Engaging with Digital Inequalities Research in the Developing World

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Abstract
The issue of skills and usage inequality in information technology has increasingly become a problem for HCI4D and ICTD. These issues are also being studied by digital inequality researchers, but most of this work has been done outside the context of the developing world. Both fields have had limited interactions and missed opportunities for synergy. We believe that these collaborations should be explored further.

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ACM Classification Keywords
H.5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous

Introduction
Technology research in developmental contexts is a broad and amorphous field. While the exact boundaries of HCI4D and ICTD have consistently changed and are still up for discussion, generally this work has some association with technology and marginalized communities [8]. In that regard, ICTD researchers understand the importance of focusing on the needs of a diverse set of users situated in different social contexts. Despite this diversity, to the authors'

knowledge, HCI4D and ICTD have had only limited engagement with scholarly work on digital inequalities and digital inclusion.

Digital inequalities refers to the field that studies differential engagement with ICTs in and between communities [3,11]. These differences may manifest themselves in access to technology, usage, or skill even amongst existing users. Scholars have proposed theoretical frameworks to explain how these differences are being created and perpetuated. However, work in this domain has been pursued almost entirely outside of the context of development in the global south, and represents a lost opportunity for natural synergy.

This position paper argues that both the digital inequality and ICTD scholarship can benefit from understanding each other's theoretical perspectives. We outline the background and work of digital inequality literature and summarize efforts in HCI4D and ICTD that have also examined inequality. We believe it would be valuable to both sets of researchers to work together on longitudinal studies to co-design, deploy, and study ICTD interventions, and we suggest some areas for future collaboration.

Background of Digital Inequality

Studies of inequality have been an integral component of social science. Within these large communities of inequality studies, smaller groups have been studying the effects of digital technology on society. Organized under various umbrellas like Communication, New Media Studies, and Internet Studies, these interdisciplinary groups of researchers have examined the disparities that exist within various forms of digital engagement [14]. Their concerns have included the means of digital access, the type of information accessed with it, and the socio-economic-cultural context of the users who are accessing this information.

It is difficult to summarize digital inequality literature in a few paragraphs. Larger works, such as that written by Hargittai and Hsieh [6], provide a more comprehensive review of digital inequality. During the 1990s and early 2000s, the emphasis of digital inequality scholars was around the physical access and diffusion of ICTs, or the first-level of digital divide. Specifically, researchers pointed to how socioeconomic and demographic differences manifested themselves in "haves" and "have-nots" groups in regards to information technology [3,18]. However, others have pointed out that an access-based narrative leads to deterministic technology solutions [11].

In the past decade, a second-level of digital inequality research has looked at differentiation in ICT skills and usage. There is a growing body of work that has studied how differences between social factors in varying demographics change technology usage and behavior and how effectively users can find and retrieve information. These researchers critique the assumption that digital skills can be learnt through purely informal self-education [4,13]. Others have pointed out how digital inequalities, whether in the form of access to technology, skills, usage, or simply self-perceptions, continue to be strongly related to traditional forms of inequality and often have the effect of reinforcing inequalities outside of the digital context [6,14]. To quantify skill-based inequalities, some researchers are developing theoretically informed survey instruments to measure internet skills [9,17] while others have explored perspectives such as appropriation of

technology [11] towards the goal of enabling digital inclusion.

Existing Overlaps with HCI4D and ICTD

Given that HCI4D and ICTD themselves are highly interdisciplinary fields, there has been past overlap with digital inequality literature. One of the earliest overlaps was around the limited deployment of ICTs in disadvantaged communities without addressing the overall issue of access [5,18]. Others have studied the gaps in existing social, human, and technical infrastructures [1,10,19]. More generally, building tech literacy through formal and informal education has been a longstanding area of interest for ICTD researchers [5,8]. Some researchers have also noted that providing technology access alone tends to amplify underlying inequalities [15]. But there has been only limited engagement with findings and theoretical frameworks from digital inequalities scholarship.

Probably one of the reasons for this gap is geography. While the digital inequalities research has been primarily situated in the global north, HCI4D and ICTD have focused almost exclusively on the global south [8]. These fields have not defined themselves intrinsically in terms of geography, but they have been spatially separated by the nature of their topics. Not only is the underlying socioeconomic and cultural contexts of these geographies different, but for a long time, ICTD researchers were still dealing with access issues, or the first-level of digital divide.

But even though the research might be situated at opposite ends of the world, some works share common methodological attitudes. The closest overlaps have come from the anthropological accounts of technology diffusion in various countries [10,12,15] and the recent emergence of topics such as privacy and repair [7]. Similar to digital inequality research, these accounts have studied human and social factors around ICT usage, and proposed theoretical frameworks to help think about the underlying phenomena. Moreover, the increasing proliferation of mobile phones is bringing the Next Billion to the digital world, making access alone a less pressing issue. The second-level concerns of digital inequalities around skills and usage are increasingly being shared by ICTD researchers [8].

Potential for New Synergies

Digital inequalities scholars have extensively studied factors that perpetuate the technology skills gap. One of the theoretical orientations proposed is that of informational advantage [13]. It explores the relationship between a user's prior exposure to online and offline informational resources and their current information seeking practices. While the original work was situated in the context of schoolwork and college planning by economically disadvantaged high school students in the US, it is an important concern for ICTD researchers.

One potential area of collaboration includes research aimed at understanding how informational advantage and disadvantage manifests itself in the context of the global south. In developing contexts, the contributing factors of informational advantage may be significantly different, as access to offline materials, such as newspapers, magazines, and libraries, may be severely limited. People may rely on alternative sources of information, and the networks of support that individuals have for obtaining guidance in information seeking may be limited.

Another area of collaboration could be on the design of quantitative instruments for the measurement of digital skills. One approach would be to look at existing standards like Internet Skills Scale [17] and evaluate its relevance for the global south. Given that skills are often context-sensitive, it would be important to redesign them for the specific socioeconomic and cultural context. These standards could also become the baseline for developing country and context-specific mobile information literacy curriculum [2].

While digital inequalities research provides theoretical frameworks that are useful to think about ICTD work, the former is also a rich repository of longitudinal studies that offer detailed accounts of users' interaction with technology [4,13]. HCI4D researchers are increasingly using ethnographic inquiry to inform their designs. It is not so far-fetched to consider joint digital inequalities and ICTD field sites as a potential source of collaboration and resource-sharing.

Finally, ICTD and digital inequalities researchers have an opportunity to reimagine and redesign telecenters and community multimedia centers that serve as access points to ICT in developing contexts [11]. Applying networks of support and other concepts from the field of digital inequality may allow us to design and implement telecenters that are inclusive, where users are not just consumers of top-down information, but also producers and participants in the digital world.

Summary

In summary, both ICTD and digital inequality have addressed similar problems in very different contexts. For digital inequality, ICTD's focus on emerging users provides an opportunity to test and further develop theories in new contexts. For ICTD, digital inequalities' theoretical background and experience provides a framework to consider and address a skills and usage problem that is becoming increasingly relevant in the global south. We believe that these mutual opportunities should be explored in collaborative research.

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