurement presented in this paper can be seen as a way of scaling participation. Building on the concept of participatory infrastructuring (Bødker, 2017), participation includes much more than the work done with users in workshops and other collaborative activities; it is also a continuous process that takes place over time at multiple levels, both horizontally and vertically, in an organization. Thus, it does not merely comprise of isolated participatory activities, but also in the writing of requirements and the inclusion of end-user representatives in various knotworks.

Consequently, understanding participation as something that also takes place behind the scenes—that is, decision-making in between workshops and user testing—provides a more nuanced view of how participation can scale up than in the traditional service design view of participation. Work practices centering around the new case management system will change in different ways depending on the context the system will be implemented. This provides challenges in writing the requirements, as additional considerations are to be made, and in establishing knotworks that attempt to represent all users. Here some municipalities participated more directly than others as they had the resources and an existing infrastructure that supported electing CWS experts to participate in knotworks and decision-making. Though challenges to user participation are often seen as an issue of the designer opening the decision-making process to users, the users' context can also hinder their ability to participate.

In sum, we see participatory infrastructuring executed in the project in the way it was scaled up, the placement of CWS experts in decision-making positions throughout development, and the opening of some avenues for future decisions during the procurement process while closing others. This led to a view of participation as embedded in practices within the project that included remnants of CWS voices. In the context of the procurement process, essential decisions were made that profoundly affected how a developing system would function and therefore constituted a pivotal moment that crystallized the articulation of previous participatory activities.

8 Conclusions

This paper contributes to the discussion on participation in CSCW infrastructuring processes by presenting a case of new system procurement for municipal CWS. Particularly, we elucidated procurement's role in shaping the outcome of infrastructuring processes, as well as its effect on defining how user participation in systems development is facilitated. The act of procuring systems in the public sector, through writing and publishing a tender report, has crucial implications for subsequent choices. The infrastructure practices that were triggered by the procurement process, and identified through analysis, related to the project's scaling, the positioning of CWS workers, and the opening of avenues for future decisions.

Our analysis illustrated how early-stage infrastructure practices significantly influence CWS practices and participation. First, we have underscored this impact on project scaling regarding the procurement of the system and the parties with whom the project is negotiated and solidified. Thus, the project's scale is determined in the tender, which—in turn—delineates who will participate in which stages of development. Any flexibility is established by the tender and/or negotiated between the customer and supplier. Second, we have shown that positioning CWS workers in different positions related to the development process is a way to embed subject experts into participatory activities. This approach allows experts to share their own experiences and opinions while working directly with IT specialists and participating in collaborative activities with other end-users, such as interviews, user testing, and workshops. Finally, we have shown that the procurement process, in the case of DigiBarnevern, opens avenues for further participation while closing others. This view of procurement in an infrastructuring light has not been explored much by existing CSCW; however, this study aims to highlight the realities of public procurement and the tendering process as an important factor in determining participatory practices.

Our study was empirically limited to findings regarding the early stages of the design and procurement process, focusing on case management systems and caseworker participation. Therefore, subsequent studies of this case seek to investigate other aspects of the DigiBarnevern-project, particularly participation by citizens as end-users, the development of citizen services, and other phases of the infrastructuring process, like that of implementation. Having focused on the planning and procurement phases, we do not unpack the results of participatory activities or infrastructuring work during the project's later stages. Additionally, the context of this single case study is inspired by Scandinavian democratic ideals and with a participatory agenda while adhering to CWS and municipal CWS regulations and the organizational structure of the Norwegian public sector. However, we encourage similar studies on procurement's role in relation to participation in the CSCW community.

Appendix

Table 3 Analysis stages

Stage 0: Preparing the data for analysis

Using the qualitative data analysis software Nvivo, data was imported and categorized by source - i.e., who the informant was and their role in the project - as well as the type of data - fieldnotes from observations, interviews, or public documents.

Stage 1: Inductive coding

The coding was conducted in vivo, closely conveying what informants said, without interpretation. At the same time, memos were used to indicate quotes and note related concepts.

E.g.: 'We had this tool for clarifying messages, for example, ['G'], I and a couple of others went out and tested it on people we know in child welfare' ('M,' interview transcript), was coded as '*child welfare experts in charge of user testing of fellow caseworkers.'*

Stage 2: Conceptual coding

A second coding round was conducted based on repeating concepts from the memos and the coding done in Stage 1. Sentences that fell under more than one theme were coded several times as sentences did not necessarily fit into discreet categories. Using Nvivo, the coded themes were displayed across different data types (interviews, observations, and documents). This categorization resulted in the following codes:

- *Preparing the tender specification*: All instances of defining specifications included in the tender.
- *Invoking project goals*: All instances of describing the project's main goal or motivation.
- *Specifying technical requirements*: All mentions of fixed technical requirements (e.g., security and interoperability).
- *Aligning with the organizational structure*: All instances of adhering to the organizational hierarchy (e.g., when an organizational level is required to take part in a decision and concerns that span several municipalities).
- *Increasing ownership*: All mentions of establishing ownership over the project or system.
- *Leveraging expertise*: All mentions of using people with a specific profession or experience.
- *Collaborating:* All instances of collaboration between different stakeholders.

These child codes converged under parent codes in Step 3.

E.g.: 'As of now, the systems are used for archiving and noting decisions in a case. A new case management system will change a lot about how you work with methods and professionally' was code as new case management system will change work practices in stage 1, and as invoking project goals in stage 2.

Stage 3: Identifying overarching practices

In stage 3, three overarching codes representing practices relate to participation in the procurement process. Here we focused on the practice performed that shaped how participatory processes would unfold. These overarching codes were scaling, positioning CWS experts, and negotiating participation (see Figure 1).

Note that the child codes from stage 2 did not fit discreetly into these overarching practices, so quotes presented in the findings may have more than one child code. We present the quotes under the section that best illustrates the overarching practice.

Acknowledgements

This paper is part of the project Digital Infrastructures and Citizen Empowerment (DICE) funded by the NTNU (the Norwegian University of Science and Technology) initiative Digital Transformation (project nr. 81771189). The first author collected all data together with Anne Wullum Aasback, from the Institute of Social Work at the Norwegian University of Science and Technology. This collaboration has been characterized by fruitful discussions and mutual learning in understanding the sociotechnical infrastructure surrounding the project. Additionally, this work could not have been done without open and amiable dialog with the DigiBarnevern-project's management team and the cooperation of Trondheim municipality. We thank the 'Forskerfabrikken' discussion group for providing valuable input on an earlier version of this manuscript. We are also grateful to the anonymous reviewers for their valuable comments and the associate editor for their guidance.

Funding Open access funding provided by NTNU Norwegian University of Science and Technology (incl St. Olavs Hospital - Trondheim University Hospital)

Decalarations

Conflict of Interest Statement The authors declare that they have no conflict of interest.

References

Aanestad, Margunn; Miria Grisot; Ole Hanseth; and Polyxeni Vassilakopoulou (2017). Information infrastructures and the challenge of the installed base. In M. Aanestad; M. Grisot; O. Hanseth; P. Vassilakopoulou (eds): *Information Infrastructures within European Health Care: Working with the installed base.* Cham, Switzerland: Springer, pp. 25–33.

Ahlgren, Per Christian; Johnny Lind; and Kari Nyland (2019). *Styring av samarbeid i offentlig sektor.* Norway: Fagbokforlaget.

Andersen, Lars Bo; Peter Danholt; Kim Halskov; Nicolai Brodersen Hansen; and Peter Lauritsen (2015). Participation as a Matter of Concern in Participatory Design. *International Journal of CoCreation in Design and the Arts (CoDesign)*, 11, 3–4, 250–261.

Anthopoulos, Leo G.; Panagiotis Siozos; and Ioannis A. Tsoukalas (2007). Applying participatory design and collaboration in digital public services for discovering and re-designing e-Government services. *Government Information Quarterly,* 24, 2, 353–376.

Arnstein, Sherry R. (1969). A Ladder of Citizen Participation. *Journal of the American Planning Association*, 35, 4, 216–224.

Artman, Henrik (2002). Procurer Usability Requirements: Negotiations in Contract Development. In *NordiCHI 2002. Proceedings of the 2nd Nordic conference on Human-computer interaction, Aarhus, Denmark, 19–23, October 2002*. New York: ACM Press, 61–70.

Beck, Eevi E. (2002). P for Political: Participation is Not Enough. *Scandinavian Journal of Information Systems*, vol. 14, no. 1, pp. 77–92.

Bjerknes, Gro; and Tone Bratteteig (1995). User Participation and Democracy: A Discussion of Scandinavian Research on System Development. *Scandinavian Journal of Information Systems*, vol. 7, no. 1, pp. 73–98.

Björgvinsson, Erling; Pelle Ehn; and Per-Anders Hillgren (2010). Participatory design and "democratizing innovation". In *Proceedings of the 11th Biennial Participatory Design Conference, Sydney, Australia, 29 November – 3 December 2010*. New York: ACM Press, pp. 41–50.

Blomberg, Jeanette; and Helena Karasti (2012). Ethnography: positioning ethnography within participatory design. In J. Simonsen and T. Robertson (eds): *Routledge International Handbook of Participatory Design.* London/New York: Routledge, pp. 86–116.

Bødker, Susanne; Christian Dindler; and Ole Sejer Iversen (2017). Tying Knots: Participatory Infrastructure at Work. *Computer Supported Cooperative Work (CSCW)*, vol. 26, pp. 245–273.

Bødker, Susanne; and Kaj Grønbæk (1991). Design in action: From prototyping by demonstration to cooperative prototyping. In J. Greenbaum and M. Kyng (eds): *Design at Work: Cooperative Design of Computer Systems*, New Jersey: Lawrence Erlbaum Associates, pp. 197–218.

Bødker, Susanne; and Morten Kyng (2018). Participatory Design That Matters–Facing the Big Issues. *ACM Transactions on Computer-Human Interaction*, vol. 25, no. 1, pp. 1–31.

Bøhmer, Roy (2020). Om DigiBarnervern-prosjektet, Norwegian Association of Local and Regional Authorities (KS), October 2020. https://www.ks.no/fagomrader/digitalisering/fellesloesninger/digibarnevern/om-digibarnevern/. Accessed 23 March 2023.

Børmer, Øystein (2014). Gevinstrealisering - planlegging for å hente ut gevinster av offentlige prosjekter. Report. Norwegian Agency for Public and Financial Management, October 2014. https://dfo.no/sites/default/files/fagomr%C3%A5der/Gevinstrealisering/Veileder-i-gevinstrealisering.pdf. Accessed 4 November 2022.

Boulus-Rødje, Nina (2018). In Search for the Perfect Pathway: Supporting Knowledge Work of Welfare Workers. *Computer Supported Cooperative Work (CSCW)*, vol. 27, pp. 841–874.

Bowers, John (1994). The Work to Make a Network Work: Studying CSCW in action. In *Proceedings of the CSCW 1994 conference on computer supported cooperative work*. New York: ACM Press, pp. 287–298.

Bowker, Geoffrey C. (2015). The Infrastructure Toolbox: Temporality. Cultural Anthropology Online, September 2015. https://culanth.org/fieldsights/temporality. Accessed 18 November 2020.

Bratteteig, Tone; and Ina Wagner (2016). Unpacking the Notion of Participation in Participatory Design. *Computer Supported Cooperative Work (CSCW),* vol 25, pp. 425–475.

Cornwall, Andrea (2008). Unpacking 'Participation': Models, meanings, and practices. *Community Development Journal,* vol. 43, no. 3, pp. 269–283.

Dahl-Jørgensen, Tangni C.; and Elena Parmiggiani (2020). Platformization of the public sector: Assessing the space of possibility for participation. In *PDC 2020. Proceedings of the 16th*

Participatory Design Conference - Participation(s) Otherwise, *Manizales, Colombia, 15–20, June 2020,* vol. 2. New York: ACM Press, pp. 35–39.

Dittrich, Yvonne; Dave W. Randall; and Janice Singer (2009). Software Engineering as Cooperative Work. *Computer Supported Cooperative Work (CSCW)*, vol. 18, no. 5, pp. 393–399.

Ehn, Pelle (2008). Participation in Design Things. In *PDC 2008. Proceedings of the 10th Participatory Design Conference, Bloomington, USA, 1-5, October 2008*. New York: ACM Press, pp. 92–101.

Engeström, Yrjö; Ritva Engeström; and Tarja Vähäaho (1999). When the center does not hold: the importance of knotworking. In S. Chaiklin; M. Hedegaard; and U-J. Jensen (eds), *Activity theory and social practice: Cultural-historical approaches,* Aarhus: Aarhus University Press, pp. 345–374.

Falch-Eriksen, Asgeir; and Marit Skivenes (2019). Right to Protection. In M. Langford; M. Skivenes; and K. H. Søvig (eds): *Children's Rights in Norway: An Implementation Paradox?* Universitetsforlaget, Norway, pp. 107–135.

Farshchian, Babak A.; Thomas A. Vilarinho; and Marius Mikalsen (2017). From Episodes to Continuity of Care: a Study of a Call Center for Supporting Independent Living. *Computer Supported Cooperative Work (CSCW),* vol. 26**,** pp. 309–343.

Flyvbjerg, Bent (2006). Five Misunderstandings About Case-Study Research. *Qualitative Inquiry*, vol. 12, no. 2, pp. 219–245.

Fylkesnes, Marte K.; Anette C. Iversen; and Lennart Nygren (2018). Negotiating deficiency: Exploring ethnic minority parents' narratives about encountering child welfare services in Norway. *Child & Family Social Work*, 23, 2, 196–203.

Greenbaum, Joan; and Morten Kyng (eds) (1991). *Design at Work: Cooperative Design of Computer Systems.* New Jersey: Lawrence Erlbaum Associates.

Grisot, Miria; and Polyxeni Vassilakopoulou (2017). Re-Infrastructuring for eHealth: Dealing with Turns in Infrastructure Development. *Computer Supported Cooperative Work (CSCW),* vol. 26, pp. 7–31.

Halskov, Kim; and Nicolai Brodersen Hansen (2015). The diversity of participatory design research practice at PDC 2002–2012, *International Journal of Human-Computer Studies*, vol. 74, pp. 81–92.

Hayes, Niall; Lucas D. Introna; and Noel Cass (2021). Participatory Design as the Temporal Flow of Coalescing Participatory Lines. *Computer Supported Cooperative Work (CSCW)*, vol. 30, pp. 507–538.

Hertzum, Morten (2004). Small-Scale Classification Schemes: A Field Study of Requirements Engineering. *Computer Supported Cooperative Work (CSCW),* vol. 13, no. 1**,** pp. 35–61.

Hochwarter, Stefan; and Babak A. Farshchian (2020). Scaling Participation - What Does the Concept of Managed Communities Offer for Participatory Design? In *PDC 2020. Proceedings of the 16th Participatory Design Conference – Participation(s) Otherwise, Manizales, Colombia, 15–20, June 2020,* vol. 2. New York: ACM Press, pp. 50–54.

Karasti, Helena (2014). Infrastructuring in Participatory Design. In *PCD 2014. Proceedings of the 13th Participatory Design Conference*: *Research Papers.* New York: ACM Press, pp. 141–150.

Karasti, Helena; Andrea Botero; Johanna Saad-Sulonen; and Karen S. Baker (2021). Visualizing Devices for Configuring Complex Phenomena in-the-Making. *Science & Technology Studies*, vol. 34 3.

Karasti, Helena; and Anna-Liisa Syrjänen (2004). Artful infrastructuring in two cases of community PD. In *PDC 2004. Proceedings of the 8th Participatory Design Conference: Artful integration: interweaving media, materials and practices*, *Toronto, Canada, 27–31, July 2004,* vol. 1. New York: ACM Press, pp. 20–30.

Karlsson, Fredrik; Jesper Holgersson; Eva Söderström; and Karin Hedström (2012). Exploring user participation approaches in public e-service development. *Government Information Quarterly*, vol. 29, no. 2, pp. 158–168.

Kyng, Morten (2010). Bridging the Gap Between Politics and Techniques: On the next practices of participatory design. *Scandinavian Journal of Information Systems*, vol. 22, no. 1, pp. 49–68.

Langford, Malcolm; and Tori Loven Kirkebø (2019). Children's Rights' Indexes: Measuring Norway's Performance. In M. Langford, M. Skivenes; and K. H. Søvig (eds): *Children Rights in Norway: An Implementation paradox?* Norway: Universitetsforlaget, pp. 42–104.

Langseth, Marius; and Jan Ole Similä (eds) (2021). *Å kjøpe for Norge*. Norway: Cappelen Damm Akademisk.

Le Dantec, Christopher A.; and Carl DiSalvo (2013). Infrastructuring and the formation of publics in participatory design. *Social Studies of Science*, *42*(2), pp. 241–264.

Lloyd, Robert E.; and Clifford P. McCue (2004). What is Public Procurement? Definitional Problems and Implications In *IPPC 2004. Proceedings of the 1st International Public Procurement Conference, Fort Lauderdale, Florida, 21-23, October 2004,* vol. 3, pp. 2-18.

Lodato, Thomas; and Carl DiSalvo (2018). Institutional Constraints: The Forms and Limits of Participatory Design in the Public Realm. *In PDC 2018 Proceedings of the 15th Participatory Design Conference*, *Hasselt and Genk, Belgium, 20–24, August 2018*, New York: ACM Press, pp. 1–12.

Lutters, Wayne G.; and Carolyn B. Seaman (2007). Revealing actual documentation usage in software maintenance through war stories. *Information and Software Technology*, vol. 49, no. 6, pp. 576–587.

Mikalsen, Marius; Babak A. Farshchian; and Yngve Dahl (2018). Infrastructuring as Ambiguous Repair: A Case Study of a Surveillance Infrastructure Project. *Computer Supported Cooperative Work (CSCW),* vol. 27, no. 2, pp. 177–207.

Mikalsen, Marius; and Babak A. Farshchian (2020). Can the Public Sector and Vendors Digitally Transform? A Case from Innovative Public Procurement In *ECIS 2020. Proceedings of the 28th European Conference on Information Systems – Liberty, Equality*, *and Fraternity in a Digitizing World, Research-in-progress papers, Marrakech, Morocco, 15–17, June 2020,* vol. 62, pp. 1–10.

Moe, Carl Erik; Anne Cathrine Risvand; and Maung K. Sein (2006). Limits of Public Procurement: Information Systems Acquisition. In M.A. Wimmer; H.J. Scholl; , Å, Grönlund; K.V. Andersen (eds): *Electronic Government (EGOV),* vol. 4084, Heidelberg: Springer, pp. 281–296.

Moe, Carl Erik; and Tero Päivärinta (2011). Challenges in Information Systems Procurement in the Norwegian Public Sector. In M. Janssen; H.J. Scholl; M.A. Wimmer; and Y. Tan (eds): *EGOV 2011. Proceedings of the 10th IFIP WG 8.5 International Conference on Electronic Government, Delft, The Netherlands, 28 August - 2 September 2011.* Berlin, Heidelberg: Springer, pp. 404–417.

Møller, Naja Holten ; Maren Gausdal Eriksen; and Claus Bossen (2020). A Worker-Driven Common Information Space: Interventions into a Digital Future. *Computer Supported Cooperative Work (CSCW)*, vol. 29, pp. 497–531.

Monteiro, Eric; Neil Pollock; Ole Hanseth; and Robin Williams (2013). From artefacts to infrastructure. *Computer Supported Cooperative Work (CSCW),* vol. 22, no. 4–6, pp. 575–607.

Neumann, Laura J.; and Susan Lee Star (1996). Making infrastructure: The dream of a common language. In J. Blomberg; F. Kensing; and E. Dykstra-Erickson (eds): *PDC 1996. Proceedings of the Participatory Design Conference, Palo Alto, USA, 13–16, November 1996.* New York: ACM Press, pp. 231–240.

Oostveen, Anne-Marie; and Peter Van den Besselaar (2004). From Small Scale to Large Scale User Participation: A Case Study of Participatory Design in E-Government Systems. In *PDC 2004. Proceedings of the 8th Conference on Participatory Design: Artful Integration: Interweaving Media, Materials and Practices, Toronto, Canada, 27–31, July 2004,* vol. 1. New York: ACM Press, pp. 173–182.

Orlikowski, Wanda (1992). Learning from Notes: Organizational issues in groupware implementation. In *CSCW 1992 Proceedings of Computer Supported Cooperative Work.*New York: ACM Press, pp. 362–369.

Parmiggiani, Elena; and Helena Karasti (2018). Surfacing the Arctic: Politics of Participation in Infrastructuring. *In PDC 2018 Proceedings of the 15th Participatory Design Conference*, *Hasselt and Genk, Belgium, 20–24, August 2018*, 7. New York: ACM Press, pp. 1–5.

Parmiggiani, Elena; Eric Monteiro; and Vidar Hepsø (2015). The Digital Coral: Infrastructuring Environmental Monitoring. *Computer Supported Cooperative Work (CSCW),* vol. 24, no. 5, pp. 423–460.

Pollock, Neil; and Williams, Robin (2010). E-Infrastructures: How Do We Know and Understand Them? Strategic Ethnography and the Biography of Artefacts. *Computer Supported Cooperative Work (CSCW),* vol. 19, no. 6, pp. 521–556.

Roland, Lars; Terje Aksel Sanner; Johan I. Sæbø; and Eric Monteiro (2017). P for Platform. Architectures of large-scale participatory design. *Scandinavian Journal of Information Systems,* vol. 29, no. 2, pp. 3–34.

Rubin, Herbert J.; and Irene S. Rubin (2011). *Qualitative Interviewing: The Art of Hearing Data.* Thousand Oaks: SAGE Publications Inc.

Saad-Sulonen, Joanna; Amalia de Götzen; Nicola Morelli; and Luca Simeone (2020). Service design and participatory design: time to join forces? In *PDC. Proceedings of the 16th Participatory Design Conference - Participation(s) Otherwise*, *Manizales, Colombia, 15–20, June 2020,* 2. New York: ACM Press, 76–81.

Saad-Sulonen, Joanna; Eva Eriksson; Kim Halskov; Helena Karasti; and John Vines (2018). Unfolding participation over time: temporal lenses in participatory design. *International Journal of CoCreation in Design and Arts (CoDesign)*, 14, 1, 4–16.

Schön, Donald A. (1983). *The Reflective Practitioner*. New York: Harper Collins.

Schön, Donald A.; and Glenn Wiggins (1992). Kinds of seeing and their function in designing. *Design Studies*, 13, 135–156.

Scott, Susan. V.; and Wanda J. Orlikowski (2021). The Digital Undertow: How the Corollary Effects of Digital Transformation Affect Industry Standards. *Information Systems Research*, 1, 311–336.

Shapiro, Dan (2005). Participatory design: the will to succeed. In *CC 2015. Proceedings of the 4th decennial conference on Critical computing: between sense and sensibility.* New York: ACM Press, pp. 29–38.

Simonsen, Jesper; and Toni Robertson (eds) (2012). *Routledge International Handbook of Participatory Design.* London/New York: Routledge.

Star, Susan Leigh (1999). Ethnography of Infrastructure. *American Behavioral Scientist*, vol. 43, no. 3, pp. 377–391.

Star, Susan Leigh; and Geoffery C. Bowker (2002). How to Infrastructure. In L. A. Lievrouw and S. Livingstone (eds): *Handbook of new media. Social shaping and consequences of ICTs*. Thousand Oaks: SAGE Publications Inc., pp. 151–162.

Star, Susan Leigh; and Karen Ruhleder (1996). Steps Toward an Ecology of Infrastructure: Design and Access for Large Information Spaces. *Information Systems Research*, vol. 7, no. 1, pp. 111–134.

Suchman, Lucy (2006). *Human-Machine Reconfigurations,* New York: Cambridge University Press.

Svanæs, Dag; and Jan Gulliksen (2008). Understanding the Context of Design – Towards Tactical User Centered Design. In *NordiCHI 2008. Proceedings of the 5th Nordic conference on Human-computer interaction: building bridges, Lund, Sweden, 20–22, October 2008,* pp. 353–362.

Svanæs, Dag; and Gry Seland (2004). Putting the Users Center Stage: Role Playing and Low-fi Prototyping Enable End Users to Design Mobile Systems. In *CHI 2004. Proceedings of the SIGCHI Conference on Human Factors in Computing Systems, Vienna, Austria, 24–29 April 2004.* New York: ACM Press, pp. 479–486.

Thai, Khi V. (2008). International public procurement: Concepts and practices. In K. V. Thai (ed), *International handbook of public procurement.* Florida: CRC Press, pp. 1–24.

Tjora, Aksel (2018). *Qualitative Research as Stepwise-Deductive Induction.* Routledge, London.

Torvinen, Hannu; and Pauliina Ulkuniemi (2016). End-user engagement within innovative public procurement practices: A case study on public-private partnership procurement. *Industrial Marketing Management*, vol. 58, pp. 58–68.

Walsham, Geoff (2006). Doing Interpretive Research. *European Journal of Information Systems,* vol. 15, pp. 320–330.

Weise, Sebastian; and Mike Chiasson (2020). Infrastructuring Public Consultation in Town Planning - How Town Planners Translate Public Consultation into a Socio-Technical Support System. *Computer Supported Cooperative Work (CSCW),* vol. 29, pp. 533–561.

Zahlsen, Øivind Klungseth; Dag Svanæs; Arild Faxvaag; and Yngve Dahl (2020). Understanding the Impact of Boundary Conditions on Participatory Activities: Lessons from a Large-Scale IT Project in Health Care. In *NordiCHI 2020. Proceedings of the 11th Nordic Conference on Human-Computer Interaction: Shaping Experiences, Shaping Society, Tallinn, Estonia, 25–29, October 2020.* New York: ACM Press, pp. 1–11.

Paper 3

The role of contextual conditions in systems development: The impact of design context on participation in Norwegian Welfare Services

Authors: Dahl-Jørgensen, Tangni Cunningham and Aasback, Anne Wullum

Presented at NIKT/NOKOBIT November 2023

The role of contextual conditions in systems development: The impact of design context on participation in Norwegian Welfare Services

Tangni Cunningham Dahl-Jørgensen[1] and Anne Wullum Aasback[2]

[1]Dept. of Computer Science, NTNU, [2] NTNU Social Research

Abstract. Human-Computer Interaction and adjacent fields agree that citizen participation is vital in designing digital public services. However, a gap remains between recommendations and how participation is facilitated in practice in the public sector. As challenges to participation remain even in the face of established design standards and best practices, contextual conditions warrant more investigation. Based on this discrepancy, we must clarify how the design context impacts participatory activities. This paper presents an exploratory case study of how designers and caseworkers seek to involve vulnerable persons in a public service project's digital solution development. We identified three interconnected contextual conditions that impact participation in the design process: 1) organizational complexity, 2) recruitment and representation, and 3) power imbalances. This paper contributes to a more nuanced understanding of the role of context as a determinant of participatory outcomes in digital public system design.

Keywords: design context, participation, digital public services

1 Introduction

Researchers and practitioners have long recognized the importance of end-user participation in public system development, citing motives ranging from instrumental, i.e., improving the quality and efficiency of the service to normative, i.e., democratic principles and empowerment of end-users [1]. This is particularly prevalent in design projects aimed at vulnerable and marginalized citizens [2], such as people with cognitive or physical disabilities [3,4,5], patients [6], and children [4,7], leading to unresolved tensions in many design projects [1]. Issues in the socio-technical context can prevent vulnerable citizens from meaningfully influencing design outcomes [4,8]. Despite the best intentions of IT-experts and public sector officials, design context is detrimental in shaping participatory efforts [7,9]. Svanæs and Gulliksen defined the context of design as a project's boundary conditions that "impact user-centered design activities, and hence the success of the end result of the project" [9, p. 353]. Contextual factors include internal factors (organisational relations, agendas, developmental methodology, and tools) and external factors (stakeholder relationships, handover issues, and conflicting requirements). Based on examples where user-centered design

efforts were constrained by contextual factors, they recommend identifying factors in the context of design that pose a risk to the quality of participation and the end-product[9]. Dittrich et al. [10] saw design practices as something that needed investigating "in the wild". Using examples from public service administration, they found that practices were shaped by preconceived notions of participation embedded in the context. Research highlights participation challenges, but often ignores contextual challenges that affect design participation. Despite the importance, contextual factors' effects on participation are still poorly described [11]. Thus, participation in design must be empirically investigated in a given context. Therefore, we ask the question: *how contextual conditions impact participation of end-users in a public digital service development project?*

We answer this question by presenting a Norwegian citizen services digital solution for interaction with Child Welfare Services (CWS). An exploratory case study of Norwegian CWS design projects for caseworkers and citizens was conducted. This new solution was envisioned to allow children, parents, and other caretakers to communicate with municipal CWS via digital chat and access case documentation. We found that the socio-technical context of systems was a barrier to the participation of citizens in design, based on interviews with CWS and IT experts and observations of project management meetings. We demonstrate how organizational complexity, recruitment practices, and embedded power imbalances complicate end-user participation. This paper contributes to participation theory by highlighting how context affects citizen-user participation in municipal public service development.

2 Related Literature

2.1 Designing with vulnerable citizens

In recent years, research on citizen-users' participation in design processes has indicated how to elicit vulnerable and marginalized voices. However, a literature review on underprivileged users in design projects found guidance for designing with "groups facing more barriers to participation" [2, p. 1] lacking. When common understandings were reached, differences were addressed, and participants felt valued, many of the reviewed studies succeeded [6,8]. Due to use context challenges, practice-led projects struggle to implement and replicate these studies' successes [11,12]. Positive participatory activities require a shared understanding to foster mutual learning, trust, and openness between participants and designers, which is a major challenge [2,3,8]. Not doing so exacerbates misunderstandings arising from social and professional contexts [2,13]. Few studies on vulnerable users in design projects included them in the entire process, and fewer in building activities, like prototyping, and validifying/testing [2]. Considering a high dropout rate, designers had to rely on other practices than direct participation for parts of the projects [5,6,14]. These can include relying on personas, documentation, and user requirements [7,14], or other people, such as caregivers friends and partners [3, 4, 7], or stand-ins [6]. Sustaining

participation of vulnerable user requires organizational resources and time spent on building trust and adjusting to the participants' capacity [5, 15].

Andersen et al. identified difficulties including vulnerable children in a CWS design context, “the stances of participants are translated and overtaken by policy reports, evaluations and prototypes before they are manifested in action” [7, p. 254]. They found from empirical research on the introduction of communication technology in CWS that children would always participate with others, unlike fully independent adults. Children only partially participated in the project from the start leading to external actors and those in the children’s network representing their interest. In summarizing eight case studies including vulnerable populations, Mulvale et al.[5] identified challenges of participant engagement, power imbalances, health concerns, funding, and economic and social conditions. Power dynamics were a challenge in all cases due to previous negative experiences that made participants afraid to voice negative views. Participant inclusion was often negotiated before the project due to power dynamics.

In sum, literature highlights significant challenges, particularly when facilitating the participation of vulnerable citizens in the design context.

2.2 Participation in design contexts

Many research fields, including user-centered design and codesign [1,7,9,15], participatory design [2,3,10,14], Computer Supported Cooperative Work [13], and Information Systems [11,12], promote end-user participation in design. Most practice-led projects state instrumental reasons for participation, such as improving system quality while theoretical contributions often cite normative reasons, such as empowerment and equalizing power imbalances [16].

In this paper, we draw on Bratteteig and Wagner’s [13] view of participation and define participation as *having an influence on the decision-making process*. Regarding the design context, they state that ‘the participatory context of a project may be bounded by structural elements that limit the possibilities for joint decision-making’ [13, p. 33]. Gartner and Wagner [16] recommended mapping actors and agendas in political and organizational design participatory efforts. They see context as interconnected social arenas where actors at different organizational levels negotiate design.

The International Organization for Standardization [17], adhered to by designers and developers worldwide, issued a standard describing the principles of the Human-Centered approach and emphasizes understanding the user's experiences, needs, and context of use. This version also includes that usability relates to the wide range of use contexts for all users. As addressed by Svanæs and Gulliksen [9] the previous ISO standard was predicated on the absence of conflict between users’ interests and the organization meaning that this was not foreseen as a concern for designers. Though providing requirements for participation, the ISO standard still centers usability when promoting participation in the development process [17]. Research has identified barriers to participation in the design context such as a lack of motivation or resources, changes of the project over time due to internal conflicts, and the complexity of managing multidisciplinary teams [18].

In specialized contexts, the facilitation of participation changes character as the complexity of the design context adds to the difficulty of facilitating meaningful participation. Mosleh and Larsen [19] underscored participation as something that materializes between actors in a context. Participation can therefore not be understood separate from its context. Morrison and Dearden [8] linked the issues of the public participating to being situated into existing 'language games' - i.e., the rules of how and when one can speak - that take place in specialized care contexts. Anderson et al. state that "participation becomes first and foremost a relational and heterogeneous network achievement running through specific designs processes and projects" due to context complexity [7, p. 253]. In practice, the design context can help or hinder user participation, as these theoretical contributions note. Therefore, it's crucial to identify contextual conditions that facilitate participation.

3 Case background

This paper is based on research on a project on Digital Child Welfare Services (CWS Digital). This project provided a unique case study on how Norwegian CWS involved children and families when developing a new user interface. This 'Citizen Services' interface enables children and families to communicate digitally with municipal caseworkers. CWS assists children, adolescents, and families in difficult living situations and in cases of child abuse and neglect. This is a complex task that creates requirements for information systems and work practices that account for the legal requirements that CWS must adhere to. Current communication is slow and requires sending physical letters which is considered the most secure. In the assessment process, families often lack information about the justification for life-altering decisions made by CWS. Citizens receive little information about the general practices of CWS, and getting specific information or participating in one's own case is difficult and time-consuming. By implementing new digital solutions, the Norwegian government hopes to increase the transparency and explicit decision-making reasoning in CWS.

CWS Digital is a partnership between several municipalities, the Municipal Interest Organization (MIO), and the state's Directorate for Child, Youth, and Family Affairs. Motivated by a lack of information and autonomy for children and families in contact with CWS, the project grew from the development of a case management system to include Citizen Services as a subproject, which is the focus of this paper.

The project goal was to develop an easy-to-use digital system led by Municipal A and MIO to expand the channels for citizen-CWS communication. The system must be secure, user-friendly, and allow asynchronous chat communication both for adults and children. The term service describes the relationship between the system being created and the work practices consisting of many interactions between CWS caseworkers and families. The novelty of this project has been stressed in project documents and by informants due to the collaboration between municipalities and MIO, and none of the parties have made similar solutions before. Implementing Citizen Services and a new

case management system, in addition to a reform of the Child Welfare Law, will mark a substantial shift in municipal CWS's work practices in Norway.

We initially became interested in the case because the project management team wanted to involve caseworkers and families in design and development. The Citizen Services sub-project engages with end-user participation in two ways. Firstly, the representation of citizens is seen as an important aspect of the development process of the service. Second, the project aims to increase citizen participation through the solution, by disseminating information and facilitating continuous communication digitally in addition to physical meetings. The goal of the service is to expedite citizen participation as content producers in their own case documents while facilitating communication and the sharing of information.

4 Methods

Data was collected from the fall of 2020 to the beginning of 2023. As most work with citizens was done previous to 2018, we relied on the perspective of those leading the workshops to describe the process and were unable to talk directly to citizen representatives due to pandemic restrictions in 2020-2022 and project delays.

The data presented in this paper comes from a case study (Yin, 1981; Flyvbjerg 2006) of the process of facilitating participation of end-users in the development of systems for CWS. Data collected from August 2020 to February 2023 from meeting observations, semi-structured interviews, and observations of user testing (Flyvbjerg 2006;). Our research strategy is based on an interpretive approach (Walsham, 2006) following the development process led by the municipality. This approach has involved conducting interviews with managers from all subprojects and meetings with the project management team in a large Norwegian municipality (municipality A) leading work on citizen services. This approach as beneficial in attempting to faithfully present an example of public digitalization initiatives for welfare services without normative interventions by us as researchers. However, discussions with informants were inquisitive in nature and did include reflections on participation of end users and development practices. In interviews, we asked questions that related to participation of end-users in addition to questions that aided in understanding the different aspects and concerns in the project, especially in how future practices and communication would be supported during and after implementation of the new systems.

Table 1. Data Collection.

Data type	Informants	Number (1 hour each)
Interviews	CWS workers from 3 different municipalities	6
	Designers and IT experts	4
Observations	Status meetings with project manager and/or project management team	15
	User testing with citizen-users	2

Fieldnotes were written during observations of meeting and user testing. During interviews with willing informants voice recordings were done, transcribed, and analyzed using the qualitative analysis program Nvivo. The analysis was done in stages inspired by Tjora's (2018) stepwise deductive induction. The first step of coding inductively captured the original intent of the informant without interpretation led to over 150 unique codes. After this first stage was completed, the utterances were coded based on aspects of participation, specifically focusing on the contextual conditions that impact participation of citizen users in the project, leading to the following overarching codes: 1) organizational complexity, 2) recruitment and representation, and 3) power imbalances. All quotes have been translated from Norwegian and are presented using pseudonyms to ensure the anonymity of informants.

5 Findings

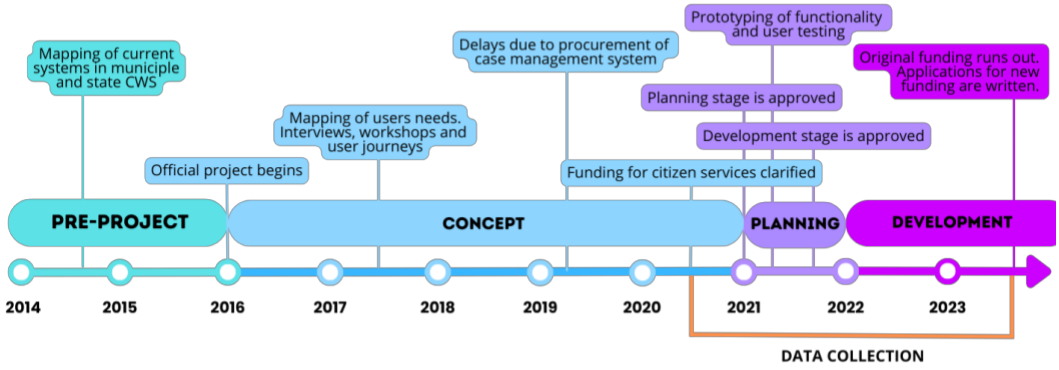

Figure 2. Citizen Service timeline

5.1 Organizational complexities

CWS Digital started with municipal and state initiatives. In 2015, Municipality A mapped CWS caseworkers' needs and found that a new case management system was needed. Similarly, the Directorate of Children, Youth, and Family Affairs found that current CWS systems did not adequately support caseworkers professionally in their work practices, raising concerns about the quality of decision-making across municipalities. In 2016, the project expanded in two ways. First, in that MIO, the directorate, and seven municipalities collaborated on the project. Second, by

developing a digital solution for citizens to communicate CWS. Since 2016, the project management team has consisted of members with caseworker experience from CWS (CWS experts), and IT experts.

"It started with a mapping of needs during fall 2015 [as a] local project for developing a new case management system. (…) The actual project began at the end of 2016 with seven municipalities. (…) One of the subprojects consists of developing a [case management] system with the [Directorate for Child, Youth and Family Affairs] that focuses on quality and is connected to the other subproject that is Citizen Services for the municipality. In Citizen Services we are concerned with participation which includes [promoting] understanding and disseminating information, and communication as a supplement to physical meetings". (Interview, caseworker, project management, June 2020).

The project's size, timeline, and collaboration between different organizations made coordination, funding structures, and expectations more complex, leading to project congestion. Work on Citizen Services got postponed while waiting for other parts of the project to be done. Delays at the state level led to delays in developing the case management system, which led to delays in the design and development of Citizen Services. Organizational-level funding for each phase and other major project changes had to be decided upon by the steering group.

"The steering group has consisted of representatives from the participating organizations, (…). The project management team, which has been responsible for producing deliverables in the project, has been led by me as the project manager (…), with a service designer, two professional resources [CWS experts from two different municipalities], and one IT resource. The project group, which has been responsible for participating in workshops and in the market dialogue [for procurement of a case management system], has consisted of participants from all participating organizations. The project has been financed by all participating municipalities, [the municipal interest organization], and the [Directorate for Child, Youth and Family Affairs]." (Project manager, status meeting, September 2020)

This organizational division in decision-making was seen as necessary by the project management team but presented bottlenecks that impact communication and ultimately the timeline and resource allocation. An interviewed CWS expert from another municipality that participated in a reference group expressed not being updated on what was going on in the project.

"What we have struggled with in [our municipality] is the communication from the steering group down to the project. We have just now established a group internally in [the municipality] which I think is great, to have a group that covers and has authority in areas such as finance, archives, IT, and on [CWS standards]. Finally, [project management] has managed to get a project organization. This time he said that there is a budget, and there are funds, but there are no funds linked specifically to the project." (Interview, social worker, municipality C, September 2021)

In addition to communication problems between municipalities, issues in communication between CWS experts and IT experts from MIO arose. At one status meeting, they discussed 'branding' as MIO had hired a new IT experts to work on this. After a while, one social worker asked what the term meant in this context. She had

heard it before but was unsure what branding, and therefore this IT expert, would bring to the project. The project management team had established roles and common ground through continuous dialogue and cooperation throughout the entirety of the project. Adding new experts required time and resources to build a common understanding.

In status meetings during late 2022 and early 2023, this continued to be a problem when previously established wishes for system functionality were challenged in discussions with new IT experts. For example, in a status meeting in September of 2022, one team member described that an IT expert from MIO had suggested reusing existing functionality and municipal systems for citizens to communicate with CWS. A CWS expert in the project management team worried they did not understand how sensitive the citizen's situation would be and that incoming communication should not be displayed alongside other municipality information. This difference in understanding also related to the communication and information functionality envisioned: “We are having to work a bit with the tech-people to make them understand that the communication model [i.e. the way in which CWS is trained to communicate with citizens] is central to the development of the service. It is key to understand your own case.” (Project status meeting, CWS expert, Municipal A, September 2022).

Another concern that came up was the need to differentiate between types of documents in CWS, like meeting summaries and legal decisions, which have different functions and recipients. Sensitive documents mandate guarding access. Designing for these distinctions required a deep understanding of the rules and practices in CWS.

Delays finally led to the Citizen Service project running out of municipal funding before functionality was developed and the project management submitted new funding applications in spring 2023 to be able to finish the project.

5.2. Recruitment and representations

The project management team conducted several workshops early on in the concept and planning stages. The workshop participants were recruited from interest organizations through the Directorate for Child, Youth and Family Affairs: “The invitation went out to the different organizations. I can’t remember exactly how many where there (…) but I know that the national association for CWS children was there and the association for parents was there (…) at the same time.” (Interview, CWS expert, Municipality B, July 2020.

Having a diverse group of participants was seen as a benefit: “Well, I think that we encompass it quite well when we included the interest organizations in contact with [the Directorate for Child, Youth and Family Affairs] because they encompass many. And then it is a bit up to them who they send from their organizaitons so we think is was very ok to do it that way. Then you have both biological parents who have had lost custody, children in foster homes, queer youth, youth mental health and disability organizations.” (Interview, CWS expert, Municipality A, August 2021).

The project management team described workshops as mutual learning experiences as CWS took on the role as facilitators for citizen participation. “We have had many teenagers in [workshops]. It is a bit unfamiliar to me to talk about the subject (i.e., CWS) in that way with teenagers. (…) It went very well. And we have taken a lot with

us, I think. So, we have absolutely taken the input we received very seriously, especially on what goes on in the Citizen Service project." (Interview, CWS expert, Municipality B, June 2020).

Additionally, they were able to explain the reasoning behind some of the limitations in functionalities to the citizen representatives. "Initially they wanted to be able to contact CWS 24 hours a day. I think that most [of the participants] have an expectation that if you send a [chat] message, then you will get a response very quickly. So, I was almost thinking that, wow, should we have applied for funding to get more people to follow up this chat [service]? (…) So we had to explain this." (Interview, CWS expert, Municipality A, August 2021).

During the workshops, needs expressed by participants were noted by a designer from the project management team: "I like to exemplify users' needs with [direct] quotes. During the workshop [with citizen representatives] we noted good quotes from what was being said. These 'one liners' illustrate a specific need or a target user group depending on which [project] phase we are in. We use an activity like user story mapping where we group quotes that are about the topic and these needs become the functionality in the project." (Meeting observation, designer, municipality A, August 2021).

Early design activities included creating tangible representations of end-users, such as personas. These personas were presented as anonymized personifications of the different target groups. 6 personas representing citizens were developed based on workshops with representatives from interest organizations. These personas were seen as crucial by the project management team in the design process in meeting with other stakeholders, such as external designers. In an interview, the same designer stated: "Analysing the target group brings empathy into the mapping of needs. The activities we used in workshops show how decisions affect people. The personas that we used have different degrees of IT knowledge, knowledge of the child welfare service, trust in the child welfare service, and the like. [...] Using personas lifts the weaker user groups forward that otherwise are difficult to involve. We've done customer journey workshops using personas and user journeys with caseworkers. The purpose with user journeys is to map the users' needs and experiences of the service from the first to the last point of contact." (Interview, designer, municipality A, February 2021).

Quotes from the workshops formed the foundation of users' needs and user journeys. User journeys were given names relevant to CWS like the 'trust journey', the 'participation journey', and the 'availability journey', all representing different aspects of the connection between caseworkers and families over time. Thereafter, they were used to find potential points of conflict when citizens interact with the service, prompting the project management team to work on finding solutions for these potential conflicts. Using personas and user journey descriptions was an active choice by the project management team to build empathy and being able to see the position of the citizens in meeting with external caseworkers representatives and developers from MIO.

Workshop participants included citizens that had been in contact with CWS either as children or parents. Therefore, the project management team acknowledged that participating in the project would place participants in a vulnerable position. After the

concept phase, personas and user journeys played a bigger role in representing users' needs in meeting with other stakeholders, as citizen-users were not directly included in such meetings. Design representations were important in interacting with external stakeholders, validating service design approaches as having merit in public innovation.

Further on in the later stages of the project, recruiting citizen participants seemed to become more difficult. Apart from two observations of user testing of prototypes in the summer of 2022 – notably the participants expressed only positives about the initiative and prototype – inclusion of citizens became overshadowed by other concerns like collaboration with external IT experts in observed status meetings. During meetings from the fall of 2022, most of the discussions shifted from participation of citizens to the challenges they faced in working with MIO. This progression suggested the existence of power imbalances embedded in the context.

5.3 Power imbalances

Power differences among stakeholders involved in the project became apparent in several ways**.** Issues emerged right from the beginning when we negotiated access to the project. It became clear that as outside researchers, we could not research the context as first envisioned, as there was no guardian that could sign off on us collecting data from participants who are underage and in foster care. The inability to obtain informed consent from children in CWS was another reason for including interest groups, as it provided a formal way to include vulnerable citizens. This partly explains the reliance on personas and customer journeys in the development phase. During the aforementioned workshops, children and parents expressed a feeling of there being a wall between them and CWS thus bringing the difficulties of including such a vulnerable user group in the design of services to light.

The vulnerable situations citizens in contact with CWS find themselves was highlighted by the project management team throughout. In an interview with the project manager, the need for discrete contact both in development and in how the service will function was emphasized: "For those who have a case with CWS, the most important thing is that no one else knows that they have a case, and secondly that the case is handled in a good way." (Interview, Project manager, Municipality A).

Throughout the project, CWS experts would advocate for citizens needs even when citizen representatives or other representations such as personas were not directly included. They would often voice the needs of citizens in interviews and observed meetings. This was problematized by a consultant with experience from IT projects during an interview: "Yes, there has been very well-informed participants [included] from CWS throughout the process, but they have taken over for the user and that is something that can be problematized all the way up to the steering level". (Interview, IT expert, September 2021)

In discussing the participation of citizens in the workshop, a member and designer reflected on the ethical implications of user participation. In being asked about participation in workshops, he responded: "The ethical guidelines and implications are important here. There are many different emotions that can arise during workshops for the user of the service. We want to acknowledge that and illustrate their needs while

not putting them in an exposing situation. (Meeting observation, service designer, municipality A, August 2021).

The issues concerning recruitment seemed exacerbated by the project management team having to defer to the Directorate for Child, Youth and Family Affairs, as the responsibility for recruiting participants for testing lay there, and this became an additional step in the development work. In a meeting late in 2022, after spending most of the meeting discussing the functionality agreed upon with MIO and what they can deliver, a CWS expert asked if there were any more plans for user testing of prototypes and was told by a designer that there will be no more testing of prototypes, meaning that testing would be suspended till a solution was developed. Therefore, developers from MIO were never in direct contact with citizen representatives. In the design context, embedded power imbalances between citizens, the project management team, and MIO as the organization in charge of development came to light through discussions and expressed concerns as well as practices like trying to shield vulnerable citizen-users from the rest of the design context.

6 Discussion

As society becomes more digital, public services have begun to follow suit, implementing new ways of delivering services to and communicating with citizens. However, this presents new challenges in terms of how to develop services and systems that cater to the most vulnerable citizens. In researching a case of digitalization in Norwegian CWS including a system to aid communication between citizens and CWS, we asked *how do contextual conditions impact participation of end-users in a public digital service development project?*

Throughout meetings and interviews with the project management team, they emphazised the importance of adequate and broad participation of citizen-users in defining their needs and functionality of the Citizen Services interface. However, contextual conditions related to the organizational complexity, recruitment and representation, and the embedded power dynamics shaped the participation of citizen-users. In the case of designing Citizen Services, we saw how the project management used design techniques to represent citizens in the construction of personas and user journeys that informed the creation of mockups and prototypes. Since CWS experts maintained key roles in within the project, they are the ones who often relayed the needs of citizens as well as their peers in meetings with other organizations, similar to findings of vulnerable citizens participating in other design projects [5, 7,13]. Much of this has to do with the way the responsibilities for recruitment and development was organized and distributed among several public organizations as well as the perceived vulnerability of citizen-users that led to the project management team shielding them through the use of personas and other representations.

In the project, participation had been an explicit goal, as a part of both the final service and the design of it, from the beginning. However, this required considerable work to been done by the project management team to create a common understanding and language for all stakeholders. Previous research showed that a lack of common

understanding and language was an obstacle for participation in design as this leads to lack of trust and proliferations of misunderstandings [2, 3, 8]. In the project CWS experts were employed in full time positions in the project together with IT experts. Both groups identified this as a key success factor to develop digital services that aligned with the needs and practices of CWS as this allowed for more time to develop a common language and mutual learning. However, when new IT experts from outside of the project management team were introduced into the project they struggled to understand both CWS work practices and the needs of citizen-users. This shows that even with intentions of direct and effective participation, the context can place serious limitations on how participation is enacted in practice.

This aligns well with Bratteteig and Wagner's [13] understanding for what factors effect participation in design work and the importance of understanding the contextual before design can take place highlighted by Svanæs and Gulliksen [9]. The context can limit the possibility for collective decision-making and determine whether the result become participatory [13]. However, many projects do not account for this when planning what design work needs to be done [2, 9]. The time and resources that it takes to build trust with vulnerable citizen-users was understood by the project management team but not supported by other stakeholders who stood for expertise or resources.

Presenting the different perspectives on the service requires interpreting what different user groups can contribute of expertise based on what is of use to the end user representative and what is of use to the project.

In addition to the workshop participants, customer journeys and personas were used in a way to illustrate the user without putting their life story on display in development, similar to other projects [2, 7, 8, 15]. This was thought to be an adequate solution during negotiations with the developing organization and would be followed up by user testing of the finished solution. However, these practices could become problematic when citizens were included in a lesser degree in the later stages of the development especially considering that sometimes CWS experts and citizens would have conflicting interests in the functionality, like how long the response time on a chat solution could be.

As discussed in the findings, the feedback and input that came up in the participatory activities were not always possible to implement in the final solution. Through the workshops with different stakeholder groups, priorities and needs came up that did not align or became challenging because of technical aspects or lack of resources. To what degree participation in development and design activities influenced the decision-making of the finished product would therefore vary. If citizen representatives are not included throughout the process, they are likely not privy to the technical and recourse aspects that limit what functionalities are possible to develop. Therefore, their conclusion might be that their contribution is not valued by developers. Though HCI researchers see a great value in use of personas when designing with vulnerable populations [c.f. 15] an overreliance on such proxy representatives can be seen as problematic as vulnerable citizens could end up being further marginalized in the process. Such representations might not be able to convincingly portray the inherent power imbalance embedded in the context [5, 17], and exacerbating misunderstandings [2, 5].

Based on the findings of this case study and the lack of resources, we see the need for clearer guidelines for municipalities and other public institutions on how to include end users. Such official guidelines can be used by those developing public services in order to argue for participation outside of domain specific laws available for when developing services for certain user groups. Additionally, the scale of the project and inclusion of IT experts in development that were not present during workshops with citizen representatives presented a challenge in that common understandings of the importance of some functionality had to be reiterate, leading to time and resources being spent and ultimately the fate of the project to be uncertain.

In accordance with previous research, the CWS Digital encountered dfficulties in the process of facilitating the participation of vulnerable citizen-users due in a large part to the contextual limitations that the project management team met as the project progressed through stages of conceptualizing future digital solutions, organization, receiving funding, prototyping, and developing. Despite having intentions of broad participation, contextual contingencies shaped what participation was possible to facilitate in practice.

6 CONCLUSION AND LIMITATIONS

In this paper, we have addressed the way in which context of design greatly impacts participation of vulnerable citizen-users even when participation is an agreed upon goal among those in charge of the project. Finding that contextual conditions predicate how participation is employed in practice, we isolated three specific conditions based on a case of how designers and CWS experts facilitated participation: the organizational complexity, recruitment and representation, and power imbalances.

This study builds upon other research in an ongoing project; therefore, the focus is limited to citizen representatives. Other publications will take into account the social worker perspective and the development of a case management system. However, though we voiced a desire to speak directly to citizen-user representatives, this proved to be challenging partly due to the challenges presented in this paper, the vulnerability of representatives, and the organizational structure. Additionally, the length of the project made it difficult to do data collection on the early phases as these were exploratory in nature and the project was not well-known or publicized at that point.

References

1. Liang, C.A., Munson, S.A., Kientz, J.A.: Embracing Four Tensions in Human-Computer Interaction Research with Marginalized People. ACM Trans. Comput.-Hum. Interact. 28, 2:14, 47 p. (April 2021)
2. Galleguillos, M.L.G., Coşkun, A. How Do I matter? A Review of the Participatory Design Practice with Less Privileged Participants. Proceedings of the 16th Participatory Design Conference 2020 - Vol 1, 11 p, Manizales, Colombia. ACM, New York, NY, USA, (2020)
3. Spiel, K. Brulé, E., Frauenberger, C., Bailley, G., Fitzpatrick, G. In the details: the micro-ethics of negotiations and in-situ judgements in participatory design with marginalised children, CoDesign, 16:1, pp. 45-65, (2020)

4. Çarçani, K., Bratteteig, T., Holone, H. et al. EquiP: A Method to Co-Design for Cooperation. Comput Supported Coop Work 32, pp. 385–438, Springer Nature (2023)
5. Mulvale, G., Moll, S., Miatello, A., Robert, G., Larkin, M., Palmer, V.J., Powell, A., Gable, C., Girling, M. Codesigning health and other public services with vulnerable and disadvantaged populations: Insights from an international collaboration. Health expectations: an international journal of public participation in health care and health policy, vol. 22,3 (2019)
6. Bjerkan, J., Hedlund, M., Hellesø, R. Patients' contribution to the development of a web-based plan for integrated care – a participatory design study, Informatics for Health and Social Care, 40:2, pp. 167-184, Taylor and Francis Group (2015)
7. Andersen, L.B., Danholt, P., Halskov, K., Hansen, N.B., Lauritsen, P. Participation as a matter of concern in participatory design, CoDesign, 11:3-4, pp. 250-261, (2015)
8. Morrison C, Dearden A. Beyond tokenistic participation: using representational artefacts to enable meaningful public participation in health service design. pp. 179-186. Health Policy (2013)
9. Svanæs, D., Gulliksen, J. Understanding the Context of Design – towards Tactical User Centered Design. NordiCHI 2008: Using Briges, Proceedings of the 5th Nordic conference on Human-computer interaction: Lund, Sweden (2008)
10. Dittrich, Y., Eriksen, S., Hansson, C. PD in the wild: Evolving Practices of Design in Use. In Proceedings of the Participatory Design Conference, T. Binder, J. Gregory, I. Wagner (Eds.), Malmö, Sweden (June 2002)
11. Roland, L.K., Sanner, T.A.; Sæbø, J. I., Monteiro, E. "P for Platform. Architectures of large-scale participatory design," Scandinavian Journal of Information Systems: Vol. 29 : Iss. 2, Article 1, (2017)
12. Melchiori, C.E., Sanches, B., Cortez da Cunha Cruz, M., Diniz, E.H., Cunha, M.A. Digital Welfare and Vulnerable Citizens: A Literature Review, ECIS, Research-in-Progress No. 58, AIS Electronic Library (2023)
13. Bratteteig, T., Wagner, I. Unpacking the Notion of Participation in Participatory Design. Computer Supported Cooperative Work (CSCW), vol 25, pp. 425–475, Springer Link (2016)
14. Wärnestål, P. Svedberg, P., Nygren, J. Co-constructing child personas for health-promoting services with vulnerable children. In Proceedings of the SIGCHI Conference on Human Factors in Computing Systems (CHI '14). Association for Computing Machinery, New York, NY, USA, (2014)
15. Bødker, S., Grønbæk, K. Cooperative prototyping: Users and designers in mutual activity. International Journal of Man-Machine Studies*, 34*(3), 453–478, Elsevier (1991)
16. Gartner, J., Wagner, I. Mapping Actors and Agendas: Political Frameworks of Systems Design and Participation, Human–Computer Interaction, 11:3, pp. 187-214, Taylor and Francis (1996)
17. ISO 9241-210:2019 Ergonomics of human-system interaction — Part 210: Human-centred design for interactive systems (2019)
18. Chammas, A., Quaresma, M., Mont'Alvão. A Closer Look On The User Centred Design. 6th International Conference on Applied Human Factors and Ergonomics (AHFE 2015) and the Affiliated Conferences, AHFE, Elsevier (2015)
19. Mosleh, W.S., Larsen, H. Exploring the complexity of participation, CoDesign, 17:4, pp. 454-472, Taylor and Francis (2021)

Paper 4

The discourse on user involvement in the design of digital public services: A case study of two municipal projects in Norway

Authors: Dahl-Jørgensen, Tangni, Dahl, Yngve, Svanæs, Dag, and Parmiggiani, Elena

Submitted to a journal

NTNU | Faculty of Information Technology and Electrical Engineering

PLEASE DO NOT SCAN OR PRINT THIS FORM. COMPLETE THIS FORM IN A PDF READER e.g. ADOBE ACROBAT READER or FOXIT READER

DECLARATION OF CO-AUTHORSHIP

A doctoral work with several contributors must include a signed declaration that describes the candidate's contribution to each piece of work. The candidate and all the other contributors must sign the declaration. (cf. the NTNU PhD regulations section 11-3 or the NTNU dr.philos regulations section 3).

Name of PhD candidate:

Tangni Cunningham Dahl-Jørgensen

Title of the Doctoral Thesis:

Exploring end-user participation in the design of digital public services: an empirical study of discources and practice

Publication:

[Authors, title of paper, name of journal/conference proceedings incl. volume/pages/year]

Tangni C. Dahl-Jørgensen and Elena Parmiggiani
Platformization of the public sector: Assessing the space of possibility for participation. In Proceedings of the 16th Participatory Design Conference 2020- Participation(s) Otherwise - Vol. 2 (PDC '20: Vol. 2), June 15–20, 2020, Manizales, Colombia. ACM, New York, NY, USA, 5 pages.

Description of the Candidate's contribution:

[The declaration should describe the work process and division of labour, **specifically identifying the candidate's contribution**, as well as give consent to the article being included in the thesis.]

Dahl-Jørgensen conducted the data collection, the analysis, and interpreted and categorized the findings. Dahl-Jørgensen wrote most of the paper through discussions with the coauthor, Parmiggiani. Parmiggiani contributed by defining the scope of the paper and co-writing introduction and discussion. The conceptual framing and premise for the paper arose through discussions and was jointly agreed upon. The final manuscript was revised by both authors in collaborative sessions.

Statement by the co-author:

I hereby confirm that the doctoral candidate's described contribution to this paper is correct, and I consent to including the paper in the named dissertation.

Place, date and signature by the co-author (Guidelines on Digital ID for signing of documents):

Trondheim

2023-12-07

Elena Parmiggiani

Digitally signed by Elena Parmiggiani
DN: OU=Department of Computer Science, O=NTNU, CN=Elena Parmiggiani, E=parmiggi@ntnu.no
Reason: I have reviewed this document
Location:
Date: 2023.12.07 14:42:29+0100'
Foxit PDF Reader Version: 2023.3.0

NTNU | Faculty of Information Technology and Electrical Engineering

PLEASE DO NOT SCAN OR PRINT THIS FORM. COMPLETE THIS FORM IN A PDF READER e.g. ADOBE ACROBAT READER or FOXIT READER

DECLARATION OF CO-AUTHORSHIP

A doctoral work with several contributors must include a signed declaration that describes the candidate's contribution to each piece of work. The candidate and all the other contributors must sign the declaration. (cf. the NTNU PhD regulations section 11-3 or the NTNU dr.philos regulations section 3).

Name of PhD candidate:

Tangni Cunningham Dahl-Jørgensen

Title of the Doctoral Thesis:

Exploring end-user participation in the design of digital public services: an empirical study of discources and practice

Publication:

[Authors, title of paper, name of journal/conference proceedings incl. volume/pages/year]

Tangni C. Dahl-Jørgensen and Elena Parrmiggiani
Caseworkers' participation in procurement: Infrastructuring Child Welfare Services in Norway.
In Computer Supported Cooperative Work (2023). 43 pages.

Description of the Candidate's contribution:

[The declaration should describe the work process and division of labour, **specifically identifying the candidate's contribution**, as well as give consent to the article being included in the thesis.]

Dahl-Jørgensen conducted the data collection, the analysis, and interpreted and categorized the findings. Both authors provided the conceptual focus through discussions and jointly wrote the introduction (section 1) and the theory chapter (section 2). The candidate wrote the remaining sections. The paper underwent two rounds of revisions that were discussed and revised by the two authors in dialogue.

Statement by the co-author:

I hereby confirm that the doctoral candidate's described contribution to this paper is correct, and I consent to including the paper in the named dissertation.

Place, date and signature by the co-author (Guidelines on Digital ID for signing of documents):

Trondheim 2023-12-07

Elena Parmiggiani

Digitally signed by Elena Parmiggiani
DN: OU=Department of Computer Science, O=NTNU, CN=Elena Parmiggiani, E=parmiggi@ntnu.no
Reason: I have reviewed this document
Location:
Date: 2023.12.07 14:45:28+0100'
Foxit PDF Reader Version: 2023.3.0

NTNU | Faculty of Information Technology and Electrical Engineering

PLEASE DO NOT SCAN OR PRINT THIS FORM. COMPLETE THIS FORM IN A PDF READER e.g. ADOBE ACROBAT READER or FOXIT READER

DECLARATION OF CO-AUTHORSHIP

A doctoral work with several contributors must include a signed declaration that describes the candidate's contribution to each piece of work. The candidate and all the other contributors must sign the declaration. (cf. the NTNU PhD regulations section 11-3 or the NTNU dr.philos regulations section 3).

Name of PhD candidate:

Tangni Cunningham Dahl-Jørgensen

Title of the Doctoral Thesis:

Exploring end-user participation in the design of digital public services: an empirical study of discources and practice

Publication:

[Authors, title of paper, name of journal/conference proceedings incl. volume/pages/year]

Tangni C. Dahl-Jørgensen and Anne W. Aasback
The role of contextual conditions in systems development: The impact of design context on participation in Norwegian Welfare Services. In: Norsk IKT-konferanse for forskning og utdanning, NOKOBIT series, 27-30 November, 2023, Stavanger, Norway. 14 pages.

Description of the Candidate's contribution:

[The declaration should describe the work process and division of labour, **specifically identifying the candidate's contribution**, as well as give consent to the article being included in the thesis.]

Dahl-Jørgensen wrote most of the paper with input and comments from the coauthor, Aasback. The authors conducted data collection jointly. Analysis for this paper was done by the candidate. Aasback contributed through discussions and additions in the findings (section 5).

Statement by the co-author:

I hereby confirm that the doctoral candidate's described contribution to this paper is correct, and I consent to including the paper in the named dissertation.

Place, date and signature by the co-author (Guidelines on Digital ID for signing of documents):

Trondheim 2023.12.08

NTNU | Faculty of Information Technology and Electrical Engineering

PLEASE DO NOT SCAN OR PRINT THIS FORM. COMPLETE THIS FORM IN A PDF READER e.g. ADOBE ACROBAT READER or FOXIT READER

DECLARATION OF CO-AUTHORSHIP

A doctoral work with several contributors must include a signed declaration that describes the candidate's contribution to each piece of work. The candidate and all the other contributors must sign the declaration. (cf. the NTNU PhD regulations section 11-3 or the NTNU dr.philos regulations section 3).

Name of PhD candidate:

Tangni Cunningham Dahl-Jørgensen

Title of the Doctoral Thesis:

Exploring end-user participation in the design of digital public services: an empirical study of discources and practice

Publication:

[Authors, title of paper, name of journal/conference proceedings incl. volume/pages/year]

Tangni C. Dahl-Jørgensen, Yngve Dahl, Dag Svanæs, and Elena Parmiggiani.
The discourse of user involvement in the design of digital public services: a case study of two municipal projects in Norway. Submitted to CoDesign - International Journal of CoCreation in Design and the Arts (submitted)

Description of the Candidate's contribution:

[The declaration should describe the work process and division of labour, **specifically identifying the candidate's contribution**, as well as give consent to the article being included in the thesis.]

Dahl-Jørgesen conducted the data collection and analysis. All co-authors contributed to the final categorization of the findings. Svanæs suggested the premise of the paper and the theoretical framework. Dahl-Jørgensen, Dahl, and Parmiggiani co-wrote the introduction and the discussion. Dahl-Jørgensen wrote all other sections. All authors participated in discussing the scope and framing of the paper and provided continuous comments.

Statement by the co-author:

I hereby confirm that the doctoral candidate's described contribution to this paper is correct, and I consent to including the paper in the named dissertation.

Place, date and signature by the co-author (Guidelines on Digital ID for signing of documents):

Trondheim 2023-12-08

Yngve Dahl Digitalt signert av Yngve Dahl
Dato: 2023.12.08 15:53:08 +01'00'

NTNU | Faculty of Information Technology and Electrical Engineering

PLEASE DO NOT SCAN OR PRINT THIS FORM. COMPLETE THIS FORM IN A PDF READER e.g. ADOBE ACROBAT READER or FOXIT READER

DECLARATION OF CO-AUTHORSHIP

A doctoral work with several contributors must include a signed declaration that describes the candidate's contribution to each piece of work. The candidate and all the other contributors must sign the declaration. (cf. the NTNU PhD regulations section 11-3 or the NTNU dr.philos regulations section 3).

Name of PhD candidate:

Tangni Cunningham Dahl-Jørgensen

Title of the Doctoral Thesis:

Exploring end-user participation in the design of digital public services: an empirical study of discources and practice

Publication:

[Authors, title of paper, name of journal/conference proceedings incl. volume/pages/year]

Tangni C. Dahl-Jørgensen, Yngve Dahl, Dag Svanæs, and Elena Parmiggiani.
CoDesign - International Journal of CoCreation in Design and the Arts (submitted)

Description of the Candidate's contribution:

[The declaration should describe the work process and division of labour, **specifically identifying the candidate's contribution**, as well as give consent to the article being included in the thesis.]

Dahl-Jørgesen conducted the data collection and analysis. All co-authors contributed to the final categorization of the findings. Svanæs suggested the premise of the paper and the theoretical framework. Dahl-Jørgensen, Dahl, and Parmiggiani co-wrote the introduction and the discussion. Dahl-Jørgensen wrote all other sections. All authors participated in discussing the scope and framing of the paper and provided continuous comments.

Statement by the co-author:

I hereby confirm that the doctoral candidate's described contribution to this paper is correct, and I consent to including the paper in the named dissertation.

Place, date and signature by the co-author (Guidelines on Digital ID for signing of documents):

Trondheim 2023-12-18

Dag Digitally signed by Dag
Date: 2023.12.18 15:54:51 +01'00'

NTNU | Faculty of Information Technology and Electrical Engineering

PLEASE DO NOT SCAN OR PRINT THIS FORM. COMPLETE THIS FORM IN A PDF READER e.g. ADOBE ACROBAT READER or FOXIT READER

DECLARATION OF CO-AUTHORSHIP

A doctoral work with several contributors must include a signed declaration that describes the candidate's contribution to each piece of work. The candidate and all the other contributors must sign the declaration. (cf. the NTNU PhD regulations section 11-3 or the NTNU dr.philos regulations section 3).

Name of PhD candidate:

Tangni Cunningham Dahl-Jørgensen

Title of the Doctoral Thesis:

Exploring end-user participation in the design of digital public services: an empirical study of discources and practice

Publication:

[Authors, title of paper, name of journal/conference proceedings incl. volume/pages/year]

Tangni C. Dahl-Jørgensen, Yngve Dahl, Dag Svanæs, and Elena Parmiggiani.
CoDesign - International Journal of CoCreation in Design and the Arts (submitted)

Description of the Candidate's contribution:

[The declaration should describe the work process and division of labour, **specifically identifying the candidate's contribution**, as well as give consent to the article being included in the thesis.]

Dahl-Jørgesen conducted the data collection and analysis. All co-authors contributed to the final categorization of the findings. Svanæs suggested the premise of the paper and the theoretical framework. Dahl-Jørgensen, Dahl, and Parmiggiani co-wrote the introduction and the discussion. Dahl-Jørgensen wrote all other sections. All authors participated in discussing the scope and framing of the paper and provided continuous comments.

Statement by the co-author:

I hereby confirm that the doctoral candidate's described contribution to this paper is correct, and I consent to including the paper in the named dissertation.

Place, date and signature by the co-author (Guidelines on Digital ID for signing of documents):

Trondheim 2023-12-07

Elena Parmiggiani

Digitally signed by Elena Parmiggiani
DN: OU=Department of Computer Science, O=NTNU, CN=Elena Parmiggiani, E=parmiggi@ntnu.no
Reason: I have reviewed this document
Location:
Date: 2023.12.07 14:49:17+0100'
Foxit PDF Reader Version: 2023.3.0

ISBN 978-82-326-7772-6 (printed ver.)
ISBN 978-82-326-7771-9 (electronic ver.)
ISSN 1503-8181 (printed ver.)
ISSN 2703-8084 (online ver.)

NTNU
Norwegian University of
Science and Technology