

How to Use Qualitative Interviews in E-health Research

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Abstract—Qualitative interviews are much used in e-health research. It is a challenge that qualitative studies in e-health are of varying quality, and not always based in an explicit methodological framework. In this paper, we present easy-to-use guidelines for using qualitative interviews in e-health research that are firmly based in social science methodology. The paper outlines some topics and practical advice that are of special interest for e-health. We draw on the qualitative methods literature and our own experiences from e-health research, where we have used qualitative interviews for more than 10 years and in studies among several different user groups. Qualitative interviews stand out as a well-suited method to grasp the socio-technical complexity and rapid changes that characterise the e-health sector.

Keywords-Method; qualitative; interview; e-health; telemedicine.

I. INTRODUCTION

E-health research is characterised by studies of the implementation of novel technology in health care. In line with the small scale and explorative nature of many e-health projects, qualitative methods are well suited and frequently used. The benefits of qualitative methods in e-health research have been underlined in the literature [1][2].

In this method paper, we stick to the concept *e-health* and discuss aspects that are especially relevant for this field. We would like to emphasise that we think of e-health in broad terms. The points we make are relevant for all qualitative studies within the field of digital technologies in health care, and thus apply also to studies defined as telemedicine, telecare, telehealth, m-health etc.

The in-depth interview often plays a crucial role in qualitative e-health research, whether as a singular method or along with observations. The interview method is well suited to grasp complexity and individual differences [3]. The human users of e-health technologies are not part of one singular group; rather, there are multiple user groups and differences among them. There are patients in different stages of illness and with different diagnoses; caregivers; health professionals with various institutional affiliations, educations and experience backgrounds; and administrative personnel and IT advisors with different functions and depths of understanding of the technology. In order to understand

when, how and why people end up using or not using e-health, we need to understand their detailed experiences and reflections on e-health technology. In other words, user experiences need to be studied in-depth and on their own premises.

The qualitative interview stands out in the field of e-health studies with evident methodological advantages. It is well suited to document not only user experiences from hands-on use of the technology but also reflections on non-use. Through interviews you can gain knowledge on everyday work and patient practices that are not striking or noticeable during observation of user situations. As an example, interview studies have revealed that both patient and professional users of e-health relate to technology as a “security line”, and thus incorporate it into their everyday lives even when it is not used [4]. Qualitative interviews can provide insight into how users actually reason, as far as the e-health technology is concerned, i.e., how they construct meaning around their everyday habits and work (for professionals) [5], or health practices (for patients and their families) [6][7]. Open-ended questions and flexibility in the communication between researcher and informant, combined with the researcher’s continuous efforts to be active, but never paternalistic, allows for the informants to present in-depth stories [8]. Thus, in qualitative interviews with e-health users, unexpected accounts and new angles can be revealed; these angles and understanding may differ from management, design and policy understanding of what technology is, or is supposed to do [9].

However, it is a challenge, that existing studies relying on qualitative interview-methodology in e-health are of varying quality, and not always based in an explicitly scientific methodological framework. As e-health is a multidisciplinary research field, the e-health researcher is confronted with multiple scientific ideals and various approaches to the process of data production. The qualitative in-depth interview and the techniques used to conduct such interviews should not be confused with other kinds of interviews or scientific methods, e.g., the professional authority and aim to give advice that is present in the clinical patient interview must be avoided; the same goes for the positivist strategies to obtain objectiveness that permeate surveys and strictly structured questionnaire-like interviews

[10]. In a qualitative in-depth interview, an exact repetition of wording and order of questions is not desirable, as it risks concealing the particular subjective experience of your informant, which is what you want to find and study.

The aim of this paper is to contribute with practical advice and suggestions for method reflections in e-health interview studies. In Section 2, we present an easy-to-use guideline for how to use qualitative interviews, that is based in social science methodology. The three-phase guideline deals with the planning, carrying out and analysis of interviews. Our paper highlights aspects from our own and others' empirical research that are of special interest for e-health. We round off with some reflections on the use of qualitative interviews in this field. We draw on general insights from the social science methods literature and, more specifically, on the interpretative and constructivist traditions [3][8][10].

II. QUALITATIVE INTERVIEWS IN E-HEALTH RESEARCH: A THREE-PHASE GUIDELINE

There are three main phases in an interview study: the planning, the actual carrying out the interview and the analyses of the empirical material.

A. *Planning Your E-health Interview*

As a first step, you have to reflect on your choice of methods and make sure that the in-depth interview is an appropriate method to answer your research question. As can be seen in the literature, the qualitative interview can be suited for all phases of e-health, from feasibility studies [11][12], through processes of participatory design [13][14], and to evaluation and action research [15][16]. The choice of research methods is always linked to the scope and objective of your study. If your study objective is to understand user experiences, local practices or human constructions of meaning of e-health technology, then the qualitative interview should be considered. When you have decided that you want to interview users of e-health for your study, and you have the methodological arguments for choosing this method over others sorted out, you are ready to start the practical planning.

In the planning phase, there are three main issues to work on: who you want to talk to; where you want the interview to take place; and what topics you want to include in your interview guide.

1) *Who to interview:* When your method is based on subjective accounts, finding the right informants is crucial. It is important to plan the process carefully and reflect on whom you want to talk to and why. Again, you need to look at the scope of your study.

A common strategy in qualitative research is theoretical sampling, where your aim is to recruit informants that will give you the most and best information on your specific study questions. This is different from representative sampling, where you want to recruit a sample reflecting the population that you are studying. Thus, if you are looking for barriers to e-health implementation and have decided to use qualitative interviewing as your method, non-users will be valuable informants. An example can be found in

Sandaunet's study of an online self-help group [17]. She explained how some users experienced a challenge of fitting in and that there were several barriers to use. These findings could be revealed only through the analysis of her sample of *drop-outs* from this particular e-health service [17]. Likewise, for a study on how e-health technology is intervening in existing work practices, the most frequent users will likely provide the most interesting input. This was the rationale behind Savolainen, Hanson, Magnusson and Gustavsson's decision to only include users in their sample who had used a videophone service for frail elderly people at least six times [18]. However, as suggested in the interview literature, when you are assessing potential informants, it is also important that you try to get a range of views on the topic of your study. Those few informants who could potentially express different or contrasting statements or experiences than others can often be central to modifying your assumptions, hypotheses and theories [3].

When you have decided on your preferred sample the next step is to find suitable informants. Depending on the specifics of your study, we advice you get in touch with the responsible management for the e-health service you are interested in. This can be, e.g., a project manager, hospital directors, clinicians, patient organisations or others. Such collaborations are crucial for gaining access to the names and addresses of potential informants, for distributing information about your study, and for discussing practical procedures for the recruitment of informants. There are no strict rules with regard to exactly who you may or may not include in your interview study. However, in e-health, research and the development of new technologies are often closely connected processes. This requires special attention to the interrelationship between researchers, developers, health policy and management, commercial interests and informants. You may want to interview representatives from various groups of actors. As in all research, the researcher has the responsibility to ensure research of high ethical quality.

In qualitative interviewing, there is no standard answer to how many informants you need. A common strategy is snowball sampling [19]. This strategy means you start out with a few key informants and then either asks them to suggest who else you should talk to, or you use the information in the first interviews to decide on new informants who could elaborate on or oppose your first findings. You continue sampling and testing emerging themes with new interviewees up to the point of analytic saturation; this is when you realise that no new themes are emerging, but that all that is said in the last two or three interviews has already been mentioned by previous informants. However, if your interview study is part of an e-health pilot and there are only a limited number of users and involved parties, we suggest you aim to interview all of them.

After having decided whom you want to talk to, you will have to approach the person and check whether he or she is willing to do an interview. Most countries have ethical standards that need to be followed when making contact, and some require an ethics committee's approval of

your recruitment plan. In general, we recommend you make the first contact in writing and include a request for the informants to reply within a week or two. This will ensure that the informant has time to reflect on your request, and does not experience any pressure to participate, but actually does so voluntarily. Before you start the interview, you should gather the informant's written consent. If you are planning to recruit patient users of e-health, it is important you take the necessary steps to avoid deceptive practice. You should be cautious that you do not approach the patients in such a way that they interpret the interview as part of their relation to their doctor or treatment plan. This can be a challenge, as patient lists are protected through privacy laws, implying that you will often need to collaborate with clinicians to get access to potential patient informants. For example, when recruiting patient informants for a study of a videoconference service in psychiatric emergency care, we had to let the treating clinician do the practical recruitment. In this case, we underlined, in both written and oral information, that participation was voluntary and that if they should choose to withdraw this would not have any consequences for their further treatment [20, 21].

2) *Where to do the interview:* The locations you choose for your interviews will influence the atmosphere and, thus, to what degree the informants open up to you. In addition, there are several practical considerations to make, like economy, travel distance, timing and the option to use videoconference equipment, telephone or e-mail. These all have to be weighed with care.

In e-health research, we recommend that you conduct interviews in the location where the technology use takes place (or is supposed to take place), when possible. This will help you frame the interview and draw the informants' attention to your topic, which is e-health. When the interview takes place close to the technological device, the informant can show you how he or she uses it while you talk, as well as explain experiences with the functionality. If you are able to have such a practical exercise during your interview, this can often give you an entrance to ask more specific questions about the user's relationship with the e-health application. In one of our studies, the aim was to examine patients' use of home-based e-health services; hence, we decided it was an advantage to conduct the interviews in the patients' homes [7]. This proved to be a good decision, as we discovered something we had not thought about in advance: that the patients related to the e-health service even when they did not use it. They thought of it as a safety alarm; thus, it influenced how they handled illness, even when the service was not used. This particular service was similar to e-mail, and opened for the patients to send requests at any time. It guaranteed a reply from a doctor in three days. For the patients, just "knowing that the service was there", was reassuring and eased their self-management of treatment plans and medications. However, in studies where the informants use an e-health service for sensitive or emotional issues, it is crucial to conduct the interview in a location where you can talk undisturbed and without risk of putting the informant in an embarrassing

position. For example, in a study of the experiences of adolescents who had a mentally ill parent and used an Internet-based self-help group for assistance with that situation, we chose to conduct the interviews at an office and after ordinary work time, instead of their homes or in a public place in respect of the informants need for privacy [6].

The location of the interview has to be assessed in each interview situation and accommodated to fit the individual interviewees. If it is possible, you should offer the informants a choice and welcome their suggestions as to where the interview should take place.

3) *What topics to include in the interview guide:* Before meeting with your informant, you have to consider what topics, themes and issues you want to address in the interviews. This is what you outline in your interview guide. The interview guide is a template for how to structure the conversation that is to take place between you and your informant.

Several strategies exist for structuring the interview. For e-health research and evaluations, we suggest the semi-structured interview. In a semi-structured interview, you have a list of pre-defined topics or themes that you want to address in-depth, but the order of themes can vary, and some interviews may comprise more (or less) topics than originally planned [3]. The semi-structured interview is different from the structured interview (where the same list of pre-defined questions is asked to every informant) or the unstructured interview (where you talk without an interview guide). It is not uncommon to have two guides: one with a list of themes/topics, and one with a list of more detailed questions to fall back on in case your informant does not elaborate as much as you hoped. The concepts "semi-structured interviews" and "in-depth interviews" are sometimes used intertwiningly.

In e-health, the researcher is most often interested in studying a change that has happened: for example, the introduction of a new technological device or service in a social setting (such as the work place, an organisation or in a patient's home). Further, if your study is an evaluation, very often you will have observed variation in user patterns during a test or pilot phase. In your research, you want to follow the technology through everyday routine settings and gather various users' subjective experiences.

Some suggested topics for an interview guide addressing users' experiences of e-health technologies are: (1) what the informants' expectations of the e-health service were prior to it being introduced; (2) actual practical experiences with the technology, including benefits and challenges, non-use of the application (and why), and when and in what situations e-health was used; (3) if the e-health service or technology interfered in other work-/health-related processes (and how); (4) if there were any other uses or relations to the technology than the user had expected; and (5) how the informant would assess the actual outcomes of e-health as compared with the expectations held in advance.

It is important to underline that a main advantage with the in-depth interview method is its flexibility, in that your

interview guide can be changed and adjusted based on emergent themes throughout the process.

When you have designed the initial interview guide, we recommend that you do a test interview with somebody who could be a potential informant, e.g., a health professional, or a colleague in e-health. After the test interview, you can adjust your topics and the wording of questions in order to avoid misunderstandings and ensure that your guide covers the purpose of your study.

There are various guidelines for qualitative research that can be of value when planning your study, e.g., the Critical appraisal skills programme (CASP) qualitative guidelines [22]. Researchers need to assess guidelines according to national, disciplinary and other requirements.

B. Carrying Out the Interview

An in-depth interview is demanding and requires hard work from the researcher. During the entire interview, you constantly work on creating a good trusting atmosphere, as well as developing the structure and deciding how to follow up on your informant and his or her input as you go along. The following aspects are interrelated.

1) *Atmosphere*: First, you need to introduce yourself in an honest and trustworthy way. You should start by stating the aim of your study, as well as your own relation to the e-health service or application that is to be discussed. You have to emphasise to the informant that, whatever your background and attachment to the application, you are interested in their subjective experiences, and that they can withdraw from or abort the interview at any time. Underline that you will treat the information confidentially and ensure the informant's anonymity when reporting the results. This has to be stated even if you have made these points in your invitation letter. Our experience is that some users of new e-health technology can feel they have to apologise if they have not used the technology as expected, feel embarrassed if they found the technology difficult to use or withhold negative experiences with the e-health technology. Hence, you need to ensure that you tell the informants that you need their individual experiences, including the advantages as well as the challenges, and that there are no correct answers. If you want to record the interview, make sure you ask if this is OK before you turn the recorder on.

2) *Structure*: A good way to build trust and a comfortable atmosphere is to start with questions related to simple, harmless facts, such as age, job, residence, education and how much experience the informant has with e-health. Afterward, go further into the essential topics according to the scope of the study and your interview guide.

To wrap up the interview, it is important you first let the informant finish his or her reflections on the core topics, and then ask some simple and non-emotional questions. Examples of such can be whether the informant imagines e-health will be much used five years from now, if he or she has any feedback or advice for the developers of this technology and, finally, if there are any other issues the informant wants to bring up. A neutral and non-emotional completion means that the informant leaves the interview

with a satisfied feeling. This is always important, and especially so if your topic involves vulnerable groups like psychiatric patients or their close relatives [6][21].

3) *Follow up with your informant*: In a semi-structured interview, you should be open to include topics that are not on your interview-guide. The interview guide is to be applied as support: as a checklist. The core characteristics of a good in-depth interview researcher is his or her ability to follow the informant's talk, allow use of the interviewee's own words and logic, follow up on the informant's themes and avoid organising the interview strictly according to the predetermined list of questions [3]. Dare to let there be silence and do not interrupt the interviewee. Still, be aware that a passive interviewer can create a powerful constraint on the interviewee to talk [10]. The interviewer has to evaluate the need for active communication during each interview. If your informant talks of e-health in general terms, make sure you ask him or her to give examples for each statement. In our experience, this can often be a challenge, especially when the informant is a manager, bureaucrat, policy maker or other who is used to talk in broad terms and relate to e-health on a general level [23].

Some practical advice is to leave your list of questions out of sight until you come to the end of the interview, and only then bring it out and explain to your informant that you want to check the list to ensure that you have covered all the topics you wanted to address. The goal of a qualitative study in the e-health field is to get in-depth insights into individuals' experiences, and it is interesting to find individual variations and nuances in the use of an e-health service to get the whole picture.

Finally, we recommend you take notes, even if you make a recording. Notes are useful not only for the analysis, but to follow up details and aspects of special interest during the interview.

C. Analysis and Report

In contrast to studies based on questionnaires and structured interviews, you will not have the categories you want to compare ready prior to your data gathering, or rather, the production of empirical material that happens during the interviews.

In e-health, a qualitative analysis is about creating categories that reflect the empirical material in a truthful way and that contribute to generating new understanding of the users' stories, as well as the story of the e-health application and its relation to the human actors you have met. A common strategy to ensure an analysis that reflects the empirical material in a truthful way, is that a team of researchers start out independently, producing separate lists of categories. The comparison of categories and further conceptual development can then be a joint second step.

The qualitative researcher often alters the research questions during the research process, as well as in the final stages of the analysis. This practice places a huge responsibility on the individual researcher. There is no pre-defined scheme, no methodological or statistical program that can ensure the reliability and validity of your data. All

qualitative researchers and research teams are responsible to ensure an active reflexive treatment of the data in all stages of the research process [24].

Be aware that a qualitative analysis often takes much more time than a statistical analysis, where most of the reflexive research work is already done before data is gathered. If you have more than about 20 interviews in your sample, you might want to consider using software for qualitative analysis.

In-depth interview analysis is a constant juggling of interview transcripts or recordings, research literature, and reflections on your method and research question. The product of your analysis will be a list of categories and the comparison of these, often presented in a table.

In qualitative research the analysis of empirical material and the writing of the research report, or paper, will in practice be parts of the same process. As you go from preliminary analysis to drafting your research report, it is important to ensure the informants' anonymity and confidentiality. Pertinent biographical details must be concealed in the quoted material used in the published report.

III. REFLECTIONS ON THE USE OF QUALITATIVE INTERVIEWS IN E-HEALTH

Interviews are well suited to gather knowledge on users' experiences and constructions of meaning, as well as the embedding of e-health in their social environments. User involvement is crucial in the e-health design and development processes. This is well acknowledged, and participatory design is now a preferred method in e-health development work, as well as in health technology assessment [13][14][25]. Nevertheless, a lot of e-health projects and pilots still fail to be implemented as routine services after the development period [26]. We argue that this challenge needs to be addressed by the e-health community through a stronger, more in-depth focus on users' experiences and the local construction of technology. Methodologically, this implies more in-depth interviews. The technology implementation process needs to be followed closely over a longer period of time: that is, longer than the design and development phases that often constitute the project period in e-health research, and where observation fieldwork is often carried out. What happens after the e-health development and project teams have "left the building"? When e-health services and technologies are released for everyday usage, they meet with complex networks of humans and technologies. In most cases, these existing networks surpass the limited environments of the design process.

IV. CONCLUSIONS AND FUTURE WORK

There is no doubt the qualitative interview will continue to hold a strong position in e-health research, as a stand-alone method or in combination with other methods. For the knowledge production in the field, it is important that the method is thoroughly applied when used. Thus there is a continuous need for developing and reflecting on the interview method to ensure high quality e-health research. In

this paper we have presented a three-phase guideline for how to use qualitative interviews in e-health research. The guideline is built on social science methods literature as well as our own experiences from using interviews in e-health research. Some practical advice and suggestions for e-health researchers interested in this method have been outlined. Qualitative interview stands out as a well-suited method to grasp the socio-technical complexity and changes that are taking place in an increasingly digitalised health care sector.

ACKNOWLEDGMENT

We would like to thank all the informants who so kindly have shared their time and reflections with us through our 10 years in e-health. Each and every informant has contributed to our empirical work and our formation as qualitative researchers.

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