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Reflections on the Use of a Smartphone to Facilitate Qualitative Research in South Africa

Sogo France Matlala
University of Limpopo, France.Matlala@ul.ac.za

Makoko Neo Matlala
University of Limpopo, neomatlala70@gmail.com

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Abstract

This paper describes conditions that led to the use of a smartphone to collect qualitative data instead of using a digital voice recorder as the standard device for recording of interviews. Through reviewing technical documents, the paper defines a smartphone and describes its applications that are useful in the research process. It further points out possible uses of other applications of a smartphone in the research process. The paper concludes that a smartphone is a valuable device to researchers.

Keywords

Document Review, Qualitative Research, Smartphone

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The Use of a Smartphone to Facilitate Qualitative Research in South Africa

Sogo France Matlala and Makoko Neo Matlala
University of Limpopo, Mankweng, Limpopo, South Africa

This paper describes conditions that led to the use of a smartphone to collect qualitative data instead of using a digital voice recorder as the standard device for recording of interviews. Through reviewing technical documents, the paper defines a smartphone and describes its applications that are useful in the research process. It further points out possible uses of other applications of a smartphone in the research process. The paper concludes that a smartphone is a valuable device to researchers. *Keywords: Document Review, Qualitative Research, Smartphone*

Introduction

In this paper, we describe the usefulness of a smartphone in conducting qualitative research by using the experiences of the first author while conducting a qualitative study for a doctoral degree in South Africa. The paper defines a smartphone, describes its multi-tasking applications (Haverila, 2013) and relates them with selected components of the research process. The research process followed steps such as introduction, aims and objectives, methods, population and sampling, data collection and analysis, and ethical considerations as well as reporting of the results or findings as outlined in Heath (1997), Klopper (2008), Mabuza, Govender, Ogunbanjo, and Mash (2014), and Mash (2014).

In 2005, the first author bought a small voice-recording device, the Dictaphone, and used it to record focus group discussions while doing research for a master of public health (MPH) degree. About eight years later in 2013, he needed a device to record semi-structure interviews for a doctoral degree but found the Dictaphone inadequate as he could not find the microcassettes required for recording from the local shops. The other challenge he faced with a Dictaphone was its inability to convert voice recordings into a digital form that could be uploaded and stored on a computer to make data analysis easier. He then thought of buying a digital voice recorder, similar to those used by qualitative researchers these days (Aydin, 2013; Lemmer, 2012; Xaba, 2012), but found the device expensive and also became anxious it would be obsolete in some few years to come, just like the Dictaphone. As a part-time student with a family to support, the first author had financial limits. He then realized that his smartphone, which had a voice recorder, could record semi-structured interviews conducted with participants. In addition, he realized that a smartphone had already been useful in the research process when phoning participants to organize for data collection. He discussed that discovery with some of his colleagues, but some of them were doubtful that a smartphone could assist with recording of qualitative interviews lasting more than 30 minutes; he regarded that as showing lack of familiarity with the smartphone's capabilities. However, one techno-literate researcher was convinced and the two collaborated; together they thought further about the value of a smartphone in research. The two researchers realized that a smartphone is a useful tool throughout the research process from conceptualization, collection and analyses of qualitative data and the reporting of findings, as this paper give details. Johnson (2013) confirms that the use of smartphones may possibly facilitate the research process.

Context of Doctoral Studies in South Africa

In order to meet its developmental needs, South Africa should produce 100 doctoral graduates per year for every million citizens by the year 2030 (National Planning Commission, 2012). According to the Academy of Science of South Africa (2010), there are, unfortunately, barriers such as financial constraints for many students wishing to register for doctoral degrees. Furthermore, lack of finance is a risk factor for students already registered for a doctoral programme in terms of failing to finish their studies. On the other hand, most of those who register for doctoral degrees are part-time students and take an average of 4 to 8 years to graduate as they divide their attention between full-time employment, parenting responsibilities and studying. More doctoral graduates are still from the previously advantaged groups (in terms of race and gender) and are older than 30 years. The Academy of Science of South Africa (2010) and Cloete, Mouton, and Sheppard (2015) reveal that 55% of the doctoral graduates in 2012 were White while 45% were African; more (58%) were males while females (42%) were fewer.

About the Authors

The authors belong to two different generations with the first author belonging to Generation X while the second author belongs to Generation Y, also called millennials. Although they are both techno-savvy, the second author is more techno-literate than the first author (Edge, 2014). Millennials are comfortable with technology as they were born within it while Generation X is less comfortable with technology as they are said to have been born before its arrival (Murray, 2011).

Method

This paper uses reflections of the first author while conducting a qualitative study for a doctoral degree and a review of technical documents, guided by the second author, as research methods. We also searched for peer-reviewed documents. The first author kept a field journal throughout the research process in which he wrote about his observations, insights and reflections on various aspects of the research process. It is from this field journal as well as personal recalling that data for this paper was drawn together.

The second author collaborated by using his knowledge of a smartphone to identify more of its applications useful in research, interpreting those applications by reading the user manual and in the writing of the manuscript. We then searched for those applications on technical documents, using Google, to gather facts on and understand applications of smartphone useful to researchers. By technical documents we refer to user manuals or user's guide and descriptions, which are shorter explanations of procedures and processes that help users to understand how a smartphone works (Wingkvist, Ericsson, & Löwe, 2011). Owen (2014) refers to the method of document analysis in research as examination of documents by a researcher to gather facts about a phenomenon. To confirm the use of smartphone applications in research, we searched "smartphone" and some names of applications on Google Scholar.

Findings on a Smartphone and Discussion of its Applications

What is a Smartphone?

A smartphone is an advanced cell phone or an intelligent cell phone, as Pandher and Bhullar (2016) put it, as it combines characteristics of an ordinary cell phone with computer

abilities. It is a form of information and communication technology (Kyobe & Shongwe, 2011), defined as a cell phone with advanced functionality beyond an ordinary cell phone and works like a small computer as it has a powerful processor (Gill, Kamath, & Gill 2012; Smartphone, 2017; The Tech Terms Computer Dictionary, 2017). A smartphone has applications such as short messaging systems (SMS), multimedia messaging system (MMS), internet browser, short-range wireless communication (Bluetooth), global positioning system (GPS), camera phone, voice recorder, memo pad, dictionary, task or to-do list, alarm and is capable of running social networking system such as Facebook and Twitter (Bornman, 2012; Haverila, 2012; Kyobe & Shongwe, 2011; Lepp, Barkley, & Karpinski, 2014; Samaha, & Hawi, 2016; Thomas, McIntosh, & Edwards, 2014; Wiese, Lauer, Pantazis, & Sammuels, 2014). Smartphones with advanced operating systems such as Windows mobile, iPhone Operating System, Google's Android, Symbian Operating System, RIM's BlackBerry and Palm's WebOS can run third-party applications such as WhatsApp, Instagram and Skype (Adam, Spencer, Sivsankar, & Jacub, 2016; Anshari, Almunawar, Shahrill, Wicaksono, & Huda, 2017; Yaman, Şenel, & Yeşilel, 2015). These applications make the smartphone a useful tool for conducting research and are listed and defined in Table 1.

Table 1: Smartphone applications and their definitions

Smartphone Application	Definition
Airplane mode, Flight mode	Disabling of all radio functions of a smartphone while leaving other functions not requiring radio transmitters available (Flight mode, 2017).
Audio jack, Connector, Port, Jack	A smartphone connector for plugging in standard pair of music headphones similar to the ones found on music players, computers and most other electronic devices with audio outputs (Audio jack, 2017).
Alarm Clock	A smartphone application which works like a common alarm clock but with the added advantage of permitting the user to set several alarms and having them repeating as required (Alarm Clock, 2017)
Address book, Phone book, Contacts	A smartphone application that enables a person to electronically store and record personal information of people such as their names, e-mail address and phone numbers that he or she can contact at a later period (Phonebook, 2017)
Bluetooth	A wireless network which can be used to transfer data between smartphones, computers and other electronic devices over very short distances (Bluetooth, 2017).
Calculator	A smartphone application that can do addition, subtraction, multiplication, division and more advanced functions such as square root as well as currency conversion (Calculator, 2017).

Calendar, Personal Information Manager (PIM)	A smartphone application which allows the user to store event information on the cellular phone and be reminded by means of an alarm when the event is due (Calendar, 2017).
Camera	A smartphone application which can take still photos and audio-visuals (Camera, 2017)
Dictionary	A smartphone application with electronic listing of words and their meaning just like a printed dictionary (Dictionary, 2017).
Global Positioning System (GPS)	A satellite navigation system smartphone application which uses coordinates to provide location and walking or driving directions (Global Positioning System, 2017)
Google Maps	A mapping and map reading application for smartphones from Google. Google Maps uses the smart phone's GPS location finding services to provide direction to a destination (PC Magazine Encyclopedia, 2017)
Internet browser	A smartphone application that enables the cellular phone to surf the World Wide Web (www) similar to a computer (Browser, 2017)
Memo pad, Note pad	A smartphone application that allows the user to type short notes and file them. Filed notes can be synchronized to another device (Samsung, 2016)
Multimedia Messaging Service (MMS)	A smartphone messaging service that allows subscribers to exchange multimedia files such as text, pictures, audio or their combination as messages (Multimedia Messaging Service, 2017)
To-Do List	A smartphone application which allows the user to write a list of personal tasks, prioritize them and assign due dates (To-Do List, 2017).
Short Message Service (SMS), Text message	A way of sending short text messages from one smartphone to another through a smartphone network (Short Messaging Service, 2017)
Voice memo or Voice note	A note recorded using a smartphone's voice recorder application. A voice note allows easily recording of notes on the go especially when one is walking, running or driving a car (Samsung, 2016).
Voice recorder	A smartphone application which allows recording of audio files and sharing them using Bluetooth, SNS, MMS or SMS. The audio files can also be stored in the phone or memory card (Huang, 2017)
Wi-Fi (Wireless Local Area Network)	A smartphone application which permits short-range wireless high-speed data connections between smartphones and nearby Wi-Fi access points (Wi-Fi, 2017).

Using a Smartphone during Data Collection

To organize for data collection, the first author phoned and went to offices of education managers to obtain permission and find schools to visit where data from pregnant students was collected. He used Google Maps and the Global Positioning System (GPS) on a smartphone, to find directions (Kyobe & Shongwe, 2011; PC Magazine Encyclopaedia, 2017) to the schools identified by managers and to the places where he met with parents of the pregnant students to interview them. At the identified schools, he met with the principals and recorded their phone numbers as well as those of the parents of pregnant students in the phonebook or address book of a smartphone so as to always talk to them to establish a relationship which is necessary in qualitative research (Gill, Stewart, Treasure, & Chadwick, 2008). Johnson (2013) also used a smartphone to arrange interviews with participants in a Nairobi, Kenya study. The first author discussed and agreed on the date, time and venue of the interviews with each participant and recorded the dates in the calendar or personal information manager (PIM) as reminders and further used the SMS application to remind participants about the appointment dates for data collection. Smith-Stoner (2012) also found smartphones helpful to student nurses with time management in nursing education by encouraging them to use their smartphones calendar to record due dates for assignments. The use of SMS as a reminder is a common practice in health care to remind patients to take their medications and attend follow-up care (Aker & Mbiti, 2010; Finitsis, Pellowski, & Johnson, 2014; Kassavou & Sutton 2017; Klasnja & Pratt, 2012). Other researchers (Domek et al., 2016; Gibson et al., 2017; Uddin et al., 2016). used SMS as effective reminders for infant immunization.

As we indicated earlier in the introduction, qualitative data for the first author's doctoral study was collected through semi-structured interviews which lasted between 30 and 60 minutes. He used the voice recorder application on the smartphone to record the 25 semi-structured interviews with 10 pregnant students, 10 teachers and five parents. Beddall-Hill, Jabbar, and Al Shehri (2011) also used smartphones to collect qualitative data in education research while Andreatta, Debpuur, Danquah, and Perosky (2011) used smartphones to collect data in a health care research. The use of a smartphone to record voices for educational purposes have also been used by Arreguin-Anderson (2011) and Hwang, Huang, Shadiev, Wu and Chen (2014) to record learning activities of students. Smartphones can also be used to conduct interviews. Francis and Murphy (2008) and Mahlomaholo (2011) point out that telephone interviews are useful where face-to-face interviews are not possible. Johnson (2013) suggests telephone interviews as solution to ethical challenges of interviewing participants on sensitive issues. Smartphones can record telephone interview conversations using the Voice Memo application.

To prevent noise and distractions during the interviews (Gill et al., 2008; Hall, Lashua, & Coffey, 2008), the first author put the smartphone on flight mode or airplane mode to prevent incoming calls and messaging notifications such as SMS, MMS, emails, Twitter, Facebook and WhatsApp which would cause noise and interference during the recording. The number of semi-structured interviews conducted was limited by saturation of data as the study was qualitative. According to Saunders et al. (2017), data saturation is a point where further data collection does not add anything new to data already collected. This point can be reached during an interview with a participant, therefore, requiring the interviewer to end the interview, or it can be reached after interviewing a certain number of participants, requiring the interviewer to stop interviewing new participants. In quantitative studies, sample size has to be calculated using scientific techniques so that the sample represents the population accurately. The calculator on the smartphone (Calculator, 2017) will become useful to a quantitative researcher when calculating a sample size. Photographs and videos can be taken with the camera on a smartphone as another method qualitative researchers use to collect data (Gill et al., 2008;

Mabuza et al., 2014; Thorne 2000). Jandee et al. (2015) found the camera function of a smartphone as effective method of collecting secondary data on immunization history. Gallay et al. (2017) used a smartphone camera to take pictures of the cervix during cervical cancer screening campaign in Madagascar. Gromik (2017) makes reference to the use of smartphones camera during data collection in a study on smartphone video recording application.

Immediately after each interview, the first author took field notes of observations, thoughts and ideas about the interview, as recommended by Gill et al. (2008). Instead of using a pen and note book, which is what Johnson (2013) refers to as research or field journal, a researcher can type field notes in the memo or note pad of smartphone or take a voice memo by speaking into the microphone of the smartphone to record the field notes. Phillippi and Lauderdale (2017) recommend collection of field notes as they have important functions within a researcher's original study but can further be useful in later analyses such as secondary analyses and metasynthesis. Beddall-Hill et al. (2011) also used smartphones to record voice memos in their study on the use of cellular phones in education. After recording the semi-structured interviews, the first author then uploaded the voice recordings to a laptop computer by the use of Bluetooth as the laptop computer and a smartphone could communicate or share data via Bluetooth. The use and potential use of the applications of a smartphone in the research process are summarised in Table 2.

Table 2: Smartphone applications and their use in research

Smartphone application	Research Component	Use in Research
Airplane mode, Flight mode	Data Collection Data Analysis	To prevent interference from calls and messages during interviews and recording
Audio jack, Connector, Port, Jack	Data Analysis	To connect headphones during listening of voice recordings To upload data from one device to the other such as from cellular phone to a laptop computer
Alarm clock	Data Collection	To set reminders about appointments with participants
Address book, Phone book, Contacts	Data Collection	To keep contact details of participants
Bluetooth	Data Analysis	To send data (audio, visuals) from cellular phone to a computer
Calculator	Data collection	To calculate the sample size in quantitative research
Camera	Data Collection Data Analysis	To take photos and videos as forms of qualitative data
Calendar, Personal Information Manager (PIM)	Data Collection	To record and set reminders about appointments with participants

Dictionary	Data analysis Reporting of Findings	To verifying spelling and meaning of words during the writing process
Global Positioning System (GPS) Google Maps	Data Collection	To find direction to places identified by participants for interviews
Short Message Service (SMS) Text message Multimedia Messaging Service (MMS)	Data Collection	To remind participants about appointments for data collection
Social Networking Service (SNS)	Data Collection	To remind participants about appointments for data collection
Voice recorder Voice memo	Proposal development Data Collection Data Analysis	To record interviews and voice memos and then store the voice recordings to use when needed.
Wi-Fi (Wireless Local Area Network) Internet browser	Proposal writing Data Collection Data Analysis Reporting of Findings	To connect to the internet and surf the World Wide Web (www) in search of relevant literature to provide background and support findings and search for tools to facilitate data analysis

The Use of Smartphone During Data Analysis and Reporting of Findings

As first step in qualitative data analysis, the first author used headphones or headset to listen to the voice recordings stored on a smartphone. A smartphone has an opening called headphone or headset socket, audio jack, port or connector through which wired headphones or headsets are connected to the smartphone. Wireless headphone or headsets do not need headphone or headset socket, audio jack, port or connector to connect as they connect through Bluetooth. Unlike a laptop, a smartphone, which is portable, makes it easier for voice recordings to be played repeatedly to help the research gain familiarity with them. The repeated playing of and listening to voice recordings facilitated immersion in or familiarization with data, which is a vital step in the analysis of qualitative data (Bradley, Curry & Devers, 2007; Mabuza et al., 2014; Xaba 2012). Listening through headphone or headset has some advantages over listening through the speakers. With headphones or headset, the first author was able to listen in private without disturbing other people. In addition, headphones or headsets optimise the sound quality of the recordings (Headphones, 2017).

In qualitative studies, findings are reported, then discussed using related literature (Burnard, Gill, Stewart, Treasure, & Chadwick, 2008). As smartphones have internet browsers, researchers can search relevant literature to support the findings. The dictionary application on the smartphone can become useful to researchers when they verify the spelling and meaning of words used in the reporting and discussion of findings.

Conclusion

This paper revealed that a smartphone has many applications that are useful to researchers. The authors identified the various applications and used document analysis to describe their use and possible use in research.

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Author Note

Dr. Sogo France Matlala is a senior lecturer in the Department of Public Health at the University of Limpopo. Correspondence regarding this article can be addressed directly to: France.Matlala@ul.ac.za.

Mr. Makoko Neo Matlala is a computer science student in the Department of Computer Science at the University of Limpopo. Correspondence regarding this article can also be addressed directly to: neomatlala70@gmail.com.

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