The Rural Information Penalty

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Abstract. This paper articulates the concept of rural information penalty, or the accumulation of rural disadvantages that lead to lower quality of information, disparate understandings of information, and increased barriers to information for rural people. Drawing inspiration from rural public health and economic development literature, I bring together research from information studies and human-computer interaction to build a framework for understanding the rural information penalty.

Keywords: Digital divide · Geography · Rural computing · Rural penalty

1 Introduction

There is an accumulation of rural disadvantages that greatly impact the use of information. These disadvantages, which range from infrastructural to cultural, lead to lower quality of information and increased barriers to information for rural people, especially when it comes to digital information and the use of information and communication technologies (ICTs). It is the goal of this paper to articulate the disadvantages in the form of what I am calling the *rural information penalty*. Drawing inspiration from rural health literature and the idea of the "rural mortality penalty," as well as the "rural penalty" in economic development literature, I bring together research from information studies and human-computer interaction to build up a framework for understanding the rural information penalty, and identify a path forward for better understanding its impact through empirical and theoretical research.[1]

This is not the first paper to consider the role of rurality on information. Prior work documents the importance of Internet infrastructure in rural communities and how different infrastructures result in different experiences of information [3, 6], as well as the place of libraries and other local institutions as key components of information infrastructure [38]. Geography, both urban and rural, plays an important role in information access. For example, prior research shows how access to health information is mediated by resource scarcity (e.g., limited health providers) as a result of location in rural communities [41]. Recent research by Lee and Butler on information deserts [22] foregrounds the role of materiality of information, meaning information's material form and

[1] I do not define rurality in this paper due to the complexity and diverging definitions of what rural means depending on geographic context. For further discussion of rurality in the computing context see [17].

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structure in physical communities, to understand how information is fragmented and spread across space and time, negatively impacting information access in communities without diverse and centralized models of information access. Further, while there's little to no foundational research to my knowledge on the impact of rurality on information literacy, prior research encourages an understanding of information literacy as socially enabled rather than purely mediated by information sources [16, 24]. Bringing the above together, we can see the impact of place on information, as well as the mediating role of material, infrastructural, and social forms on information access and literacy.

While these topics are indeed important, the goal of this short paper is to step back from the specifics of topics like information access, digital infrastructure, and information literacy to take in a birds-eye view of what contributes to a much broader and more complex rural information penalty. While the digital divide literature has evolved greatly since the 1990s to understand that digital access isn't merely about Internet access, but has to deal with a host of issues related to technology access and maintenance [12], there is still a need to understand what penalties or barriers exist in the rural context beyond basic access and maintenance. Further, previous research on information poverty in rural places [13, 40] shows what happens when information is simply not available, or is available but the skills or ability to navigate it are inadequate. The framing of the rural information penalty focuses on when the information exists, but there are compounded barriers and material realities (borrowing from [22]) that impede information quality and understanding. The rural information penalty that I put forward here is indeed exacerbated by a digital divide, though one that is multimodal, both infrastructural and cultural. In other words, the rural information penalty is a cultural process as much as it is a process of understanding access to information via Internet and information institutions. This project reframes this conversation as one of a penalty, rather than a divide or poverty, to understand how different kinds of digital access and literacies, embedded in economic, geographic, and cultural contexts, result in different understandings of information.[2]

2 The Rural Information Penalty

The rural information penalty is *the accumulation of rural disadvantages that lead to lower quality of information, disparate understanding of information, and increased barriers to information for rural people*, especially when it comes to digital information and the use of information and communication technologies (ICTs). In this section I give a brief overview of the inspiration for this concept and then present a series of disadvantages coming out of research in information studies and human-computer interaction that contribute to the formation of the penalty.

The rural information penalty is inspired by the concept of the rural mortality penalty out of public health and the rural penalty from economic development literature. The

[2] I focus primarily on the American context in this paper. This is not to say that the rural information penalty is not a useful tool for understanding other international contexts, but merely to acknowledge that, as presented here, it reflects a particular geography and perspective. To utilize this concept outside of the American context, researchers should first seek a broader understanding of what rurality means in their particular context.

rural mortality penalty is the term given to the divergence of metropolitan versus non-metropolitan death rates starting in the mid-1980s [7, 8], with metropolitan areas seeing larger overall declines in heart disease and cancer death rates [9]. This rural mortality penalty is further exacerbated by type of rural area, race, poverty, access to medical care, and other factors [7, 19, 20]. The rural penalty is a term used in rural development literature to articulate the impact that low population density and distance to markets, information, and labor have on the economic development of rural communities [25]. Drawing from earlier theoretical work in rural development on the impact of remoteness on rural economies [18], Edward Malecki uses the rural penalty to explain the urban-rural digital divide and why broader efforts for digital infrastructure development continually trail behind that of urban areas [25]. Taken together, this research allows us to sense how "penalty" might be a helpful way to understand the impact rural geography has on information.

In what follows, I draw out a handful of influences that make up the rural information penalty. These influences are not meant to be exhaustive or totalizing, but are merely a first step towards conceptualizing and drawing out the disadvantages (and their relationships) that accumulate into the rural information penalty. These include: infrastructure, information institutions, information literacy, technology access and maintenance, population density, values and networks, and perceived outsider status.

2.1 Infrastructure

Infrastructure is a classic concern in information studies, especially with respect to Internet infrastructure. There have been decades of research on the digital divides between urban and rural communities that come as a result of lack of Internet infrastructure [e.g., 6, 44] and its compounding and cascading effects [36]. Beyond telecommunications infrastructure, rural communities in the United States face other infrastructural gaps, such as lack of access to public transportation [37], which contribute to additional barriers to accessing geographically diverse information sources and/or accessing local and regional institutions (e.g., libraries) that may offer more opportunities for information access and literacy.

2.2 Information Institutions

What I am calling "information institutions" are the place-based institutions such as libraries, museums, newspapers, colleges, and governmental entities (e.g., public health departments) that serve as key local information nodes in their locality. For example, prior research shows the importance of libraries in rural communities for accessing diverse information sources [27, 28, 39]. Information institutions writ large are essential *local* institutions that interface with everyday people in various information transactions. While information institutions might have easier access to individuals in rural areas, given lower population densities, that does not necessarily mean engagement and trust in information institutions. For example, prior research from the Pew Center found that library non-users were disproportionately located in rural areas [32]. Further, a decline in trust of governmental institutions in rural areas [4] means that information from those organizations is more likely to be viewed with distrust (something that has

been increasingly clear during the COVID-19 pandemic). Lastly, the collapse of local journalism since the 1990s in the United States has hit rural communities particularly hard, resulting in vast rural news deserts throughout the country [1].

2.3 Information Literacy

Information literacy is broadly the process through which people access, make sense of, and internalize information sources. While there is little research specifically on the impact of rurality on information literacy [16], prior research in library and information science argues that contextual factors, such as culture, are key to understanding an individual's information literacy [23, 24, 29]. Though, information literacy has largely been relegated to official information institutions rather than cultural environments [16]. Information literacy, both as the end goal of literacy and the *process* of gaining literacy about a specific type of information, is negatively impacted by rurality through much of what is discussed above. With fewer information institutions, increased distrust in information sources, and lower access to information through libraries or the Internet, people living in rural areas have a much more complex task of gaining information literacy. For example, prior research on information literacy related to identity-based information for rural LGBTQ people found that rurality was a key mediator for understanding generational differences in information literacy [16]. While I am framing rurality as a key component of the information penalty, there are likely other ways that rurality improves information literacy in other topics. For example, given the unique relationship to land that rural people have, there is likely an increased information literacy in areas such as agriculture, gardening, hunting, and other related topics.

2.4 Technology Access and Maintenance

Technology access and the resulting maintenance of technology is a key component to understanding the rural information penalty. In the United States, rural areas have had consistently lower rates of home broadband adoption and smartphone, tablet, and computer ownership compared to urban and suburban areas [42]. When technology access is achieved, maintenance adds further complexity to rural people's ability to access information. As Amy Gonzales argues, low-income technology users often struggle with what she calls "dependable instability," or the normalization of disconnection or disruption in the ability to access the Internet [12]. Given the higher proportion of low-income people in rural areas compared to urban and suburban areas of the United States [21], in addition to the distinct difference in Internet infrastructure and access between urban and rural areas, it is safe to assume that technology maintenance is a more pronounced issue in rural areas.

2.5 Population Density

Population density and size are key to understanding and are the most frequently cited indicators of rurality in official definitions [17]. Population density is particularly important in understanding the rural information penalty because it is a broader determinant

of other information penalties. For example, internet infrastructure development and internet service providers have historically benefited urban areas because more paying customers means more money for their business. Low population density in combination with long distances between places makes developing infrastructure much more expensive, and therefore unsustainable unless subsidized by state and federal governments (the major way that these infrastructures have been funded).

2.6 Values and Networks

The localization of values and trust are important aspects of rural society [14], but can often lead to distrust of outsiders, such as immigrants [33] or government officials [4, 10]. While a universal set of rural values does not exist [30], rural Americans view themselves as being more "neighborly" than urban Americans [43], and tend to be more religious [5]. Tight-knit communities are often seen as a defining feature of rural areas [15]. In fact, the density of social networks is higher in rural areas than in urban communities, with rural people more likely to have family and local ties in their social networks than urban people [11, 26, 34]. This means that rural networks are likely less diverse, and therefore more susceptible to filter bubbles in accessing information [31]. This is particularly important regarding our current understandings of the role that networks play in perpetuating misinformation [28]. Taken together we can see that values and networks can be both positive and negative influences on information access and quality. In some ways, information might flow more quickly, but in the post-truth age of COVID-denialism, we can also see how values and networks greatly influence and penalize a broader information ecosystem through its homogeneity, allowing less diverse and fewer authoritative sources of information gain the most trust.

2.7 Perceived Outsider Status

The final component of the rural information penalty I'd like to discuss is what I'm calling perceived outsider status. This disadvantage is an amalgamation of other disadvantages (e.g., values) alongside an understanding of the increased political and economic polarization between rural and urban communities in America. Katherine Cramer's *Politics of Resentment* looked at the rural-urban political divide in Wisconsin that led to the rise of ultra-conservative Governor Scott Walker and later President Trump [10]. What she found was an intense sense of distrust of political outsiders in rural communities, particularly those politicians from state or federal levels that were perceived as being out of touch with rural communities and therefore outsiders and fundamentally unable to serve rural places effectively. This was especially the case when it came to purported values and the allocation of resources between urban and rural areas. This distrust, while reflecting complex and sometimes false perceptions of disparities (e.g., in many cases rural areas actually receive a higher per capita proportion of state funds), resulted nonetheless in perpetuating the lived experience of the urban-rural divide from both sides of the geographic spectrum. Further work from Jennifer Sherman and others on the growth of amenity-based tourism in rural communities [35, 45] also demonstrates how rural communities can often get the real feeling that they are merely there to serve urban outsiders. This perpetuates a sense of regional and political divide while rural

communities across the United States continue to lag behind urban communities more than a decade after the Great Recession [2]. The consequences of this perceived outsider status are likely impactful for not only the trust of information that originates from urban communities, but also reinforces filter bubbles and perpetuates an embrace of certain types of misinformation.

3 Conclusion and Future Work

What I have summarized here is a first look at what I am calling the *rural information penalty*, or the accumulation of rural disadvantages that lead to lower quality of information, disparate understanding of information, and increased barriers to information for rural people. The rural information penalty forefronts the role of geography in understanding the accumulative sociotechnical aspects of American rural areas that impact information. In doing so, I go beyond the comparative approach of the digital divide and offer a different and potentially more complex framework than information poverty, one that centers knowledge and perspectives from rural studies, development, and public health.

What is proposed here is merely that, a proposal for understanding the creation, transmission, storage, and use of information and how those processes are impacted by rurality. What is have outlined is not meant to be a totalizing or complete framing of the rural information penalty, merely the disadvantages that are at the forefront of contemporary information studies and human-computer interaction research when it comes to the intersection of rurality and technology. In particular, there are some notable elements that are missing including: the economic impacts of ICTs in rural communities; education deserts and the different types of education valued in rural places; and the role of identity and culture in the rural information penalty. Further, as characterized the information penalty is inherently negative. There is likely an inverse opportunity to highlight, as I did in my section on information literacy, the positive traits of rural places that lead to information advantages.

In addition to working to understand all of the disadvantages that accumulate to make up the rural information penalty, future work should also take an empirical approach to understanding the rural information penalty. How might we utilize measurements of information literacy, access to information institutions and technology, and the role of local values and the social capital, among other things, to generate a better understanding of how the rural information penalty changes across geography or which disadvantages impact it the most? The rural information penalty, as a framework, is also likely well situated for helping us understand the increasing role of ICTs in rural society and the expectations of connection that are imposed upon people, no matter their geography.

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