

# Algorithmic Tools in Public Employment Services: Towards a Jobseeker-Centric Perspective

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## ABSTRACT

Data-driven and algorithmic systems have been introduced to support Public Employment Services (PES) throughout the world. Their deployment has sparked public controversy and, as a consequence, some of these systems have been removed from use or their role was reduced. Yet the implementation of similar systems continues. In this paper, we use a participatory approach to determine a course forward for research and development in this area. We draw attention to the needs and expectations of people directly affected by these systems, i.e., jobseekers. Our investigation comprises two workshops: the first a fact-finding workshop with academics, system developers, the public sector, and civil-society organizations, the second a co-design workshop with 13 unemployed migrants to Germany. Based on the discussion in the fact-finding workshop we identified challenges of existing PES (algorithmic) systems. From the co-design workshop we identified our participants' needs and desires when contacting PES: the need for human contact, the expectation to receive genuine orientation, and the desire to be seen as a whole human being. We map these expectations to three design considerations for data-driven and algorithmic systems for PES: the importance of interpersonal interaction, jobseeker assessment as direction, and the challenge of mitigating misrepresentation. Finally, we argue that the limitations and risks of current systems cannot be addressed through minor adjustments but require a more fundamental change to the role of PES.

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## CCS CONCEPTS

• **Applied computing** → *Computing in government*; • **Human-centered computing**; • **Social and professional topics** → *Government technology policy*; • **General and reference** → *Design*; • **Computing methodologies** → *Machine learning approaches*; **Machine learning algorithms**;

## KEYWORDS

Public Employment Services, Participatory Design, Algorithmic Decision-Making

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## 1 INTRODUCTION

The use of algorithmic decision-making systems (ADM) in the public sector requires particular attention to fairness and justice, avoidance of bias and discrimination, and transparency of processes. But what are the building blocks of ADM that can hinder or support these goals? These questions need to be answered with attention to the specific domains, and the capabilities, needs, and expectations of the people involved. In this paper, we center the perspectives and needs of jobseekers to re-imagine (algorithmic) decision-making processes in European Public Employment Services (PES).

ADM have been introduced to assist PES in various countries. Many of them are designed to support job counsellors in assessing and classifying jobseekers as well as making decisions on the allocation of resources such as skills training and unemployment benefits. However, their deployment has also been heavily criticised, both in general terms and in relation to specific existing systems after their implementation. How these systems profile individuals is a crucial question as the categorization of jobseekers has an influence on their access to resources [3, 45]. In cases such as the Polish and Austrian systems, unemployed individuals were denied the right to question or appeal the assigned profile [3, 27, 44, 45]. Moreover,

although in theory individuals needed to consent to being profiled, in practice, refusal in Poland was punished by the loss of unemployment status and all related rights including access to public healthcare [33]. In several cases, concerns raised by research or community-led initiatives has led to the suspension of specific algorithmic systems (such is the case of the Austrian AMAS), while several others remain in use despite the criticisms [1, 42].

This paper focuses on the development and implementation of ADM in European PES, and explores paths to move forward for research and development in this area. Based on participatory methodologies, we conducted two workshops. The first one was a fact-finding workshop with academics, system developers, representatives from the public sector, and civil-society organizations. With them, we discussed risks and challenges of ADM in PES, and explored cases where differing factors and needs were integrated in algorithmic systems in a successful or, at least, promising manner. The second workshop was a co-design workshop with jobseekers who are migrants to Germany, with most of them living under refugee status in Germany. Our motivation to engage in a co-design session with these specific participants was to explore the perspectives of a group that, generally, does not “have a say” [10] in the structure of PES systems.

To that end, our research questions are:

- (1) What is the role and function of PES systems (algorithmic or otherwise) currently in place?
- (2) What are the expectations of jobseekers getting in contact with PES?
- (3) What would ADM tools for PES look like if they were based on the needs and desires of jobseekers?

The reasoning for introducing algorithmic profiling tools in PES differs across countries. In the Netherlands for instance, the Work Profiler was introduced due to insufficient funding for face-to-face services and further education [48]. The development of the AMAS system for the Austrian PES was justified by the need to increase the efficiency of counselling and standardize the distribution of funding [4]. In Poland, the reasoning for introducing an algorithmic system was rationalizing expenditure in PES and customizing services to improve their quality [33]. In each of these cases, the software was framed as a tool to support job counsellors in some aspect of jobseeker assessment. Moreover, the goals of these systems highlight a specific function of PES, namely, the role of PES as gatekeeper and administrator of resources allocated to jobseekers.

Through thematic analysis of the conversations and activities that took place at the workshops, we found that engaging jobseekers in the design processes surfaced vastly different views on what the priorities and goals of PES agencies should be. The jobseekers reported on the importance of human contact during job searching, and saw value in orientation and information provided in counselling sessions. Notably, our participants were not against profiling *per se* as long as it is used to provide better orientation to each jobseeker and not to deny access to resources. We entered the discussion specifically to examine the use and design of algorithmic systems in PES. It quickly became clear to us that attempting to design technology within the current structure of PES would not address the jobseekers’ reported problems and needs. In view of our findings, we point at the need to address structural changes to

the aim and function of PES before exploring technical solutions [35].

## 2 RELATED WORK

### 2.1 Profiling of Jobseekers

Several European countries have already introduced data-driven and algorithmic tools for the profiling of jobseekers in PES. A growing body of literature has analyzed and classified the different systems [8, 19, 31] and criticized the impact of such systems in their respective national context [3, 20, 44–46].

Algorithmic profiling can be defined as any form of automated processing of personal data in order to analyse or predict personal aspects of individuals [34]. Often, PES use profiling tools to assess jobseekers, allocate resources, and evaluate further steps [3, 7, 33]. Desiere et al. [19] identified three approaches to the profiling of jobseekers used in PES, i.e., caseworker-based profiling, rule-based profiling, and statistical profiling. *Rule-based profiling* uses administrative eligibility criteria, such as age and educational level, to place jobseekers in different groups. *Caseworker-based profiling* relies on caseworker discretion to profile jobseekers. Caseworkers may be supported by quantitative or qualitative tools, but they ultimately decide. *Statistical Profiling* uses statistical models to predict future employment chances. In addition, Barnes et al. [8] introduced *soft-profiling*, which they define as a combination of eligibility rules, caseworker discretion, administrative data, qualitative assessments and psychological screening tools.

Recently, *AI-based profiling* has also been identified; the current Flemish system which uses a Random Forest Model can be attributed to this category [20].

These approaches are not mutually exclusive and researchers disagree as to what each approach entails [8].

### 2.2 Illustrative Use Cases

The two workshops that we conducted built on discussions of the systems introduced in the Netherlands, Austria and Germany. They are described in this section.

**2.2.1 The Netherlands.** Due to government-imposed cost cuts, not every jobseeker can be offered in-person counselling. The Work Profiler (*Werkverkenner*) is used to predict jobseekers’ chances of finding work within 12 months and select who will be automatically sent an appointment for in-person counselling. It uses rule-based and statistical profiling [19]. A further function is to determine which type of services a client needs and which obstacles might prevent the jobseeker from successfully finding new employment [48]. The system was launched, country-wide, in 2015 and has been updated several times [21].

The calculation uses input data from an online questionnaire composed of hard and soft factors. Hard factors include age and Dutch knowledge. Soft factors include self-reported mental and physical work ability, and job search behavior. The scores and information given in the interface are intended to guide counsellors in their decisions on targeting services and solutions [48].

**2.2.2 Austria.** The *Arbeitsmarktchancen-Assistenz-System* (AMAS) was developed to support job counsellors in jobseekers assessment.

The system uses rule-based, statistical, and caseworker-based profiling to categorize jobseekers based on their predicted prospects in the labor market [19]. The algorithm clusters individuals with similar characteristics into *constellations*. The assumption is that there is a homogeneity of chances within the constellations [3]. The system's role is to be advisory, i.e., case workers are prompted to review the system's output before making decisions on the allocation of resources.

A test phase started in autumn 2018, and a country-wide introduction was planned for the beginning of 2021. The Austrian Data Protection Authority blocked this introduction [3]. The Austrian PES appealed, but as of May 2022, the issue remains in court and AMAS is not in use [18].

**2.2.3 Germany.** Caseworker-based profiling is embedded into the *4-Phase Model* which was introduced in 2009 [15] and updated several times [25]. In the first phase, an analysis of jobseekers' strengths and potential is conducted by interviewing the jobseeker. During the first counselling conversation, the counsellor inputs data into a software [26]. The outcome of the profiling is a binary indicator of whether integration into the primary labor market within 6 months is likely or unlikely [24]. In certain cases, counsellors use an additional software tool to calculate labor market chances [24], which has been criticized for its opacity [1, 47].

## 2.3 Critical Issues of Algorithmic Decision-Making

Critiques of systems whose outcomes influence funding were raised, among others, by Allhutter et al. [3] in the context of the Austrian AMAS. The authors point out that, even if the system's output is supposed to be a "second opinion", there is a possibility that it will become the "first opinion" in practical use, particularly if combined with short counselling conversations (10 minutes in some places). Evidence that "second opinions" can become dominant has been observed in relation to the profiling algorithm used in Poland between 2014 and 2019 [33, 44]. Official statistics showed that in 99.4% of cases the automatic profile was accepted by PES staff [33], which means that the system operated on an almost automated basis.

**2.3.1 Bias and Discrimination.** Some argue that the use of algorithmic tools allows for more systematic and consistent procedures for decision-making than potentially subjective human judgement [30]. The tension present in systems that reduce the full biography, background, and skills of individuals to a numerical value or other simplified structures for decision-making in social contexts is at the core of many critiques of the use of algorithmic or 'AI' models [9, 29, 32, 38].

For instance, Allhutter et al. [3] criticize some variable choices in the AMAS algorithm as perpetuating technical bias, emergent bias, and pre-existing bias, a classification established by Friedman and Nissenbaum [23]. Technical bias in AMAS can be caused, for example, by the simplification of data into categorical and discrete variables, especially binary ones. Oversimplified variable representation increases the likelihood that people with widely different situations and backgrounds are placed in the same "constellation." A possible source of emergent bias is the reliance on historical data.

This makes the system incapable of reacting to societal or economic changes such as those imposed by the COVID-19 pandemic [3]. Evidence of the impacts of pre-existing biases are reflected in the AMAS scores, where marginalized groups, such as jobseekers with migration backgrounds, systematically receive lower integration values. Similar effects have been observed in other systems [20].

**2.3.2 Stakeholder involvement.** Decisions around creating and maintaining classification systems (algorithmic or otherwise) are often made omitting the views of *street-level bureaucrats* such as caseworkers [36]. In practice, even when assessment tools are available, classifications often remain dependent on caseworkers' discretion and their assessments [7, 41]. Instead of treating users as "experts of their own experiences" in the design process [39], PES systems are widely constructed without the cooperation and participation of the unemployed and/or the PES workers [2]. In Poland, for instance, the unemployed were not part of the development process, and jobseekers having knowledge of how the profiling system worked was seen as an obstacle to the system's efficient delivery [33].

Recently, researchers have used participatory design methods to investigate the work practices of governmental caseworkers [5, 12, 17, 22, 28, 36]. Dencik et al. [17] found a large disparity between practitioners and stakeholders' perspectives on the use of data analytics in public services. Petersen et al. [36] found that informal practices are often excluded from formal representation, which means that only "formal" criteria of decision-making are taken into account and that algorithms operate on incomplete information. Holten Møller et al. [28] show that caseworkers did not place high value on profiling tools but rather considered whether algorithmic systems could improve organizational processes to the benefit of unemployed individuals. Saxena et al. [40] proposed a framework for high-stake decision-making in the public sector. However, the perspectives of jobseekers are not yet included in this framework. This gap is covered by the on-going investigation conducted by Flüge [22], which includes participatory design-based workshops with unemployed individuals.

The present paper contributes to the growing body of research surrounding caseworker and jobseeker perspectives on algorithms in PES. Our workshops contrast views of academics and system designers with the perspectives of unemployed individuals. This way, we aim to better understand jobseekers' needs and desires when getting in contact with PES.

## 3 METHOD

Co-design is often used as an umbrella term for various participatory design (PD) approaches, and we will use co-design and PD as synonyms throughout this paper [16]. This investigation comprised two participatory instances: a *fact-finding workshop* [17] conceived as a first step in engaging with interdisciplinary knowledge around ADM in PES, and a *co-design session* to explore the perspectives of jobseekers to allow for mutual learning between the researchers and participants, as well as provide a space for jobseekers to express their views on PES [6, 10]. During the conception of the workshops, we saw PD as a "process of investigating, understanding, reflecting upon, establishing, developing and supporting mutual learning between multiple participants in collective 'reflection in action'" [37].

### 3.1 The Fact-Finding Workshop

The 5-hour online workshop took place on May 25<sup>th</sup>, 2021, on Zoom, with eight invited speakers and 29 participants from diverse academic disciplines, civic organizations, industry, and the public sector, to discuss the use of algorithms to classify and/or otherwise assist jobseekers. The workshop was envisioned as an avenue to prompt conversations between academics, practitioners, and the public sector. In the spirit of “mutual learning” [10], the goal was to benefit from each other’s experience and knowledge. The audience was kept small to ensure the possibility of extensive discussion among highly interested individuals. Conversations revolved around the development and specific uses of data-driven systems in PES in Europe, in particular the Dutch and Austrian systems. The focus of the discussion was on the implications of algorithmically classifying jobseekers. Our discussion questions included:

- What are general and field-specific factors that are decisive for finding a job and how are they integrated into existing ADM systems?
- What tasks, skills, and expertise are inherent to the PES job counsellor role, and can they be replaced or augmented by technology?
- What are the challenges in the interaction of job counsellors and jobseekers with algorithmic decision-making systems?

To address these questions, speakers and audience mapped relevant stakeholders while brainstorming for possible strategies for involving them in design decisions. Most speakers and participants brought a critical perspective into the discussion, some also emphasizing positive aspects, promising examples, and systems’ potentials.

The workshop included three keynotes followed by a panel discussion. The keynotes and participant contributions focused on systems in use, withdrawn from use, or under development in European countries. Discussions revolved around the ethical implications of classifying jobseekers, the impact of ADM systems on marginalized populations, the role of humans and machines in decision-making as well as the interaction between them, and various design considerations, including avenues for involving diverse stakeholders in system design and development. Moreover, the relationship of citizens with the state as well as the mediation of data and systems were addressed by speakers and audience.

Many of these questions can only be truly addressed in conversation with the people potentially affected by ADM in PES. This realization inspired the co-design workshop with jobseekers.

### 3.2 The Co-design Workshop

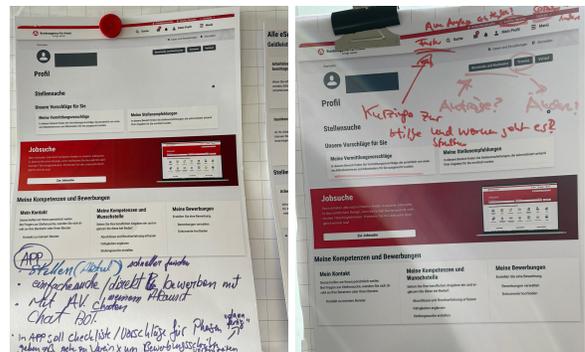
The co-design workshop took place in-person in Berlin, Germany, in October 2021. We invited jobseekers who are also migrants to Germany, because this population has been identified to be at-risk of being discriminated against by algorithmic systems [3, 20, 48]. In addition, we concentrated on a subgroup chosen based on their language skills, given that language is frequently cited as a factor hindering job search [13, 14, 48]. The decision to focus on the German PES was based on researchers’ language proficiency and field access.

The workshop was conducted in collaboration with an educational institution that provides a 18-months-long professional training program course, for which participants received funding from the PES. The training is designed to help recent migrants find a way into the German job market. The organization put us in contact with the 13 participants of our workshop, who are citizens of Somalia, Syria, Lebanon, Egypt, Poland, Macedonia, Iran, Iraq, Belarus and Afghanistan. Most of them live in Germany under refugee status. They are between 27 and 57 years old. Each participant was paid €25, the maximum amount possible due to the workshop being part of a student-led project with limited funding.

The session comprised several activities inspired by the following questions:

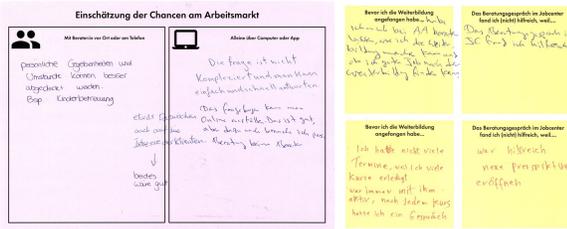
- What role does the interaction between jobseekers and counsellors play for the job-seeking process?
- Which additional services and online-services would jobseekers like to see?
- How do jobseekers rate profiling and automated decision-making in the context of jobseeking?

Three semi-structured group discussions, led by three facilitators, served as an activating exercise. Before the discussions, each participant was given a paper with prompts to write down their answers. To capture and visualize participants’ ideas on possible new online services, each group had three poster-sized screenshots of all functionalities of the existing website available to jobseekers. If a participant expressed a wish for an online service that was not available, they or the facilitator drew it onto the screenshot.



**Figure 1: Screenshots of the current website with design ideas of two groups. Translation: [In left screenshot] “APP: find job offers (current) faster”, “easy search/direct application with my account”, “chat with counsellors”, “chat bot”, “checklist/suggestions for phases if job search in app”. [In right screenshot] “At the beginning a window with short info on help, structure and what it’s about?”, “[choose] language”, “applications?”, “change? [appointments]”**

Participants were given a translated version of the Dutch Work Profiler and asked to review it. In the final two activities (roleplaying), participants were asked to assume the role of a consultant arguing for the introduction of new services and communication channels into the German PES.



**Figure 2: Left: Opinions on whether assessment of chances on the job market should be done face-to-face/via telephone or alone through computer/app. Translation: [Under face-to-face/telephone] “personal circumstances and characteristics can be covered better, e.g. childcare” [Under with app/computer] “The questions are not complicated and can be answered easily and fast”, “The questionnaire can be filled in online. That is good, but in addition I need personal counselling with a counsellor”. [In the middle] “Something in between, also in the interest of the clients”, “both would be good”. Right figure first column translation: Before I started this further education course... [top] “I got counselling from the PES, how I can do this course and if I can find a good job after the course.”, [bottom] “I did not have many appointments, because I did many courses”, “was always active with him, after every course I had a conversation”, Right figure second column translation: I did (not) find the counselling conversation in the Jobcenter helpful because... [top] “I found the counselling conversation in the JC helpful.”, [bottom] “was helpful”, “opened new perspectives”**

### 3.3 Data Analysis

The first workshop was (video)recorded to enrich our discussion notes. The enriched notes were combined, and the resulting 51-page document was coded and analyzed. The co-design workshop was recorded, and transcriptions of the conversations, as well as visual and written material were used for coding.

We used a semantic approach to reflexive thematic analysis after Braun and Clarke [11], to identify common themes, i.e., topics, ideas and patterns of meaning that were discussed at the workshops and documented in the notes and transcriptions. For the coding, we used a combination of inductive and deductive codes: some codes corresponded with the topics and questions we had envisioned for the workshops, while additional codes emerged from the workshop notes. Code curation as well as themes generation and review took place in open post-workshop discussions among the authors. For the co-design workshop, one of the authors did a first iteration of coding and then presented a first thematic map to discuss the candidate themes. In the Findings section, we will describe and discuss the key themes that we identified through the thematic analysis.

### 3.4 Ethics and Researcher Positionality

Participants in the co-design workshop were informed weeks in advance that the workshop would be taking place during one of their regularly scheduled training days in the facilities where their

normal courses take place and that participation was voluntary. The workshop was promoted as a reflection exercise. Before the workshop started, participants were given a consent form which included information on the aim of our research and the protection of data including anonymization. Participants were invited to ask questions about the form. Data were anonymized, processed and stored in line with the responsible co-author’s university’s regulations.

Due to the reflexive nature of our analysis, we want to discuss our background and how it relates to the workshop participants. We are a group of researchers working within European Computer Science and Sociology departments on AI Ethics and adjacent fields. Our disciplinary backgrounds are diverse, including Data Science, Psychology, Sociology, Machine Learning, and Cultural Studies. Our work addresses the significant potential of algorithms to be beneficial to society, while also acknowledging the risks of applying technology-driven “solutions” to complex, long-standing societal issues. We were born in Canada, Argentina, Germany, China, Belgium, and Poland, and most of us have migration experience. Our migration experience differs from that of our participants in the sense that we were not forced to flee our home countries.

## 4 FINDINGS

In this section, we describe observations emerging from the two workshops, comparing the current role of PES (RQ1), with the expectations for PES of jobseekers (RQ2).

### 4.1 Fact-Finding Workshop: What is the role and function of PES systems (algorithmic or otherwise) currently in place?

Two illustrative use cases were presented at the fact-finding workshop and served as focal points for the discussion of ADM in PES, namely, the Austrian AMAS and the Dutch Work Profiler (both described in 2.2). The following main topics emerged.

**4.1.1 Representing Individuals with Data.** Both AMAS and the Work Profiler systems utilize data representing individuals in order to formulate predictions about their employment prospects and both are meant to inform the job counsellor when they are making a decision about services for the jobseeker.

However, during the workshop, it became apparent that each system utilizes very different sources of data as input for these predictions. The outputs of each model are presented and utilized quite differently as well. There was general agreement among the participants that the Work Profiler’s design, in regards to these factors, is preferable.

The following key differences were highlighted:

- *Use-specific data:* Work Profiler’s factor selection process was presented as an evidence-based process where location-specific data was intentionally collected over a period of years, in contrast to the AMAS, which uses existing administrative data.
- *Soft factors:* The Work Profiler includes soft factors, such as self-reported mental and physical work ability, while the AMAS does not consider these.

- *Detailed information:* Both systems are intended as an informational guide but the AMAS specifically states whether a person should or should not receive retraining funds, whereas the Work Profiler gives a detailed score for each risk factor.
- *Aim of informing:* Unlike the score provided by AMAS, the only decision output by the Work Profiler is whether an in-person appointment is required. Otherwise, the profile is only meant to be informational to the counsellor.

While these differences were characterized as important, some participants argued that both systems remain similar in that they rely on individual rather than broader factors, such as the state of the economy and local job markets, for making predictions.

**4.1.2 Counsellors as Decision Makers.** The fact that data-driven tools for PES are often presented as methods to optimize the distribution of human and financial resources suggests that the role of the counsellor is conceptualized as a gatekeeper and distributor of resources. This is an oversimplified conceptualization. The framing of job counsellors as resource distributors often leads to an overemphasis on the question of whether algorithmic systems can offer higher levels of fairness and accuracy than human decision makers. Two flaws in that rationale were noticed by the workshop participants:

- Such comparison does not take into account other types of roles that a job counsellor plays, for instance, providing care and supportive interaction in cases where marginalized individuals may become even more isolated through PES processes. Similarly, in-person meetings are good opportunities for counsellors to assess risks that may not be captured in official data sources or by verbalized answers, such as drug abuse and domestic violence.
- It obscures the fact that algorithmic assessments remain normative, in the sense that getting access to resources requires that jobseekers meet pre-defined requirements such as individual characteristics or features. The source of these requirements is to be found in design, development, and implementation choices, such as the ones discussed in Sect. 4.1.1.

One of our workshop participants — an experienced job counsellor — spoke out against the characterization of case workers as gatekeepers deciding who qualifies to receive resources. The participant shared their own philosophy of open-door services, wherein the role of a counsellor is to find out what a client needs, how to best meet those needs, and to ensure they have access to all available services that are suitable for them. They described this role as very different than that of someone who is checking a series of official requirements to determine if an individual is, or is not, eligible for support (such as re-training funding). The participant likened algorithmic decision-making to the latter and argued that it is likely to leave certain individuals behind. This concern is in-line with findings previously discussed in Section 2.3.

Participants agreed that PES counsellors are part of layered institutional logics and values, and that these, along with choices made by individuals, determine whether the job counsellor ends up being a helpful social worker or a bureaucratic gatekeeper. The question

that remained with us after the workshop was whether the conceptualization of the role of job counsellors informing the Dutch Work Profiler was significantly different than the AMAS system. We also recognized that the question of which roles and normative values *should* be enforced through data-driven automation is a question best answered in a transparent process that includes the participation of all stakeholders, prior to implementation.

**4.1.3 Impacts of Interactions within Sociotechnical Systems.** One of the most important aspects of human-machine collaboration is intelligibility: it is hard for job counsellors to judge systems' outputs if they do not know the basis of the score provided by the system.

The Austrian AMAS, where counsellors are given a single score with a very limited explanation, differs significantly from the Dutch Work Profiler, which gives more extensive information about the data-driven output. However, the latter still lacks information about forms of bias that may exist within the system output as well as about discrimination that could take place in the interaction between counsellors and jobseekers.

The way in which a new system is introduced will affect how humans learn to interact with it. For instance, if the system is said to provide “neutral outputs” and job counsellors are trained to obey and not to question the system, a human-in-the-loop system may become fully automated in practice and unfair outcomes may be detected only after they have caused harm.

During the discussion, a participant brought up the example of changes in the Canadian government leading to a shift in PES policy to an efficiency and austerity approach. This caused significant changes in the guidelines that were given to job counsellors. Such examples raise questions about interactions and impacts of new systems within the larger socio-technical networks in which they are embedded and about social values encoded in systems in ways that are not made clear to users or citizens. For instance, one of the participants argued that the development of the AMAS system for the Austrian PES was concomitant with a neo-liberal shift in Austria that implies the transformation of a welfare state towards a “workfare state” which demands that jobseekers prove employability in order to receive support [2]. Certain systems even appear to reinforce their own existence: some government institutions frame increasing automation as the only option for maintaining PES, implying that, despite concerns, it is better to automate than to cut services. Further concerns centered around systems' potential for surveillance of job counsellors and jobseekers. For instance, the participants argued that the Polish system recorded all instances of overruling an automated decision by job counsellors, which made some of them afraid that the system was used to oversee their work. In addition, it was pointed out that the Austrian AMAS system monitored and enforced jobseekers' attending of appointments by including the attendance record as a predictive variable.

The complex and nuanced interactions of ADM with humans within socio-technical systems were highlighted throughout the workshop, which inspired us to investigate how citizens impacted by ADM perceive these interactions. A resounding message of the workshop was that creating (or identifying) a “successful” algorithmic system requires establishing what the desired role of PES is in a given context and what societal outcomes should be prioritized. In this sense, a key perspective was missing from the fact-finding

workshop, namely, that of jobseekers who have had interacted with a PES system. Considering that migrant jobseekers are among the groups most negatively impacted by ADM in PES, we decided to focus the co-design session on their perspectives.

## 4.2 Co-Design Workshop: What are the expectations of jobseekers getting in contact with PES?

Participants described several reasons for contacting the PES, both in the past and recently. These reasons ranged from applying for monetary benefits, including funding for German language courses or further education, to seeking guidance about potential career paths or available training opportunities. While these reasons for contacting PES are in line with the role of PES in Germany and were therefore expected, the discussion of the participants' experiences in attempting to achieve these goals surfaced insight into their expectations and needs when interacting with the German PES. We identified three themes in these needs, to be described in the following subsections.

**4.2.1 The Value of Human Contact.** The jobseekers continuously noted benefits of meaningful interactions with job counsellors. Several participants mentioned that they want to be treated with respect and spoke fondly of counsellors that were helpful and friendly. Counselling conversations were described as “opening many doors and new perspectives”. In general, participants argued that face-to-face conversations give them the advantage of seeing facial expressions and gestures. On the other hand, using e-mails allows them to take as much time as they need to translate words.

In contrast, frustration was reported when describing procedures that jobseekers conduct on their own, such as navigating websites and filling out forms. Language was the most-cited barrier. One participant explained that migrant jobseekers, especially those recently arrived in Germany, face serious problems obtaining information from the PES website. Even beyond language barriers, procedures were perceived as not particularly clear:

They are sometimes complicated, these websites... there are sometimes questions that you cannot answer. Or sometimes there are questions that are very complicated.

A participant commented on the hypothetical introduction of a questionnaire like the one in the Dutch Work Profiler:

I think the German level could be a problem, could be problematic. For this the German level is high. You should use another language.

In response to this statement, one participant said that she would like “easy German” to be used on the PES website. Some German government websites are available in simplified German.

Language barriers are also a factor in human-to-human interaction. For instance, a participant recounted having complicated governmental processes explained to him solely in German:

You have to call and enter your client number. And the employees explain everything in German and these terms from the government office are not easy. And many don't understand them.

Participants identified the support offered by interpreters as an effective strategy to address the lack of information and orientation many migrants face vis-à-vis PES:

There is someone who knows the language and comes with you or is an interpreter for the situation it's much better.

Moreover, participants also talked about the importance of having a “good” counsellor:

Maybe they want to know something about me. Know something first, and then, when she talked to me, here, I was in a training in this building and she talked to the teacher, and he told me this later, and she sent me the letter of funding.

This quote shows how access to funding is influenced by case-worker discretion. In line with points discussed in the fact-finding workshop, we see that the individual characteristics of job counsellors and how they approach their role has a significant effect on jobseekers' experiences with PES. In this sense, participants reported on some counsellors' “rude behavior” towards them. One participant even reported that she was made to stand outside the door and was not allowed inside the room during one of her appointments.

**4.2.2 Seeking Genuine Orientation.** When migrants and refugees come to Germany, they are confronted with a different culture, language, and bureaucratic system. Knowing where to find information on how to navigate the system is essential. Several workshop participants reported going to their counsellors for help and advice on finding a job and navigating the education system. One recurrent wish of our participants was to find a suitable job that has to do with their previous education and job experience. In this sense, one participant criticized that she was offered supermarket jobs despite having a university degree.

Participants also mentioned psychological repercussions of assessments, such as demotivation by low scores:

My first thoughts about this would be, if the chances are low, for whatever reason, maybe this would demotivate me. Like, I will not find anything anyway, might as well let it be, something like this would be in my head.

On the other hand, participants also reported that assessments could be motivating for their job search:

I find this very important. When I get a positive evaluation, I can go on, I get strong energy from this. But also with a negative evaluation, I can learn from my mistakes and make this better in the future. No problem.

Despite the differences in sentiment, both these quotes show that the participants see the outcome of profiling systems as a genuine source of information concerning their position and skills in relation to the job market. Another participant referred to the possible consequences tied to the outcome of profiling. The participant highlighted the importance of using assessment tools for the purpose of orienting and guiding jobseekers and not to exert pressure on them or deny them access to resources:

It could be helpful. But there is enough pressure. If this is a new way to exert pressure, then it doesn't work. We know that pressure works the other way as intended.

Instead of a tool for resource allocation, most of the participants assumed that the profiling outcomes would be similar to psychological and skills assessments that they had undergone before. Overall, most participants were not against profiling as long as it is conceptualized as an orientation tool for success in the job market. Multiple participants mentioned the potential for the assessment to be motivating.

**4.2.3 Being Seen as a Whole Human.** The possibility of not being seen as the complex human being that the participants see themselves as, was mentioned in relation to assessments by a computer and by a counsellor. The way in which assessments are communicated was described as more important than the assessment itself:

But for me, the important thing is, with this method, how you talk to me. It should always be with respect and thorough and now I accept it all. Positive assessment or criticism or something, it doesn't matter.

This statement highlights, once more, how valuable human contact is for jobseekers. In this case, human contact and communication are seen as fundamental for conveying that the jobseeker is seen as a whole human whose needs and perspective are valued.

Additionally, time and depth of the relationship with the counsellor plays an important role in accurate assessments:

The time that you spend with a counsellor, the time is not enough, and, in my opinion, it is much better at the coaching, because you get to know each other over the course of a week and get a profile and you really think about what you can do.

This participant is talking about specific coaching that is available for refugees and migrants in Germany. They also mentioned that their request for funding was accepted upon convincing the counsellor in a face-to-face meeting.

The participants also touched upon variables which are used in calculating scores. Ambiguity and soft skills were mentioned as something computers cannot calculate:

A job needs different things and these are differently emphasized between each person and another, and a computer cannot do this. It is especially in the service, service jobs, where you cannot say this. A computer will say, high chances here, this is good, he can write and another cannot, but personality, who walks into the office, we say we want to hire this one.

## 5 DISCUSSION: WHAT WOULD ADM TOOLS FOR PES LOOK LIKE IF THEY WERE BASED ON THE NEEDS AND DESIRES OF JOBSEEKERS?

Our findings show that current PES are oriented towards the administration of limited resources such as job opportunities and funding, instead of focusing on the potential of individuals, addressing communal needs, and/or advocating for deeper reforms vis-à-vis the job

market. Current attempts to integrate autonomous decisions making tools in PES are designed with the aim of assessing individual jobseekers to decide on the allocation of resources. Moreover, many of these systems carry the risk of misrepresentations and unjust decisions. Finally, the introduction of these tools will inevitably shape the context in which they are used including, potentially, the labor market itself.

In Sect. 4.2, we identified three key expressed needs of the jobseekers who participated in our co-design workshop from their interactions with PES: seeking genuine orientation, wanting to be seen as whole person and, the value of human contact. Three design considerations follow from these needs: (1) importance of interpersonal contact, (2) assessment as direction, and (3) limiting and mitigating misrepresentation. We describe each one of these in the following sub-sections.

### 5.1 Human Interaction as a Fundamental Component of ADM

Our findings underline the value of human contact in PES, in which job counsellors play an essential role. Both during the co-design workshop and the fact-finding workshop, it became apparent that in addition to being decision-makers, counsellors fulfill many other roles such as advisors, guides, and, potentially, even social workers. Data-driven technologies designed for PES should integrate human interaction as a fundamental system component. The counsellor could then serve as an interpreter of the information provided by the system and help the jobseeker take action based on that information. This role of interpreter also allows the job counsellor to flag and explain the known risks and limitations of a system. To prevent the counsellors from having a monopoly on system output understanding, the above discussed focus on designing output specifically for the jobseeker remains paramount.

To help navigate system outputs, counsellors need training and support. Counsellor training should reinforce the idea that system outputs can be contested. Moreover, organizational structures that ensure spaces for contestation for both counsellors and jobseekers are fundamental.

Adding more technology, even when well-designed, should not be the first approach to improving PES. However, we give specific recommendations for ensuring that algorithms in PES can support human contact rather than replace it:

- **Data literacy training:** Training for job counsellors in the interpretation of any algorithmic outputs provided, including an understanding of the limitations of such an approach, and potential harms such as bias and discrimination.
- **Acknowledge risk of deskilling:** Any new systems will affect the counsellors' assessment skills and influence what skills they learn.
- **Interpretability:** The implications of algorithmic system outputs must be understood and communicated by the creators and full documentation of data used and design decisions should be available.
- **Output as conversation starter:** as in the Work Profiler, output can serve to facilitate a discussion about relevant details of the jobseeker's background and circumstances.

- Attention to the individual: The meeting in which the system output is discussed can also include social interactions such as other assessments, discussing possible interventions, and sharing personal circumstances.

## 5.2 Assessment as Direction

The co-design workshop participants conceptualized a hypothetical jobseeker-assessment system as potential source of useful information. However, the system should not just provide a single, opaque score but detailed, actionable information. This information would be most useful if it is directed towards the jobseeker and serves as a source of orientation when navigating the intricacies of a (new) jobmarket. Such information could serve as a basis for career counseling or help with the development of personal skills. In this sense, any potential system designed to be implemented in PES should not be seen as a decision maker but rather an advisor.

During the fact-finding workshop, the reliance on the intervention of job counsellors to make the final decision on jobseekers' situations was considered as a positive aspect of the Dutch Work Profiler, as was the conceptualization of its scores as a conversation starter between the counsellor and the jobseeker. Still, the Dutch Work Profiler is designed to provide information to the job counsellors only. We argue that considering jobseekers as the main audience could enable alternative approaches to PES and job search.

To this end, specific design considerations for producing orienting output for jobseekers are:

- Flexibility and plurality in access modalities: Options for interacting with a job counsellor should include in-person, video call, telephone, and chat functions.
- Information-only outputs: Assessment should serve as orientation for the jobseeker and not be prescriptive or binding, nor determine resource distribution.
- Intelligibility: The system and its outputs should be understandable to the jobseeker. This could include the avoidance of “bureaucratic language” and the use of visualizations.
- Information as empowerment: Information should be chosen for its ability to empower the jobseeker, including to help identify when they are being treated in an arbitrary or biased manner by the PES system.

## 5.3 Limiting and Mitigating Misrepresentation

The co-design workshop participants expressed the explicit need to “be seen as a whole person” and not just a sum of pre-defined features. Given that any computational representation of a human being will be incomplete, we focus here on limiting and mitigating the misrepresentation of jobseekers. Specific considerations emerging from our findings are:

- Stakeholder involvement: To understand what are important factors that should be integrated into the system. Key stakeholders include jobseekers, counsellors, and NGOs.
- Regular auditing: Regarding bias and negative impacts on the community served.
- Attention to data representation choices: Problems with discrete variables categories, for example age categories.

- Acknowledge the limits of historical data: As it may not reflect current jobseekers' lived experiences. Salient examples include impacts of COVID-19, demographic shifts, and changing gender roles.
- Consider a capacity-based focus: Jobseekers, like all humans, have skills, values, abilities and interests. These may not emerge when a focus on (lack of) employment history or (lack of) market fit is too narrow.

## 6 LIMITATIONS

We have focused on European PES. The cases and systems described in this work are tied to their local contexts and cannot be generalized to other regions of the world. Similarly, the views expressed by our co-design participants refer to their experiences as migrants to Germany and with the German PES in particular. Also, to enable fluent communication on the basis of a common language, the participants to the co-design workshop were chosen according to their language skills in German (level B2 or higher). This means that more vulnerable groups, such as refugees who only recently started learning German, did not take part in the workshop and thus cannot be represented by the data.

## 7 CONCLUSION AND FUTURE WORK

In this paper, we explored various perspectives on the introduction of algorithmic systems in PES and found that engaging jobseekers in the design processes surfaced vastly different needs than currently covered by European PES. Notably, our co-design participants were open to the possibility of profiling tools used for orientation purposes, not to deny access to resources. However, current PES tend to be oriented towards the administration of limited resources. Thus, there is need to address structural changes to the aim and function of PES as a whole if the jobseekers needs are prioritized. Our proposed design considerations follow from imagining such a shift.

In line with Sloane et al. [43], we acknowledge the relevance of long-term participatory engagements. Future participatory research could, for instance, explore more deeply the jobseeker-counsellor relationship, not only with migrants but also other groups of jobseekers. In addition, a detailed inventory of algorithmic systems that have been implemented in PES is needed, so that we can continue to monitor the impact of these systems.

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