Conducting Participatory Design to Improve Algorithms in Public Services: Lessons and Challenges

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ABSTRACT

Government agencies are increasingly looking towards algorithmic decision-making systems as a means to reduce costs and optimize processes. However, these algorithms are being constructed in an opaque and isolated manner with calls to adopt a more participatory approach such that stakeholders become co-designers in the process. We share our experiences from conducting participatory design to improve algorithms in the Child-Welfare System. We discuss a policy-mandated algorithm and an agency-level theory-driven algorithm to show how tensions arise when the values of workers are not embedded in the design of an algorithm.

INTRODUCTION

Decades of neoliberal politics in the United States (U.S.) based in austerity and privatization have led to government agencies increasingly turning towards digital technologies both as a means to reduce costs [15] as well as provide greater efficiencies in public policy and social services delivery [7]. Moreover, algorithmic decision-making is often marketed as *value-free*, *objective*, and *evidence-based* solutions to socio-political problems [1, 19]. For these reasons, the underfunded Child-Welfare System (CWS) [4] in most states in the U.S. has turned towards algorithmic decision-making systems. Recent studies have raised several ethical, technical, and social concerns about the use of such algorithmic systems in CWS and called for the introduction of more participatory and human-centered approaches towards algorithm design [5–7, 17].

In this extended abstract, we present work-in-progress findings from an ethnographic study in the state of Wisconsin to investigate the interaction of policy, practice and algorithms in CWS. Wisconsin's Department of Children and Families (DCF) contracts child-welfare services to non-profit
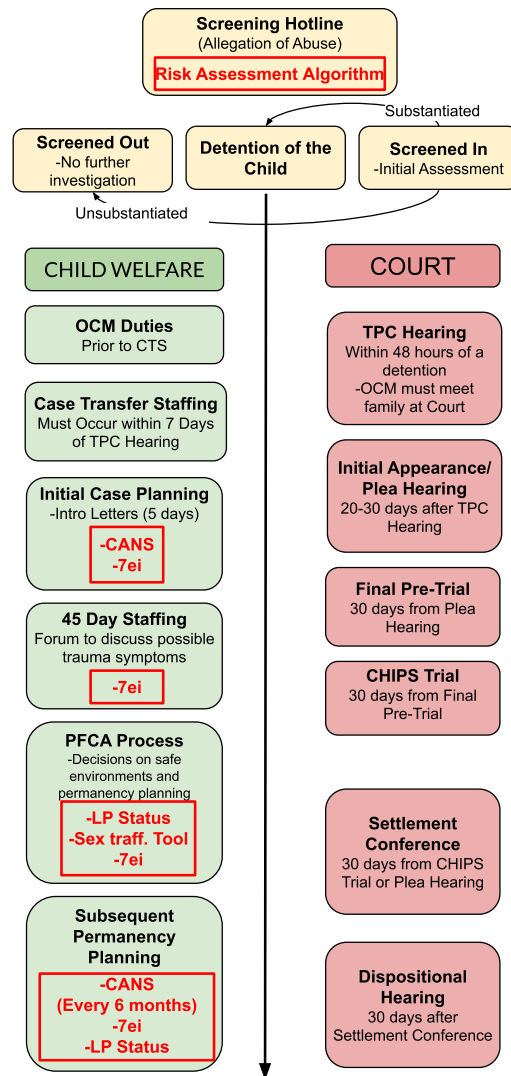
Figure 1: Life of Case: This is a simplified visualization of the life of a CWS case. The red boxes depict the algorithmic interventions at various stages.

organizations (NGOs) that work in human services. We are working with one such NGO to understand the nature of child-welfare work and the impact of algorithmic decision-making systems on practice. We are especially concerned with two specific algorithms [16] that influence the work of child-welfare teams. One of these algorithms is a legislative requirement mandated by the state while the other is designed by the NGO itself to study progress around theory-driven practice based in trauma-informed care [18]. We share our experiences of our efforts in algorithm design empowered through participatory design (PD) in a complicated public domain with several political as well as private sector actors. PD has always operated within institutional constraints and this has especially become the case for public services that now exist at the intersection of the public and private sector in an increasingly neoliberal society [12]. We specifically shared how we are addressing three institutional constraints that have been recognized by PD scholars in the past, namely, the sandbox, the administrative gap, and the ideological mismatch [12].

BACKGROUND

A Bill was introduced in the Congress of the United States to provide funding for the development of predictive analytics in CWS [1]. Moreover, a new enterprise-level data model [11] has been proposed for CWS with federal funding made available for states that implement it. These federal initiatives have laid the groundwork for future algorithmic interventions in CWS, however, this also necessitates a participatory and human-centered development of these algorithms [17].

The state of Wisconsin has been understand a federal lawsuit brought on by the American Civil Liberties Union (ACLU) alleging that the state failed in its obligation to provide adequate child-welfare services to children and families [14]. To address some of these issues, CWS has implemented algorithms at several stages of a child-welfare case to standardize decision-making (see Figure 1). For this research project, we focus our attention towards the following two algorithms –

Child and Adolescent Needs and Strength (CANS) algorithm is mandated by the state and is used to assess the level of need of a foster child by determining the associated risk factors as well as well-being indicators. However, this algorithm often does not agree with theory-driven practice founded in trauma-informed care. Moreover, it has been re-appropriated to carry out a task that it was not designed to do which has led to several unintended consequences and added to the frustrations of caseworkers (see [16] for details).

Seven essential ingredients (7ei) algorithm is used to capture a child's well-being over the course of the child-welfare case. The team scores the child's wellness on seven categories (Prevalence, Impact, Perspective Shift, Regulation, Relationship, Reasons to Be, and Caregiver Capacity) every month when the case is discussed. 7ei algorithm is based in trauma-informed care which has been proven to improve child outcomes such as placement stability and permanence [18].

METHODS

We are conducting an ethnographic study and engaging with people both at the local agency level as well as the legislative level. The graduate student is at the CWS agency two days a week attending meetings, conducting interviews, and engaging in conversations with child-welfare workers in the hallways (see Table 1). The faculty advisor continues to have meetings with legislators at the state-level to gain access to people and data concerning the state-mandated algorithm (CANS). The purpose of this continued engagement is not just to understand the nature of child-welfare work but also to understand the institutional processes and systemic and policy barriers that impact practice.

Table 1: Ethnographic study details

Data collection method	Count
Observations	60
Interviews	20
Meetings	10

OUR POSITIONALITY

As academics and computing professionals, it is imperative to recognize our own values that we bring to the PD process. We disavow technological solutionism and refuse to design, build, or deploy tools that are not centered in the values of caseworkers or theory-driven practice. Our primary motive is to empower caseworkers and grant them more agency in the process.

INITIAL RESULTS

Several processes and structures of governance exist in the public realm that limit the potential for PD [12]. There is a need to strengthen PD by especially engaging in activities that lead to the discovery and explanation of these institutional processes [12]. Moreover, PD has an important role to play in the configuration of narrative and policy in public services and not just producing new technological artifacts. Below, we discuss some of our initial findings –

Exploring Conflicting Values   PD scholars have urged research to focus on conflicting values and explore the value pluralism that arises while postponing any design decisions [3]. Paying attention to multiple voice is fundamental to PD [10]. The caseworkers' job is to navigate through the system and find services for children and families as well as act as a mediator between the children's court, district attorney's office, and families. However, critical decisions are made by the legal parties whose understanding of child well-being is based in a narrow legal framework rather than a comprehensive sociological one. Their values are inherently different from the values of caseworkers. Caseworkers directly interact with families on a daily basis and advocate for them in court. Their core values are placed in the practice of social work and helping children and families.

Empowering Caseworkers   PD scholars have warned against false-consensus [2] and pseudo-participation [8] through a lack of agency in PD practices [9]. Sharing of power is imperative for a PD process [3] and we are engaging caseworkers as co-designers and placing their values front and center. The 7ei algorithm is based in the values of workers and seeks to understand the child and parents from a trauma-informed perspective [18]. We are working with program directors at the agency (all of whom are former caseworkers) and the data specialists to revise the algorithm to better capture child well-being from a trauma-informed perspective. We have shared our concerns about some variables (inconsistent scoring, lack of understanding) that have arisen in our observations and are working with the stakeholders to address them. PD as a process works towards a democratic end centered in supporting skilled work practices as a means to intervene in local politics [12]. We continue to advocate for this theory-driven algorithm while opposing the use of CANS, a policy-driven algorithm that poses barrier to child-welfare practice.

Building Relationships to foster Mutual Learning   We have engaged in PD as a mutual learning process where an open exchange of ideas can occur [20]. Through a continuous engagement, we are learning from child-welfare workers about the CWS ecosystem, institutional processes, and power imbalances. On the other-hand, they continue to learn from us about the social and ethical issues associated with algorithmic decision-making. For instance, referring to quote from P1, we explained to the CWS workers why we need to ethnographically study the CWS ecosystem before we made any algorithmic interventions. We also shared with them the findings of our literature review [17],

PARTICIPANT QUOTES

"Why are they spending so much time talking to people and going to meetings? They haven't done anything with the data yet" - P1 (Data Specialist at NGO)

"Hey I started watching that documentary! I think I better understand what you guys are trying to do. I'm attending a conference next month. I'll bring this up at the workshop and see what people think" - P2 (Program Director at NGO)

"I have worked on the other side of data agreements at DCF before. They are being overly protective and skeptical because of a recent incident. I can help you work with them" - P3 (former Research Analyst at DCF)

findings from *Automatic Inequality* [7], as well as popular media in the form of a Netflix documentary titled, *"The Trials of Gabriel Fernandez"* that discusses risk assessment algorithms in CWS [13]. This allows the child-welfare workers to take this knowledge to state and social work conferences and deliberate over these pertinent issues within their professional circles (see quote P2) and further push the boundaries with the state.

DISCUSSION

Below, we share some implications of our findings as well as how we are addressing some institutional constraints and the challenges there in.

The "Sandbox" is described as a highly circumscribed space for experimentation, change, and engagement [12]. We work closely with child-welfare workers at a local NGO and within the confines of this agency, the 7ei algorithm acts as our sandbox. However, continually working within this space we have been able to push the boundaries further and create avenues to engage with the state. 7ei might act as a sandbox but it also acts as a proof-of-concept that better captures child well-being through a theory-driven perspective in contrast to the policy-mandated algorithm (CANS). Our success with 7ei (both academically and socially) will create leverage to push the state to either revise or abandon CANS.

Administrative Gaps stem from a lack of alignment of resources and incentive structures [12]. In our case, admin gaps have arisen because of *opacity due to bureaucracy*. We have been working on a data agreement with the state for over 18 months with several revisions of the agreement submitted by us and reviewed by lawyers, and yet more revisions requested. However, our continuous engagement has allowed us to build connections beyond the agency and bring more stakeholders to the table (see quote P4) to address such systemic barriers. Employees in social services change jobs between private non-profit and government agencies and a continued engagement allows us to develop a well-connected network of academics, bureaucrats, and CWS leadership.

Ideological Mismatch describes a constraint that stems from differing values and beliefs that impedes action [12]. 7ei algorithm has received collective buy-in from caseworkers because it grants them agency by helping them understand the needs of traumatized children. However, critical decisions are still made by legal parties who care more about the legal/policy ramifications than a trauma-informed perspective. We are working with NGO leadership to assess how can we address this ideological mismatch that often leads to frustration and a lack of agency on part of the caseworkers.

CONCLUSION

We share how PD can empower algorithm design when the values of workers are embedded in it. This not only grants them agency through the PD process but also helps earn their trust because the algorithm is founded in theory-driven practice.

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