

The Complexity of Digital Divide: Recursive Inequality, Structural Consequences, and Social Work Science

Abstract

The historical digital divide has rapidly evolved from a much-debated gap in access to a self-perpetuating system of inequality. While impacting domains such as education, employment, healthcare, and civic participation, the digital exclusion is primarily shaped by structural factors such as economic stratification, algorithmic bias, and global infrastructural disparities (Heeks, 2022). As a result, the nature of recursive feedback loops intensifies social vulnerabilities over time (Byrne & Callaghan, 2014). The emergence of AI-driven decision-making in welfare systems, hiring, and public services is prone to wide-ranging data-driven exclusions adversely impacting populations with limited digital literacy and access (Eubanks, 2018).

Using the complexity science and interdisciplinary framework of analysis, this paper examines how historically contingent but structurally persistent digital inequalities evolve. Furthermore, the paper explores the nonlinear and interdependent nature of digital exclusion. Within this, factors such as poverty, gender disparities, and technological infrastructure are objectified to understand the emergent consequences beyond individual agency or policy intervention (van Dijk, 2020).

This paper expands on how complexity science can be employed in social work science to critically examine unitary focus on access-based solutions (“bridging the gap”). Within social work science, addressing digital exclusion requires a critical shift in the traditional intervention models to more structured, adaptive, multi-level strategies that engage digital literacy, algorithmic accountability, and equitable technology policy. Without such interventions, digital exclusion will become a defining social inequity of the 21st century, with irreversible consequences for marginalized communities.

Keywords: Digital Divide, Complexity Science, Recursive Inequality, AI-Driven Exclusion, Social Work and Technology

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