Street-Level Algorithms and AI in Bureaucratic Decision-Making: A Caseworker Perspective

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Studies of algorithmic decision-making in Computer-Supported Cooperative Work (CSCW) and related fields of research increasingly recognize an analogy between AI and bureaucracies. We elaborate this link with an empirical study of AI in the context of decision-making in a street-level bureaucracy: job placement. The study examines caseworkers' perspectives on the use of AI, and contributes to an understanding of bureaucratic decision-making, with implications for integrating AI in caseworker systems. We report findings from a participatory workshop on AI with 35 caseworkers from different types of public services, followed up by interviews with five caseworkers specializing in job placement. The paper contributes an understanding of caseworkers' collaboration around documentation as a key aspect of bureaucratic decision-making practices. The collaborative aspects of casework are important to show because they are subject to process descriptions making case documentation prone for an individually focused AI with consequences for the future of how casework develops as a practice. Examining the collaborative aspects of caseworkers' documentation practices in the context of AI and (potentially) automation, our data show that caseworkers perceive AI as valuable when it can support their work towards management, (strengthen their cause, if a case requires extra resources), and towards unemployed individuals (strengthen their cause in relation to the individual's case when deciding on, and assigning a specific job placement program). We end by discussing steps to support cooperative aspects in AI decision-support systems that are increasingly implemented into the bureaucratic context of public services.

CCS Concepts: • **Human-centered learning → Collaborative and social computing →** Empirical studies in collaborative and social computing

KEYWORDS: Algorithmic Decision-Making, Casework, Job Placement, Bureaucracy, Public Services

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1 INTRODUCTION

Artificial Intelligence (AI) in public services, which supports or replaces human autonomy, discretion, and decision-making capabilities, continues to attract public and scholarly attention

[58]. According to Brayne and Christin, the implementation of AI is often justified as a way to achieve more effective and objective decisions [13]. Across disciplines, practitioners criticize AI for being opaque, occluded, biased, discriminatory, sexist, and even racist. Recent studies of algorithmic decision-making now draw an analogy between bureaucracy and AI [1, 46]. Alkhatib and Bernstein wrestle with the problem of "inflexible algorithms", arguing that the algorithm itself should have characteristics of the street-level bureaucrat bridging the gap between policy and practice to support the work done by professionals [1]. Acting like street-level bureaucrats on social media like YouTube or Twitter, algorithms decide what content remains visible or is removed. For example, when using Twitter for crowdfunding, algorithms decide who and how many people will see a post, and thereby ultimately determine who receives financial relief, something which is usually handled by public services. Pääkkönen et al. propose bureaucracy as a conceptual lens for understanding how human actors and AI interact to produce powerful consequences in areas of uncertainty [46]. Although content moderation algorithms on YouTube or Twitter act like "street-level bureaucrats", the platforms are not bureaucracies (public authorities) in the sense proposed by Weber almost a century ago [55]. In his sense, bureaucracies are *public* administration or services, and bureaucrats are the intermediaries between the state and the people. In his seminal work, Lipsky coined the front-line workers of bureaucracies—teachers, police officers, judges, and caseworkers—as street-level bureaucrats [32-34]. Their task is to balance policy and rules and exercise discretion while meeting the needs of the individual when making decisions that affect their lives. Serving in a public capacity, street-level bureaucrats face obligations of accountability and transparency in their decision-making that differ from algorithms on *private* platforms. As AI is increasingly implemented into public services in many Nordic countries [38], we find a need to investigate caseworkers' perspectives on bureaucratic decision-making — and which parts of the decision-making process might benefit from support by AI.

Taking seriously the call in Computer-Supported Cooperative Work (CSCW) to design with the perspective of those whose work it is to accomplish a certain task [47], our motivation in writing this paper is to achieve a better understanding of the collaborative aspects of caseworkers' bureaucratic decisions when designing AI for public services. For this paper we understand bureaucratic decision-making as decisions made in a public organization, often through a collaborative practice such as casework, to satisfy "the bureaucratic system" (for example, documentation of communication between the caseworker and unemployed individual to comply with legal requirements or transparency) or determine outcomes for cases affecting people's lives (for example, determining eligibility for public welfare). We investigate bureaucratic decision-making as an object for the design of AI components for caseworker (workflow) systems. At the time of writing this paper, the National Agency for Labour Market and Recruitment in Denmark has designed and implemented an algorithmic component predicting newly unemployed individuals' risk of long-term unemployment. This is a concrete example of how AI is implemented to support decision-making in job placement [38, 44], which is also being adopted in countries such as Austria [2] and Portugal [60].

Formally, caseworkers' main task is to assist job seekers to return to work. In practice, their role is divided between guiding people through a bureaucratic system, enforcing the law and policy, and advocating for the citizen's needs [4, 32-34]. Møller et al. point out that the IT-systems in casework often have divided priorities [40]; they can support the caseworkers and unemployed individuals, as well as supporting the regulatory and policymaking bodies [19, 20, 40, 44]. In this sense, the role of caseworkers, and their technical infrastructure, is in practice contradictory [5,

40]. In an example from a public service family department, the collaboration between caseworkers became visible when caseworkers "got stuck" with a challenging case, and therefore needed their colleagues' input — seeking their point of view, instead of relying on their own judgment in the case [44].

The paper reports a qualitative study of caseworkers' understanding of the perceived potentials of AI for supporting or even automating, tasks. We bring together research on algorithmic decision-making and casework from CSCW [e.g 5], including theories of bureaucracy from the field of public administration [55], and studies on the social implications of algorithmic systems [38]. Two questions guide our research:

1) *What are the key aspects of bureaucratic decision-making identified by caseworkers as relevant for AI?*
2) *When do caseworkers perceive support by AI as valuable for their work around case documentation and decision-making?*

We investigated this as part of a larger research project on public administration and algorithmic transparency[1]. Our focus here is particularly on the portion of the study set up to amass the data about job placement that are currently available for the design of AI components; however, this needs to be compared to the caseworkers' understanding of AI's usefulness, which is not a given. For this purpose, we set up a participatory workshop with around 35 caseworkers in the fall of 2019 in collaboration with the Danish Association for Social Workers (*in Danish* Dansk Socialrådgiverforening), which represents many caseworkers in Denmark. Additional interviews (n=5) with caseworkers from two different job centers, telephone interviews (n=4), and observations (n=9h) added additional context and qualified the findings from the participatory workshop. Similar to Eubanks [23], we observed that caseworkers struggled to understand the algorithmic prediction of long-term unemployment, and the value of the prediction was unclear both to them and the unemployed individuals. Decision-making is registered as an individual task of the caseworker, thus the common sense understanding of casework in job placement may falsely be reduced to individual work. We find it critical to mitigating this common sense understanding by drawing out the collaborative aspects of casework. Systems design fails to fully account for the continuous negotiation that takes place within a community of professionals, particularly if we do not articulate the need for establishing common ground [43] and how it can be maintained when emerging technologies shift work conditions [39].

We understand Artificial Intelligence (AI) in this paper as a computational or algorithmic system capable of performing tasks that require intelligence. In the context of job placement, for example, this means algorithmic decision-support on an interpretation of the law or the choice of support offered to the citizen. Although at the start of the workshop we presented the caseworkers with different types of AI (e.g. rule-based expert systems and different approaches to machine learning), the purpose of the workshop was to engage caseworkers in a discussion of when AI could support or replace their decision-making capability, and when it should do neither. It was not our aim to determine whether caseworkers saw a specific type of AI as

[1] Public Administration and Computational Transparency in Algorithms – PACTA: https://jura.ku.dk/icourts/research/pacta/

suitable for a specific decision. Consequently, neither we nor the participants distinguished between different types of AI and other algorithmic systems during the workshop.

The rest of the paper is structured as follows: first, we present related literature concerned with bureaucracy, casework, and algorithms in public services. Next, we describe our research setting and method, which is followed by our findings: the potential of algorithms for four specific decisions. We nuance and validate this potential for AI in job placement casework, bringing forward casework's collaborative aspect. Finally, we discuss how our findings pose challenges for the development and design of AI systems in public services.

2 RELATED WORK: STREET-LEVEL BUREAUCRACY AND STREET-LEVEL ALGORITHMS

CSCW has a long tradition of investigating workflow systems [8, 22, 25, 26]. The way bureaucracies track and document work has given workflow systems, such as caseworker systems, a prominent role to play. The design interest in this domain has often focused on how scholars can provide meaningful representations of work [25, 26]. More recently, the focus has shifted from designing representations and outlining models of work to an inquiry of workflows through different forms of data mining [37]. Data has become a resource for designing decision-support systems with AI. Mining the data about work processes, it becomes possible to understand how professionals can work in new ways through AI that allows for new decision-support tools. Meanwhile, bureaucracy is a complex, multifaceted phenomenon [57], and bureaucracies are often characterized by routine tasks and a high level of formalization [50]. According to Weber, bureaucracy "refers to a particular type of administrative structure, developed in association with the rational-legal model of authority" [50 p. 48]. On the one hand, this provides the basis for more predictable and stable administrative decisions or outcomes. On the other, the structure also permits public servants, as caseworkers, to exercise "relatively greater independence and discretion" [50 p.50, following Smith and Ross, 1978]. In what follows, we describe street-level bureaucracy as a conceptualization of casework in job placement and present important work on AI in public services.

2.1 The Street-Level Bureaucrats of Job Placement: Caseworkers

The work of public servants or frontline workers, such as caseworkers in job placement, is often studied through the lens of Lipsky's [32-34] seminal work on street-level bureaucracy. Caseworkers are the real-world examples of street-level bureaucrats [5, 6, 19, 24, 40, 44]: public servants who act as the intermediate between the people and the public authority. Working in public organizations, street-level bureaucrats also must adhere to administrative law, which demands cost-effectiveness, transparent, and accountable decision-making [59]. According to Lipsky, street-level bureaucrats share three distinct characteristics: interaction with citizens, opportunity to exercise discretion within a bureaucratic structure, and decision-making power with a potentially high impact on people's lives [32]. Following Scott and Davis, this double-sided relationship - independent discretion within general administrative policies and local procedures - enables bureaucratic systems to handle complex tasks [50], for example, in the area of job placement [40].

Caseworkers often face the challenge of sparse, overwhelming, or unreliable information. Boulus-Rødje points out: caseworkers in job placement in Denmark often have to deal with a "vast amount of information distributed across more than 20 IT systems and organizations, challenging their ability to conduct an adequate evaluation" [6 p. 57]. In a recent study of job placement in a German context, Dolata et al. find that caseworkers often experience conflict between regulation, technological support, and citizens' expectations. For example, what caseworkers are required to do does not necessarily align with their own, or the unemployed citizens' wants, or the possibilities within their caseworker system [19]. Prior studies of job placement find that supporting technologies often either prioritize the caseworkers and citizens or the policymakers and regulatory bodies, leading to unresolvable conflicts and the creation of parallel systems [17, 18, 53]. Møller et. al. identifies two main classes of systems and activities that are often blended into a single set of practices and support systems. The first class encompasses programs in which civic services and interfaces are transferred into digital forms and often take on the character of policy implementation and enforcement. The second class of systems and activities aligns with practices in which citizens' records are used in the instrumental role of tending to the individual and informing the activities of the care professionals who orbit that individual's progress toward stability [40].

Casework may come across as an individual activity, but Randall et al. remind us that very little work is done in isolation [47]. An example of the collaborative aspect of casework, documentation practices involve a continuously negotiated common ground [43] across the community of professionals, for example, determining the status of different types of documentation, and if they are received or within a deadline or not. When preparing for a meeting, caseworkers assess the citizen's case. This case often consists of various forms of documentation: memos from earlier meetings from other caseworkers, documentation from a union, descriptions of medical conditions from medical specialists, and so forth. All these different types of documentation must be assembled across the various IT systems used in job placement [5]. To make the right assessment and to follow up on earlier meetings, caseworkers depend on the documentation practices of their colleagues and others [19]. This challenges the commonsense notion of casework as involving an individual caseworker who sits across from the unemployed individual, entering documentation into the system. In reality, the process is much more collaborative, and the documentation that appears in the system involves distributed work. Part of this work is negotiated in the day-to-day application of the legal requirements, but also with other collaborators, for example, medical practitioners or other departments in the municipality. Further, as we see how the different classes of systems in public services are increasingly merged as part of bringing the individual into the decision-making processes of public services, it becomes increasingly important to show the collaborative aspects as we move forward to use more AI.

Across contexts, caseworkers' tasks are changing due to digitalization and technologies such as AI [7, 44, 58]. Particularly, activities relying on discretion is under pressure, but as we learn from the studies above, discretion is only one part of the uncertainty about processes and decisions in casework. Therefore, it is important to be aware that complying with the process of assembling and documenting an individual's case involves many stakeholders, not just a single caseworker. Increased use of digital technologies changes caseworkers' tasks in various ways. This includes less face-to-face time and more screen time, extensive data collecting, documentation, and data work (the work of cleaning, tidying, and adding data into caseworker

systems) [9, 10, 12, 28, 35]. Street-level bureaucrats are being replaced or finding their tasks changed due to street-level algorithms [1].

2.2 Street-Level Algorithms in Public Services

Viewing street-level algorithms as alternative strategies for the design of casework is important because these systems now make decisions traditionally made by street-level bureaucrats [1]. Alkhatib and Bernstein present and apply this novel theory to three cases: content moderation on YouTube, quality control in crowd work on the online platform Amazon Mechanical Turk, and algorithmic bias in the US justice system. Pääkkonen et al. build on this work, relying on two of the cases (crowd work and the justice system) while adding another case documented by Eubanks [23] on automated housing allocation for homeless people [46]. The algorithm in the justice system supported judges' decisions, while the housing algorithms automatically decided who was most in need of a house and matched homeless people with housing opportunities based on their eligibility criteria. These street-level algorithms either supported or automated decisions usually made by street-level bureaucrats. These algorithms are called street-level algorithms, as they perform the tasks traditionally held by street-level bureaucrats, although these algorithms have also been applied outside traditional bureaucratic settings. The issue according to critics is that algorithms on private platforms make decisions that impact people's lives, but they do not face the same level of scrutiny to avoid harm, be transparent, or demonstrate accountability that public institutions would. Another concern is the right to an individual process, for example in the job center, or the right to a free trial in the courthouse. Human cases may have characteristics or novelty that cannot be encoded [1]. Although the street-level algorithm is seen as the computational twin of the street-level bureaucrat, the algorithms in the cases presented by Alkhatib and Bernstein and Pääkkonen et al. are not limited to the bureaucracy, being the public organization. However, public services are, in fact, a domain in their own right, characterized by limited consensus about the means and ends of decisions [51]. Therefore, we find it necessary to focus our perspective on public services to gain a better understanding of how to design AI systems within this complicated and particular context. A key discussion within AI and public services focus on the altering of human discretion [44]. In the housing context, Pääkkonen et al. argue that the algorithms redistributed discretionary power to locations of uncertainty being places where it is hard to predict or control the outcomes of actions. Human discretion should support algorithmic decision-making in these places [46]. In job placement, Petersen et al. similarly finds that caseworker discretion is still relevant after algorithms enter the equation, as caseworkers are the ones who decide what information to record. In doing this, they are similarly making a decision on how AI should support them in their work [45]. Whilborg et al find that automatic decision-making systems almost become "co-bureaucrats", and public officials become mediators, rather than decision-makers [56]. In his work, which is focused on public sector organizations, Young calls for a direct link between the level of discretion and the value of AI (low discretion = automation, medium discretion = decision-support, and high level of discretion = e.g., creation of new data) [58]. The algorithmic impact on human discretion, for example in the cases described by Eubanks [23] has strengthened the scholarly and public concern regarding algorithms [15]. Across public services, AI is by public officials often justified as a mean to make public services more effective and less contingent on subjective judgments [13], or to ensure fairness in traditionally opaque decision-making and discretionary practices, thus leading to better decisions and mitigating individual caseworkers' arbitrary prejudice or bias. From the

prediction of child harm [48], predictive policing [13], determining eligibility to receive welfare support [23, 27], or experimenting with automated decision-making in asylum and integration systems [36], AI and street-level algorithms are in numerous ways being implemented in public services.

We learn from prior studies across job placement casework and AI how subtle collaboration is in this domain. Caseworkers' decision-making is highly dependent on a variety of medical specialists, therapists, and the citizens themselves for documentation and to move the processes forward. As caseworkers rely on varying specialists, for example, in order to comply with the requirements for how a case has to be assembled and documented, makes casework highly unpredictable and thus hard to model. As we seek to make sense of data about casework and use AI for decision-support, understanding how collaboration takes place becomes even more critical. Thus, a core challenge for CSCSW-scholars is to empirically describe how collaborative work functions as a basis for the responsible development of AI systems.

3 BACKGROUND AND METHOD

The initial focus of the study presented in this paper was to engage caseworkers in a discussion about the value of AI in their daily practice in job placement. This later evolved into characterizing collaborative aspects of decision-making in job placement casework.

3.1 Data Collection, Analysis, and Validation

The participatory workshop (2h) was organized in collaboration with the Danish Association for Social Workers (in Danish, "Socialrådgiverforeningen"). Approximately 35-40 caseworkers participated in the workshop, and of these 9-10 had concrete work experience in job centers. At the workshop, the caseworkers were divided into groups, and their discussion was guided by a prepared design artifact [*following* 3]: a scenario of a 40-year-old unemployed citizen going from "job-ready" to "activity-ready" (not ready to take a job). The citizen is a persona (amalgamated) across scenarios that caseworkers explained to us, mainly focusing on the more vulnerable part of job seekers. The scenario was an iteration of a commonly used tool in the public sector for process descriptions ("Servicerejsen")[2]. The iterations were made together with our student researchers in the team. The final design artifact of the scenario served as a common point for discussion with our participants at the workshop. The scenario enabled caseworkers to vote on decisions in the scenario, inspired by the principles of Dot Voting [16]. Dot Voting is a commonly used method for decision-making and design processes [30]. In groups, the caseworkers discussed different decisions and voted for algorithmic decision-making, decision-support, or neither. A joint discussion about the decisions followed the voting, where caseworkers could comment and reflect on the votes. The workshop was audio-recorded (with permission) and transcribed, and field notes were taken. Other participatory strategies could have been followed [e.g. 14].

The workshop was followed by two rounds of interviews and observations. The first round of interviews was conducted in January and February 2019 (n=5). All interviews were conducted as

[2] Description of "Servicerejsen" in Danish: https://videncenter.kl.dk/viden-og-vaerktoejer/digital-transformation/servicedesign-og-brugerinddragelse/servicedesignvaerktoejet/metode-3-servicerejsen/

individual interviews and lasted about one hour each. Four of them were both audio-recorded and later transcribed, and the fifth was only audio-recorded and not transcribed. The examples from the interviews are realistic caseworker experiences described to the authors by the caseworkers. The second round of interviews in May 2020 validated preliminary findings from the study through telephone interviews with caseworkers (n=4) also working in job placement (May 2020). They lasted between 15 and 30 minutes. Lastly, the first author conducted observations (September 2020) of meetings between caseworkers and citizens in a job center (n=9h). All citizens consented to the first author's presence in the meeting. CSCW has a long tradition of investigating technologies ethnographically [51]. Due to the opaque nature of algorithms, Seaver argues that 'scavenging' different pieces of information, such as interviews and observations, can be necessary when doing ethnographic studies of algorithms [49]. Thus, we treat the workshop, interviews, and observations as ethnographic fieldwork [47]. All interviews, observations, and the workshop were conducted in Danish; quotes in this paper were translated by the authors. All the caseworkers were experienced working in job centers with direct contact with unemployed individuals. They came from different municipalities, and also different departments within the same municipality, thereby covering many different categories of unemployed individuals (long-term unemployed, newly unemployed, with/without medical issues, varying degrees of education, etc.).

We used open coding (NVivo 12 for Mac) for analyzing data with an iterative approach [42]. We coded the workshop transcription (example of codes: 'algorithm may decide,' 'collecting medical documentation' or 'algorithmic concerns'), applied the codes, and used the coded sections as guidelines to prepare questions and analyze the first round of interviews. For example, during Dot Voting, 9/23 posited that an algorithm may decide to collect medical documentation. Since the topic of whether, when, and why to collect medical documentation had been raised, it was then used in the interviews.

Including domain experts is a crucial step in the design process, but their presence might risk becoming a box-checking exercise [38]. To avoid "false consensus," [21, 38] we introduced the caseworkers at the workshop to AI and provided examples of its use, allowing them to contest the value of AI in job placement. Through the two rounds of interviews, we also aimed at nuancing the findings from the workshop to further avoid "false consensus" and provide additional complexity and context to the decision. For example, whether or not a caseworker collects medical documentation when they suspect medical issues may be influenced by the relationship between the caseworker and unemployed individual, we learned in the interviews. The iterative aspect became a necessary part of our data analysis, oscillating between the findings from the workshop, first rounds of interviews, and again when validating preliminary findings through telephone interviews with other caseworkers from job placement. For example, the caseworkers referred to the decision to collect medical documentation as "simple". The following rounds of interviews nuanced this, highlighting the timing of a decision is important for the future collaboration between the caseworker and the citizen, as some unemployed individuals might see the wish to collect documentation as a breach of trust, thereby harming their collaboration with the caseworker. This was supported by our observations in job placement, where caseworkers prepared, held, and documented consultations with unemployed citizens. Table 1 contains the data collection activities, including duration, number of participants, and examples of questions asked.

Table 1 Data Collection

Type of activity	No. of participants	Date and Duration	Purpose and questions
Workshop	35-40	October 2019 3 hours	Identifying caseworker perspectives on the possibilities of AI in job placement Examples of questions: Which decisions can algorithms support — or not? Can algorithms support, e.g., the collection of medical documentation? How could AI support you in your work?
Individual interviews (first round).	5 (4 caseworkers and 1 manager)	February 2020 5 hours (1 hour each)	Gaining a deep understanding of decision-making practice in job placement. Examples of questions: What kind of decisions do you make? What types of information do you rely on when deciding, e.g., that an internship is the right way forward in collaboration with an unemployed individual? How could AI support you in your work?
Telephone interviews (second round)	5 caseworkers	May-June, 2020 1,5 hour (15-35 min each)	Validating results, e.g., understanding the importance of *timing* in decision-making in job placement. Examples of questions: The timing seems to be an important factor when deciding on activities for unemployed individuals, can you elaborate on that? When do you delay a decision? When do you know which decision is the right one to make?
Observations of 6 meetings between caseworker and citizen, and interviews with caseworkers	4 caseworkers, 6 citizens	October 2020 9 hours	Seeing casework in practice. Examples of questions (for the caseworkers): What data is the most significant when assessing a case? How do you prepare for a meeting with an unemployed citizen? How do you use the algorithm that predicts the risk of long-term unemployment in your work?

3.2 Dot Voting and The Scenario of an Unemployed Individual

The participatory workshop started with a presentation by one of the authors on algorithms and AI, (rule-based expert systems and different variants of machine learning) and how these are mobilized toward solving different tasks (playing chess, recognize handwritten letters or

faces, finding the shortest route between two locations) or supporting decisions in job placement. The caseworkers were then divided into groups to discuss whether AI (defined as a computational or algorithmic system capable of performing tasks usually understood as requiring intelligence) could support them in four decisions in a scenario with an unemployed citizen (prepared as a design artifact). For each decision, the caseworkers, after a discussion, individually "voted" for the type of AI support they wanted (Table 2 for votes).

The scenario described a 40-year-old citizen with two kids, an education in IT, and experiencing some issues from arthritis as well as showing early signs of depression. These are common health issues of the citizens we encountered in the study. As the caseworker opens her case, this individual is considered "job-ready". To comply with legal requirements, an unemployed individual must meet with a caseworker a minimum of four times per year. During these meetings, the caseworker and the individual work together to identify what the individual needs to find a full-time or part-time job. During the scenario, the citizen changes from being "ready to take a job" to "activity ready" (not ready to take a job). Different types of decisions are illustrated in the grey boxes in Fig. 1., which is created from realistic examples of a workflow in a municipal job center:

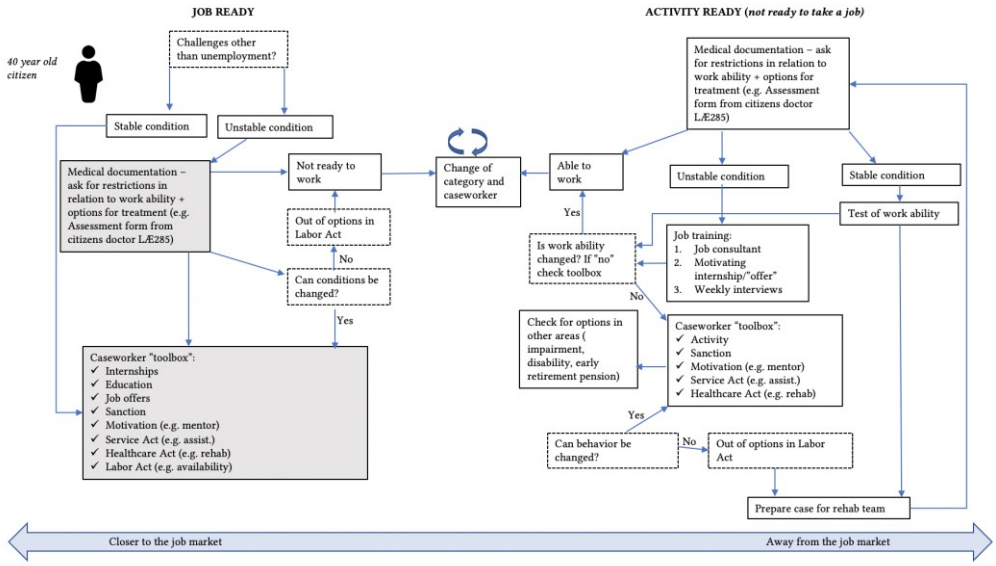

Fig. 1. The workflow of job placement of "Activity Ready" and Job Ready" individuals.

4 FINDINGS

We found a characterization of caseworkers' collaboration around documentation practices as part of negotiating the allocation of support and benefits in job placement. We show how caseworkers perceive AI in bureaucratic decision-making as an opportunity to negotiate the allocation of support and benefits to meet a particular individual's needs. Understanding how AI can become useful for casework shows the need for an orientation towards the development of collaborative AI supporting the continuous need for negotiating common ground as part of the day-to-day bureaucratic processes in job placement. These collaborative aspects of bureaucratic decision-making potentially affect how to design valuable AI in public services. Discussing the

collaborative aspects of caseworkers documentation practices in the participatory workshop, we show how caseworkers perceived AI for decision-making as valuable for their practices when it can support 1) raising issues to management if an individual job placement case requires extra resources because it is deemed "complex", or 2), become a starting point for the collective practice in relation to the individual's case when deciding on and assigning a specific job placement program. We begin by reporting the findings from the Dot Voting exercise and the discussion that followed afterward of the potential of algorithmic decision-support/making on four specific types of bureaucratic decisions.

4.1 Voting for AI

The scenario that formed the basis of our discussions with caseworkers conceptualizes the four different decisions, and caseworkers individually voted for each decision after discussing it in their groups (see Table 2).

Table 2. "Votes" collected responses from the workshop.

	Algorithms may make the decision	Algorithms may advise the decision	Algorithms may neither make nor advise the decision
#1 Decide whether to request medical documentation regarding the unemployed individual	9	14	0
#2 Decide whether a "soft start" on an internship for the unemployed individual is the right way forward	0	20	1
#3 Decide whether the internship is going well/if the internship is still going well	0	19	2
#4 Decide whether the unemployed individual should join a less demanding internship based on a health evaluation	1	13	7

Deciding whether or not to collect a medical record or other kinds of medical documentation was for many caseworkers attending the workshop seen as a trivial, almost standardized decision, with limited need for discretion. As pointed out by one caseworker, it is often mandatory for some groups of unemployed individuals to provide documentation if they are unable to take a job. The caseworkers reasoned that if a health status is mandatory, an algorithm could just as well decide to request it:

"I don't know the criteria for when to collect a medical record, but if the criteria are very simple, then perhaps the algorithm can make the decision… but it is also dependent on discretion".

(Caseworker, AI workshop, October 2019)

Collecting medical documentation is an expense in the job placement, the job center needs to pay medical practitioners for conducting an evaluation and documentation of a medical issue.

Therefore, receiving advice from an AI the caseworkers argued, could strengthen their case to management that collecting medical documentation is worth it since management has to approve the costs. 20/21 voted that an AI could provide decision-support on whether to "soft start" on an internship would be the best way forward. Several caseworkers noted that it would almost always be beneficial to have more advice when making decisions. Receiving advice to match the job seeker with the right internship — or a soft start — based on their medical documentation would be valuable, but would also strengthen the caseworkers' case in the conversation with the citizen agreeing on a specific internship. A caseworker imagines:

"My assessment is not only based on three [cases], but it is grounded in the fact that the majority of the people who have been in your situation would benefit from this".

(Caseworker, AI workshop, October 2019)

According to 19/21 caseworkers, an AI component could offer advice on whether an internship is going well. Internships are usually evaluated in conversation with the unemployed individual and an employment consultant from the organization hosting the internship. However, if their evaluation could be answered in a questionnaire analyzed by an AI component instead of a telephone interview, the caseworkers would welcome the support to guide their decision.

The last decision from the scenario, whether an unemployed individual should transition to a less demanding internship based on medical documentation, resulted in the widest spread of votes. 1/21 was for automation, 13/21 for support, and 7/21 for neither support nor automation. In general, as the decisions, data, and regulations become more complex, the type of AI changes. In this concrete decision, the caseworkers said that it would be valuable to have support to understand the medical documentation or estimate the likelihood that the citizen would complete the internship. Summarizing this part of the analysis, caseworkers' perception of the value of AI was only to some degree determined by the level of discretion; it was seen as more valuable if the AI component could support their decision mandate towards management arguing for collecting medical documentation although it is costly, and citizens arguing for a specific welfare program or internship.

4.2 Adding Context to "Simple" Decisions

Collecting documentation is a key task in many areas or public services. As we shall show in the following, what might come across as a simple decision (collect medical documentation) is complicated in some situations.

The workshop provided caseworkers' impression of AI as valuable in certain ways based on four types of decisions job placement. Using methods combining Dot Voting principles with additional interviews, it is critical to prevent falling into the trap of "false consensus". We now introduce and analyze the interviews (n=5), in which caseworkers explained how they work and which decisions they make in real and anonymized cases, as well as input from the second round of interviews (n=4) and observations (n=9h) of meetings between caseworkers and unemployed individuals at a physical job center.

A caseworker usually requests medical documentation either from a general practitioner or a specialist, such as a psychiatrist, if the unemployed individual reports that a medical condition prevents them from taking a job. In bureaucratic decision-making, caseworkers make decisions

to advance their understanding of the individual, such as deciding to collect an individual's medical records. Such decision-making in job placement takes place within a larger context of public services and largely relies on collaboration with, for example, medical specialists, therapists, and companies, who act as partners for individuals' training and internships.

Caseworkers argued that *if* the criteria for making the decision is relatively simple, for instance, because medical documentation is required by law, *then* algorithms can be suitable. On the other hand, the caseworkers also point to the need for discretion — a key element in public services. In the fictive scenario, the decision to collect an individual's medical records, may in a real-world bureaucratic context simply be a necessary step in the process for a caseworker to understand the issue at hand, for example, how serious a medical condition is. As discretion seems to remain important, we decided to further investigate this example of decision-making.

Providing more context, a caseworker explained that in practice an unemployed individual can also be a patient in a psychiatric hospital who is about to be discharged. In this case, her first step would be to collect a medical record. She had recently been in this situation, and her first meeting with the individual took place in the psychiatric hospital instead of the job placement office. However, the decision to collect the medical record depends on a variety of factors, and it is not necessarily the right way to go, she reflected. While certain diagnoses, like arthritis, often require documentation, which could be automatically requested, other mental health issues are often more complicated, as it can be less clear if or to what extent the challenges of the unemployed individual stem from their condition. It may not even be clear to the individual why they are unemployed. And in some cases, the process of diagnosing may still be ongoing.

The starting point for the caseworker also differs depending on the target group or category of citizen ("Job Ready" vs. "Activity Ready/Not Ready to Take a Job"). The formal purpose of collecting an individual's medical records is so that the caseworker can assess whether anything is preventing the citizen from taking a job. However, when meeting an individual for the first time, medical issues are not always the first thing they would look at, as another caseworker put it. Neither is the medical condition always the most important factor for why the citizen lost their job, as explained by one of our interviewees:

"Often, when a citizen is 'job ready', you don't look at whether the citizen is sick. You look at why the citizen has lost their job… Is it because of downsizing in the company, or quarrels with the boss? Perhaps it is because of a medical condition, and then it would be a good idea to collect the medical record… but in this case, it is not [a decision] that can simply be automated".

(Caseworker, AI workshop, October 2019)

Another caseworker reflected on the decision:

"The medical documentation nicely unfolds some of the dilemmas. It's the automation of some things, but not others".

(Caseworker, AI workshop, October 2019)

The differences reflected in caseworkers' decisions to collect an individual's medical record depend on the context provided in the citizen's case. For individuals who are considered "job-ready", the medical record may not be relevant or the right place to start, as the example illustrates. But the same may be true for the individual who is being discharged from the

hospital but is still being diagnosed. This complicates the suitability of an AI decision-support in the kinds of decisions that otherwise may seem "simple". It also highlights caseworkers' dependence on other professionals' documentation practices, for example, documentation from a psychiatric context interpreted into an employment context. When validating what was important when deciding to collect medical documentation in the second round of interviews with five other caseworkers in job placement, another aspect came forward. A common-sense understanding of casework is that the main task is to help unemployed individuals return to work. Caseworkers' ability to move the unemployed individual forward, is influenced by their ability to create a mutually trusting relationship with the unemployed individual, they tell us. Unemployed individuals could see a caseworker's request for medical documentation as a sign of distrust, or and an act of power.

In our workshop with caseworkers, the commonly used principles of Dot Voting helped uncover some overall trends of whether caseworkers perceive AI as valuable. Regarding the decision to collect medical documentation, none of the caseworkers entirely rejected the idea of AI support. We found that only through adding context, with caseworkers thinking aloud and providing actual examples in the interviews, did the complexity surrounding the decision come into focus.

4.3 Balancing Legality and Uncertainty in Decision-Making

Caseworkers must determine the course of a range of different issues; when and whether to collect medical documentation, an unemployed individual is just one. Some decisions relate more closely to their legislative framework or local procedure. For example, when the status of an individual is changed by the caseworker from "job-ready" to "activity ready" it is documented in their caseworker system. This decision affects the kinds of rules that apply to the individual. Another example is a caseworker's assignment of "sick-leave", which exempts the person from specific legal demands, such as the requirement to submit two job applications each week. Assigning a sick-leave can also be a matter of balancing legal requirements with the health and wellbeing of the citizen.

One of the caseworkers from the interviews described a case involving a woman who has abused cannabis for several years. However, cannabis abuse or treatment for it is not in itself enough justification to suspend the legal requirements of being "job-ready", in contrast to individuals with medical conditions such as depression and arthritis. Still, the caseworker decided to suspend the legal demands and instead encourage the citizen to concentrate on voluntary treatment. The caseworker in the situation suggested that a meeting between herself, the unemployed woman, and the rehabilitation counselor would be the best way forward, to ensure a suitable process and avoid, for example, double bookings. This again challenges the assumption of casework as an individual and single-handed practice. If they strictly follow the legislative framework, the caseworker could be indifferent about the process or plan at the rehabilitation center, but to best support the unemployed individual in this concrete situation the caseworker must collaborate. Similarly, our observations of meetings between caseworkers and unemployed individuals (n=9h) confirm that the individual caseworker is not an island. When assessing a case, the caseworkers we observed based their assessment on data in the system, thereby also on colleague's earlier documentation practices. Documenting meetings content of meetings with citizens is a mandatory task for caseworkers, so future caseworkers and the citizen can see what has already been agreed on or talked about. For example,

caseworkers wrote notes to their colleagues, if a citizen had particular challenges that other caseworkers might benefit from knowing about. For example, mental conditions like depression, or if the unemployed individual easily becomes aggressive. Both in the scenario of the 40-year-old citizen with depression and arthritis and in the case with the woman with cannabis addiction, making the "right" decision indeed depends on the caseworker's discretion, including input from colleagues: what is in their opinion best for the citizens.

"Then I say to her 'I'm exempting you from it, this means I'm registering you as being on sick-leave until our next meeting, so you can concentrate on getting your treatment started'".

(Caseworker, Interview at the job center, February 2020)

From the scenario of the 40-year old citizen, it could be that a 'soft start' on an internship is not "soft enough". Perhaps an internship is not the best way forward. A caseworker explains:

"If the citizen is depressed, tired, and has arthritis, and just started on a new medical treatment for arthritis, well then he would probably not be able to participate in an internship".

(Caseworker, AI workshop, October 2019)

During the Dot Voting exercise in the AI workshop, all caseworkers except one voted that an algorithm could support them when making their decisions, such as assigning sick-leave (see Table 2). However, this "vote" contradicted the caseworkers' reflections in the interviews. The AI workshop abstracted the job placement context, whereas the interviews brought out more of the "real-life" context. In the AI workshop, a caseworker connected the discussion on sick-leave to the role of human discretion. He used the example of the former Office Assistant paperclip 'Clippy', used in the early Microsoft office systems, to imagine that an AI could similarly support him in analyzing the data available, and then come with advice he could bring forward when collaborating with the citizen.

"[Clippy would say] 'You should just be aware that he hasn't completed a single internship in the last nine tries'. That [kind of advice] would be nice, but it should not be archived, I am still the caseworker, it is still me who is the specialist, it is me who exercise discretion, [deciding] what is the right thing to do together with the citizen".

(Caseworker, AI workshop, October 2019)

Another caseworker brought up a similar example in the interviews. She thought of the data about the completion of internships, as her way of trying to understand a particular individual's unemployment. If the individual completed the internships, she took this as evidence of the individual's ability to show up for an ordinary job. Internships could thus be a concrete place to start in terms of AI in job placement and how to include a caseworker perspective. Ultimately, the examples illustrate that there is no clear-cut distinction between decisions strictly given within a legal framework, and those made by caseworkers to mitigate the consequences for a citizen of a concrete case. Simply reading the rules and regulations may give the impression that job placement is mainly concerned with moving an individual closer to an ordinary job. An important part of the caseworkers' role from this perspective is to administer rules and make sure that an individual is economically sanctioned if they do not meet the prescribed requirements. However, the caseworkers also act as an advocate on behalf of the individual and make sure that sanctions are applied with proportionality, or even decide to bend the rules

within the flexibility of the legal framework. These are decisions in which caseworkers balance the potential consequences from a decision on an individual because they are uncertain or questionable. For example, if the caseworker did not assign a sick leave to the woman with cannabis addiction, the caseworker presumed that the woman either wouldn't get to rehab, or fail to meet up in the job center while dealing with her addiction. Both would be problematic, and if she failed to meet up in the job center, the caseworker would need to sanction her.

Usually, an internship is assigned to an individual by a caseworker both to test and develop the individual's work capacity. At the workshop, a caseworker's interpretation of *how the internship is going* can lead to a financial sanction, illustrating the complexity of the concept of sanction in practice. A caseworker explains:

"In principle, we don't make a written decision, but you decide as a caseworker that we will continue the internship. However, it might be the case that in the follow-up meeting after four weeks things are going really bad, and then we have to decide".

(Caseworker, AI workshop, October 2019)

The internship is often set up as a collaboration with a partner company. Since there can be numerous reasons for an internship to go poorly, determining how to move forward, or perhaps sanctioning the individual for not fulfilling their agreement, is a complex endeavor. A caseworker in the second round of interviews reminded us that when deciding, whether it is collecting medical documentation or assigning a welfare program, timing is very important, and not strictly defined by legislative framework. Timing is important because there are novel circumstances for the individual, for example, unstable mental condition. An internship is marked by the uncertainty of how the unemployed individual develops over time. A caseworker illustrates:

"Should we stop or shall we continue? Again, advice could be really nice in my situation, because often we are wondering: 'Okay, the citizen actually says they are really tired, when they get home from the internship, but what if we tried another 14 days, would they still be just as tired when they got home?".

(Caseworker, AI workshop, October 2019)

The Dot Voting regarding the decision, whether to stop or continue an internship, all caseworkers except two who thought they could benefit from support by AI and algorithms. Quotes above and the votes in Table 2 on deciding whether an internship is going well (19/21 for support, 2/21 for neither automation nor support) suggest that AI could be suitable for support in this decision. For example, a caseworker imagined an AI as the old Microsoft Office assistant "Clippy" to provide some kind of overview of whether the right steps were taken in the right order — especially for newly employed caseworkers. However, we interpret these votes with caution. Our data from the interviews with caseworkers in the job placement already showed how context and talking aloud is critical for the interpretation of responses in the AI workshop. For example, caseworkers at the workshop imagined an AI component as "fixing" the more frustrating parts of their job. A caseworker in the AI workshop reflected:

"Based on the algorithm's advice, I would suggest that the citizen can participate in, for example, an internship. That would be damn nice [with this kind of advice], because sometimes with this damn medical record… what the heck are they [medical practitioner] actually writing.

There I could see a benefit. And then you can use it as a supportive tool to talk with the citizen…".

(Caseworker, AI workshop, October 2019)

What these responses are even telling us about AI as valuable in job placement? Some caseworkers in the AI workshop were optimistic. Several caseworkers expressed concern regarding issues such as the accuracy of an AI component. During our discussions, several doubted whether AI would be able to grasp the complexity of the cases they deal with every day. This doubt was then often expressed as a need for human discretion. In a time-pressured environment, where caseworkers are responsible for up to 50 citizens or meeting new unemployed individuals each day, some feared that the AI suggestions would provide a too-easy solution, transforming critical caseworkers into lemmings. A caseworker expressed it:

"It is about relying on yourself. Like using a GPS to find your way. It is a bit like walking in Copenhagen without a GPS, then you're completely confused if you have never walked there before the days of the GPS… One way or another, I'm afraid that we will lose some of our professionalism in this".

(Caseworker, AI workshop, October 2019)

This discussion from the AI workshop illustrates how fear with regards to AI derives not only from the potential inaccuracy of the algorithm's advice but also on the risk that it will de-skill the caseworkers. Another caseworker added that if a decision-support system provided the advice that they would usually get from colleagues, this could decrease the need for collegial relationships and collaboration.

Bringing these insights together, our analysis shows that caseworkers imagine AI in various forms as valuable, mainly for supporting them as they negotiate, for example, allocation of benefits or support – either towards management or the unemployed individual. We learned how caseworkers at the AI workshop abstracted the job placement context, whereas the interviews brought additional complex "real life" context, and thus resulted in a deeper understanding of bureaucratic decision-making in job placement, with implications for the design of AI systems.

5 DISCUSSION

Scholars have called for more research on what it means to bring a CSCW perspective to the root of algorithmic research [52]. We do this while bringing forward the perspective of those whose work is affected by the deployment of AI, as advised by Randall [47]. Bureaucratic decision-making is not a perfect description of the topic we have discussed. We did not address how to categorize different types of bureaucratic decision-making, or how the type of bureaucracy influences the decisions made within it, for example, if decision-making is different in a Weberian machine-like bureaucracy vs. Lipsky's street-level bureaucracy, and how this materializes in practice. We also did not address the different measures available within public services. We presume that assessing whether a decision was right or wrong in the justice system, another part of public services where algorithms are being implemented, is different compared to job placement. Did the offender re-commit a crime? Did the offender fail to meet

up in court while on parole? If a crime was committed, or an offender failed to meet up in court, these are clear, tangible measures. In job placement, it seems more challenging to pin down whether an internship was a success or not, or whether it was the right thing to assign sick leave to an unemployed individual.

Following CSCW scholars [19, 40, 44], we find that casework is highly collaborative, both internally in the organization, involving managers and other caseworkers, and externally with the unemployed individual. The collaborative aspect of the casework being their daily work, was important for caseworkers at the workshop when discussing the value of AI. If caseworkers have AI support, they can leverage it as an "expert opinion" or back-up when making the case, for example, to collect medical documentation, which is costly and requires management approval. AI could also be valuable for caseworkers in the conversation with the unemployed individual, if it could provide an analysis of similar citizens matched particular internships, thereby strengthen the cause of the caseworker regarding the unemployed individual. We can develop AI for decision-support, which these examples illustrate. Although documenting is an individual activity, we need to acknowledge that decisions in casework are calibrated with other decisions, for example in former cases, in a cooperative practice. By supporting the workshop with interviews with domain experts, our findings illustrate how collaboration in casework, especially around documentation is a key aspect of bureaucratic decision-making.

Different legal frameworks in different areas of public services provide varying opportunities or demands for collaborative work, level of discretion, or types of information, and this is important to bring into the design process of, for example, AI and algorithms. Alhutter et al. critique the development of an algorithm for profiling job seekers in Austria, amongst other things, for not considering how the algorithm is integrated into the daily work of caseworkers, including meetings with unemployed citizens. Following Christin who argues for enrolling algorithms in ethnographic research to shed light on, for example, their opacity. [15], we find it critical to dive deep into the context of the domain in which we seek to deploy or design new technologies and to not overlook important aspects of the particular situation. Scholars such as [58] suggest that the complexity of a task is a good indication of whether and how AI can be valuable. The four decisions from the Dot Vote exercise were chosen because they are decisions caseworkers in job placement often have to make, and they mirror similar decisions elsewhere in public services. For example, the decision to collect medical documentation serves as an example of both a "simple" decision but also represents a more generic decision: when to collect information about a citizen. It is important to note, even seemingly simple decisions like this one may have complex and significant consequences in the specific situation. This is the kind of decision that Young and others imagine as a starting point for the implementation of AI in public services [29]. A future step for CSCW scholars may be to carefully look for the decisions in which caseworkers – or other public servants - suggest that AI as decision-support or decision-making may be valuable

In their studies Wihlborg et al. find that algorithmic decision-making systems almost become "co-bureaucrats", and public servants become mediators, rather than decision-makers [56]. Although not in public services, Lee find that algorithms were perceived as less fair and trustworthy than human decision-makers, when making decisions usually thought of as requiring unique human skills [31]. In our case, the participatory design workshop on AI provided us the opportunity to engage in a discussion with a large group of caseworkers. The in-depth interviews added additional and crucial context to even simple decisions such as "to

collect medical documentation". Interestingly, the gap between the Dot Voting and the following interviews indicate that also caseworkers' risk of oversimplifying the issues or decisions at hand, when thinking about them abstractly. Combining a participatory design workshop with in-depth interviews or observational studies allowed us to approach AI and bureaucratic decision-making from different angles, which nuanced our understanding the issues at hand. Thus, our study contributes an important methodological finding: there are limits to research methods that do not consider the specific context.

In our case, in particular, caseworkers seemed to prefer algorithmic decision-support over automation. A second step could be to carefully map different decisions with different types of AI. Applying AI for simple tasks [10, 29, 57] thereby leaving human discretion for places of uncertainty [45], seems like a good place to start implementing AI. However, it is important to consider the things that can make simple decisions complex. In our context, is collecting or not collecting medical documentation a decision meant to retrieve information more quickly, to assess the case on enlightened grounds, or to maintain a trustful relationship with the citizen? All of these can be at stake, and something the caseworker reflects upon before deciding. This is a challenge facing the design of AI systems for public services, and perhaps a solution to this could be to remove AI from the moment of decision-making.

The analogy between bureaucracies and algorithms as proposed by Pääkkönen et al., and Alkhatib and Bernstein, is a useful lens for analyzing AI in public service organizations. However, there is to some extent a theoretical disconnect, as highlighted earlier, when we perceive street-level algorithms as having the same capabilities of street-level bureaucrats, but apply the concept to algorithms on private platforms like YouTube or Twitter. Although there are algorithms making decisions and impacting our lives in ways best conceptualized as street-level algorithms, the disconnect is that the organizations running these algorithms do not have democratic accountability or legal demands of equal treatment or transparency. This is worrying. That aside, we argue, to avoid the theoretical disconnect, the theory of street-level algorithms should focus on analyzing or explaining algorithms or AI in public services - actual bureaucracies [55]. This is necessary if we as scholars want to understand the work we affect when we design AI systems for a public service context. Following this, the broader area of HCI and CSCW could conceptualize a new theoretical contribution describing the street-level algorithms of private companies as online platforms, banks, or insurance companies.

6 CONCLUSIONS

The study examines caseworkers' perspectives on the use of AI in job placement and identifies key aspects of bureaucratic decision-making. This has implications for AI design, as developers of AI should take the collaborative aspect of casework into account, to support the caseworker's decision-making. We report findings from a participatory workshop of AI with caseworkers from different types of public services, followed up by interviews with caseworkers specializing in job placement, bringing forward the collaborative aspects of bureaucratic decision-making and validating initial findings through telephone interviews with caseworkers and observations of meetings between caseworkers and unemployed individuals at a job center. The paper contributes an understanding of caseworkers' collaboration around documentation as a key aspect of bureaucratic decision-making practices, contesting the common sense understanding of job placement is a practice carried out individually and single-handed by a caseworker. Our

data show that caseworkers perceive AI for decision-making as valuable when it can support their work towards management, (strengthen their cause, if a case requires extra resources), and towards unemployed individuals (strengthen their cause in relation to the individual's case when deciding on, and assigning a specific job placement program).

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REFERENCES

[1] Ali Alkhatib and Michael Bernstein. 2019. Street-Level Algorithms: A Theory at the Gaps Between Policy and Decisions. In Proceedings of the 2019 CHI Conference on Human Factors in Computing Systems (CHI '19). Association for Computing Machinery, New York, NY, USA, Paper 530, 1–13. DOI: https://doi.org/10.1145/3290605.3300760

[2] Doris Allhutter, Florian Cech, Fabian Fischer, Gabriel Grill, and Astrid Mager. 2020. Algorithmic Profiling of Job Seekers in Austria: How Austerity Politics Are Made Effective. Front. Big Data 3:5. doi: 10.3389/fdata.2020.00005

[3] Antonella De Angeli, Silvia Bordin, and María Menéndez Blanco. 2014. Infrastructuring participatory development in information technology. In Proceedings of the 13th Participatory Design Conference: Research Papers - Volume 1(PDC '14). Association for Computing Machinery, New York, NY, USA, 11–20. DOI: https://doi.org/10.1145/2661435.2661448

[4] Nikolaj Gandrup Borchorst and Susanne Bødker. 2011. "You probably shouldn't give them too much information" — Supporting Citizen-Government Collaboration. ECSCW 2011: Proceedings of the 12th European Conference on Computer Supported Cooperative Work, 24-28 September 2011, Aarhus, Denmark

[5] Nina Boulus-Rødje. 2018. In Search for the Perfect Pathway: Supporting Knowledge Work of Welfare Workers. Comput Supported Coop Work 27, 841–874. https://doi.org/10.1007/s10606-018-9318-0

[6] Nina Boulus-Rødje. 2019. Welfare-to-work Policies Meeting Complex Realities of Unemployed Citizens: Examining Assumptions in Welfare. Nordic journal of working life studies Volume 9, Number 2, June 2019.

[7] Mark Bovens and Stavros Zouridis. 2002. From Street-Level to System-Level Bureaucracies: How Information and Communication Technology Is Transforming Administrative Discretion and Constitutional Control. Wiley (on behalf of the American Society for Public Administration).

[8] John Bowers, Graham Button & Wes Sharrock. 1995. Workflow from within and without. Technology and cooperative work on the print industry shopfloor. Proceedings of the fourth European Conference on Computer-Supported Cooperative Work (ECSCW), September 10-14, Stockholm, Sweden: 51-66.

[9] Aurélien Buffat 2013. Streel-Level Bureaucracy and E-government. Public Management Review.

[10] Justin B. Bullock. 2019. Artificial Intelligence, Discretion and Bureaucracy. American Review of Public Administration, 2019 Vol. 49(7) 751-761.

[11] Adam Burke. 2019. Occluded algorithms. Big Data & Society. July–December 2019

[12] Peter André Busch and Helle Zinner Henriksen. 2018. Digital Discretion: A systematic literature review of ICT and street-level discretion. Information Polity 23 (2018) 3-28.

[13] Sarah Brayne and Angèle Christin. 2020. Technologies of Crime Prediction: The Reception of Algorithms in Policing and Criminal Courts. Social Problems, 2020, 0, 1–17 doi: 10.1093/socpro/spaa004 Article

[14] Carrie J. Cai, Samantha Winter, David Steiner, Lauren Wilcox, and Michael Terry. 2019. "Hello AI": Uncovering the Onboarding Needs of Medical Practitioners for Human-AI Collaborative Decision-Making. Proc. ACM Hum.-Comput. Interact. 3, CSCW, Article 104 (November 2019), 24 pages. DOI: https://doi.org/10.1145/3359206

[15] Angèle Christin. 2020. The ethnographer and the algorithm: beyond the black box. Theory and Society https://doi.org/10.1007/s11186-020-09411-3

[16] Jeff Dalton. (2019) Dot Voting. In: Great Big Agile. Apress, Berkeley, CA. Apress, Berkeley, CA. DOI: https://doi.org/10.1007/978-1-4842-4206-3_27

[17] Christopher A. Le Dantec & Keith Edwards. 2008. The view from the trenches: Organization, power, and technology at two nonprofit homeless outreach centers. In Proceedings of the ACM Conference on Computer-Supported Cooperative Work and Social Computing (CSCW), 589–598.

[18] Christopher A. Le Dantec & Keith Edwards. 2010. Across boundaries of influence and accountability: The multiple scales of public sector information systems. In Proceeding of the ACM Conference on Human Factors in Computing Systems (CHI), 113–122

[19] Mateusz Dolata, Birgit Schenk, Jara Fuhrer, Alina Marti and Gerhard Schwabe. 2020. When the System Does Not Fit: Coping Strategies of Employment Consultants. Computer Supported Cooperative Work (CSCW) © Springer Nature B.V. 2020 DOI 10.1007/s10606-020-09377-x

[20] Lynn Dombrowski, Gillian R. Hayes, Melissa Mazmanian, and Amy Voida. 2014. E-government intermediaries and the challenges of access and trust. ACM Trans. Comput.-Hum. Interact. 21, 2, Article 13 (February 2014), 22 pages. DOI: https://doi.org/10.1145/2559985

[21] Paul Dourish. 2019. User Experince as Legitimacy Trap. ACM Interactions. 2019 ACM 1072-5520/19/11

[22] Paul Dourish. 2001. Process Descriptions as Organisational Accounting Devices: The Dual Use of Workflow Technologies. In Proceedings of the 2001 International ACM SIGGROUP Conference on Supporting Group Work (GROUP '01). Association for Computing Machinery, New York, NY, USA, 52–60. DOI: https://doi.org/10.1145/500286.500297

[23] Virgina Eubanks. 2018. Automating Inequality — How High-Tech Tools Profile, Police, and Punish the Poor. St. Martin's Press

[24] Hans-Tore Hansen, Kjetil Lundbergb and Liv Johanne Syltevika. 2018 Digitalization, Street-Level Bureaucracy and Welfare Users' Experiences. SOCIAL POLICY & ADMINISTRATION ISSN 0144-5596 DOI: 10.1111/spol.12283. VOL. 52, NO. 1, January 2018, PP. 67–90

[25] Richard R. Harper, Michael G. Lamming & William M. Newman. 1992. Locating systems at work: Implications for the development of active badge applications. Interacting with Computers, 4, 3: 343- 363.

[26] Richard R. Harper. 1992. Looking at ourselves: An examination of the social organization of two research laboratories. Proceedings of the 1992 ACM conference on Computer-Supported Cooperative Work & Social Computing, Toronto, Ontario, Canada: 330-337.

[27] Human Rights Watch. 2020. Automated Hardship - How the Tech-Driven Overhaul of the UK's Social Security System Worsens Poverty. September 2020. ISBN: 978-1-623138615

[28] Gabriella Jansson and Gissur Ó. Erlingsson. 2014. More E-Government, Less Street-Level Bureaucracy? On Legitimacy and the Human Side of Public Administration, Journal of Information Technology & Politics, 11:3, 291-308, DOI: 10.1080/19331681.2014.908155

[29] Lise Justesen and Ursula Plesner. 2018. Fra skøn til algoritme. Tidsskrift for Arbejdsliv. 20, 3 (nov. 2018), 9-23. DOI: https://doi.org/10.7146/tfa.v20i3.110811.

[30] Eva-Sophie Katterfeldt, Anja Zeising, and Heidi Schelhowe. 2012. Designing digital media for teen-aged apprentices: a participatory approach. In Proceedings of the 11th International Conference on Interaction Design and Children(IDC '12). Association for Computing Machinery, New York, NY, USA, 196–199. DOI: https://doi.org/10.1145/2307096.2307124

[31] Min Kyung Lee. 2018. Understanding perception of algorithmic decisions: Fairness, trust and emotion in response to algorithmic management. Big Data and Society. Russel Sage.

[32] Michael Lipsky. Street-Level Bureaucracy, 30th Ann. Ed. Dilemmas of the Individual in Public Service. 2010. Russel Sage Foundation.

[33] Michael Lispky. 1980. Toward a Theory of Street-level Bureaucracy. New York: Russell Sage.

[34] Michael Lipsky. 1969. Toward a theory of street-level bureaucracy.

[35] Ida Lindgren, Christian Østergaard Madsen, Sara Hofmann, Ulf Melin. 2019. Close encounters of the digital kind: A research agenda for the digitalization of public services. Government Information Quarterly 36 (2019) 427–436

[36] Petra Molnar. 2019. Technology on the margins: AI and global migration management from a human rights perspective. Cambridge International Law Journal, Vol. 8 No. 2, pp. 305–330

[37] Naja Holten Møller. 2018. The future of clerical work is precarious. I : interactions. 25, 4, s. 75-77

[38] Naja Holten Møller, Irina Shklovski and Thomas Hildebrant. 2020. Shifting Concepts of Value. Designing Algorithmic Decision-Support Systems for Public Services. In Proceedings of the Nordic Conference on Human-Computer Interaction (NordiCHI).

[39] Naja Holten Møller, Maren Gausdal Eriksen and Claus Bossen. 2020. A Worker-Driven Common Information Space: Interventions into a Digital Future. Computer Supported Cooperative Work (CSCW) (2020) 29:497–531 © Springer Nature B.V. 2020 DOI 10.1007/s10606-020-09379-9

[40] Naja L. Holten Møller, Geraldine Fitzpatrick, and Christopher A. Le Dantec. 2019. Assembling the Case: Citizens' Strategies for Exercising Authority and Personal Autonomy in Social Welfare. Proc. ACM Hum.-Comput. Interact. 3, GROUP, Article 244 (December 2019), 21 pages. DOI:https://doi.org/10.1145/3361125

[41] Henrik Palmer Olsen, Jacob Livingston Slosser, Thomas Hildebrandt and Cornelius Wiesener. 2019. What's in the Box? The Legal Requirement of Explanability in Computationally Aided Decision-Making in Public Administration. iCourts - The Danish National Research Foundation's Centre of Excellence for International Courts

[42] Judith S. Olson and Wendy A. Kellogg. 2014. Ways of Knowing in HCI. Springer.

[43] Gary M Olson and Judith S Olson. 2000. Distance matters. Human-Computer Interaction, vol. 15, pp. 139–178.

[44] Anette Chelina Møller Petersen, Lars Rune Christiensen and Thomas Troels Hildebrandt. 2020. The Role of Discretion in the Age of Automation. Comput Supported Coop Work. DOI: https://doi.org/10.1007/s10606-020-09371-3

[45] Anette C. M. Petersen, Lars Rune Christensen, Richard Harper, and Thomas Hildebrandt. 2021. "We Would Never Write That Down": Classifications of Unemployed and Data Challenges for AI. In Proceedings of the ACM on Human-Computer Interaction, Vol. 5, CSCW1, Article 102 (April 2021), 26 pages, https://doi.org/10.1145/3449176

[46] Juho Pääkkönen, Matti Nelimarkka, Jesse Haapoja, and Airi Lampinen. 2020. Bureaucracy as a Lens for Analyzing and Designing Algorithmic Systems. In Proceedings of the 2020 CHI Conference on Human Factors in Computing Systems (CHI '20). Association for Computing Machinery, New York, NY, USA, 1–14. DOI: https://doi.org/10.1145/3313831.3376780

[47] Dave Randall, Richard Harper, and Mark Rouncefield. 2007. Fieldwork for Design: Theory and Practice (Computer Supported Cooperative Work). Springer-Verlag, Berlin, Heidelberg.

[48] Devanesh Saxena, Karla , Badillo-Urquiola, Pamela Wisniewski and Shion Guha. 2020. A Human-Centered Review of the Algorithms used within the U.S. Child Welfare System. In Proceedings of the 2020 CHI Conference on Human Factors in Computing Systems. ACM.

[49] Nick Seaver. 2017. Algorithms as Culture: Some Tactics for the Ethnography of Algorithmic Systems. Big Data & Society, (December 2017). doi: 10.1177/2053951717738104.

[50] W. Richard Schott and Gerald F. Davis. 2007. Organizations and Organizing – Rational, Natural, and Open Systems Perspective. Person International Edition.

[51] Lucy Suchman, Jeanet Blomberg, Juliane E. Orr and Randall Trigg. 1999. Reconstructing Technologies in Social Practice. The American Behavioral Scientist; Nov/Dec 1999; 42, 3; ABI/INFORM Global pg. 392. Sage Publications.

[52] Michael Veale and Van Kleek, Max and Binns, Reuben. 2018. Fairness and Accountability Design Needs for Algorithmic Support in High-Stakes Public Sector Decision-Making. 2018. Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems (CHI'18) doi:10.1145/3173574.3174014, ISBN: 978-1-4503-5620-6. Available at SSRN: https://ssrn.com/abstract=3175424

[53] Amy Voida, Lynn Dombrowski, Gillian R. Hayes, and Melissa Mazmanian. 2014. Shared values/conflicting logics: working around e-government systems. In Proceedings of the SIGCHI Conference on Human Factors in Computing Systems (CHI '14). Association for Computing Machinery, New York, NY, USA, 3583–3592. DOI: https://doi.org/10.1145/2556288.2556971

[54] Dakuo Wang, Elizabeth Churchill, Pattie Maes, Xiangmin Fan, Ben Shneiderman, Yuanchun Shi, and Qianying Wang. 2020. From Human-Human Collaboration to Human-AI Collaboration: Designing AI Systems That Can Work Together with People. In Extended Abstracts of the 2020 CHI Conference on Human Factors in Computing Systems (CHI EA '20). Association for Computing Machinery, New York, NY, USA, 1–6. DOI: https://doi.org/10.1145/3334480.3381069

[55] Max Weber. 2012. Makt og Byråkrati – Essay om politikk og klasse, samfunnsforskning og verdier. Gyldendal Akademisk. 3rd edition (first published in 1971).

[56] Elin Wihlborg, Hannu Larsson and Karin Hedström. 2016. The computer says no! — A case study on automated decision-making in public authorities. Proceedings from 49th Hawaii International Conference on Systems Sciences (HICSS). Washington, DC: IEEE Computer Society.

[57] James Q. Wilson. Bureaucracy – What Government Agencies Do And Why They Do It. 1989. Basic Books Inc.

[58] Matthew M. Young, Justin B. Bullock and Jesse D. Lecy. 2019. Artificial Discretion as a Tool of Governance: A Framework for Understanding the Impact of Artificial Intelligence on Public Administration. Perspectives on Public Management and Governance, 2019, 301–313 doi:10.1093/ppmgov/gvz014

[59] Bernado Zacka. 2017. When the State meets the Street – Public Service and Moral Agency. The Belknap Press of Havard University.

[60] Leid Zejnilović, Susana Lavado, Íñigo Martínez de Rituerto de Troya, Samantha Sim and Andrew Bell. 2020. Algorithmic Long-Term Unemployment Risk Assessment in Use: Counselors' Perceptions and Use Practices. Global Perspectives 1 (1). https://doi.org/10.1525/gp.2020.12908.

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