AI, Identity, and Equity: Examining Intersectionality and Systemic Barriers in Digital Information Access and AI Proficiency

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Introduction

Users' access to and engagement with technology are shaped by a complex interplay of technological design, personal identity, and socio-economic factors. Today's digital experiences —from social media content to search engine results—are increasingly filtered through platform-driven perceptions of users' identities and personal contexts [1]. The rapid advancement of AI, coupled with globalization and evolving social movements, has intensified these dynamics, exacerbating risks related to inequality, bias, manipulation, and privacy violations while widening the digital divide and deepening existing disparities [2-3].

Modern identity is more fluid, diverse, and multifaceted than ever before. Younger generations, particularly Gen Z, embody this shift—making them the most diverse generation in history. In 2022, nearly half of individuals under 21 in the U.S. identified as part of an ethnic minority [4]. In the United Kingdom, there was a significant shift in sexual orientation identification, with 10.4% of individuals aged 16 to 24 identifying as lesbian, gay, or bisexual (LGB)—a tenfold increase from the 0.9% observed among those aged 65 and older [5]. At the same time, socio-economic factors—ranging from access to education and digital literacy to technological infrastructure—play an increasingly critical role in shaping global AI equity as AI technologies become more complex and resource-intensive. While advanced connectivity and state-of-the-art devices dominate in the Global North, regions in the Global South continue to face infrastructural challenges and reliance on lower-end technology [6-7].

Several studies and frameworks have been developed to enhance our understanding of how people are made visible, represented, and treated based on their production of digital data, with the potential to build on one another [8-10]. This research complements existing knowledge by analyzing key intersecting factors that influence AI equity and data justice, offering a deeper exploration of users' perspectives. Specifically, it examines how overlapping factors influence individual information needs, the contexts in which these multifaceted identity dimensions have the most significant impact, and the effectiveness of AI tools in addressing them. Furthermore,

this study investigates how intersectional identity and compounding socio-economic factors correlate with AI proficiency and access levels.

In this context, Brazil serves as an ideal case study for this investigation. Home to the world's largest Black population outside Africa, along with substantial Indigenous and immigrant communities and pronounced socio-economic disparities, Brazil's demographic diversity, social complexity and digital landscape is unique [11-12]. With over 80% of its population online—predominantly via low-end mobile devices—the country offers a distinct opportunity to analyze how AI intersects with users' multifaceted identity needs and systemic barriers [13].

This study builds on existing literature and offers deeper insights into the nuanced ways in which intersectional identity needs shape digital information journeys. By identifying when and how these factors influence users' experiences with AI, it also provides a comprehensive, user-centered perspective on the AI Divide. Through actionable recommendations, this research supports the development of responsible AI solutions that address users' unique needs while respecting privacy, mitigating bias, and preventing worsening inequalities.

Research Questions

- How and when do intersecting aspects of identity (e.g. race, gender, age, sexual orientation, disability status) and socio-economic factors (e.g. income, education level, employment status, access to technology) shape individual digital information journeys?
- Which aspects of identity and their intersections most significantly shape users' experiences with AI, and how do they relate to their sense of community?
- How do intersecting factors influence the perceived effectiveness of AI tools in addressing information needs?
- What key systemic barriers—including education, device access, and infrastructural limitations—and intersecting aspects of identity most significantly influence AI equity, particularly regarding proficiency, accessibility, and usability?

Objectives

- **Examine the Role of Intersectional Factors in Digital Information Journeys:** Delineate the ways in which intersecting aspects of identity and compounding

socio-economic factors shape individual digital information journeys, particularly in the contexts where these influences are most pronounced.

- **Determine Influential Factors:** Identify which aspects of identity and their intersections most significantly shape users' experiences with AI, and explore their relationship to users' sense of community and digital connectivity.
- **Assess the Perceived Effectiveness of AI Tools:** Evaluate how intersecting aspects of identity and socio-economic factors influence users' perceptions of the effectiveness, relevance, and usability of AI tools in meeting their specific information needs.
- **Identify and Analyze Systemic Barriers to AI Equity:** Investigate key systemic barriers and examine how they intersect with aspects of identity to impact AI literacy, accessibility, and usability.

Methodology

This study employs a **mixed-methods approach**, integrating qualitative and quantitative methods to capture the complexity of digital experiences and AI engagement across diverse demographic groups. A demographic section will be incorporated to collect data on intersecting aspects of identity and socio-economic factors.

- **Understanding Behaviors and Intersectional Influences:** To explore how identities and socio-economic backgrounds shape AI interactions, the study will utilize semi-structured interviews, digital ethnography, and diary studies. These qualitative methods will capture in-depth narratives from a diverse range of participants, providing contextual insights into their AI experiences.
- **Identifying Key Aspects of Identity and Intersections:** A comprehensive survey will be developed and distributed, incorporating validated demographic and socio-economic indicators, along with intent-based use case frameworks for digital information journeys (e.g. productivity, creativity, companionship). Qualitative themes will be compared with statistical findings from the survey to identify convergences and divergences, ensuring the validation of insights.
- **Assessing Perceptions of AI Effectiveness:** The study will evaluate AI tool outputs across different user profiles to identify systematic discrepancies or biases that may affect

perceived effectiveness. Standardized questionnaires will measure user satisfaction, perceived effectiveness, and usability of AI tools. Regression or factor analysis will be applied to quantify the relationship between intersectional factors and user perceptions of AI effectiveness.

- **Analyzing Systemic Barriers to AI Equity:** A comprehensive literature review on systemic barriers to AI equity will be conducted, integrating both quantitative and qualitative research findings to validate patterns and uncover nuanced insights. Specifically, the study will examine whether technical limitations—such as the type and specifications of the devices used to access the internet and AI systems—correlate with actual and perceived performance, user experience, and engagement, along with their relationship with additional influencing factors.

Significance

As AI continues to transform societies, a deeper understanding is essential to ensure its opportunities and benefits are equitably distributed. Despite the abundance of studies covering a wide range of areas related to AI equity, fewer comprehensively examine how intersecting aspects of identity and socio-economic factors shape users' digital information journeys, AI proficiency, usability, and access.

By centering users' experiences and analyzing these intersectional influences, this study contributes to a more nuanced understanding of the AI Divide. Brazil serves as a case study, illustrating the challenges faced in regions with pronounced infrastructural and socio-economic disparities, along with large and diverse populations, while offering transferable lessons for addressing similar issues globally.

Ultimately, this research aims to inform the development of AI systems that are not only more inclusive but also better aligned with the diverse needs of global users, ensuring that AI technologies empower rather than marginalize.

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