INTERGROUP PARTICIPATION IN DISTRIBUTED ISD: REVIVING AN ESTABLISHED TRADITION FOR NEW CONTEXTS

Research paper

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Abstract

Participation is critical in information systems development (ISD) for promoting effective knowledge sharing among diverse stakeholder groups. However, the emergence of new, challenging project contexts has led to calls for the 'old, tired' concept of participation to be revisited. In particular, our understanding of intergroup participation within the context of distributed teamwork remains under theorised. Distributed ISD projects require participation among both IT specialists and domain experts or users, who more often than not come from diverse geographical, organisational, and disciplinary backgrounds. In addition to geographical and temporal distances, socio-political differences between stakeholders in distributed ISD projects raise questions around the nature of participation. In this paper, we investigate how participation emerges in distributed ISD projects and the factors which support or impede its emergence, using the 'Theory of Practice' and 'Collective Reflection-in-Action' frameworks a theoretical lens. We draw on empirical findings from an in-depth case study of a 6-month distributed project called 'Health ISD', which involved a distributed team of IT specialists and clinicians. Our findings point to five socio-political factors which support or impede participation: rules, resources, interests, values, and goals. These factors act as instruments of both coordination and conflict across both face-to-face and online communications. We also identify five modes through which participation emerges: adding, challenging, ignoring, defining, and finalising.

Keywords: distributed teams; systems development; participatory design; stakeholder management; power relations.

1 Introduction

Intergroup participation is crucial in Information Systems Development (ISD) for supporting effective knowledge sharing among stakeholders such as IT specialists and users (He and King, 2008; Kautz, 2011). Over the past 60 years, the concept of participation has received considerable attention in IS literature - its impact reflected in the prevalence of development methods which now emphasise ongoing participation by users and developers (Barki and Hartwick, 1989; Cavaye, 1995; Markus and Mao, 2004; He and King, 2008; Kautz, 2011; Bergvall-Kåreborn et al., 2014). For instance, rapid application development, Scrum, and participative design have all been developed in response to the increasing demands for IT specialists (e.g. developers, analysts, project managers) and users to work together and share knowledge in dynamic environments (Ramesh et al., 2006; Kautz, 2011; Persson et al., 2011).

In this paper, participation is defined as a set of operations and activities relevant to the development of a system which need to be performed in collaboration with different stakeholders during an ISD project (Barki and Hartwick, 1989; Cavaye, 1995; Lynch and Gregor, 2004; Licorish and MacDonell, 2018). IT specialists and users participate in dialogue around a proposed information system (the object of understanding) to address an identified problem, as well as the method (the process of understanding) that will be used to develop the proposed system (Kensing and Blomberg, 1998; Gasson, 2008; Kautz, 2011). Their aim is to improve understanding of the focal object and process with a view to meeting quality targets, and aligning activities around the overall project objective. In addition to addressing gaps in knowledge, participation can promote empathy building between stakeholders, by allowing them to see the world 'through the eyes' of each other (Donetto et al., 2015; Robert et al., 2015).

However, given recent changes around how ISD projects are conducted, some scholars have asserted that the 'old, tired' concept of participation is in need of revisiting (Markus and Mao, 2004; Iivari, 2009; Bergvall-Kåreborn et al., 2014). IS research on participation emerged during a time when systems were required by a bounded social group (e.g. a single internal department), and developed by a co-located team of IT specialists (Kensing and Blomberg, 1998; Markus and Mao, 2004; Hansson et al., 2006; Loebbecke and Powell, 2009; Bergvall-Kåreborn et al., 2014). However, the increased prevalence of distributed ISD projects and participatory methods has brought with it new challenges to our understanding of the concept of participation (Bergvall-Kåreborn et al., 2014; Kautz et al., 2018).

Distributed teams are often assembled on a temporal basis for the duration of a project, and the lack of a shared history and context between team members can make cooperation difficult (Kankanhalli et al., 2006; Windeler et al., 2015). The limited opportunities to meet face-to-face can further impede the reconciliation of any divergent perspectives within the distributed team (Hinds and Mortensen, 2005; Robert Jr et al., 2008). Asynchronous inter-team communication (e.g. such as through the use of email) can make it difficult to coordinate teamwork due to time delays in responding to requests (Sarker and Sahay, 2004). In addition, the participation of numerous stakeholder groups can make the situation even more complex, especially when decision-making power is shared within the distributed team (Mumford, 1983; Kautz, 2011). The different backgrounds of stakeholders can in turn create different and sometimes competing perspectives which must be recognised and reconciled in the journey towards a successful project outcome (Markus and Mao, 2004).

The majority of IS research on participation adopts an *outcome* focus by looking at how the participation of co-located IT specialists and users impacts systems success e.g. whether the system meets stakeholders' needs and is accepted by them (Markus and Mao, 2004; Bano and Zowghi, 2015). However, an understanding of the *process* of participation in distributed ISD teams remains nascent and under-developed (Loebbecke and Powell, 2009; Obendorf et al., 2009; Iivari et al., 2010; Licorish and MacDonell, 2017; Kautz et al., 2018; Licorish and MacDonell, 2018). Previous studies on participation in ISD projects have been primarily quantitative in focus which also presents opportunities for qualitative, longitudinal studies that embrace the emergent nature of participation in distributed teams (Markus and Mao, 2004). In addition, literature on distributed teamwork has primarily focused on participation among distributed IT specialists, with less attention directed towards the socio-political factors that shape participation among distributed stakeholders such as domain experts, IT specialists and users (Howcroft and Wilson, 2003; Markus and Mao, 2004; He and King, 2008). Socio-political

factors centre on the study of social change and intergroup politics (e.g. power dynamics), which are of particular relevance to participation in the context of distributed teams given the diversity of stakeholder backgrounds (Kankanhalli et al., 2006; Kautz, 2011). Fundamental questions therefore remain unanswered concerning the dynamics of participation in distributed ISD projects, where stakeholders from diverse geographical, organisational, and disciplinary backgrounds must engage together in system development (Iivari et al., 2010). Consequently, we seek to address the following research questions:

RQ1 *What socio-political factors support or impede intergroup participation among stakeholders in distributed ISD projects?*

RQ2 *How does intergroup participation emerge in distributed ISD projects over time?*

In order to address these research questions, we draw on empirical findings from the in-depth case study of a 6-month Health ISD project involving a distributed team of IT specialists and clinicians. The study follows the development of a prototype Electronic Health Record (EHR) to a very short and demanding timeline. The prototype was to be implemented in a hospital for recording patient data during a clinical study. The successful delivery of this prototype rested on the ongoing participation of IT specialists and clincians in uncovering and mapping requirements to high-fidelity designs of the prototype EHR. A distributed participatory design approach (Loebbecke and Powell, 2009; Obendorf et al., 2009) was adopted by the project manager to strengthen communication between the two groups and promote participation around the solution design. Our findings suggest that intergroup participation was shaped by five socio-political factors: *rules, resources, interests, values, and goals.* We also identify five modes through which participation emerged: *adding, challenging, ignoring, defining, and finalising.* In doing so, we contribute new insights into the dynamics of participation within the context of distributed teams.

The remainder of the paper is structured as follows: Section 2 reviews related work on participation in distributed ISD projects, while Section 3 presents our theoretical background. Section 3 introduces the research design behind our in-depth case study and Section 4 then describes findings from our in-depth case study. Section 5 presents a discussion of those insights relevant to academic and practitioner communities, while Section 6 brings the paper to a close with a conclusion.

2 Related Work

For nearly four decades, participation has been recognised as a core topic in IS research (Markus and Mao, 2004; Iivari et al., 2010). Literature has traditionally focused on the nature of user participation in ISD however, increased calls have been made more recently to also consider IT specialists as participants in ISD projects "on par with user participants in terms of potential importance" (Markus and Mao, 2004, pg. 519). Participation research can centre on individual users and IT specialists, representatives of both groups, or even fictive personas representing groups (Mumford, 1983; Iivari and Iivari, 2006; Iivari, 2009). Participation can also be defined according to an individual's degree of influence in system development (Lin and Shao, 2000). An individual can assume a participative, informative, or consultative role (Damodaran, 1996; Iivari, 2009; Kautz, 2011). A participative role recognises an individual's viewpoints and provides them with decision-making power in the design process (Törpel et al., 2002; Loebbecke and Powell, 2009). On the other hand a consultative role is where the individual only offers comments on predesigned solutions, or an informant role where the individual only provides requested information (Damodaran, 1996; Iivari, 2009; Kautz, 2011).

Related literature on participatory design outlines the organisational decision-making process of stakeholder participation in the development of products and services (Schuler and Namioka, 1993; Kensing and Blomberg, 1998; Byrne and Sahay, 2007; Kautz, 2011). Participatory design brings together individuals, groups, or organisations who can affect or be affected by the proposed information system, and collects their personal experiences and perspectives to inform design efforts (Kensing and Blomberg, 1998). For instance, participatory design can require ongoing engagement between designers, domain experts, developers, and management to guide the design of solutions (Hansson et al., 2006). Essentially, participatory design is categorised as a bottom-up, collaborative approach to organisational change that engages stakeholders in the dynamic and complex process of change (Donetto et al., 2015).

This contrasts with a top-down approach where senior management are responsible for prioritising areas of product or service change. Stakeholders engage in an emerging dialogical process by sharing their experiences and co-designing solutions to identified challenges (Robert, 2013).

Elements of participatory design are identifiable in systems development methods that assert user participation as a central tenet of their philosophy e.g. agile methods such as Scrum (Chamberlain et al., 2006; Kautz, 2011). However, participatory design is not synonymous with methods such as agile, and instead it is characterised by two unique features. First, it centres on promoting an explicit agenda for socio-political change and aims to question issues of control and democracy (Kensing and Blomberg, 1998; Hansson et al., 2006; Obendorf et al., 2009). This can in turn help reduce resistance to change among users and to create more realistic expectations about technology use (Obendorf et al., 2009; Kautz, 2011). Second, it emphasises that different stakeholder groups have equal decision-making power around the solution, and it asserts that the design of high quality products is only possible when stakeholders listen and learn from each other (Kensing and Blomberg, 1998).

However, there is still some uncertainty in literature around how participation is conceptualised, and how it emerges in novel IS contexts such as distributed ISD (Markus and Mao, 2004; Iivari et al., 2010; Bergvall-Kåreborn et al., 2014). In addition, findings on the relationship between participation and systems success are inconclusive, drawing into question whether the impact of participation varies depending on the context, and the factors associated with said context (Markus and Mao, 2004).

Traditionally, participatory design centred on the co-location of developers, designers, and users for an extended period of time to allow for immediate communication and negotiation (Obendorf et al., 2009). Nevertheless, more recent advances in ICT media have provided new opportunities for 'distributed participatory design' where stakeholders from distinct physical and temporal settings engage in systems development (Loebbecke and Powell, 2009; Obendorf et al., 2009; Titlestad et al., 2009; Kautz et al., 2018). Distributed participatory design can also involve a mix of online and face-to-face techniques to broaden the representation of diverse stakeholder groups at different stages of the design process using technology-mediated communication and co-located workshops (Loebbecke and Powell, 2009). Related literature on distributed teamwork showcase the socio-political challenges that can emerge due to budding tensions within and between stakeholder groups (Ågerfalk et al., 2005; Luna-Reyes et al., 2005; Ågerfalk et al., 2009). Hinds and Mortensen (2005) point to numerous studies that have suggested the temporary and disparate nature of distributed project teams can make it more challenging to integrate knowledge, especially where team members have not previously worked together. However, scholars have noted that our understanding of participation in distributed ISD projects remains nascent (Loebbecke and Powell, 2009; Obendorf et al., 2009; Titlestad et al., 2009; Kautz et al., 2018). Moreover, the socio-political factors which shape stakeholder participation across geographical, organisational, and disciplinary distances has been under theorised (Hansson et al., 2006; Bergvall-Kåreborn et al., 2014).

3 Theoretical Background

Prior research suggests that the diverse socio-political backgrounds of distributed team members can create dissimilarities in perspectives, interests, and beliefs around problems (Paul et al., 2004). In turn these differences can increase the salience of subgroup identities within the distributed team and lead to political tensions during collaboration due to task interdependencies and a lack of face-to-face communication (Kankanhalli et al., 2006; Zimmermann, 2011). However, our understanding of the impact of socio-political factors on participation remains nascent (Zimmermann, 2011). Building on Bourdieu's (1977) seminal work the Theory of Practice, we develop a theoretical framework for investigating the *socio-political factors* (RQ1) that support or impede participation in distributed ISD. Bourdieu (1977) provides insights into the socio-political factors that shape the conduct of practices involving diverse collectives or groups and how they take action to create change. In particular, we draw on five socio-political concepts from the Theory of Practice: *Rules*, *Resources*, *Interests*, *Values*, *Goals*.

Rules are a set of regulations or principles that govern practice (cf. Bourdieu, 1977) and shape how individuals perceive the world and take action across situations. An individual's course of action during

distributed ISD could be constrained by the explicit or implicit rules within the project team or a particular subgroup (e.g. profession, organisation). Rules shape decision-making by setting out which individual will be designated as the primary decision maker in the team. Strict top-down decision-making rules (e.g. waterfall methodologies) can constrain the ability of team members to develop creative responses during ISD. On the other hand, teams with more flexible bottom-up decision making rules (e.g. agile methodologies) may be empowered to make decisions without formal approval.

Resources refer to different forms of capital (e.g. knowledge, social contacts, finance, and material objects) which are utilised by individuals in order to affect change during distributed ISD projects (cf. Bourdieu, 1977). The control of resources can create power relations by conferring certain individuals with the legitimacy to direct practice, influence the actions of others, and potentially constrain the pursuit of conflicting objectives. An individual's resources can be derived from different sources such as economic capital (e.g. project budget), social capital (e.g. network of contacts), education capital (e.g. computer science degree), and professional achievements (e.g. prior systems development experience).

Interests are the motives which guides individuals' course of action in distributed ISD projects based on their desire for gratification (e.g. recognition from peers) and their aversion to deprivation (e.g. blame from superiors) (cf. Bourdieu, 1977). Interests act as stimuli towards action by drawing the attention of individuals towards a desired outcome, and are a key feature of the social context which shape behaviours, and perspectives. Collective interests emerge from the network of roles and relationships that an individual is embedded in (e.g. project team), or social cohesion within a subgroup such as a profession (e.g. career ambitions), and organisation (e.g. departmental objectives) (Beal et al., 2003).

Values refer to the implicit or explicit belief systems which are internalised by individuals over time and enable them to make sense of different situations (cf. Bourdieu, 1977). Values are learned and validated through experience as individuals encounter problems and develop strategies for addressing these problems during systems development; thus forming the core basis for collective actions (Schein, 2010). Values influence an individual's judgements based on what is perceived to be important to the group and in turn drives individuals to action by aligning their behaviours with underlying group value judgements (Schein, 2010). In a distributed ISD project, some staff might place high symbolic value on documentation in the project, whereas developers may place more value on programming code.

Lastly, *Goals* refer to the objects of an individual's ambition and guides their intended course of action (cf. Bourdieu, 1977). Goals differ to the defined objective of a project as they are more emergent and localised in nature. Individuals can assume multiple formal and informal goals which are subject to change, and are positioned relative to each other. Goals enable individuals to plan and make decisions, particularly in situations that may be subject to high levels of uncertainty (Bourdieu, 1977). Collective goals can also arise through continuous dialogue between stakeholders. These collective goals in turn guide how individuals seize the opportunities afforded by technology to drive organisational change.

In addition, we draw on Levina's (2005) Collective Reflection-in-Action (CRIA) framework in order to gain insights into RQ2. CRIA follows the socio-political perspective of Bourdieu's (1977) Theory of Practice to explain how power relations produce particular IS designs (Levina, 2005). In particular, CRIA offers a useful lens for exploring how participation *emerges over time* through three modes: *adding*, *challenging*, and *ignoring*. In the *adding mode*, an individual reflects on the knowledge contribution of another member, internalises / preserves it, and alters her action as a result. The adding mode is enacted when interactions consolidate the related knowledge of individuals (Cavaye, 1995; Levina, 2005). In the *challenging mode* an individual reflects on the knowledge contribution of another member but does not internalise / preserve it and instead transforms it by making an alternative contribution. The challenging mode centres on addressing the divergent perspectives of individuals by internalising and then transforming the contributions of others (Levina, 2005). Finally, in the *ignoring mode*, an individual does not reflect on the knowledge contribution of another member due to the contribution being misunderstood, not being received, or not being registered. Without reflection, an individual does not internalise or transform the contribution of others and her actions do not change. The ignoring mode is enacted when interactions do not recognise the task related knowledge of other individuals (Cavaye, 1995; Levina, 2005). Figure 1 illustrates our conceptual model.

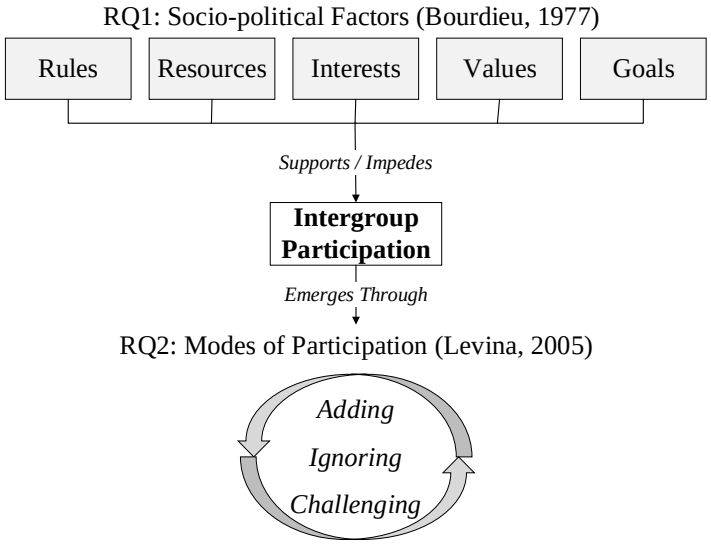

Figure 1. Conceptual Model

4 Research Design

An in-depth case study (Walsham, 1995; Darke et al., 1998) was chosen to investigate a 6-month distributed ISD project (The Health ISD project) which sought to develop an Electronic Health Record (EHR) that would enable clinicians to record and monitor the wellbeing of patients. One of the primary advantages of qualitative case study research is that it enables the researchers to elicit detailed accounts of individuals' actions, experiences, and contested meanings in their natural setting (Klein and Myers, 1999; Myers, 2013). The project was exploratory and novel in its aims which led to complexity and uncertainty around problem formulation, approach design, and solution design. Owing to the complexity of the project (in terms of aims and structure), the project was designed as a collaborative effort involving expert stakeholders from industry, academia, and the healthcare sector. Team members were located across four distinct geographical areas and came from diverse professional and educational backgrounds (i.e. clinical, IT, project management). The distributed team is described in Table 1. Innovation Inc. is a research institution with a centre located in a national university which offers research, development and innovation capabilities to domestic and international companies. Data Analytics Inc. is a global technology firm that delivers consulting services, while Health Data Inc. is a local start-up with an interest in the remote monitoring of patients' wellbeing. Meanwhile the clinicians were based in a National Hospital, one of the largest in its country in terms of population coverage.

Role	Organisation	Duration
Principal Investigator	Innovation Inc.	20+ years' experience in academia.
Project Manager	Innovation Inc.	20+ years' experience in planning ISD projects.
Full-time Developer	Innovation Inc.	5 years development experience in industry.
Part-time Developer	Innovation Inc.	1 year development experience in industry.
Analyst	Innovation Inc.	2 years' experience in academia.
Funded Investigator	Innovation Inc.	20+ years' experience in IT sector and academia.
Data Architect	Data Analytics Inc.	20 years' experience as a solutions architect.
Founder	Health Data Inc.	20+ years' experience in entrepreneurship.
Clinical Lead	National Hospital	20+ years' experience as a senior obstetrician.
Clinical Researcher	National Hospital	5 years' experience as a clinician.
Research Nurse	National Hospital	2 years' experience as a midwife.

Table 1. Distributed Team in the Health ISD Project

Data collection was undertaken using three qualitative techniques: observations, interviews, document analysis – see Table 2. The first author had direct access to the live environment and collected over 700 hours of participant observations over a 6-month period. He was a full-time member of the distributed ISD team and was involved in documenting requirements for the proposed IT solution in collaboration with other team members. The first author also had access to project documents, emails between the team, and online interactions on the project-tracking platform, JIRA. Participatory observations were complemented by 10 semi-structured interviews with each member of the distributed team, each lasting around 90 minutes. The interviews were conducted, recorded and transcribed by the first author.

Source	**Description**	**Volume**
Participant observations	Field notes taken by the first author in the live environment over a period of six months.	700+ hours
Interviews	Interviews with IT specialists and clinicians in the distributed team.	10 interviews
Email conversations	Email conversations between members of the project team as well as internal and external stakeholders.	800+ emails
JIRA project-tracking	Project documents including user stories, periodic reports, and related diagrams such as the use case diagrams.	100+ items
Shared network drive	Formal minutes from meetings between team members, and PowerPoint presentations used to deliver knowledge and provide updates on the practice to internal and external stakeholders	250+ files

Table 2. Summary of Data Collection

Findings were triangulated from the three different data collection techniques to address issues of first author bias. Case analysis meetings were also organised regularly involving colleagues with experience in the domain of study to further address potential biases through the joint analysis of data (Miles and Huberman, 1994, pg. 76). The unit of analysis was the field of practice (e.g. distributed ISD project) which refers to the spatial and temporal nexus of action (Schatzki, 1997). Data analysis began with the lead author repeatedly reading and re-analysing collected empirical data. Coding (as per Miles and Huberman (1994)) was used to analyse the empirical data, and NVivo 11 was utilised to manage the inventory of codes. Coding was undertaken based on the first author's perception of variables and relationships, otherwise referred to as theoretical sensitivity, which was influenced by the theoretical development outlined in Section 3. During the coding process, keywords and phrases were coded which related to the concepts set out in the theoretical framework. Using NVivo 11, root nodes were first defined based on the concepts outlined in the theoretical framework (rules, resources, interests, values, goals). Child nodes were then created through open coding and assigned to a root node. In coding the different types of participation, we adapt the works of Levina (2005) in order to gain insights into the modes through which participation emerges over time: *adding*, *challenging*, and *ignoring*. Theoretical saturation was deemed have been reached when the author was unable to identify additional codes.

5 Findings

This section presents findings from our in-depth case study, with a particular focus on the distributed participatory design phases involving IT specialists and clinicians. Early in the project, the project manager decided to organize four phases of face-to-face and online participatory design workshops to provide stakeholders with a means of sharing knowledge and discussing their perspectives on the proposed system. The face-to-face workshops (each six hours in duration) provided the first opportunity for the IT specialists and clinicians to come together in one physical location for a dedicated length of time and engage in dialogue about the project. The face-to-face workshops were further complemented by online interactions (taking place over one week) using of technology-enabled communication (e.g. via email, JIRA) where team members engaged in further dialogue around the project. The clinicians were brought into the team as domain experts in the expectation that it would facilitate knowledge sharing and expedite requirements gathering.

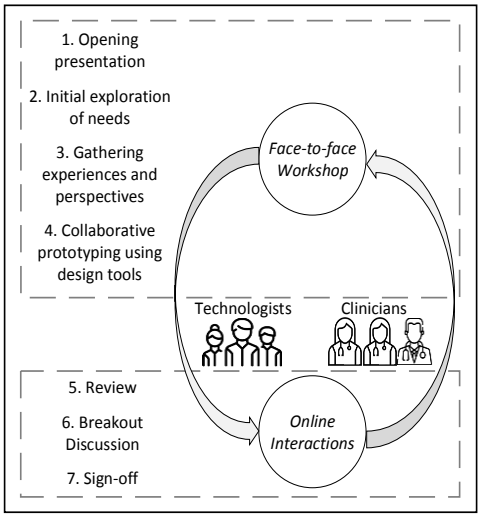

Figure 2. Steps in the Participatory Design Phases

Figure 2 illustrates the steps in the distributed participatory design approach. The face-to-face workshops began with the project manager presenting an overview of what the workshop would entail, followed by a questions and answer session which allowed participants to provide feedback. In Steps 2 and 3, team members were encouraged to draw on their domain expertise and work together to define the requirements around an evolving prototype of the proposed EHR. Design tools were used in Step 4 to guide discussions during the participatory design workshops. For instance, tools such as journey mapping, scenario building, and use cases were designed to support participation during this step. Once each face-to-face workshop had ended, team members then moved their interactions online to review the outputs from the workshop, add clarifications, and eventually agree requirements. These outputs in turn became an input into a new cycle of face-to-face workshop and online interactions.

The face-to-face workshops and online interactions were intended to provide a facilitated, participatory design environment for systems requirements gathering. A number of outcomes were delivered from the phases including four drafts of use case documentation, patient journey maps, patient personas, and clinical pathway. The duration of the four phases (i.e. completed cycle of face-to-face and online participatory design workshops) was two months. The findings are presented according to each factor in the Theory of Practice (RQ1), with insights also taken from the CRIA framework (RQ2).

5.1. Participation and Rules

The Principal Investigator noted how the decision-making rules of "*a matrix of disciplines of practice*" shaped how action was taken during the participatory design phases. Both clinicians and IT specialists came with its own set of both explicit and implicit rules around the division of work, roles, responsibilities, and expected involvement. Planning activities during the workshops attempted to formalise work stream descriptions, work breakdowns, and resource allocations; however, other rules such as those around the decision-making hierarchy remained more implicit. For instance, one developer noted how the IT specialists were "*accustomed to working in a flat structure*" and felt empowered to make decisions around their own tasks. However, he felt this was not the case for clinicians, who maintained "*a top down structure"* where "*many decisions can't be made except at the top"*. The speed of decisions requiring clinical input therefore depended on which member of the clinician subgroup was available, with decisions made much more quickly when the clinical lead was present. Indeed, the more junior clinicians noted they didn't feel empowered to make decisions in the absence of the clinical lead.

The availability of the clinical lead became an ongoing issue as she held multiple senior roles: consultant in the hospital, a teaching role in the university hospital, as well as part-time positions on other research projects. Given the interdependencies between most tasks, IT specialists found it difficult to complete certain work when formal feedback was not received from clinicians. The full-time developer believed that implicit rules (around decision making within the clinical group) impeded participation as: *"it's not*

a good way to get things done on a software technology project; you need to have people there to talk to and make decisions when needed". The Principal Investigator admitted that the IT specialists were less accustomed to the need for deference to seniority and perhaps lacked the respect for hierarchical rules when collaborating with other stakeholders. During an interview, he noted the dangers of confusing "*freedom*" with "*respect*" and asserted professional rank is important to the running of the project: "*A lot of people lose sight of that and need to be reminded to respect hierarchy".* This referred to the IT specialists' somewhat informal communication approach with clinicians. The Principal Investigator however did accept that while "*saving lives is obviously important*", clinicians should recognise "*a project deadline is a deadline*", and project-level communication should be forthcoming and timely.

5.2. Participation and Resources

The access to resources (e.g. expertise, knowledge, documents) created power relations in the participatory design phases, with certain individuals gaining positions of dominance at different stages. The part-time developer noted these power asymmetries between the stakeholders by stating that some knowledge contributions received more "*weight and credibility"*. Field notes also remark on the weight carried by the clinical researcher's opinions during workshop discussions given her expertise in perinatal research. In addition, clinicians' medical qualifications, and access to clinical documentation such as the maternity health records, meant that their opinions had a strong influence on decisions around which requirements were deemed in or out of scope. Interestingly, IT specialists felt the clinicians also gained power by withholding their participation at key stages of the project when their feedback was required. For instance, by transferring ownership of the solution to the IT specialists, the clinicians at times ignored the IT specialists' requests for clarifications, yet still reserved their power to veto any solutions put forward later on. As stated by the project manager: "*They (clinicians) are a profession that demands respect, both within their own hierarchy and among others in the team*".

The participatory design phases afforded each partner an opportunity to contribute knowledge whenever required. Nevertheless, members of Innovation Inc. felt that their disciplinary expertise conferred them with project management power as they could "*see the big picture*" connecting the needs of the different stakeholder groups. In particular, the IT specialists played an important role in helping clinicians realise that in the discussions about the data requirements for the EHR, the clinicians had overlooked some of the data items required for the analytics. The part-time developer noted that at times there was a disconnect between the clinicians and the IT specialists and he felt that knowledge transfer between the two groups "*were disjointed*", especially when it came to the clinical lead's decision making. For example, the IT specialists and clinicians had previously agreed that some automated calculations in the EHR were out of scope; however, clinicians later argued that this should be included.

5.3. Participation and Interests

Based on our document analysis, it became clear that the participation of certain individuals decreased when the workshops ended and interactions moved online. Clinicians' participation in the project decreased when the IT specialists began seeking detailed requirement clarifications through email. This worried the IT specialists who felt that reduced clinician engagement would affect the quality of the final product: "*(clinicians) don't realise the importance of (stakeholder) involvement*". The clinical researcher seemed unmotivated to read through emails and documentation produced by the analyst. She later noted in an interview that she was primarily interested in activities that directly benefited hospital patients and saw the questions about system requirements as an unnecessary distraction from this. The Principal Investigator attempted to justify this attitude by suggesting that it was a result of poor levels of communication early in the project: "*It's conceivable retrospectively that we didn't communicate enough at the outset… on the need for timely feedback"*. This created difficulties later when prompt feedback was urgently needed to complete requirements but requests were being ignored by clinicians.

Field notes from the workshops also highlighted differences in the interests of different subgroups in the project team. For example, the professional interest of the clinicians was long-term in its orientation and focused on the publication of high impact papers in the area of perinatal research, whereas the interest

of Innovation Inc. was short-term and focused on winning funding to continue the development of a novel health IT platform. The clinical researcher's interest was to develop new clinical guidelines and in so doing to further her career prospects. This sometimes conflicted with the IT specialists' interests in working on ISD projects to expand their professional experience and expertise.

5.4. Participation and Values

Differences between the values of IT specialists and clinicians were also evident during the workshops. For instance, the IT specialists valued a high intensity collaborative approach to participatory design, which demanded that all important requirements were discussed and agreed. However, this process was unfamiliar to clinicians, who preferred a low intensity approach with responsibility for the day to day 'techie bits' abdicated to the IT specialists. The IT specialists felt that the clinicians saw themselves operating independently of the project plan, but at the same time retaining a veto over all decisions. The clinicians saw the development of the platform as the concern of the IT specialists and that they themselves were 'waiting in the wings' to take control of it once the clinical study was to commence. This gap led to conflict as the IT specialists expected clinicians to stay engaged and to make decisions in a timely fashion. One developer felt the clinical researcher sometimes did not want to make decisions and used the excuse of needing to revert decisions to senior clinical members in the National Hospital.

Consequently, differences in values delayed progress during online interactions. The IT specialists utilised email to document all requirements from the workshops and request 'sign-off' from clinicians. However, the volume of unresolved questions created difficulties and at one stage led to a complete breakdown in communication. Reflecting on this, one developer noted: "*Maybe we showed a lack of respect in throwing questions at them… Maybe it was the way the questions were asked. I'm not sure what [clinicians] were worried about: the tone of the emails or quantity*". The clinical researcher however later noted that: "*I didn't have a problem with the amount of questions asked but felt that some questions were hard to deal with as I don't know the answer and felt I had to revert to (my supervisor)*".

5.5. Participation and Goals

The workshops allowed team members to identify conflicting project goals such as between Data Analytics Inc. and Innovation Inc. Data Analytics Inc. had expected that the its proprietary product suite would be at the core of the EHR; however, Innovation Inc. was concerned that this might lead to vendor lock-in and it instead preferred to use open-source solutions. A series of difficult conversations took place between senior members of both organisations to resolve this goal conflict. Following intense negotiation, Data Analytics Inc. reluctantly accepted the right of the project to use open source solutions but also noted that they felt this would threaten project success. The project manager felt that this put down a clear marker demonstrating that the goals of the project were more important than the goals of anyone individual partner, no matter how large they were. Reflecting on this decision, the full-time developer also stated that the decision was important for Innovation Inc.'s future organisational goals: "*[open-source solutions] slowed things down, but I feel it will pay back later… I understand the rationale and if there are more projects it's good to have an open source EHR*".

Interestingly, document analysis shows how this decision resulted in higher task independence between Data Analytics Inc. and Innovation Inc. Data Analytics Inc. later decided to exclude itself from those tasks that worked directly on developing the open source EHR. Instead it focused on tasks that were more closely aligned with its goals and this in turn required less collaboration with Innovation Inc. Meanwhile, interviews suggest that the clinicians' goals primarily centred on the conduction of the research study and potential publications that would emanate from this work in the future. Their participation with tasks related to systems development was seen as more volatile by IT specialists, who questioned whether delivery of the system was a comparatively less important goal for them.

6 Discussion

In this section, we discuss the socio-political factors which shape intergroup participation in distributed ISD projects (6.1 - RQ1), and how intergroup participation emerges over time (6.2 - RQ2).

6.1. The Socio-political Factors of Participation in Distributed ISD Projects

Prior literature on participation has traditionally emphasised the need to co-locate IT specialists and users / domain experts in order to support knowledge sharing during ISD projects (Markus and Mao, 2004; Iivari, 2009; Bergvall-Kåreborn et al., 2014). However, our understanding of the unique socio-political factors affecting intergroup participation in distributed ISD projects remains nascent. Drawing on the seminal works of Bourdieu (1977), we identified five socio-political factors which shape participation in distributed ISD projects: *rules*, *resources*, *interests*, *values*, and *goals*.

Firstly, our findings show that the existence of rules in distributed ISD allow IT specialists and domain experts to interact in a clear and transparent way. These rules can in turn provide a common ground for participation (Kensing and Blomberg, 1998). Obendorf et al. (2009) have noted that participatory design workshops are somewhat useful for revealing differences in rules originating from each individual's background. However, rules turned out to be a complex issue in the Health ISD project owing to organisational differences between IT specialists and clinicians, and in some situations became an impediment to participation. For instance, the implicit professional rules of the clinicians meant that most decisions followed a top-down hierarchy. This impeded the IT specialists' ability to communicate freely with the clinicians and led to long delays.

Resources contributed towards power relations between IT specialists and clinicians, and were found to both enable and constrain participation during the Health ISD project. Literature has traditionally looked at how IT specialists exert power over other stakeholder groups during systems development (Robey and Farrow, 1982; Markus and Bjørn-Andersen, 1987; Cavaye, 1995); however, our study provides contrasting examples of where the clinicians exerted power over the IT specialists, often through unexpected means. The clinicians sometimes gained power by withholding their participation, despite the door being opened for collaboration with the IT specialists. For instance, clinicians displayed low levels of participation during key stages when feedback was required, yet their control of resources still reserved them the power to veto solutions put forward by the IT specialists. Disciplinary expertise empowered clinicians to decide which requirements should be included; however, at the same time, they gained power from distancing themselves from the project and transferring ownership to IT specialists.

We also find that the Health ISD project had to cater for the different interests of stakeholder groups. To date, the concept of interests has received limited attention in existing literature on distributed participation. In the health ISD project, IT specialists and clinicians each came with unique and multifaceted perspectives on what was deemed 'important' in the project. In particular, the clinicians were more interested in the 'patient perspective' and were less motivated to read requirements documentation and to sign-off requirements. This decreased their participation during key stages when the IT specialists were trying to gain input into, or sign-off on requirements. There were also differences seen in the temporal aspect of interests e.g. long and short-term. The IT specialists asserted that the clinicians were more focused on more long-term interests such as gaining publications from their involvement in the project, rather than participating in systems development.

In addition, the recognition of diverse values between groups during the Health ISD project helped support participation. Values guide how stakeholders take action and influence their choice of one approach over another (Obendorf et al., 2009). Findings suggest a gap emerged between the more 'rigorous' approach demanded by the IT specialists where the requirements should be agreed before development, and the more 'flexible' approach demanded by clinicians where the requirements could change regularly. Both groups embodied principles of agility (cf. Conboy, 2009) however, there were discrepancies between each group's interpretation of what agile meant. IT specialists valued rapid prototyping as a means for stimulating ongoing stakeholder participation; clinicians also valued rapid prototyping but more as a means for controlling progress. Clinicians did not see the need for providing ongoing feedback especially when requested weeks and months in advance of a deliverable's due date, and instead invested their time in 'firefighting' with what was happening in the hospital. These different interpretations of agility were not complementary and resulted in conflict, particularly when requirements for proposed features shifted - often unbeknownst to the IT specialists. Clinicians seemed less aware or concerned with the consequences this would have for the IT specialists. It was only when

the project manager outlined the impact that changes to requirements would have on the 'go live' date for the system did it result in more concerted, but also contentious, engagements between the groups.

Lastly, our findings show how goals shape participation by influencing stakeholders' perspectives on why a proposed system is needed, and how it should be developed. The concept of goals has also received limited attention in IS literature on distributed participation. Participatory design can be used to support participation among stakeholders, with a view to eventually fostering a shared understanding of system goals (Cavaye, 1995). However, in the case study, questions remained around whether clinicians and IT specialists truly had a shared understanding of the process and what each required from the other. Clinicians' continuous prioritisation of hospital work over project work made IT specialists question whether they understood the time-sensitive nature of ISD project goals. The part-time developer noted that clinicians were less familiar with the mechanics of running projects; indeed, the clinician researcher accepted that prior to Health ISD, she had no experience of working on projects.

6.2. Modes of Participation in Distributed ISD projects

In relation to RQ2 we find, consistent with Levina (2005), that participation can be understood through three modes: *adding*, *challenging*, and *ignoring*. We further find that these modes can be used by distributed team members as instruments of both coordination and conflict.

Firstly, face-to-face workshops and online interactions supported the *adding mode* by allowing all team members, regardless of background and expertise, to have their say in the design process. Nevertheless, power relations emanating from the control of project resources (Robey and Farrow, 1982; Markus and Bjørn-Andersen, 1987; Cavaye, 1995) were also observed as an inherent characteristic of the adding mode. For instance, during the participatory design workshops, the senior clinician's opinions were at times conferred with greater legitimacy in decision making processes than the opinions of other team members. Secondly, we find that participation in distributed ISD projects can embrace a *challenging mode*, where an argumentative process is used by stakeholders to highlight differences in interpretations through clarification and discussion (Levina, 2005). Findings show how the challenging mode revealed differences between Innovation Inc.'s intention to use open source solutions and Data Analysts Inc.'s goal in integrating their proprietary solutions into the EHR. These differences emerged at least in part due to the participative nature of the project where each partner was allowed to have a say on the project's goals; in contrast, a more consultative approach (where comments are invited on pre-set solutions) or an informative approach (where individuals only provide information for systems development) may emphasise the adding mode and lessen the need for the challenging mode (Damodaran, 1996; Kautz, 2011). However, we find that the challenging mode subsequently improved participation and strengthened relations in the case. Finally, the *mode of ignoring* was seen across distributed team interactions, such as when clinicians purposely decided not to engage in requirements gathering. The clinical researcher was also slow to agree to requirements and did not always refer to documentation as "*the information was more in my mind and I knew the points I wanted to discuss*"

Based on our findings, we also found a need to extend Levina (2005), to include two additional modes of participation in distributed ISD: *defining*, and *finalising*. 'Defining' refers to situation in which team members engage in new 'green field' discussions on subjects where no prior contributions have been made. This is particularly important in distributed ISD projects given that individuals may lack a shared context and history prior to the project commencement (Kankanhalli et al., 2006; Windeler et al., 2015). This mode was seen in the case during initial distributed participatory design phases when IT specialists and clinicians tried to understand the overall vision of the project. 'Finalising' refers to situation in which contributions that aim to close out discussions and progress tasks towards completion. The finalising mode is important in distributed ISD projects in order to synthesise the diverse contributions of different individuals and to find a common ground between them. In the Health ISD project, both the defining and finalising modes were crucially supported by the use of design artefacts such as use cases and journey maps. For instance, the part-time developer noted that use cases were important for aligning Innovation Inc. and Data Analytics Inc.'s goals. However, clinicians were less familiar with these artefacts and as a result they proved ineffective for stimulating participation.

We also see an interplay between participation modes such as ignoring and finalising in the Health ISD project. Clinician's tendency to ignore emails affected IT specialists' ability to engage in the finalising mode. Clinicians had ultimate power in approving the platform for implementation in the hospital; however, they were often unwilling to commit time towards tasks which they felt were the responsibility of the IT specialists, such as requirements gathering and prototyping. Clinicians were happy to delegate development of the health IT platform to the IT specialists, but wished to retain their power to have the final say on its completion. This created issues later on when the clinicians ignored IT specialists' requests for feedback on prototypes of the EHR and the finalisation of requirements documentation. Clinicians seemed unconcerned about the impact that this was having on the delivery of the health IT platform and that IT specialists felt isolated in their concerns for missed deadlines.

Our findings also hypothesise that the emergence of certain modes may depend on where the locus of dominance lies at the *subgroup* level (cf. O'Leary and Mortensen, 2010; Carton and Cummings, 2012; Pflügler et al., 2018). For instance, indicative patterns suggest that the ignoring mode was more likely to emerge during discussions in the Health ISD project where one subgroup (i.e. clinicians) was more dominant than another subgroup (i.e. IT specialists). As disciplinary experts, clinicians reserved the right to have the final say on the Health IT platform's design, yet often ignored the IT specialists' requests for feedback on requirements. Meanwhile, we hypothesise that the challenging mode and adding mode is more likely to emerge when subgroups share partial dominance. In the case, the partial dominance shared between Innovation Inc. and Data Analytics Inc. fostered the challenging mode as both groups felt that they depended on one another and would need to negotiate differences in interests, such as during discussions around the use of open source components. Partial dominance also supported the adding mode as stakeholders were able to deliberate on the tasks they would pursue e.g. tasks related to the open source EHR. Figure 3 illustrates hypothesised relationships between the modes and the locus of dominance between subgroups which future research can investigate.

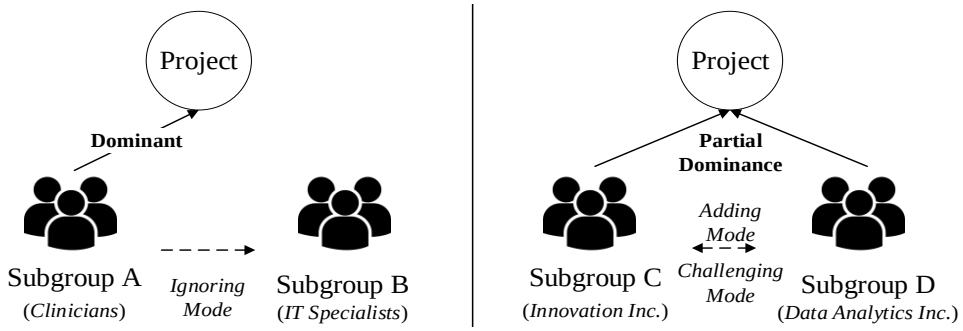

Figure 3. Hypothesised Relationship between Participation Modes and The Locus of Dominance

7 Conclusion

In this paper, we contribute insights into how socio-political factors such as rules, resources, interests, values, and goals can support or impede intergroup participation in distributed ISD projects. In terms of theoretical contributions, we build on findings from an in-depth case study to provide fellow scholars with insights into how socio-political factors can act as instruments of coordination and conflict across both face-to-face and online communications, and point towards unique theoretical implications for different modes of participation. In terms of practical contributions, we provide ISD practitioners with a means to conceptualise the challenges of participation in distributed ISD by explicating five modes through which participation emerges (e.g. adding, challenging, ignoring, defining, finalising), with reference to different socio-political factors. A limitation of our research is the unique context in which the case study took place e.g. health ISD. Therefore, further studies are needed to explore socio-political factors of participation in different contexts. The author's involvement in the case is another potential limitation; however, the use of multiple data sources was adopted to triangulate findings and address the risk of subjective biases. In terms of future research, the implications of subgroup formation across the five modes of participation is worthy of further exploration.

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