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New Emerging Technologies in Qualitative Research

Abstract

According to Mayan (2009) being a qualitative researcher means to "enjoy living and learning with people to collectively make sense of our world. Qualitative research is not only done with people, it is also accomplished through people..." (p. 12). By virtue of its various definitions, qualitative research involves a great deal of human communication. Communication has a major role in all aspects of qualitative research from planning to execution. While many new qualitative research technologies have evolved over the past few decades, the most critical and influential ones are those related to communication technologies. As there is limited data about the use of communication technologies in qualitative research, the purpose of this paper is to provide an overview of the new emerging technologies in qualitative research. We provide descriptions of the evolving technologies and highlight the importance of qualitative researchers being up to date with these developments.

Keywords

Qualitative Research, VOIP, Teleconferencing, Skype, Social Mobile Devices (SMD)

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New Emerging Technologies in Qualitative Research

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According to Mayan (2009) being a qualitative researcher means to "enjoy living and learning with people to collectively make sense of our world. Qualitative research is not only done with people, it is also accomplished through people..." (p. 12). By virtue of its various definitions, qualitative research involves a great deal of human communication. Communication has a major role in all aspects of qualitative research from planning to execution. While many new qualitative research technologies have evolved over the past few decades, the most critical and influential ones are those related to communication technologies. As there is limited data about the use of communication technologies in qualitative research, the purpose of this paper is to provide an overview of the new emerging technologies in qualitative research. We provide descriptions of the evolving technologies and highlight the importance of qualitative researchers being up to date with these developments. Keywords: Qualitative Research, VOIP, Teleconferencing, Skype, Social Mobile Devices (SMD)

"We learn best-and change-from hearing stories that strike a chord within us... Those in leadership positions who fail to grasp or use the power of stories risk failure."
- John Kotter, Harvard Business School Professor, and author, *Leading Change*

Introduction

The first author is a PhD student at the University of Alberta, and has planned to qualitatively study hope among Palestinian and Israeli mothers of mentally ill people. In view of the political and technical difficulties which may be encountered in such a delicate situation, we considered doing these interviews by Skype. Indeed such a technique has recently been applied within this population (Bruneau, 2012). Skype is only one of various emerging new communication technologies available to anyone who is interested to conduct qualitative research. As there is limited data about the use of communication technologies in qualitative research, the purpose of this paper is to review the available relevant literature.

The history of communication dates back to prehistory, with significant changes in communication technologies (media and appropriate inscription tools) evolving in parallel to political and economic changes. Communication can range from very subtle processes of exchange, to full conversations and mass communication. Human communication was revolutionized with speech approximately 200,000 years ago. Symbols were developed about 30,000 years ago (Steinberg, 1995) and writing in the past 30 centuries.

Distant or electrical telecommunications emerged in the 19th century using telegraph lines and Alexander Bell invented the telephone in 1870. Analog television broadcasting was developed in the beginning of the 20th century and later was followed by video telecommunication. The internet started in the early 80s and internet access became

widespread late in the century, using the old telephone and television networks. Figure 1 summarizes the timeline of communication technologies.

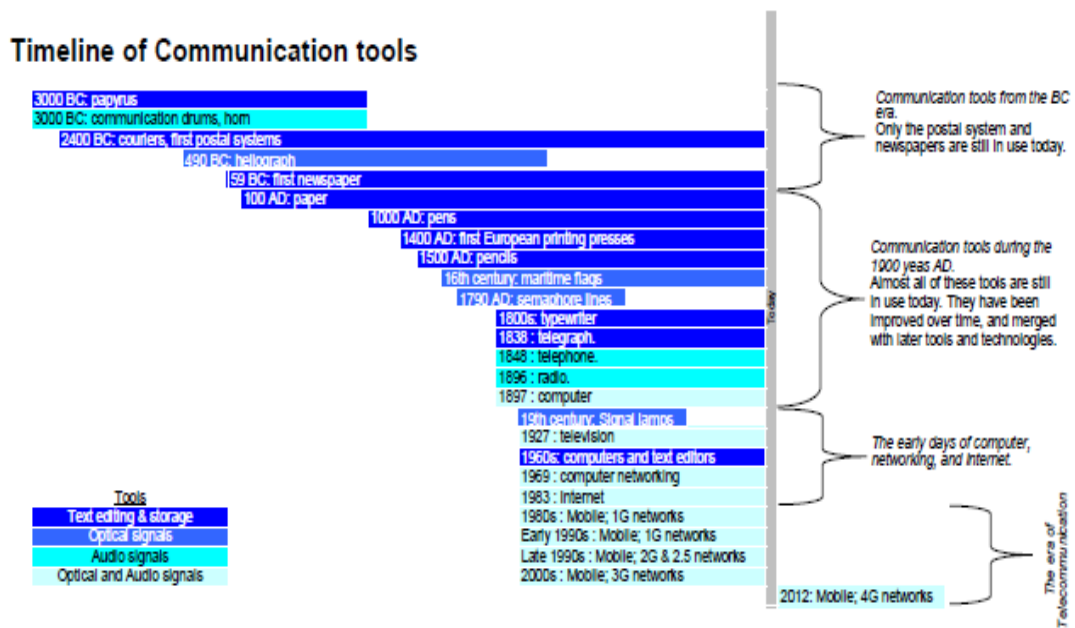


Figure 1. Timeline of communication tools (Khourdajie, 2008).

Communication Technologies in Qualitative Research

Our purpose in developing this manuscript is to map and scope the range of new and emerging technologies that might be useful to both experienced and neophyte qualitative researchers in expanding or updating their knowledge of qualitative data collection tools, thereby potentially enhancing their qualitative research repertoire.

Most qualitative inquiry is grounded in information collected from observation, text, talk, and interviews (Mayan, 2009). At a very basic level, then, qualitative researchers engage in the process of studying communicative practices in context and the main task in qualitative research after choosing a methodology and methods is data collection. Data collection in qualitative research is commonly accomplished through three components (Creswell, 2007; Patton, 2002):

1. Interviews
2. Observations
3. Documents

Among these three components, interviews dominate. For many years traditional/ classical interviews were performed through face-to-face interaction which allowed researchers to delve deeper into the participant's condition using such cues as "non-verbal" communication. Researchers doing phenomenological, grounded theory, and narrative research derive most of their data from individual face-to-face interviews. This form was considered for many years to be the "gold standard" for obtaining data in qualitative research (McCoyd & Kerson, 2006) with the view that other methods are a compromise, rather than valid techniques in themselves. However, in the 80s, researchers started to slowly integrate telephone media into their research methods and found it to be a productive and valid methodological tool (Stephens, 2007).

Telephone

Holt (2010) suggested that the lack of non-verbal communication during telephone interviews meant that, unlike in face-to-face interactions, everything had to be articulated by both the participant(s) and the researcher. This need for full articulation meant that a much richer text may be produced from which to begin analysis, an insight which suggests that the relationship between the mode of data production and the method of data analysis is a further avenue for methodological debate.

One of the features of using a telephone for research interviewing is the need to explicitly direct the conversation because of an absence of non-visual cues and the reduced concern about low response rates. Telephone interviewing further implies that the researcher should be the one to choose whether to use the telephone for interviews. By contrast, during their qualitative interview study of jail corrections officers and visitors, Sturges and Hanrahan (2004) found that allowing participants to choose the medium (face-to-face or telephone) increased participation.

The telephone interview can allow the participant more flexibility during the interview. For example, it allows the participant the possibility of walking and moving around his/her house during the interview and to feel more comfortable to share when one of the family members comes home (Holt, 2010). Many conversations in Holt's experience were interspersed with comments such as "Oh, my son's just come in[;] I'm just going upstairs. . ." (p. 117).

In contrast, during face-to-face interviewing participants have to be stable in one setting, and the entrance of a family member may be a distraction. Using telephone interviewing enables the participant to control the privacy of the conversation. This flexibility can be particularly useful when young children are present, because the use of the telephone seems to provide parents with a legitimate reason to resist interacting with their children in a way which face-to-face encounters may not. Holt (2010) provides the example that during a face-to-face interview with a mother, her 4-year-old son's presence and demands for attention were increasingly distracting as the interview progressed. In contrast, a telephone interview with a mother who was overheard telling her young daughter "Ssshhhh, I'm on the phone. . ." at the beginning of the interview, seemed sufficient to enable the interview to progress uninterrupted (p. 117). Thus, the use of the telephone could provide participants with a resource to both control their own social space and to protect them from being interrupted by other family members—a resource which would not have been available in face-to-face interview encounters (Holt, 2010).

As the internet evolved in the 80s and 90s, telephone technology changed and was gradually replaced by internet communication. As we will see later, all of the relative advantages of the telephone methods remain valid and even expand when using the internet.

Internet

The Internet has become so widely used in the world both in developed and developing countries (see Figure 2). The Internet has been one of the most useful technologies of the modern times. It helps us not only in our personal but also professional lives. There are various internet platforms available for communication with two main categories: synchronous communication and asynchronous communication. Synchronous communication, including chat rooms and instant messages, occurs in real time. On the other hand, asynchronous communication, such as e-mails and blogs, allows people to respond to communications at their convenience.

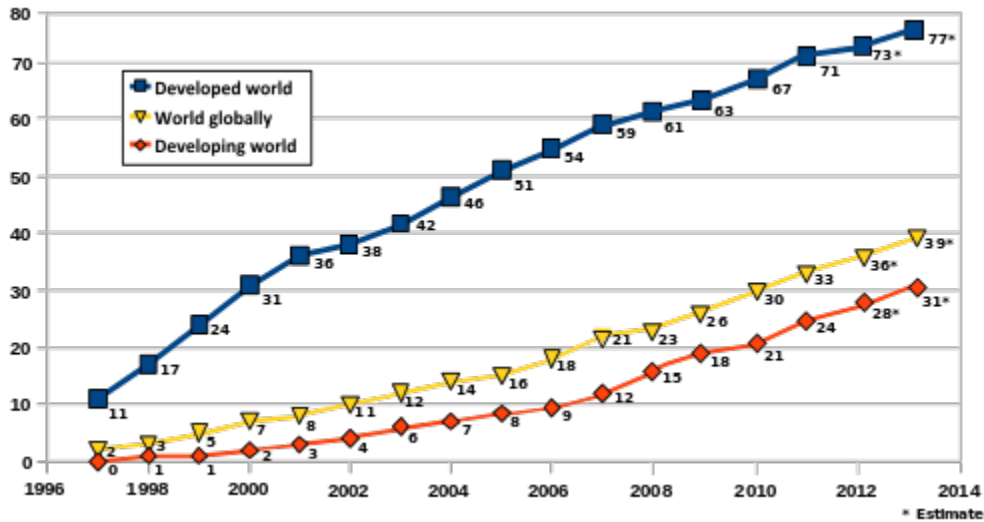


Figure 2. Internet users per 100 inhabitants ITU. (Ogden, n.d.)

Technological communication has become a way of life in today's global society and connecting with others has never been easier. Wherever people go, staying connected is merely a click away. Some people still maintain their technological base on the home computer, but many carry it everywhere they go on their smart phones. Communication technology has advanced to the point such that face-to-face contact is no longer necessary to stay updated and involved.

The recent Internet domains which have gained much popularity are the social media networks sites like Facebook, MySpace, and Twitter, and the social media devices such as Smartphones and Tablets which make staying updated easy. People share photos with family, gossip about their favourite topics or simply check out what everyone's plans are for the day by following them on a social networking site.

The advances in internet have not skipped qualitative research. The Internet is frequently used in the research process, for the review of literature, compiling bibliographic databases, and data analysis. Computerized databases are used to source information; bibliographic database programs are commonly used to organize references, and many qualitative researchers use data analysis programs. Waskul and Douglas (1996) suggested that the Internet “presents conceptual, theoretical and methodological challenges. . .which represents the seeds of academic advancement” (p. 130).

The most affected area of qualitative research has been the collection of data. Data collection methods have fast evolved along the similar Internet platforms. Thus, Internet interviews can be asynchronous or synchronous, public or semi-private (Mann & Stewart, 2002). Internet interviews often include text, which is rare in face-to-face interviews, and which can change many aspects of data collection and analysis. Computer-mediated administration of questionnaires became commonplace in the second half of the 1990s (Witmer, Colman, & Katzman, 1999), as did the covert observation and collection of naturally occurring online discussions, which offers a speedy and viable way of collecting rich data although not without significant ethical obstacles which will be discussed later.

The initial Internet technologies used for collecting data during interviews were e-mail and instant messaging.

E-mail interview

E-mail interviews are asynchronous and are considered semi-private (Mann & Stewart 2002). E-mail interviews succeed most when the interviewer and participant are both comfortable communicating via email (Young, Persichitte, & Tharp, 1998). Researchers who need facial and body language expressions to be part of their interview data, may find that E-mail interview cannot address this need.).

Cook (2012) recently described the advantages of e-mail interviewing as a method when face-to-face interviewing is difficult. The author suggests that e-mail interviews enable one to recruit people who would otherwise be excluded from research because of geographical distance, different time zones, or wanting to keep their anonymity for various reasons. The benefits of this method are particularly evident for recruitment of people who are vulnerable and marginalized. Because of the asynchronous nature of this method, researchers need to become aware of the speed at which they should reply and at which they can expect replies from respondents (Gibbs, Friese, & Mangabeira, 2002).

Holge Hazelton (2002) used e-mail as a method for a 2-year period in order to understand how a chronic illness such as diabetes is expressed in the everyday lives of youth. The study was performed more than a decade ago, long before social media evolved. The author was able to develop very intimate relationships with the participants through this asynchronous technique. She describes that some of her participants would not have shared their experience if it was not through the internet. According to her findings, the participants did not experience any personal or technical difficulties, yet she emphasized the importance of being sensitive and empathic to the issues that were raised, trying to answer each e-mail within 24 hours.

Instant messaging interview

Instant messaging (or instant messenger; in either case, IM) can be used for interviewing, and like e-mail, has some features that affect the research process (Luders, 2004; Opdenakker, 2006; Steiger & Goritz, 2006). For example, IM allows synchronous and semi-private interaction and can automatically record the interaction text. The ad hoc conversational nature of IM interviews lets them resemble oral interviews. Callaghan, Barber, Cusik, & Buchanan, (2010) argue that IM offers an interesting opportunity to explore what happens when research participants are able to express themselves in writing, while at the same time engaging in real-time dialogue.

On-line focus groups and forums

Traditional focus groups are characterized as an organized group discussion around a given topic, which is monitored, guided if necessary, and recorded by a researcher. They are distinguished by their explicit use of group interaction to produce data. While most traditional, face-to-face research methods developed telephone equivalents before the development of computer-mediated communications, the “technologization” of the focus group evaded the inherently one-to-one nature of the telephone and therefore may seem an innately “terrestrial” method (Bloor, Frankland, Thomas, & Robson, 2001). Robson and Robson’s (1999) early attempts with online focus groups, studying the employment experiences of inflammatory bowel disease sufferers, exemplifies the use of asynchronous (non- real-time) online focus groups, identifying key practical issues such as online moderation and the analysis of digital data. In contrast, Williams’s (2012) study of deviance within online communities provides examples of how synchronous (real-time) forms of

online focus groups, using 3D graphical environments, further challenges researchers highlighting the unique ethical considerations of online fieldwork. Asynchronous online forums have been reported to be observable, relatively easy to use, accessible, and safe (Anderson & Kanuka, 1997).

Im and Chee (2006) described the practical issues encountered in implementing an online forum as a qualitative component of a larger study on cancer pain experience. They reviewed the practical issues that emerge both technically and ethically. Interestingly, they discuss various aspects relating to rigor in qualitative research when using the internet. For example, they point out that some of the participants were not consistent in their scheduled forum discussion because they frequently forgot their passwords and usernames. The participants ascribed this “forgetfulness” to their chemotherapy. This shed doubts on the credibility of the data. The asynchronous nature of the study over six months further interfered with achieving saturation, another component of study rigor. During forum interactions, people often use many different symbols, signs and abbreviations. The authors raised concerns that if there is no pre-determined agreement about language and jargon used in such forums, this may result in misunderstanding among participants and researchers which is another threat to the rigor of the study.

Voice over internet protocol (VoIP) and social media

One of the mostly used recent internet applications in qualitative research is the use of VoIP to conduct interviews. Modern technologies of VoIP further advance the internet as a medium to create the most feasible alternative to face-to-face interviews. Among these newer technologies we can find

- Skype—videoconferencing and text messaging with time response in real-time
- Facebook--text chatting and posting of images or media
- Twitter chat—text messaging

These newer technologies provide synchronous interaction between the researcher and their participants. Furthermore, they overcome the problems of losing visual and interpersonal aspects of the interaction (Evans, Elford, & Wiggins, 2008). Using these technologies, the researcher can easily record both the visual and audio interactions of the interview through simple software downloaded onto their computer. This overcomes the often impractical use of battery-powered dictaphones through which recordings were often difficult to hear during later transcriptions, and the researcher was constantly worried about battery life. In addition, both the researcher and the participants are able to remain in a “safe location” without imposing on each other’s personal space. For example, the interviewee can remain in a comfortable location of his/her home while being interviewed without the sense the researcher is encroaching on his/her personal space, and the researcher avoids the feeling of imposing himself/herself physically within the participant’s personal space. Thus, a neutral yet personal location is maintained for both parties throughout the process.

Here then, it is suggested that the previously mentioned Holt’s (2010) argument for the use of telephone interviews can be expanded to the use of VoIP as a new research medium with the additional benefit of enabling the visual in the interview setting. It is through this additional visual element offered by Skype (and alternative Webchat softwares) that the interview can remain, to a certain extent at least, a “face-to-face” experience while preserving the flexibility and private space elements offered via telephone interviews. We have outlined

below some advantages and disadvantages of these new technologies as cited by various authors describing their own experience (see Table 1).

Pretto and Pocknee (2008) found advantages for these new technologies in relation to their expense (no-cost use with both conference and chat calls); the good quality of audio, video, and chat methods; and the ease with adding callers to conferences. Disadvantages included slowing down of the interview by video, reduced quality with too many worldwide participants, occasional microphone and/or headset problems, and differences in time zones between participants. Hay-Gibson (2009) used VoIP to connect with businesses during her doctoral research and claims the following advantages.

1. Expense: calls made PC-to-PC were free
2. Time: the time taken to set up the VoIP interview was considerably less than the travel time usually taken to reach the business location
3. Availability and flexibility in scheduling the interview (i.e., flexibility of choosing to take the call at home or at one's business)
4. Practicality: the Skype VoIP system was already available within the business setting, required no training on the part of the researcher or participant, and provided a good quality audio for recording and later transcription
5. Acceptability: participants were conversant with VoIP technology and the Skype system was a conventional and familiar program in frequent daily use within the business.

On the other hand she also points out some disadvantages such as when the participants are not familiar with holding a conversation over VoIP services, when the participants show an aversion to technology, and when participants are visually or hearing impaired. The process may be more stressful than a telephone interview for elderly or infirm participants who are unfamiliar with these technologies.

Guldberg and Mackness (2009), studying the on-line learning experience, found that their participants' learning experiences were affected by the mix of technologies employed, access issues, the complexity of the online environment, and navigation. Their study employed a variety of different technologies, including the Webcrossing platform, discussion forums, teleconferences (Skype and Phone Bridge), e-mail, and instant messaging. The different technologies affected learning and participation in different ways, with synchronous teleconferencing discussion (VoIP) being highly valued for enabling a greater sense of connection with others. "I also liked that we had periodic teleconferencing. It's the closest we could come to a face to face and that just brings a whole new level to understanding" (Participant S, p. 532).

Participants of Guldberg and Mackness (2009) needed a degree of technical competence to be able to use these technologies. "I feel for beginners this was far too advanced. . . .I think a basic technology workshop—even a couple of hours—is needed" (Participant J, p. 532). Some participants indicated that it took 3 to 4 weeks to become comfortable with the technology. One participant had particular problems with Skype, which made it difficult to take part in teleconferences and this led to a negative learning experience. Another participant was affected by international time differences, which made it impossible for him to participate in teleconferences.

Saumure and Given (n.d., p. 2) provide another useful list of advantages and disadvantages to Skype. Advantages include low cost; geographic flexibility; user-friendly and easy to install; instant messaging function, useful for managing data collection problems and sharing information among participants; and easy audio-recording of conversations.

Disadvantages cited include time lags in conversation, which can break the flow of an interview; lack of non-verbal cues in audio-only mode; potential failure; and disconnections and loss of data.

Table 1. Advantages and disadvantages of new technologies for data collection in qualitative research

Attribute	Advantages	Disadvantages
Expense	Calls made PC-to-PC were free. No cost use of both conference and chat calls.	
Technical	Good quality audio, video and chat.	Slowing down of interview by video which may break the flow of an interview.
Technical		Reduced quality with too many worldwide participants.
Technical		Occasional microphone and/or headset problems, potential failure and disconnections and loss of data.
Geographic	Easy to add callers from all over the world to conferencing.	Differences in time zones between participants.
Time	Time taken to set up the VoIP interview was considerably less than the travel time usually taken to reach location	
Flexibility	Availability and flexibility in scheduling the interview and flexibility of choosing taking the call at home or other place.	Participants show an aversion to technology.
Acceptability	Participants were familiar with VoIP technology.	Participants are not familiar with technologies.
Human impairments	People who have visual impairments can take part using software that reads the onscreen text.	Participants who have visual or hearing impairments.
Human		Participants' learning experiences were affected by the mix of technologies.
Human	Relationship developed online can become strong and personal in a very short time.	The complexity of the online environment and navigation.
Human relationship	Participant enjoy using the VoIP, they felt connected.	Participants needed a degree of technical competence to be able to use these technologies.
Human interaction online	Incorporating text, audio and visual information and live interaction by sharing each other's screens to show documents or pictures.	Lack of non-verbal cues in audio mode, only upper body.
Human		The internet may be less secure, with hackers able to break passwords, databases or encryption.

Getting Mobile

Mobile devices have become multifunctional tools integrating many functions that previously required several separate devices. These functions include the use of digital cameras for capturing visual media, audio recorders and players, laptops for processing data and reading e-mails, and so forth. Now, these functions and others are being integrated into social mobile devices (SMDs) such as Smartphones and Tablets. The introduction of SMDs has created a whole new dimension to qualitative research. Participants are now able to talk, text, and send videos while commuting to work, making dinner in the kitchen, or shopping. SMDs provide an easy way to capture thoughts that can be followed up later using personal or on-line methods to capture deeper insight. While the mobile device may be a solitary research tool for main data collection (e.g., interview), it can also serve as a secondary tool due to the wide range of functionality of Smartphones and tablets (e.g., diary for further discussion or as part of a community or bulletin board, and may be a home assignment prior to a focus group meeting).

Researchers are beginning to consider the promise of their own SMDs as research tools; due to their portability and affordability, SMDs are appealing for the storage and development of research, particularly outdoor and on-the-move research.

Van't Hooft (2007) suggests that mobile devices can be used to collect information on different learning research data, such as spatial and temporal data, patterns of use, learner data (such as context-created or accessed), and connectivity data (e.g., who the learners share and connect with). Authors of a recent ethnographic study (Beddall-Hill, Jabbar, & Al Shehri, 2011) described the use of a head-mounted internet camera with voice recorder and GPS tracker to stay in touch with participants and their field notes. Later on during the study, all of these devices were replaced by an iPhone which proved to be a much more valuable tool. The iPhone's camera captured both photos and video and was much easier to handle than the digital camera. Field notes were also captured by audio recording which was quicker and easier than typing them later, given the nature and length of the observations (spanning the whole day). As quoted recently by Kuhagen (2013), "Information gathered at the spur of the moment provides the researcher with the emotions as experienced and not memorized. Take advantage of it" (para. 8).

Table 2. Software programs (Apps) for SMDs

Name	Purpose	Notes
Safari or Google Chrome	Literature searches	
Mendeley or Refwork	Manage references, quickly review portable document format (PDF) files	Create a reference list in different styles
PDFExpert or iAnnotatePDF	Read and annotate PDFs	
Dropbox -"cloud storage"	Store and backup PDFs	A network of virtual servers generally hosted by third parties, allowing access to and from multiple devices at any given time
Evernote	Create memoing, journaling, note-taking, and capturing textual, aural, visual, and temporal data	
Dragon	Create memoing and journaling	Voice recorder

SMDs allow for the capture of multiple data types, provide access to wider networks, and can make backup of data easier and faster. This helps preserve research data in an

efficient and timely manner. To facilitate the use of SMDs many special designated software programs (Apps) have been developed. Among the popular Apps one can find that Safari or Google Chrome for example, can be used to assist researchers in literature searches and Mendeley can be used to manage references and quickly review portable document format (pdf) files. Other software programs are outlined in Table 2.

Employing these Apps in qualitative research was recently described in an article on a study of real-life experiences of academics working in higher education and how these experiences may have an effect on pedagogy for ethnic minorities (Beddall-Hill, Jabbar, & Al Shehri, 2011). The authors used an iPhone 3GS to record the interviews and an iPad for memoing and collecting non-standard data such as body language and eye contact. The use of both technologies was underpinned by Apps like Dropbox for cloud storage and Evernote for digital writing and automatic synchronization on multiple devices. The use of Evernote in this study facilitated flexible storage of multiple types of data which could then be tagged and stored for convenient searching at a later stage. The cloud storage eliminated the problem of relying on the physical device's storage capacity. The use of Evernote and Dropbox alongside the devices greatly reduced back-up and confidentiality issues.

Ethical Considerations

Many authors have addressed the various ethical issues associated with internet and qualitative research (Cook, 2012; Crompvoets, 2010; Walker, 2013) and even a special website has been developed for this purpose (<http://aoir.org/documents/ethics-guide/>). One of the most common ethical dilemmas facing internet qualitative research relates to distinction between private and public spaces. The perceived level of privacy with internet can vary and may be different between private e-mail (most private), chat rooms, mailing lists, newsgroups, social networks, and web sites (least private). The participants themselves can determine what is perceived as privacy for them. For example, a group of sexual abuse survivors discouraged professionals who were not sexual abuse survivors from joining the group (Finn, 1999). Many might perceive the researchers as intruders. King (1996) quoted such a group member:

When I joined this, I thought it would be a support group, not a fishbowl for a bunch of guinea pigs. I certainly don't feel at this point that it is a safe environment, as a support group is supposed to be, and I will not open myself up to be dissected by students or scientists. (p. 122)

The question of how to obtain informed consent is difficult. Posting a request to a group saying that its communication will be monitored may influence the results or even disrupt the community. Assuring anonymity and possibility to withdraw from the newsgroup, blog, or mailing list should be sensitively handled. While many authors fiercely argue for new ethical guidelines and conventions, it is interesting to cite another perspective brought by Holge-Hazelton (2002). The author asserts that the cyberspace should be regarded as an extension of existing interaction and communication research; it should thus be possible to extend the current ethical practice to virtual space rather than to develop new ethical guidelines. Gotved (as cited in Holge-Hazelton, 2002) for example, claims that,

Cyberspace is closely connected to the space of everyday life, and even though the means of expression vary over a broad spectrum, they can at the same time be captured by more or less the same ethical guidelines. Not that we

shouldn't relate to the special, but on the contrary, that the nature of the special derives from and is defined in relation to the well-known. (p. 83)

Summary/Discussion

The pace of new technologies may find us as qualitative researchers lagging behind. Yet, there is strong suggestion that the qualitative research community is adequately responding and adjusting itself appropriately. The new technologies open the way for new innovative approaches to qualitative research, for example in data collection. It may be possible for future research participants to select the most appropriate data collection tool for themselves (e.g., SMDs, Skype, e-mail) without decreasing the quality of the research. Furthermore, the use of multiple and simultaneous methods for different participants addressing a similar research question is a new exciting possibility to be studied.

There are still some important questions that will need to be addressed in future qualitative research. For example, what is the relationship between these technologies and the various theoretical perspectives of qualitative research? Do these relationships differ between the data collection and data analysis stages of the research? Can the existing (and newer) data analysis software programs (e.g., ATLAS.ti) adequately analyse data obtained through these new technologies? Because of the rapid growth in new technologies it may be challenging for qualitative researchers to be fully aware of all the qualitative data tools available to them or in the case of a single device challenges may be encountered in recognizing and developing expertise in the full range of functionality. All these new emerging technologies introduce a whole new continent, culture, and language to the qualitative research community and call upon us to respect the many places we still do not know about.

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