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MIGRANTS' IMAGINARIES AND AWARENESS OF DISCRIMINATION BY ARTIFICIAL INTELLIGENCE

A CONCEPTUAL FRAMEWORK FOR ANALYSING DIGITAL LITERACY

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ABSTRACT

This paper asks what skills migrants need to be able to deal with artificial intelligence (AI) technologies in a self-determined way in their everyday lives. We propose a conceptual framework to empirically identify migrant's awareness and perceptions of possible discrimination through AI. Following Bucher (2017, 40), we argue that by experiencing AI systems in their digital environments, people develop AI imaginaries that shape their attitudes, interactions, and practices with AI. We assume that experiences of discrimination evoke affects, feelings, and emotions that at first glance are not associated with AI technologies. The paper provides relevant research questions that address AI imaginaries. In addition to studying knowledge about and perceptions of AI, research should increasingly focus on users' attitudes towards AI, their evaluations of AI, and their feelings, emotions, and affects related to AI. Subsequently, we elaborate on dimensions of digital literacy based on these AI imaginaries. Finally, we will describe the digital skills that are necessary to confidently cope with discrimination by AI technologies.

1 INTRODUCTION: MIGRANTS' EXPERIENCES OF DISCRIMINATION BY AI TECHNOLOGIES

From the research literature on self-learning systems, we know that various artificial-intelligence-based technologies reproduce bias and thus reinforce inequality and exclusion (Tulodziecki, 2020). For example, Lopez (2021) describes how certain groups are rendered invisible, overly visible, or distorted due to a "racial bias." At the same time, social bias and stereotypes are reproduced as structural inequalities within the society, while they are emphasized and reinforced by algorithms and artificial intelligence (AI). Nevertheless, studies have shown that users often do not perceive the algorithmic curation of various AI-driven services or do not see it as problematic or discriminatory (MeMo:KI, 2020; Swart 2021). For a self-determined life with digital media, however, an informed, reflective, critical approach to AI is necessary (Digitales Deutschland, 2021). This is especially true for groups that are particularly affected by inequality, such as migrants. Confident use of AI technologies is also crucial for migrants' participation practices.

We therefore ask why the discrimination caused by AI is scarcely perceived by the population. One of the reasons may be the invisibility and opaqueness of AI technologies for laypeople and semi-professional users of digital systems. Invisibility also makes empirical research on possible experiences of discrimination difficult. At the same time, discrimination can be latent; those who are discriminated against may perceive it unconsciously. These aspects also make it difficult to research experiences of discrimination in the digital world. So how can we grasp an encounter with AI technology when it is perceived unconsciously and the technology is not always visible? One possible approach is to explore subjective everyday life theories about the use of a given technology: in our case AI. However, even if most users do not understand the technical aspects of algorithms and AI, they can, nevertheless, or even for that very reason, form an understanding of it. In the research literature, we find several terms for these everyday life theories: for example, folk theories, lay theories, mental models or more concretely "users' intuitive theories about the composition of their Facebook News Feeds," or "algorithmic expertise and algorithmic gossip" (Rader & Gray, 2015; Bishop, 2019; Dogruel et al., 2020). Such subjective everyday life theories do not necessarily correspond to technological developments; they are also constantly updated and if necessary refuted by the user. They describe the imaginaries about AI that people develop.

Studies in the field of computer-human interaction focus their analyses on algorithms and on how aware the general digital-media-using population is of them. We are interested in a wider field of user perception and interaction with AI technologies. Algorithms are an essential part of many AI systems, but AI encompasses many other technologies as well. Algorithmic decision-making in online applications is certainly one of the most familiar AI technologies. In everyday language, the

term algorithm is often used synonymously with the term artificial intelligence, as different studies about the perception of AI show (Digitales Deutschland, 2021b). However, we are less interested in the technological understanding and definitions of AI; we will instead focus on migrants' attributions of meaning, evaluations, and practices of using AI technologies.

In the following, we will present a conceptual approach to empirically study migrants' possible experiences of discrimination by AI technologies. We will argue that analyzing subjective everyday life theories can render this study possible. These subjective theories will help us analyze migrants' perceptions and their coping mechanisms for dealing with discrimination by AI systems. In addition, the AI imaginaries make it possible to determine the dimensions of digital literacy that migrants have and need to deal with AI technologies in a self-determined way in everyday life. Various coping mechanisms regarding discrimination by AI can then be linked to these.

2 SUBJECTIVE EVERYDAY LIFE THEORIES ABOUT ARTIFICIAL INTELLIGENCE

What exactly are subjective everyday life theories and what do they reveal about the role of AI in migrants' lives and experiences of discrimination? People develop folk theories to explain aspects of life that are complex in their structure—be they technical or other features. Such mental models represent *a subjective idea of what* AI *is*, what it *can do*, and *what it should do*. These theories serve as a symbolic resource for practices of using AI technologies (Ytre-Arne & Moe, 2021, p. 810). Subjective lay theories are intuitive ways of thinking about the function and structure of things, and especially about technologies. They shape the practices of using and experiencing them (Siles et al., 2020, p. 2) and help people to interact with the technology. Subjective lay theories also contain strategies of action and thus include general solutions for dealing with technology, which can be valid and exemplary in various everyday situations. Ytre-Arne and Moe (2021) highlight the "value of folk theories not just in guiding behavior, but also in making sense of experiences, generating inference and steering learning about the world." (Ytre-Arne & Moe, 2021, p. 811) Furthermore, the respondents' statements about their folk theories can be contradictory. This is not surprising, as they are often not as well-formed or thoroughly tested as scientific theories. Moreover, people are constantly developing new perspectives on technologies through continuous interaction with them (Rader & Gray, 2015, p. 177).

We thus argue that subjective everyday life theories build on people's *perceptions* and *knowledge* about, *attitudes* towards, and *emotional* and *affective* evaluations of AI. These theories emerge in a relational process: They are developed, adapted, and changed through the experience of using AI systems. An unaddressed issue in previous research is that the affective dimension is rarely

considered when analyzing the imagining and use of AI systems (with the exception of the studies by Bucher, 2017; 2018 and Swart 2021). We argue that it is, however, an important facet of attitudes towards AI and its use.

We propose to analyze people's personal AI stories to explore what subjective everyday life theories migrants develop about AI and what these theories uncover about digital literacy and discriminatory experiences with AI. These are "stories about situations and disparate scenes that draw algorithms and people together." (Bucher, 2017, p. 30) The focus is on what people imagine and associate with AI and algorithms. Bucher (2017) calls it the "algorithmic imaginary." Such imaginaries of AI are strongly shaped by feelings and emotions. What people experience when using AI systems is not a mathematical equation but rather the moods, affects and feelings evoked by AI systems. We are interested in "beliefs people form about algorithms not as right or wrong but as a point of access for understanding how and when algorithms matter." (Bucher, 2018, pp. 97–8) This helps us to understand the social power of AI. Related to this are questions regarding what emotions and feelings are evoked by the experience of inequality and discrimination by algorithmic systems. Similarly, Ytre-Arne and Moe (2021, p. 810) argue that the subjective construction of the meaning of AI and algorithms is an interpretive process, it is less about technical knowledge than about the negotiation and attribution of meanings and evaluations. AI imaginaries can emerge in a collaborative way, and they are negotiated in the context of cultural and societal beliefs. Moreover, they are imprecise and can embody cognitive biases (Bishop, 2019, 2593; Ngo & Krämer, 2021, p. 3). Imaginaries can be seen as the "outcome of individual and collective sensemaking activities resulting in shared ideas about technology, including fears, hopes, and expectations." (Kazansky & Milan, 2021, p. 364) Furthermore, subjective everyday life theories and AI imaginaries rely on different discourses about AI. Mager and Katzenbach (2021, p. 223) emphasize that AI imaginaries are increasingly dominated by discourses developed by technology companies, followed by discourses from science fiction and the media.

Quantitative studies (Fischer & Petersen, 2018) have shown that the population's overall knowledge and awareness of AI is relatively low. Several studies have demonstrated that knowledge about and awareness of AI can be better explored through qualitative research. For example, in an open-ended interview, the interviewer can connect with the interviewee's concrete experiences of use and interaction with AI systems (Dogruel et al., 2020, p. 13). Hargittai and colleagues (2020, p. 767) asked users about their "individual perception and understanding of online processes with algorithms" instead of asking directly about their knowledge about algorithms. In this context, we argue that whether people have explicit knowledge about the specific functioning of the systems is of secondary importance for research into possible discrimination by AI systems. Rather, we are interested in how

users perceive these systems, how they feel them, interact with them, evaluate them, and how they adapt their practices in this context. How self-determined and sovereign do they perceive their interaction with AI systems to be, or to what extent can they shape this interaction in a self-determined way.

3 ADDRESSING AI IMAGINARIES AND DIGITAL LITERACY

In the following section, we will identify useful research questions for analyzing self-determined interactions with AI technologies. As previously described, it can be helpful to use qualitative methods to examine AI imaginaries and possible discriminatory experiences with AI. These methods allow us to "capture more intuitive, tacit forms of knowledge and make it possible to explore openly how people understand and engage with algorithms" (Swart, 2021, p. 3). In open-ended interviews or group discussions, researchers can uncover the interviewees' indirect experiences with AI systems, which they have often not reflected upon. It is helpful to connect to the experience of using and interacting with AI systems in everyday life (Hargittai et al., 2020, p. 771; Dogruel et al., 2020, p. 13). Siles et al. (2020, p. 4) have argued that group discussions are "ideal for exploring the social nature of folk theories, that is, how they form as people share them with others." When group discussions are combined with the method of rich pictures (Bell & Morse, 2013), which involve drawings about the role of the technology in everyday life made by individuals, researchers can understand the unstated and self-evident nature of users' knowledge of AI systems. Two more useful methods are the think-aloud method (Charters, 2003) and the walkthrough method (Light et al., 2018), which means that an individual goes through their device together with the researcher and describes typical practices of the use of AI technologies. These drawings and stories can be used as starting points for group discussions or personal interviews (Siles et al., 2020). In their studies, Bucher (2017, p. 38) and Dogruel et al. (2020, p. 4) have shown that the power of algorithms and AI becomes particularly visible when users face problems and irritations due to algorithms or AI. This often negatively associated interaction with algorithms makes the penetration of their social environment by AI systems visible. Conversations about these experiences have provided promising results.

4 RESEARCH QUESTIONS ABOUT AI IMAGINARIES

We propose the following steps for empirically identifying AI imaginaries. It is useful to start with overall questions about the respondent's general experience of using AI systems. When it comes to identifying important aspects of everyday life theories of AI, respondents' ideas about AI and attitudes towards it, their evaluations of AI, and their feelings, emotions, and affects related to AI are important—in addition, of course, to their awareness of, knowledge about, and perception of AI. In

this context, the following research questions have emerged (several of them have been analyzed in: Bucher 2017; Pedersen, 2019; Dogruel et al., 2020; Siles et al., 2020; Hargittai et al., 2020; Swart 2021; Ytre-Arne & Moe, 2021):

1. *Awareness, opinion, perception, and attitudes about AI technologies*: How do users make sense of the mostly opaque AI systems? To what extent are migrants aware of AI in their media use? How are these AI technologies integrated into people's everyday lives? How do users think that algorithmic recommendations work, for example? How do users perceive the role of AI technologies in their lives? What positive and negative aspects of algorithms do users perceive? To what extent do they find them discriminatory?
2. *Emotions and feelings towards AI*: If users do recognize the existence and role of AI, how do they feel about it? What emotions and feelings might refer to a discriminatory experience?
3. *Evaluation of and reflection on AI*: How much do users reflect on the impact of AI systems when using the internet and digital media? Do they understand when and how AI may influence their actions? How do users adapt their everyday practices in response to critical evaluation? Do they reflect on changes in the technology over time and how it changes their use of AI systems? To what extent do respondents reflect on ethical aspects of their individual use of AI systems.
4. *Media practices adapted to AI imaginaries*: How do users adapt their media practices with AI systems within the context of their imaginaries, awareness, knowledge, evaluation, and emotions? How self-determined are these practices?

What can these aspects of AI imaginaries reveal about sovereign living in general and about practices of coping with possible discrimination by AI?

5 ADDRESSING DIGITAL SOVEREIGNTY AND DIGITAL LITERACY

Furthermore, we relate the skills described in various media and digital literacy models (Hobbs, 2010; Livingstone et al., 2005) to AI imaginaries and thus describe the competence requirements that the subjects must face if they want to participate sovereignly in a democratic society shaped by digitalization. Based on Müller et al. (2020, p. 32), we define digital sovereignty as the skills and opportunities of a person to shape their own life in a competent, self-determined, and secure way when using or depending on digital media. Digital sovereignty is relational and is shaped not only by individual conditions but also by technical, legal, and social ones.

The Digital Germany research network (Digitales Deutschland, 2021) highlights the following skills that can enable a sovereign way of living in a digitalized society: *instrumental skills* (the skills necessary to use digital media), *cognitive and critical-reflexive skills* (knowledge about AI systems

and how to evaluate them), *creative skills* (concerning the self-determined, independent (re)design of digital media and systems), and *affective and social skills* (being able to react emotionally and socially appropriately to media content and AI systems). The affective and social dimension is neglected in many models of AI or algorithm literacy (cf. the comprehensive systematizations by Dogruel, 2021; Long & Magerko, 2020). If we relate the digital literacy dimensions to the research questions we have formulated, the following connection emerges (see Table 1): The first set of questions analyses the cognitive and critical-reflective aspects, such as awareness, opinion, perception, knowledge, and attitudes towards AI. The second question highlights the affective and social dimension of dealing with AI and possible discrimination. The third set of questions describes the critical evaluation of AI technologies. The last point focuses on creative practices and coping strategies in dealing with AI.

Question	Digital literacy dimensions
Awareness, opinion, perception, attitudes about AI technologies	Cognitive and critical-reflexive skills
Emotions and feelings toward AI	Affective and social skills
Evaluation of and reflection on AI	Critical evaluation skills
Media practices adapted to AI imaginaries	Creative coping strategies with the impact of AI—creative skills

Table 1. Digital literacy and AI imaginaries.

In the context of digital sovereignty, we particularly want to highlight the productive power of AI imaginaries. Even though users' agency around AI systems is substantially limited by platform structures, they develop different coping strategies (Swart, 2021). Nevertheless, subjective everyday life theories describe people's productive interaction with AI (Bucher 2017, p. 41; Bishop 2019, p. 2592). Based on their affectively informed experience with the algorithm, people try to change it, adapt to it, and make it useful for themselves. Ytre-Arne and Moe (2021, p. 809) also emphasize that unexpected experiences with AI promote user's activity and performativity. This can be particularly interesting for research on self-efficacy in the face of discrimination by AI systems. Everyday user encounters with AI can contribute to the development of resistance practices (Velkova & Kaun, 2021, p. 525).

6 CONCLUSION

Our starting point was the question of what skills and abilities migrants need to be able to deal sovereignly with AI systems in their everyday life. Linked to this was the question of how to best explore imaginaries and experiences of AI and how to analyze potential experiences of discrimination. Our proposed approach was to explore AI imaginaries as subjective everyday life theories to describe people's perceptions and knowledge about, attitudes towards, and emotional and affective evaluations of AI. Furthermore, the AI imaginaries describe what digital literacy the migrants have as well as what is necessary for them to lead a sovereign life in the digitalized world. Digital literacy refers to possible skills and abilities to deal with discrimination experiences with AI: in the sense of being able to recognize and counter discrimination. We argue that especially the affective, social, critically reflexive, and creative skills and abilities are significant for a sovereign way of living.

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REFERENCES

1. Bell, Simon, und Stephen Morse. 2013. “How People Use Rich Pictures to Help Them Think and Act”. *Systemic Practice and Action Research* 26 (4): 331–48. https://doi.org/10.1007/s11213-012-9236-x.
2. Bishop, Sophie. 2019. “Managing Visibility on YouTube through Algorithmic Gossip”. *New Media & Society* 21 (11–12): 2589–2606. https://doi.org/10.1177/1461444819854731.
3. Bucher, Taina. 2017. “The Algorithmic Imaginary: Exploring the Ordinary Effects of Facebook Algorithms”. *Information, Communication & Society* 20 (1): 30–44. https://doi.org/10.1080/1369118X.2016.1154086.
4. ———. 2018. *If...then: algorithmic power and politics*. New York: Oxford University Press.
5. Charters, Elisabeth. 2003. “The Use of Think-aloud Methods in Qualitative Research. An Introduction to Think-aloud Methods”. *Brock Education* 12 (2): 68–82.
6. Cotter, Kelley, und Bianca C. Reisdorf. 2020. “Algorithmic Knowledge Gaps: A New Horizon of (Digital) Inequality”. *International Journal of Communication* 14 (0): 21. https://ijoc.org/index.php/ijoc/article/view/12450.
7. Digitales Deutschland. 2021. Rahmenkonzept Digital- und Medienkompetenz, accessed February 15, 2022. https://digid.jff.de/rahmenkonzept/.
8. Digitales Deutschland. 2021b. Data Dashboard. Accessed August 9, 2022. https://digid.jff.de/data-dashboard/.
9. Dogruel, Leyla, Dominique Facciorusso, and Birgit Stark. 2020. “I’m Still the Master of the Machine. Internet Users’ Awareness of Algorithmic Decision-Making and Their Perception of Its Effect on Their Autonomy”. *Information, Communication & Society*, 1–22. https://doi.org/10.1080/1369118X.2020.1863999.
10. Dogruel, Leyla. 2021. “What Is Algorithm Literacy? A Conceptualization and Challenges Regarding Its Empirical Measurement“. In *Algorithms and Communication*, edited by Monika Taddicken and Christina Schumann, 9:67–93. Digital Communication Research. Berlin. https://doi.org/10.48541/dcr.v9.3.
11. Fischer, Sarah, and Petersen, Thomas. 2018. “Was Deutschland über Algorithmen weiß und denkt. Ergebnisse einer repräsentativen Bevölkerungsumfrage“. Bertelsmann Stiftung. Accessed February 15, 2022. https://doi.org/10.11586/2018022.
12. Hargittai, Eszter, Jonathan Gruber, Teodora Djukaric, Jaelle Fuchs, and Lisa Brombach. 2020. “Black Box Measures? How to Study People’s Algorithm Skills”. *Information, Communication & Society* 23 (5): 764–75. https://doi.org/10.1080/1369118X.2020.1713846.
13. Hobbs, Renee. 2010. Digital and media literacy: A plan of action. Washington, DC: Knight Foundation and Aspen Institute. Accessed February 15, 2022. https://knightfoundation.org/wp-content/uploads/2019/06/Digital_and_Media_ Literacy_A_Plan_of_Action.pdf.
14. Kazansky, Becky, and Stefania Milan. 2021. “‘Bodies Not Templates’: Contesting Dominant Algorithmic Imaginaries.” *New Media & Society* 23, No. 2: 363–81. https://doi.org/10.1177/1461444820929316.
15. Light, Ben, Burgess, Jean, & Duguay, Stefanie. 2018. “The walkthrough method: An approach to the study of apps.” *New Media & Society*, 20(3), 881–900. https://doi.org/10.1177/1461444816675438.

16. Livingstone, Sonia, Elizabeth van Couvering, and Nancy Thumim. 2005. *Adult Media Literacy: A Review of the Research Literature*. London: Ofcom.

17. Long, Duri, and Brian Magerko. 2020. "What Is AI Literacy? Competencies and Design Considerations". In *Proceedings of the 2020 CHI Conference on Human Factors in Computing Systems*, 1–16. Honolulu HI USA: ACM. https://doi.org/10.1145/3313831.3376727.

18. Lopez, Paola. 2021. "Diskriminierung durch Data Bias. Künstliche Intelligenz kann soziale Ungleichheiten verstärken." *WZB Mitteilungen.* Heft 171: 26-28.

19. Mager, Astrid, and Christian Katzenbach. 2021. "Future Imaginaries in the Making and Governing of Digital Technology: Multiple, Contested, Commodified." *New Media & Society* 23, No. 2: 223–36. https://doi.org/10.1177/1461444820929321.

20. MeMo:KI. 2020. Meinungsmonitor Künstliche Intelligenz. Künstliche Intelligenz und Diskriminierung. Factsheet Nr. 2 (August). Accessed February 15, 2022. http://www.cais.nrw/wp-94fa4-content/uploads/2020/08/Factsheet-2-KI-und-Diskriminierung.pdf.

21. Müller, Jane, Mareike Thumel, Katrin Potzel, and Rudolf Kammerl. 2020. "Digital Sovereignty of Adolescents". *MedienJournal* 44 (1): 30–40. https://doi.org/10.24989/medienjournal.v44i1.1926.

22. Ngo, Thai, and Krämer, Nicole. 2021. "It's just a recipe? – Comparing expert and lay user understanding of algorithmic systems." *Technology, Mind, and Behavior*, *2*(4): 1–10. https://doi.org/10.1037/tmb0000045.

23. Pedersen, Emily. 2019. "'My Videos are at the Mercy of the YouTube Algorithm': How Content Creators Craft Algorithmic Personas and Perceive the Algorithm that Dictates their Work". Technical Report, University of California at Berkeley.

24. Rader, Emilee, and Rebecca Gray. 2015. "Understanding User Beliefs About Algorithmic Curation in the Facebook News Feed". In *Proceedings of the 33rd Annual ACM Conference on Human Factors in Computing Systems*, 173–82. CHI '15. New York, NY, USA: Association for Computing Machinery. https://doi.org/10.1145/2702123.2702174.

25. Siles, Ignacio, Andrés Segura-Castillo, Ricardo Solís, and Mónica Sancho. 2020. "Folk Theories of Algorithmic Recommendations on Spotify: Enacting Data Assemblages in the Global South". *Big Data & Society.* January–June: 1–15. https://doi.org/10.1177/2053951720923377.

26. Swart, Joelle. 2021. "Experiencing Algorithms: How Young People Understand, Feel About, and Engage With Algorithmic News Selection on Social Media". *Social Media + Society*, *7*(2), 1–11. https://doi.org/10.1177/20563051211008828.

27. Tulodziecki, Gerhard. 2020. Künstliche Intelligenz und Medienpädagogik. Zwischen Utopie und Dystopie. In *Medienpädagogische Perspektiven für die digitale Gesellschaft,* edited by Angelika Beranek, Sebastian Ring, Martina Schuegraf. 1-15. München: koPaed.

28. Velkova, Julia, and Anne Kaun. 2021. "Algorithmic Resistance: Media Practices and the Politics of Repair". *Information, Communication & Society* 24 (4): 523–40. https://doi.org/10.1080/1369118X.2019.1657162.

29. Ytre-Arne, Brita, and Hallvard Moe. 2021. "Folk Theories of Algorithms: Understanding Digital Irritation". *Media, Culture & Society* 43 (5): 807–24. https://doi.org/10.1177/0163443720972314.