Short Take

Field Methods
1-10

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Short Take: Lowering the Access Barriers to Ethnographic Methodology

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Abstract

Researchers based in low- and middle-income countries (LMIC) often cannot access conventional but high-priced ethnographic tools. I developed a low-cost methodology as an exercise in meeting the needs of both LMIC-based researchers and the broader qualitative community. As demonstrated in this proof of concept, ethnographic researchers should strive for a suite of open access software tools and common and affordable hardware to reduce inequities in knowledge generation and dissemination.

Background

Traditionally, ethnography was done by people from high-income countries (HIC) in low- and middle-income countries (LMIC). Today, universities in LMIC are training ethnographers, but to stay on pace with conventional qualitative research standards, those ethnographers must use industry-standard tools, many of which require exorbitant hardware or license fees (Al-Busaidi 2008; Madrigal and McClain 2012; Mays and

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Pope 1995; St. John and Johnson 2000). Others with little access to online banking systems cannot climb the pay walls that guard online payments in the first place.

To get a sense of what one qualitative research project may cost, I tabulated the hypothetical expenditures for one LMIC-based researcher unaffiliated with a HIC-academic institution (Abdekhodaie et al. 2018; Banner and Albarrran 2009; Hart and Achterman 2017; Lewis 2004; ONLYOFFICE vs LibreOffice 2018; *PC Magazine* 2019). My total came to $2,138 (for a breakdown of the expenditures, see Online Appendix Table 1).

However, the fundamentals of qualitative research may not require these expenses (Do and Yamagata-Lynch 2017; Heyerdahl 1950; Lane 2018). For example, we have seen technological opportunities explode in resource-poor areas in tandem with the smartphone's evolution and continued development in open source (free and public code) software (Câmara and Fonseca 2007; Kalogriopoulos et al. 2009; World Bank 2016, 2017). Thus, if we can make low-cost locally available technology work for collecting and analyzing field data, we can create a more diversified and equitable research community.

Methodology

Funded by a 2019–2020 Fogarty Fellowship, I conducted ethnography on the psychotherapeutic potential of rural Nepali traditional healers. In preparation, I conducted a pilot project that revealed the potential for a low-electricity, low-Internet work environment (Pham et al. 2020a). Consequently, I developed a low-cost, resource-efficient methodology as an exercise to meet the needs of my research, as well as the needs of LMIC-native researchers and of the broader qualitative community. This methodology, while flexible, targets a younger generation with an interest in technology. I describe the methodology below in 10 detailed steps. (For an outline of the software/hardware and acronyms/abbreviations that I reference, see Online Appendix Tables 2 and 3, respectively.)

1. Preparing the Hardware

I did all my ethnographic work using a low-specification smartphone (LG K20 PLUS; $46; all prices estimated using e-auction website eBay). I selected the smartphone form-factor to take advantage of four things: (1) a 24-fold percentage increase in LMIC mobile-phone ownership between

2000 to 2015 and its now higher accessibility relative to electricity or clean water (World Bank 2018a, 2018b; World Health Organization 2015); (2) younger generations that have more experience with smartphones than with desktop computers (Evers 2018); (3) light-weight, energy-efficient features that suit working in and traveling between electricity- and Internet-limited regions; and (4) external powerbanks (INIU-10000mAh; $17.71), which can power smartphones but not conventional laptops. To prepare my smartphone, I installed the Android-based (mobile operating system [OS]), open-source Lineage OS (Version 16.0, 2019) so that people who can only afford older and cheaper smartphones can use that hardware by replacing their original OS with one that offers more up-to-date usability, security, and software compatibility. However, any Android-based OS will suffice.

2. Choosing Software

To match the methodological standards of qualitative analysis using the Android OS, I emulated software typically found on laptops (Miles et al. 2020). Unless otherwise stated, I used free, open-source software that prioritized an offline workflow. Unlike many free-to-use closed-source software, researchers can download open-source software free of charge without having to pay for extra features. Furthermore, because anyone can contribute to or branch separate projects from existing open-source projects, open-source software provides protection against the prospect of a parent company retiring its product or going out of business (Evers 2018). Finally, open-source software makes it easy to digitally archive and share research data.

3. Collecting Data

I used the Android app "MuPDF Viewer" (Version 1.17.0, 2020) to read the interview texts and rating scales produced by my project and the Android app "Audio Recorder" (Version 3.313, 2020) to collect data using the phone's built in microphone. I tested the built-in microphone against a discrete microphone (Sony PX470; $39.61) during a mock interview. Both yielded identical transcription fidelity.

4. Storing Data

I locally encrypted all storage devices and saved audio data directly to the phone's internal storage. I managed files with the Android file management app, "Ghost Commander" (Version 1.60b1, 2020) and made back-ups

on both a micro-SD card (SanDisk Ultra SDSQUAR-032G-GN6MA; 32 GB; $10.50) and an encrypted cloud storage account (Mega 2020; 50 GB; proprietary; free). I remotely synced data using an open-source OS, Linux, accessible using the Android app "Termux" (Version 0.94, 2020). Specifically, I ran the cloud sync application "rclone" (rclone 2020) in a Linux command-line (text-only) interface (Version 1.51.0).

5. Writing Field Notes

I wrote field notes continually using both touch and physical keyboards. For the latter, I paired a Bluetooth keyboard and phonestand (ZAGG PRO, $17) with the command-line text editor "Vim" (Vim 8.2.0760, 2020). Vim features a sparse graphical user interface but saves time and physical strain by focusing on the keyboard's homerow keys over analog interfaces such as the trackpad. Moreover, Vim supports Markdown, a simple rich-text format with syntax highlighting akin to a word processor. To improvise within more chaotic work settings, I typed/formatted on a touch keyboard using the Android app "Markor" (Version 2.2.10, 2020). Markor shares Markdown formatting in common with Vim, which eased transition between various work settings.

6. Transcribing

I listened to interview audio with the Android app "mpv" (Version 0.32.0, 2020), which offered scrubbing (fine-seeking) for back-and-forth transcription. I transcribed the audio with Vim to enhance readability with Markdown formatting. I maintained a keyboard driven work-flow switching between mpv and Vim using one of Termux's keyboard shortcuts (Ctrl+Shift+N/P).

7. Coding

At present, no computer-assisted qualitative data analysis software (CAQDAS) offers a completely keyboard-driven workflow (Silver and Lewins 2014). So instead I coded attributes and themes while transcribing using a personalized in-line coding system (e.g., <"name of code">Text.</"name of code">) (Charmaz 2006; Saldaña 2016). This system saved time by merging transcription with first-pass coding while circumventing tedious "point and click" coding, which can strain the wrist. A Nepali research assistant independently coded each interview using the same method. I sent

him a transcript without in-line coding by first making a copy of my original transcript and then removing all in-line coding with a Vim command.[1]

8. Analyzing the Data

After completing our individual first passes, we ran personalized command-line functions to output code counts,[2] coded text,[3] and differences between our coding (Gibbs 2018).[4] To formulate code categories and themes, I created an iterative thematic concept cloud using the Android app "LucidChart" (Version 2.9.14; proprietary; free with student e-mail address). We then discussed emerging differences and themes, finalized the codebook, coded for a second and final pass, and again discussed.

9. Preparing the Manuscript

Using my field note setup, I wrote initial drafts of manuscripts while conducting a separate ethnographic study in another region. I typed/formatted via a touch-keyboard using the Android word processor app "Collabora Office" (Version 4.2.3, 2020) and formatted via a physical keyboard using the more fully featured Linux application LibreOffice (Version 6.4, 2020), on which Collabora Office is based. LibreOffice can save in Microsoft file formats (which some journals did require), albeit with less fidelity than Microsoft Word itself (Version 16.0.12730.20214, 2020). I ran LibreOffice, conventionally a desktop application, by utilizing the Linux desktop operating system "Debian" (Version 10.4, 2020) and emulated Debian on Android using the Android apps "UserLAnd" (Version 2.7.2, 2020) and "bVNC" (Version 4.1.0, 2020). bVNC offers additional utility by turning the phone screen into both a monitor and a touchpad for cursor movement and zoom-in/out gestures. I created accompanying figures using LucidChart (Version 2.9.14, 2020). I managed references using the Linux application "JabRef" (Version 5.0, 2020) with which I auto-generated a reference list.

10. Submitting the Manuscript

I submitted all final manuscripts, revisions, and proofs using the Linux desktop browser "Epiphany" (Version 0.3.1, 2020) as I encountered mobile-browser incompatibility with various submission web portals.

Conclusion

Using this methodology, I produced six manuscripts (at varying stages ranging from project conception to proofing), including Pham et al. (2020a, 2020b, 2020c).

Overall, I found that the use of free, offline software and cheap, energy-efficient, lightweight hardware did not compromise the efficiency or integrity of my research. The key expenses were for a smartphone and Bluetooth keyboard, and totaled $63 USC, compared to $2,138 for a laptop and proprietary software

Using this methodology, however, created many problems. I had to limit desktop emulation because desktops proved cramped, resource heavy, and on the whole suboptimal on the smartphone form factor. Linux command-line applications translated well onto the mobile screen, given their text-only display, keyboard-driven interface, and aggressive focus on efficiency. However, they, most notably Vim, suffer from steep learning curves when compared to intuitive and graphically driven apps, an investment perhaps more tedious than the tedium they overcame. Fortunately, my focus on specific open-source software should not preclude others from utilizing the many alternatives afforded by the broader open-source library: QualCoder (Version 1.9, 2020), Dropsync (Version 4.4.29, 2020), and Voice (Version 5.0.2, 2020) to name a few.

Despite these challenges, lowering the cost barriers to access tools for qualitative research (ethnography, grounded theory, phenomenology, etc.) will open these fields of research to colleagues from all countries. I recommend the following immediate goals. First, we should strive for an integrated, open-source software-suite native to accessible OSs within LMIC (e.g., Android). Second, to generate discussion about qualitative tools, we should incorporate open-source software (e.g., Linux), and low-specification hardware (e.g., smartphones), into our methods. Third, we should voice our needs to the volunteer developers of open-source projects to keep them abreast of continued user interest and software bugs. Finally, we can assist (with programming or with donations to open-source programmers) the growing library of open-source tools that support the collection and analysis of qualitative data, common exchange formats, and digital archives independent from proprietary influence.

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Supplemental Material

Supplemental Material for this article is available online.

Notes

1. :%s{.*?}/
2. grep -lr \<"name of code"\> "name of containing file directory" | wc -l
3. grep -f <"name of code">.*?<//"name of code"> file1 file2
4. vimdiff "name of file from coder1" "name of file from coder2"

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Supplementary Material 1: Breakdown of Proprietary Expenditures for Qualitative Analysis

Use case	Product	Price
Reference Management	EndNote X9.3	$250
Qualitative analysis	NVivo 12[1]	$849
Private Microsoft file-formats, e.g. docx, as required by journals[2]	Office 2019	$140
Operating system as required by EndNote, NVivo, or Microsoft Office	Windows 10[3]	$139
Hardware specifications as required by Windows 10	Average Laptop	$760

[1] Alternatives: MAXQDA; ATLAS.ti
[2] Non-Microsoft, open-sourced office suites struggle to match Microsoft's compatibility with their own file-formats.
[3] Alternative: Mac OS X

Table 1. Utilized Hardware and Software

Stage	Hardware	Software (Android)	Download Link
Data Collection	• Smartphone[1] • Built-in Microphone • micro-SD card[2] • Cloud Storage[3]	Audio Recorder	https://tinyurl.com/quqq3of
		MuPDF	https://tinyurl.com/y9a9qz47
		Ghost Commander	https://tinyurl.com/uq7zdea
		rclone[5]	https://tinyurl.com/yyqqn68v
Field Notes	• Smartphone[1] • Bluetooth Keyboard[4]	Markor	https://tinyurl.com/yblrq2p7
		Vim[5]	https://tinyurl.com/o9ovvyu
Transcription	• Smartphone[1] • Bluetooth Keyboard[4]	Vim[5]	https://tinyurl.com/o9ovvyu
		mpv[5]	https://tinyurl.com/mksw89t
Qualitative Analysis	• Smartphone[1] • Bluetooth Keyboard[4]	Vim[5]	https://tinyurl.com/o9ovvyu
		LucidChart	https://tinyurl.com/y6mnmoxf
Manuscript Writing	• Smart Phone[1] • Bluetooth Keyboard[4]	Collabora Office[6]	https://tinyurl.com/y4nk3par
		LibreOffice[6]	https://tinyurl.com/henebzs
		JabRef[6]	https://tinyurl.com/ocoxaqa
Submission	• Smartphone[1] • Bluetooth Keyboard[4]	Epiphany[6]	https://tinyurl.com/y2gr3k84

[1] LG K20 PLUS; $46
[2] SanDisk Ultra SDSQUAR-032G-GN6MA; 32GB; $10.50
[3] Mega; 50GB; proprietary; free
[4] ZAGG PRO, $17
[5] Requires the Android app Termux (https://tinyurl.com/yb5xgt5v)
[6] Requires the Android apps UserLAnd (https://tinyurl.com/y5ysqht6) and bVNC (https://tinyurl.com/y3cpj948)

Supplementary Material 3. Abbreviations and Acronyms

Abbreviation	Meaning
HIC	high-income country
LMIC	low- and middle-income country
OS	operating system
CAQDA	computer-assisted qualitative data analysis
app	application