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Abstract: Collecting relevant and appropriate data when conducting research in the Global South and other resource-constrained environments can be challenging. This is particularly true when the researcher originates from a different country and has different social, cultural, and political beliefs to the research participants. Data collection in such contexts can be challenging for a variety of ethical, philosophical, theoretical, and methodological reasons which may arise resulting from the use of research approaches designed in the Global North. There are also many practical and infrastructural issues which may be relevant in resource-constrained countries. This paper provides examples of challenges encountered by the authors in a variety of ongoing research projects in the Global South. We propose approaches to address the identified challenges, and we conclude by calling for additional work on this important topic.

Keywords: Data collection, methodology, Global South, ethics

1. Introduction

This paper presents early-stage work which results from an examination of the philosophical, methodological, ethical, and practical challenges associated with data collection in various different social, cultural and political contexts in the Global South and other resource-constrained contexts. The paper has been motivated by the authors' ongoing research on projects in Malawi, Bangladesh, India, Sierra Leone and various other countries throughout Europe and across the world. We start by proposing that there is no one universal methodology or practical approach which is appropriate for data collection in all contexts. This has been further highlighted by the COVID-19 global pandemic which has seen much data being collected remotely online or by local research assistants. The research gap identified in this paper arises from both a lack of literature on this topic and from the work of the authors who have experienced these data collection challenges personally in many countries over many years. The aim of this paper is to highlight these issues and to act as a catalyst to promote this conversation within the broader Global Development and technology for development (ICT4D) communities.

2. Literature Review

According to the World Economic Forum, as of 2020 world data is expected to reach approximately 44 zettabytes, with that number doubling every 2 to 3 years¹. However, data production and collection is unequal across the planet, and the global data landscape remains heavily concentrated on English-speaking, urban, and relatively prosperous locations within the Global North. This may be because of the particular difficulties associated with data collection in resource-constrained contexts in the Global South where a variety of different ethical, social, cultural and political contexts are highly likely to apply.

This literature review is divided into two main sections. We begin by examining the body of literature which looks at practical and methodological challenges associated with data collection and methodology in the Global South. We then conclude with a review of the body of work concerning Southern-based Theory and an examination of whether this is relevant to data collection and methodology in the Global South.

2.1 Practical and Methodological Challenges Associated with Data Collection

Our work has highlighted a huge dearth of literature on practical and methodological challenges of data collection in the Global South. Among those writing about this topic include Shatz (2015), Asher (2010), and Roberts (2020). These authors warn of the difficulties of collecting data in such environments, with Asher (2010) highlighting that such data collection is not for the faint of heart or weak of stomach. Others have written more about challenges to data collection in specific fields, for example Ismail (2018) writes about data collection in community health, while Louis-Charles (2020) discusses ethical considerations for post-disaster fieldwork in the Caribbean. In addition, there exists a body of work which proposed solutions to the many and varied challenges identified. One such study is by Young et al. (2021) which features the potential power of crowdsourcing as a tool for knowledge production in the Global South. The authors point out that the success of such a crowdsourcing approach should focus on topics of high interest to the global development community as opposed to more traditional topics which may be of interest to a Global North audience.

2.2 Southern-Based Theory

We also completed an examination of the body of literature examining philosophical and theoretical approaches to conducting research in the Global South. This body of work is far more extensive and includes the work of Frantz Fanon (1961) who originally came up with the idea of 'Southern Theory' which Connell (2014) defines as a social thought from the societies of the Global South which does not necessarily have to be about the Global South (Connell, 2014). The notion of Southern Theory was further developed by Connell (2007), Jean and John Comaroff (2012) and de Sousa Santos (2014) who all highlighted the possibilities of a different way to view theory in a Southern (or Global South) context. These studies fit in Avgerou's theoretical dimension for ICT4D, namely a foundational theory that problematizes 'development' (Avgerou, 2016).

The main difference between theories in the Global North and Southern-based theories according to Connell (2014) is concerned with colonial attitudes where various notions of progress are in the material culture. Southern-based theories are less concerned with such progress and represent the concerns of a rural, village-centred world-view. The concept of theory for Connell (2014) is not any specific theory, but to a spectrum of social thought with a range of different theories. This is further developed by Kreps & Bass (2019) who discusses Southern theory in data collection. In the light of Southern theories they propose a specific focus on appropriate research questions and the data which is required for support. The emphasis should be on whether or not ICT4D researchers follow the same data quality requirements when collecting data in the Global South. Furthermore, do they conduct research with or along local researchers, and if so, how do they choose and collect data to answer research questions that align ethical, social, cultural and political perspectives and contexts in the Global South? These are highly relevant questions which should be carefully considered when designing research to be conducted in the Global South.

3. Case Descriptions

The authors have been involved with research in the Global South over many years and are currently involved with a variety of research projects based in Bangladesh, Malawi, Sierra Leone and other parts of the world. This section provides some detail on these projects and the associated data collection challenges which have been encountered.

3.1 Bangladesh

The research in Bangladesh involves a project called Mobility Aid which is financed by a humanitarian grant from Grand Challenges Canada. This project focuses on the needs of persons with physical disabilities that can be ameliorated with alteration to canes or crutches. In September 2021 one of the investigators for the Mobility Aid project travelled to Cox's Bazar, Bangladesh to conduct interviews with Rohingya refugees with physical disabilities. These interviews were conducted with the assistance of Young Power in Social Action NGO over a period of three weeks. Fourteen Rohingya refugees were asked questions about the origin of their disability, barriers, and challenges related to their

¹ <https://www.weforum.org/agenda/2019/04/how-much-data-is-generated-each-day-cf4bddf29f/>

disability, and ways in which they adapt to compensate for physical disability, and disability-related discrimination. In addition, for the purpose of gait analysis, multiple videos were obtained using simple mobile phone cameras from six participants who walked three times each. The cameras were positioned to provide a stereoscopic view of the participant's walking with crutches, with one camera recording the side view of the walk and the second camera, at 90 degrees to the first camera, recording the participant from the front view. The two cameras were calibrated using a large checkerboard pattern to obtain the stereoscopic transformation matrix, which was used to obtain the 3D position data of an object in the covered area.

3.2 Malawi

An ongoing research project based in the Dzaleka refugee camp in Malawi investigates the role of technology in enabling refugee entrepreneurial activity. Drawing on 25 structured interviews with refugee entrepreneurs, the multilevel and multidimensional nature of refugee entrepreneurship was examined in an attempt to explore the challenges refugee entrepreneurs face. Dzaleka refugee camp is located in Dowa District approximately 45 km from Lilongwe, the capital city of Malawi. The camp houses refugees from different countries such as the Democratic Republic of Congo, Burundi, Rwanda, Somalia, and Ethiopia. Dzaleka refugee camp can thus be seen as a large and multicultural African community as the refugees brought their own cultures and norms with them from their native countries.

Interviews were conducted on a face-to-face basis by a local research assistant who is also a refugee in the camp and has resided there since January 2015. The research assistant was a student at the Global Education Movement (GEM) that provides access to online degrees to refugee learners, an initiative by the Southern New Hampshire University (SNHU). The research assistant speaks multiple languages and was trained by the SNHU faculty to conduct qualitative research. The interviews were conducted in French, English, Kinyarwanda, Kirundi, and Kiswahili which are all native languages of the camp residents. Engaging with a native of the camp and conducting the interviews in the native language helped in keeping the natural atmosphere and ensured the interpretive validity of the research.

3.3 Sierra Leone

The ongoing research project in the Bonthe District of southern Sierra Leone involves the design, implementation and scaling of a mobile health (mHealth) initiative. Extensive field work and data collection commenced in 2015 and continues to take place throughout 2022 with many researchers collecting data from a variety of stakeholders including community health workers, mHealth project team members, NGOs involved with the project and Government officials from the Ministry of Health and Sanitation in Sierra Leone. Various challenges arose during data collection including Africa's biggest cholera outbreak in 2012 with 22,885 reported cases and 298 confirmed deaths (WHO 2013), a landslide in Freetown in 2017 which killed 1,141 people and left more than 3,000 homeless (World Bank 2017), and four major floods in the last 15 years which have affected over 220,000 people and caused severe economic damage (World Bank 2017). In addition, the most widespread Ebola virus outbreak in history occurred in West Africa between May 2014 and March 2016 affecting Guinea, Liberia and Sierra Leone. According to the World Health Organization (2016) the total death toll in Sierra Leone was 3,955 with 11,308 deaths in total attributed to Ebola across the affected countries in West Africa.

3.3 AI Ethics in the Global South

This research project commenced in 2020 and examines Artificial Intelligence (AI) ethics and AI ethical standards in the Global South. The research is inspired by huge interest and growth in technology and AI, is an increasing corresponding discourse on AI governance and ethics, leading to a proliferation of documentation, including policies, strategies and frameworks from a variety of different agencies. Detailing approaches and plans for dealing with the impact of AI in various sectors and fields, such documents articulate the many social, legal, ethical and policy implications of autonomous and intelligent systems. As of January 2022, more than 500 documents related to AI from a range of sources have been produced (Fjeld et al., 2020; Jobin et al., 2019; Schiff et al., 2021). Analysis of a corpus of largely 'grey literature' found blind spots in the literature regarding both representation from the Global South and women (Roche et al., 2021). A review of the role of underrepresented groups in the broader AI discourse reveals voices from the Global South and consideration of marginalised populations are largely absent from the conversation, with this suggesting careful consideration should be given to the context in which research is conducted.

The proposed ethical frameworks and governance models are also reflective of power structures within the society in which they are developed. As technology is "*ultimately influenced by the people who build it and the data that feeds it*" (Chowdhury & Mulani, 2018), it is influenced by the cultural and social context. Similarly, any ethical frames of reference are situated in their context, meaning there is a risk of ethnocentrism. It cannot be assumed that ethical guidelines developed and accepted in a Global North context can be applied directly in any other environment. As noted earlier, there are particular challenges in collecting data in resource-constrained environments which can further enhance the dominance of Western or Northern research paradigms. Ownership of data in these environments is also a difficulty with power shifting from traditional development actors to corporations and public-private partnerships. While Kwet (2019) characterised United States (US) dominance of the digital ecosystem in many African countries as an insidious form of "*digital colonialism*", Taylor and Broeders (2015) observed how datafication is affecting power dynamics in the Global South. Concerned at the growth in data collection and processing by large corporations in these countries, they identify the risk of development interventions becoming a by-product of "*informational capitalism*". Within this

context, it is therefore imperative that consideration is given to not only the power structures at play but the ethical framework guiding the sourcing and collection of data and the methodology underpinning the research approach adopted.

4. Specific Challenges Associated with Data Collection in the Global South

As mentioned, the primary motivation for this paper is the authors' personal experiences of a wide variety of practical difficulties associated with collecting data in the Global South and the dearth of literature on this topic. Personal experiences in the aforementioned research projects have shown that it is both challenging and extremely ambitious for a researcher from the Global North to attempt any level of understanding of the social, cultural, political and ethical nuances at play in these research projects in any significantly way. Research in such contexts and settings is highly likely to involve multiple interactions of ethical, structural, cultural, agential, political, social and technological factors which the researcher may not fully understand and have little experience of. The task at hand is made even more difficult when the researcher comes from a significantly different social and cultural background and the research site is located thousands of kilometres away from the researcher's home and place of work. The following sub-sections discuss these ethical, philosophical, social, cultural, and practical challenges in more detail.

4.1 Finding and Accessing a Suitable Research Project

Those of us interested in conducting research in the Global South are likely to find it difficult to negotiate access to a suitable project at a stage where research is appropriate or even possible. There are currently many research projects at various stages of completion around the world, but these projects may not be suitable as research sites for a variety of reasons including: the project may be too small, the project may be at an inappropriate stage of development, the project is already the subject of research from other researchers and institutions, or the project may be based in a country that is not possible to access as a result of global politics, bureaucracy, war or disease epidemic. Additionally, many such projects in the Global South do not allow access to external researchers for many reasons including the disruption the researcher might potentially cause, the additional costs the project implementer may have to incur, or the additional resources that may need to be deployed or redeployed when the research visits the research site.

A further practical difficulty associated with research based in the Global South is the likelihood that there will be a significant amount of additional work involved for the researcher. This includes the work needed to establish the various networks and collaborations required to carry out the research. This task is made more challenging as many of these collaborations may be extensive and geographically dispersed. In particular, NGOs may require extensive information about the nature of the research and the research frameworks to be used, as well as the research questions and research methodologies to be applied. They may also require details of how specifically the research would be disseminated across partner NGOs and academic networks, and how the research would be fed back to their people at community level in the field.

4.2 Poor Infrastructure and Difficulty of Travel

A number of practical and infrastructural issues in terms of accessing research participants are also likely to exist when researching in the Global South. Normally researchers from the Global North do not face significant difficulty getting a tourist visa, but getting a research-specific visa may be troublesome requiring various documentation and delayed approval processes (Musasa, 2021). Moreover, if the research is funded by a time-critical grant, such delay may be costly in terms of fund utilisation. Once a visa is secured, poor infrastructure and difficulty of travel may pose challenges in some resource-poor countries. Issues such as water purity, food quality, and disease may pose a significant health risk to the researcher. Researchers working in Europe and North America have the opportunity to avail of public transport, power and light, security, and are somewhat assured of their own personal safety. Research in the Global South may be far more challenging when the researcher does not have a source of electricity to power their laptop or a source of light to write notes by. Other practical challenges include the difficulty of travel to the research sites, the vast size and unequal travel infrastructure, and possible communication difficulties. In addition, there may be frequent obstructions on the roads such as fallen trees and floods.

4.3 Remotely Managing Field Research Staff

An alternative to problems highlighted in the previous section might involve hiring a local research assistants or a research team based in country. Hiring such local resources could be beneficial since not only do they possess contextual knowledge, they may also increase the interpretive validity of the study by conducting interviews in the local language (Maxwell, 2012). However, this comes with its own challenges. Firstly, it may be difficult to find research assistants with the appropriate level of skills required to assist with research at a satisfactory level. Any research assistant is required to have a good working knowledge of research practices and principles. In addition, they will be required to have good computer skills and an excellent knowledge of both English and various local languages and dialects. Some project-specific requirements may also be critical. For instance, the Bangladeshi project (Vairis et al., 2020) required the hiring of a local technically competent person who could operate a 3D printer.

Once a good research assistant is found, the data collection protocol would need to be clearly defined and to be clearly explained to the research assistant(s). While this ensures that consistent data is collected from all participants, it also runs the risk of missing on any important insights due to a lack of flexibility. For instance, in the Malawi project there seemed to be a strong gender dimension in refugee entrepreneurship (Brown et al., 2022) which could not be investigated further simply because gender-related aspects were not part of the original data collection protocol. There is also the issue of their positionality (Turner, 2010) in terms of how much of their interpretation is incorporated (or otherwise) in the data collection and analysis process.

Despite this however, there are also possible practical issues when hiring research assistants. In some cases, it may be difficult to hire research assistant due to visa regimes. In the Sierra Leone, Malawi and Bangladesh cases the research assistants could be only hired and paid unofficially via researchers' own funds. Moreover, the fund transfers often proved to be problematic since out of all researchers, fund transfer mechanisms of only one researcher allowed transfer to Malawi. Such administrative process are complex and frequently require time and creative solutions. Money transfers eventually succeed but there are still monetary losses because of currency exchanges and bank fees. Even when such hiring and compensation mechanisms are resolved, there still may be problems in working remotely with research field staff. Remote meetings depend on internet availability and bandwidth, therefore, audio and particularly video calls are often impossible. Furthermore, time zones require different team members to work unsocial hours, sometimes late into the night or very early morning.

4.4 Social and Cultural Challenges that come with Working the Global South

Perhaps most important are the social, cultural, and political challenges that come with working in the Global South. Any researcher coming from an individualistic culture may find it difficult to frame the norms and practises in collectivist culture. For instance, as opposed to an individual reading the consent form and recording their consent, a participant from a collectivist culture may wish to discuss it with their peer groups of family (Roberts et al., 2017). The cultural difference may also reflect in the attribution for success or failure. Participants from collectivist cultures may attribute success more to a charismatic leader (Pillai, 1995) whereas failure will be considered to be due to a lack of group effort (Yan and Hunt, 2005).

Another issue may be in terms of recording the data being collected. Our own experience suggests that the participants from the Global North are not averse to their interviews being recorded, given all the relevant protocols of informed consents are being communicated with the participating individuals transparently. In other parts of the world, we found the concept of informed consents to be considered as strange and inappropriate. In many cases, there is the existence of mistrust towards what are perceived as outsiders due to previous negative experiences with research. Often, the respondents in Global South countries or any vulnerable population within any country in the Global North are hesitant to get their responses recorded due to possible repercussions from the authorities or anyone who is perceived as superior or in a position of power. For instance, we have experience of a research project in India (not described in this paper) where the participants did not wish to be recorded so that the recording could not be 'used against them', not necessarily by the researcher but by anyone else who gets access to those recordings. Similarly, in our research in Malawi participants were concerned about informing us of the circumstances that led to them being in the refugee camp for the fear that their governments may find out about their whereabouts based on the information provided as part of the research project. This may be why some countries restrict data collection on what they perceive to be sensitive topics or with sensitive groups. In such cases, the researcher simply loses access to such vulnerable groups, such as Rohingyas in Myanmar or Uyghurs in China.

4.5 Research Rigour and Ethical Challenges

In many cases, research entities from the Global North may have unrealistic and disconnected research standards which are assumed to be followed irrespective of the geolocations and socio-cultural-political-economic realities in the ground in other parts of the world. For example, the Rohingyas from Myanmar maintain a rich oral history tradition due to the absence of the official alphabets for their language. Hence, whenever a Rohingya researcher has tried to publish about the plights of her/his people in any western research venue using English or any other accepted western language, her/his sources were considered to be not trustworthy or rigorous enough. Similarly, while we were working with the Rohingyas, our research team from different Global North universities had to depend to multi-level translations and data collection process (English to Bengali in the written format, then Bengali to Rohingya in the verbal format). Such complex processes meant the risk of losing valuable information between several translated iterations.

Also of relevance is the requirement to obtain ethical university from the University and many other bodies such as the NGO, the Ministry of Health and partner universities in the host country in the Global South. This is made complex as many countries have widely different requirements, for example some are regulating medical research while others have strict requirements to be applied where data is to be collected from individuals at community level. Also, privacy protection requirements across countries are often different and diverse, and in some cases are in conflict with each other. This is all further complicated by research funding entities who have their own requirements regarding ethical approval and rules for such things as compensation to researchers in another country. Conducting the fieldwork on the ground also raises ethical questions in terms of the health and safety of the research assistants.

4.6 'Black Swan' Events

Even fieldwork is meticulously and carefully planned, some black swan events may provide significant obstacles and cause significant delay to the work. A good example of this is the Sierra Leone mHealth project which was severely interrupted by the Ebola virus epidemic which occurred in West Africa between May 2014 and March 2016. Travel to Sierra Leone was severely restricted during that time, and researcher's university would not approve research trips to any part of West Africa affected by Ebola. It was also extremely difficult to contact any of the people involved in the mHealth project as communications were poorer than normal and many key staff were redeployed to work on Ebola projects and were thus unavailable and difficult to contact. The ongoing Covid-19 pandemic was another black swan event that significantly restricted data collection for both the Malawi and Bangladesh projects. This was not just in terms of data collection by the lead researchers, but also by local research assistants due to health risks and government restrictions. Beyond epidemics and pandemics, socio-political conditions may also be of relevance when planning and conducting fieldwork. This includes political unrest, elections and changes of government. There are also likely to be institutional rules from each university which may prohibit travel to what are perceived to be dangerous or unstable countries, for instance currently Ukraine, Palestine, Afghanistan, Syria and South Sudan.

6. Discussion and Conclusions

As we have discussed in the previous sections, the six authors involved with this paper have significant experience of data collection in the Global South with previous sections of the paper outlining the many and significant challenges we have experienced when conducting research in this context. Our experiences may serve to make any researcher aspiring to work in such contexts fearful and reluctant! Despite the challenges associated with data collection outlined in this paper however, we suggest that it is very rewarding to carry out research in resource-constrained environments in the Global South with different social, cultural, political and ethical contexts. This is particularly relevant when the research being carried out has the potential to directly improve and enhance the lives of the local population and thus is likely to help many of the poorest and most disadvantaged people on the planet.

Our objective with this early-stage paper is to describe our experiences in the field in order to highlight these data collection issues. The purpose of this work is not to provide a significant contribution to either theory or practice, but instead we propose to act as a catalyst to promote this conversation amongst researchers from the various disciplines working in such situations. We note that this research-in-progress is not specific to the ICT4D community, but we do see this work as having specific relevance to this community for many reasons and we suggest that future iterations of this work will have the potential to make a significant contribution to the ICT4D field. Thus, we call on researchers and practitioners to further develop and expand this initial work in significant and creative ways in order to make a contribution to both theory and practice. Any such iteration of this work is highly likely to encourage and guide both experienced and early-stage researchers in their work in the Global South.

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