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Conducting Qualitative Research Study: A Step-by-Step Process

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***Abstract*— Recent years have seen an increase in the acceptance and recognition of engineering education research (EER) on a global scale. In particular, over the past ten years, EER has increased in India. Since EER is still in its early stages in India, it is important to comprehend the various EER research methodologies so that the most appropriate ones can be used when carrying out EER-related activities. Three methodologies are used in EER: quantitative, qualitative, and mixed. This paper's goal is to provide a thorough explanation of all the steps used in qualitative research methods for EER, along with relevant examples. Qualitative research is an investigation of a research topic under consideration by collecting non-numerical data to understand perceptions, opinions, experiences or beliefs of individuals or group of individuals. In qualitative research studies, data is collected through interviews, observations, focus group discussions, studying documents, etc. Qualitative research methods are used to fundamentally gain a unique in-depth understanding of a research topic which otherwise is difficult to explore through surveys used in quantitative research.**

The various steps involved in a qualitative research study typically consist of (1) concentrating on your interests and choosing a research topic, (2) framing research questions to be investigated, (3) conducting a thorough literature review, (4) choosing/creating an appropriate framework to guide the study, (5) designing the research, (6) choosing the research site and research participants, (7) collecting data, (8) analyzing the collected data, (9) documenting significant findings, and (10) publishing results. Qualitative research has many benefits, including the collection of rich data, detailed evaluation of the data, an open-ended research process, the development of specific insights, etc. As a process document to direct themselves when conducting qualitative research projects, this paper will be helpful to beginning engineering education researchers.

Keywords—coding, engineering education research, interviews, interview protocols, novice researchers, observations, qualitative research

I. INTRODUCTION

Engineering education research (EER) is in its infancy in India, and Indian engineering education researchers require direction and support to carry out EER successfully. For instance, the study (Kittur, Coley, & Kellam, 2020) describes in detail how Indian faculty members engage in conducting EER; the study also found that these faculty members are unaware of the overall process of conducting EER and do not adhere to all the necessary steps. As EER is well established in the USA, a different study (Kittur & Brunhaver, 2020) found that Indian faculty members' self-efficacy in conducting EER was relatively lower than that of faculty members in the US.

Most of the published papers do not adhere to all the necessary steps in the research process, according to a

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preliminary study conducted to assess the overall quality of the recently published research papers in the Journal of Engineering Education Transformations (JEET). The papers were evaluated using scholarly teaching and scholarship of teaching as a framework (Richlin, 2001). A few of the observations and conclusions were as follows: a gap in the literature was not identified; the literature was not cited; there were no research questions; there was no theoretical framework; there were insufficient data collection and survey instruments; the analysis was limited to student feedback and test/exam results; etc. Those published papers in JEET primarily deal with curriculum development as well as teaching and learning. This research needs to shift its emphasis to more rigorous research so that researchers in engineering education in India can begin to investigate and contribute to the direction of rigorous research in EER.

EER is described as "the area of research that generates knowledge with the aim to define, inform, and enhance the education of engineers" (EER, 2020). Five key areas of study are available in engineering education (Colloquies, 2006; EER, 2020): Research on engineering knowledge and thinking in present-day and foreseeable social contexts is known as engineering epistemologies. Engineering learning mechanisms: research on how learners in the field of engineering acquire skills and knowledge. Research on the instructional culture, institutional framework, and epistemology of engineering educators is known as engineering learning systems. Research on the relevance of our profession and how diverse human talents contribute to solutions for social and global challenges is known as engineering diversity and inclusiveness. Engineering assessment is research that focuses on the creation of evaluation techniques, tools, and metrics to guide engineering education practice and instruction.

EER is not the same as engineering research, and the majority of researchers who conduct it have formal training in engineering research rather than EER (Borrego, 2007). As a result, this paper will act as a fundamental manual for researchers who are interested in carrying out EER successfully. This paper aims to inform novice researchers about the various steps involved in conducting EER and where to look for the necessary information rather than serving as training material for them. Three methodologies are used in EER: quantitative, qualitative, and mixed. As EER is still in its early stages in India, it is important for nascent engineering education researchers to comprehend the various research methodologies in EER in order to select the most appropriate ones when carrying out EER-related activities.

Only qualitative research methods in the study of engineering education are discussed in this paper. Readers are directed to article (Kittur, 2023) for a detailed discussion on quantitative research process. Research studies that aim to respond to research questions about perspectives, meaning, and experience from the viewpoint of research participants use qualitative research methods (Borrego, Douglas, & Amelink, 2009). The data collected in qualitative research studies is non-numerical. The data collection in qualitative research is through 'in-depth interviews' to gain insight about an event, condition, or experience from an individual's perspective; 'semi-structured interviews' are used when research under investigation is exploratory, and participants' responses are used to generate further questions; 'focus-group discussions' to investigate the perceptions/opinions on a certain topic from a set of participants; and 'analysis of texts and documents' includes personal documents, websites, government reports, diaries, articles, etc. to gain supplemental information about the participants' experiences/perspectives related to the research topic.

Qualitative research studies involve systematic collection of data, followed by organization, and interpretation of textual data, visual data, and/or verbal data. The quality of data collected is often an important concern for all qualitative researchers and there exists methods to evaluate and guidelines to assess the qualitative research (Kitto, Chesters, & Grbich, 2008; Young, Fisher, & Kirkman, 2015). Reliability and validity are important and contentious terms in qualitative research. Qualitative researchers focus on research integrity and robustness, and verification of the overall qualitative research process. A widely accepted and common understanding about conducting qualitative research is that it should be intelligibly described, important, ethical, and use rigorous and appropriate methods (Cohen & Crabtree, 2008). In qualitative research, a researcher is considered as an instrument and the subjects are the research participants contributing to data collection, interpretation, and analysis. As stated earlier, qualitative researchers consider the integrity of the work to be the most crucial aspect of their research, and this is presented in different articles by different researchers as consistency, credibility, trustworthiness, and applicability (Leininger, 1994).

Using qualitative research techniques, a wide range of topics in engineering education have been examined. For instance, a study was created and carried out to comprehend how professors working in conventional engineering programs engage in and carry out research on engineering education (Kittur, Coley, & Kellam, 2020). The authors of this study employed narrative methodology, semi-structured interviews, and qualitative research to gather their data. In another study (Kittur et

al., 2021), a qualitative study was developed to understand the integration of design thinking into engineering curriculum. The authors conducted interviews of 45 to 60 minutes, and they used deductive coding approach for the data analysis. Additionally, case studies were used to gain further insights. The Journal of Engineering Education (JEE), European Journal of Engineering Education (EJEE), IEEE Transactions on Education, International Journal of Engineering Education (IJEE), Australasian Journal of Engineering Education (AJEE), Advances in Engineering Education (AEE), etc. are some of the publication outlets that readers can visit for additional articles. Websites for these and other EER journals can be found online (REEN, 2018).

II. QUALITATIVE APPROACHES TO RESEARCH INQUIRY

Four distinct qualitative research methodologies can be identified (Creswell, 2007), and these methodologies are described below.

Narrative Research: This approach offers detailed insights of research participants' lived experiences. Narrative research focuses on individual's experiences of specific events than perceptions, opinions, or beliefs. This method aims at collecting participants responses to events in much depth in a story form by recounting the moments of participants lived personal experiences of concrete events. This approach provides meaning to the individual's lived experiences by presenting insights into the trajectory of events across time. The stories are recorded using observations, documents and images, interviews, etc., and then documenting the experiences in a chronological order that gives meaning to those lived experiences. This research approach follows an informal way of collecting data and does not follow a rigid process. One of the challenges of narrative research is it involves gathering extensive information/data from the research participants.

Phenomenology: While narrative research studies on an individual's lived experiences, the phenomenological research focuses on investigating the meaning of several individual's lived experiences of a phenomenon or a concept. This research approach describes the common aspects of experiences of participants including grief, anger, being/feeling left out, insomnia, etc. The phenomenological approach is best to be used for research studies focusing on understanding the individual's common or shared experiences of a situation, process, or phenomenon. This in turn will help formulate procedures or policies and gain critical insights about the phenomenon. Understanding the philosophical assumptions required by the phenomenology is significant and these must be acknowledged by the researchers.

Grounded Theory: Unlike the narrative and phenomenology research approaches, grounded theory looks beyond the description of the data to discover or generate a theory grounded in the data. The outcome of this approach will provide a framework to be used in future research by other researchers in the area. As a theory/framework emerges from the data in this research approach the inquirer is required to collect data from many participants (20 to 30 or 50 to 60 interviews). In addition to the interview data, other forms of data including audio-visual materials, observations, documents, etc. could also be collected to ensure that proposed theory or framework is fully developed. One of the major challenges with this approach is the researcher's ideas, thoughts, assumptions, notions, etc. can bias the development of emergent theory. These biases need to be acknowledged such that they do not influence the analysis.

Ethnography: The grounded theory approach focuses on developing a theory by examining the experiences of individuals who may not be in the same place or have been interacting with each other on a frequent basis. In ethnography research approach, a researcher builds on the grounded theory approach with an additional focus on entire cultural group. The assumption is that the research participants' group has had several opportunities to interact with each other in a community setting over time. An ethnographer focuses their analysis examines the shared patterns of beliefs, values, and experiences of a group sharing culture. In this approach, the researcher makes observation of the individuals and the group wherein the researcher is fully involved in the day-to-day lives of the research participants. The basic requirement for an ethnography study is the researcher's awareness of the cultural anthropology and the meanings of the associated social-cultural system.

Case Study: The ethnography research investigates the experiences, values and beliefs of a cultural group and does not study the problems or issues of such groups or individuals in those groups as a specific case. Hence, the case study approach examines the issues with one or more cases within a system with boundaries. This research explores one or more cases over time with a detailed data collection approach from different sources including audio-visual material, observations, reports, documents, and interviews. Through this exploration, the researcher documents a case description and related case-based themes. The participants in this research approach could be from a specific site (single unit) or multi-sites (several units). To gain an in-depth understanding about a specific research topic, it is recommended that researchers use a single site as using multi-sites may dilute the overall analysis. Also, when using multi-sites approach there

isn't a defined number about how many sites should be included; however, it is recommended to not go beyond four to five cases.

III. DIFFERENCES BETWEEN QUANTITATIVE AND QUALITATIVE RESEARCH METHODS

There are several distinct differences between quantitative and qualitative research methods and the same are described in this section. Table I below presents the differences based on various criteria including purpose, approach to inquiry, hypotheses, sampling techniques, sample sizes, research setting, design and method, measurement, data collection, data analysis, and data interpretation.

TABLE I
COMPARISON OF QUANTITATIVE AND QUALITATIVE RESEARCH METHODS

	Quantitative	**Qualitative**
Purpose	To predict/explain a phenomenon using numerical data	To gain insights and/or explain a phenomenon using narrative data
Approach to inquiry	Focused, objective, outcome-oriented	Holistic, subjective, process-oriented
Hypotheses	Testable, specific, stated prior to the study	Evolving, tentative, based on the research study
Sample size	Generally large (at least more than 50)	Generally small (5 to 20)
Sampling	Random	Purposive
Measurement	Standardized numerical measurements	Non-standardized non-numerical measurements
Data collection	Surveys, questionnaire	Interviews, focus groups
Data analysis	Statistical tests	Textual analysis
Data interpretation	Conclusions are generalizable	Conclusions are tentative and subjective to change
Design and method	Inflexible, structured, specifics planned at the beginning of the study	Flexible, subject to change as the study evolves

IV. DIFFERENCES BETWEEN QUANTITATIVE AND QUALITATIVE RESEARCH METHODS

The steps necessary to conduct qualitative research, as shown in Fig. 1., are thoroughly explained in this section. When conducting a qualitative research study, each of the steps mentioned is crucial and ought to be followed. Examples are given at particular steps, providing more clarity and assisting inexperienced researchers in this field.

A. Concentrating on your interests and choosing a research topic

Choosing an area of interest is the first and most important step in conducting any kind of research in any field. You should take your time in identifying and choosing a research area that most interests you because undertaking a research project is a serious commitment that requires a lot of your time, energy, and effort. You might begin with a broad research concept in mind and ultimately focus your research efforts. The research topic that you ultimately want to study will be finalized as the research area is narrowed.

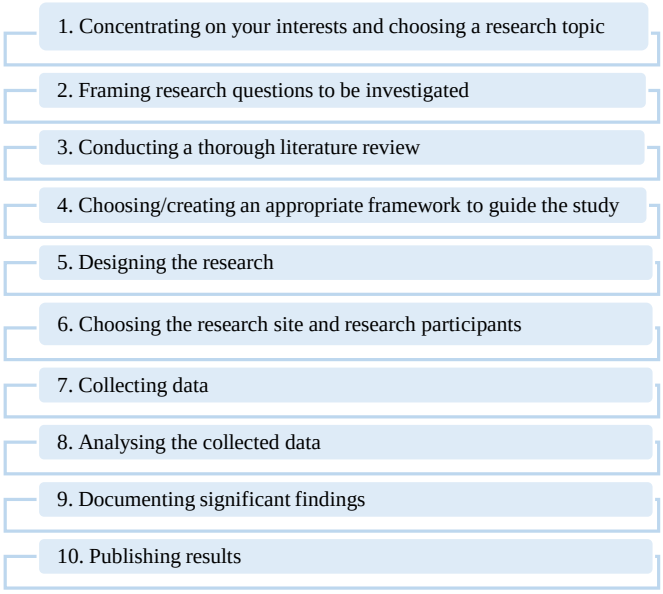

Fig. 1. Steps in the qualitative research process

B. Framing research questions to be investigated

In any research study, the research questions are a crucial component and the first active step because they shape and direct every aspect of the study, including the methodology, literature review, data collection, and analysis. Therefore, it is crucial and helpful to formulate appropriate research questions early on in a research study. The time is right to formulate the research questions now that the research topic has been decided upon. Based on the data gathered during the next step's literature review phase, the research questions can be modified and improved. For instance, "How can the elements of design thinking be integrated in curriculum to provide appropriate skills that support interdisciplinary and integrative efforts to meet the needs of 21st century life?" is one example of a research question from a qualitative research study. What are physics instructors' opinions on physics objectivity, and how do these opinions relate to the use of culturally relevant pedagogy? (Mathis et al., 2023). Likewise, "How do faculty members

in traditional engineering programs construct, interpret, apply, and communicate new knowledge in engaging in engineering education research in India?" (Kittur, Coley, & Kellam, 2020).

C. Conducting a thorough literature review

It is a good idea to start reading the literature to learn more about your field of study and what other researchers have contributed to it after selecting a research topic and creating a draft research question or questions that you hope to find answers to. The literature review is a crucial component of a research study because it gives readers (and other researchers) a succinct overview of the subject matter, shows that the researcher (you) is an expert on the subject, and justifies your contributions to the body of existing literature. You can find the gap that you might want to fill with your study by conducting a thorough review of the literature, and that gap becomes the subject of your study. In order to set an appropriate context for the study and to situate your work in the larger context of the existing literature, it is advised that beginning researchers devote enough time to the literature review phase.

A survey of academically published works on the subject of the research constitutes the literature review. It consists of five simple steps: searching for the necessary and pertinent materials/sources, assessing the sources found, identifying key insights, conclusions, and gaps, creating an outline or structure, and writing the literature review. The different databases that researchers can explore to find articles include Google Scholar, IEEE library, Scopus, Science Direct, Web of Science, Engineering Village, etc. Search terms should be intentionally chosen to pick articles from different databases. When conducting a literature review, it's crucial to take care not to simply summarize the articles but rather to analyze, synthesize, and critically evaluate the data in order to present a comprehensive picture of the subject at hand.

In addition to the advantages mentioned above, the literature review aids in exploring and comprehending the various demographic traits and variables that may be important to your study. Reviewing the articles in the literature will walk you through the different variables and factors that influence (positively or negatively) some aspects of the topic of your research. Based on the review and scope of your study, you might want to include or exclude some of them. A few instances include prior teaching and industry experience, the quantity of EER-related conference and journal papers that have been published, the number of years that a faculty member has participated in EER activities, etc. These and other variables have a significant impact on how faculty construct, interpret, apply, and communicate knowledge when conducting EER (Kittur, Coley, & Kellam, 2020). The following section provides information on selecting a framework.

D. Choosing/creating an appropriate framework to guide the study

Frameworks are crucial when conducting research studies, just as they are when building a house (Creswell, 2007). Frameworks offer a typical framework or boundary that enables researchers to remain constrained and stay on topic. A research study without a framework, in the words of one of my colleagues, is like a blind person trying to walk without a cane. Therefore, it is advised that those who are new to this field find suitable frameworks to use as a roadmap for their research. Frameworks assist researchers in deciding how to perceive, understand, and interpret data. Additionally, explaining the framework in the research articles aids in clarifying the researcher's viewpoint and the study's overall context for readers and reviewers. For example, in the qualitative study designed to understand how the novice faculty housed in traditional engineering programs conduct engineering education research, the Boyer's model of scholarship was used as the framework (Kittur, Coley, & Kellam, 2020).

This article describes the method that can be used to either select or develop a framework for your study. Start by highlighting important words and ideas from the research questions. You can find related information about ideas and theories used in studies like yours by using the key terms and concepts. You might decide against conducting another thorough literature review if the one you've already done (as described in step 3 above) contains the data you need to support the use of a suitable framework. If not, you will need to return to the literature, but this time the emphasis will be on locating data pertaining to frameworks. Next, evaluate the theories and concepts and explain how they relate using the information you have gathered. By doing this, you are analyzing and contrasting the strategies employed by other researchers in comparable studies. Last but not least, it is a good idea to discuss why a particular theory or concept fits your research well. It's also crucial to discuss how it specifically fits in your work. Additionally, it's important to describe how you plan to use those concepts or ideas in your research project when selecting a framework.

E. Designing the research

The next step is to plan and design the research study using the research questions to be investigated, a thorough literature review, and a framework to serve as a guide for the research study. Finalizing the approaches, you will take to tackling the research questions at hand is

something you must do in this phase. The discussion in this paper will be restricted to designing interview protocols and qualitative research techniques. Brainstorming and determining which data will be useful in addressing the research questions are typically the key steps in this phase. Let's assume for the time being that we want to create a qualitative study with an interview protocol.

The following step is to see if there are any interviewing protocols that have already been conducted in previous literature reviews that are related to the research topic. If the literature offers interview protocols that are comparable to what is desired in the research study, it is necessary to critically review the interview protocols in order to determine whether they are sufficient to collect data on their own or if additional modifications, additions, and/or revisions are required. The examination must be used to determine the best course of action. The researchers will have the opportunity to design and develop a new interview protocol that must be well-grounded in the literature if there are no existing interview protocols to collect the necessary data for the study under consideration.

Following a thorough literature review, the first step in developing a new interview protocol is to comprehend the needs of the research study. Interview protocols might include a few demographic questions and a set of interview questions related to the study. After the design of interview protocol, it is a good practice get it validated from experts in the field (for example, researchers with similar areas of research, qualitative researchers, etc.) and potential participants. A pilot interview must be conducted with at least one potential participant to ensure that the data collection is as required to answer the research questions. The interview protocol needs to be changed in light of the feedback from the experts and the potential participant(s). Now, the interview protocol will be ready to be used to collect qualitative data.

An email invitation must be sent out to the potential participants explaining the research study. In addition to the description of the research topic, this email should also include details like participant benefits, incentives, participation risks (if any), etc. Like in the quantitative research studies, it is a requirement to take participants' consent if they wish to be a part of the research study. After receiving the consent from the participants, an initial screening survey must be shared with them which includes questions corresponding to their demographic information, prior experiences (number of years or yes/no type of questions) related to the topic of research, etc. These survey responses are analyzed and the participants that fit the research study will be invited to participate in the interview. Readers are directed to a few examples from the literature that included interview protocols in the qualitative research studies: Kittur, Coley, & Kellam, 2020; Kittur et al., 2023; Mathis et al., 2023; etc. Exploring and reviewing several other qualitative research studies will help readers further understand the design of interview protocols.

F. Choosing the research site and research participants

The research site and participants vary depending on the need and nature of the research project. For instance, if a study's context is centered on a laboratory setup, the lab becomes the research site, and the people who use that particular lab become the study's participants. A maker's space or a school can be chosen as the research location for field experiments, and the field experiment participants will act as research participants. The research site may be more diverse (engineering institutions in a particular state or country) depending on the study's topic, and participants from those sites will be taken into consideration as research participants.

Through an initial demographic survey or by using your contacts or network if you prefer to directly contact the research participants, it is crucial to gather the contact information (email and/or phone numbers) of the participants. To continue with the data collection process and reach out to a single point of contact (SPOC) who will assist you in administering the initial survey, you must first identify the SPOC and obtain their contact information. Before conducting the survey, it is a good idea to compile the participant data into a database because it will be useful later on.

The research site was engineering institutions where EER was given equal recognition and importance to engineering research in India, and the research participants were the faculty members at these institutions who were inclined to conduct EER. The study (Kittur, Coley, & Kellam, 2020) focused on understanding how Indian engineering faculty conduct EER. Higher education institutions served as the research site for a different study (Kittur et al., 2023) that sought to design curriculum by incorporating the five discourses of design. Faculty members at those institutions participated in the study. To obtain the answers to the predetermined research questions, it is crucial to accurately identify the research site and participants. Reaching out to as many people as you can in the population to participate in the initial screening survey is a good idea so that a sufficient number of people can be shortlisted for the interview.

G. Collecting data

After having the interview protocol designed and finalizing the research participants, the next task is to collect the data by conducting interviews. Additionally, depending on the need or requirement of the study, participant observations could be made, and participants' documents related to the topic of research could also be explored to collect further insights on the data. The subsequent sections provided more details on collecting qualitative data through different approaches including interviews, observation, and studying documents (Farber, 2006).

1. *Interviews*: Conducting interviews requires practice and it is a skill that will be developed over time. Novice researchers with limited or no training, are suggested to first learn and then conduct mock and pilot interviews to gain firsthand experience of conducting interviews. Critically reviewing the interviewee's responses and reflecting on the overall interview process will help the interviewer assess their own performance and make any changes if required. Additionally, building a rapport with the interviewee and creating an environment that will make them comfortable is critical as this will help interviewees to respond to the interview questions with full confidence and completeness.

   One of the questions that often novice researchers struggle with is where to conduct the interviews. The answer to that question is 'it depends', it depends on the research question and the research participants' preference. Always, the research participants have the final say as to where the interview could be conducted. Some participants prefer face-to-face in person interview, some prefer telephonic interview, and others prefer an online interview (Zoom, Skype, etc.). The bottom line is that the participants must feel comfortable during the entire interview process ensuring their privacy and confidentiality is not breached at any time. It is important to record the interviews using a recording tool and then it must be transcribed. The transcription could be done manually or using a software package. Once the transcription is complete, it is a good practice to review the entire document to make sure that all the information is correct and if there seems some misinformation, you are required to review the interview recording and make changes accordingly.

2. *Observations*: Observations are an important data in addition to the interviews. In qualitative research observations include descriptions of the research participants, physical settings, details about the activities and events related to the research topic. Also, researchers can include self-observations as an additional information to their data. The self-observations will help researchers understand the bias they might bring to their research as self-observations include researchers own thoughts, feelings, and reactions. During the self-observations, the researchers can also document new ideas and/or questions related to the research that might occur to them.

   It is common to maintain a journal or a notebook by the researchers to document the observations. Anything and everything related to the research study must be noted in the journal as and when you notice it. Observations provide an opportunity to the researchers to collect visible data relevant to the research questions under investigation. One of the questions that the observers must keep reminding themselves often is 'What do I notice?' Observers must be alerted all the time during their observation and take notes as observations have the power to make the invisible data visible. For ease of access and analysis it is a good practice to organize the information/data in the journal in a format that will help answer the research questions.

3. *Studying Documents*: In addition to interviews and observations, documents including videos, photographs, instructional material, memos, manuals, etc. can be used as additional information to support our analysis. There are two types of documents that researchers can include in the data: personal and official documents. Personal documents include photo albums, journals, drawings, letters, videos, etc., that are essentially used to document and share the experiences of research participants relevant to the research study. These documents fundamentally provide the researchers insights on the participants' perceptions and experiences on different aspects which could be used to relate to the topic of research. The personal documents will explain and provide more information about the individual participants. On the other hand, the official documents explain the organizational side of things about the research participants. The official documents include memos, handbooks, professional websites, newsletters, files, academic calendars, etc.

H. Analyzing the collected data

One of the most crucial stages in any research project is data analysis because the results give answers to the research questions. After gathering the data, the first step is to clean it up and convert it into the format needed for analysis. Cleaning the data ensures that the data analysis will be more effective because inaccurate information will be removed. It is important to consider all the data (interviews, observation, and studying documents), during the analysis phase. The next section provides more details about coding the qualitative data.

I. Coding Data

Analyzing the data is the next main step. Coding is essentially screening the qualitative data and assigning codes as you sift through the data. In qualitative research, the data is coded by organizing into different categories based on similar features, concepts, patterns, and/or themes.

1. *First phase*: The initial review of the qualitative data is also called open coding. During this first round of review the coders are recommended to code everything they think is important and must be coded. You might code a word, sentence or an entire passage depending on what strikes out to you as a coder. You can use the codes you like, however; it is a good practice to not use long sentences as a code instead a phrase or using few words is recommended. You might choose to code either manually or using a software application (for example NVivo, Dedoose, etc.). If you choose to code manually, you might want to use colour highlighters to code different codes or patterns you see in the data. A code can have multiple sub-codes. A code is called a parent code and sub-codes are called as child-codes (Creswell, 2007).
2. *Second phase*: In this round you have the opportunity to code anything that you might have missed in the initial examination of the data. Additionally, you might change, update, or modify the existing codes. During the second review you will understand the data better and will be able to code better and look for patterns or themes in the data When coding the qualitative data, a researcher will bring in their biases and hence it is recommended to have a second reader/coder review and code the data. The coding completed by both the reviewers must be compared and discrepancies (if any) must be resolved by discussion. An interrater reliability index must be used to ensure that there is agreement between the coders (Creswell, 2007).
3. *Third phase*: In the third phase, the codes generated earlier will be sorted. The codes then will be combined to examine the categories, patterns and/or themes across the data. Essentially, codes that closely relate with each other will be combined to propose a theme/pattern (Creswell, 2007). The themes and/or patterns that are generated from the data are essentially the answers to the research questions under investigation. The observations and supporting documents can be used in now to further support the findings from the interview data.

J. Documenting significant findings

An essential component of all research-related activities is making sure that findings are presented in a way that is clear to readers and reviewers. When writing the section focusing on findings, some crucial suggestions to keep in mind include (a) including an introductory paragraph to let readers know what to expect, and it's especially crucial to reiterate the research questions, methodology, and analysis used in the study; (b) present the findings using word clouds, tables, and any other format that clearly explains them, Also, the data presented in this format must be explained in the text. (c) Describe the data interpretation and how you came to a particular conclusion using the data, (d) relate the findings to the initial research questions; (e) look for earlier studies that were similar to the one under consideration; (f) explain and discuss the findings; etc. It is recommended to include a section called "Discussions" in the paper in addition to the results and analysis section, which focuses on discussing the findings by comparing and contrasting them with the findings in the existing literature. This will assist the researchers in situating their work within the larger framework of the body of existing knowledge.

K. Publishing results

It is crucial to publish your work and disseminate it to the public so that other researchers interested in the same or related fields can gain from it. Additionally, publishing research enables individuals to develop a strong profile that may draw potential research funding and collaboration opportunities. A paper may be published in a conference proceeding or a journal, depending on the type of work and information included in the manuscript. Researchers are advised to look into the various options (conferences and journals) for publishing their work and carefully review the areas of research that the outlet expects, page limit, word count, etc.

V. ADVANTAGES AND DISADVANTAGES OF QUALITATIVE RESEARCH

Qualitative research offers several advantages and in this section a few of those are explained below (Opdenakker, 2006; Pham, 2018).

1. Data can be evaluated with greater detail: Qualitative research methods allows researchers to examining the detail in as much detail as required based on the research questions. The depth of analysis with the qualitative data is a choice of the researcher.
2. Flexible approach: Qualitative research methods provide flexibility in data collection. For example, during an interview, if the researcher believes that useful insights are not being captured then they can ask follow-up questions to make sure that all the required information is collected.
3. Gain critical insights: Unlike the quantitative research methods, qualitative research provides opportunities to ask questions such as 'how' and 'why' about a certain thing and collect the associated data. This data will help explore the reasons pertaining to different aspects of the research topic under investigation.

Besides these advantages, qualitative research methods have a few disadvantages, and the same are explained below (Opdenakker, 2006; Pham, 2018).

1. Data subjectivity: The qualitative data collected is often criticized and questioned. Different researchers may perceive different information as being important and might collect different data. Based on the researchers' prior experience or exposure to the research topic can certainly bring in biases in data collection.
2. Data cleaning and analysis: Cleaning the qualitative data by reading all the information word by word and line by line is time consuming. Additionally, reviewing the qualitative data, coding the data, and generating patterns/themes also requires considerable amount of time. Qualitative data analysis requires significant repetition and hence significant time investment.
3. Difficulty is replication: As the qualitative work is often said to be subjective, it becomes difficult to replicate studies and finding same/similar conclusions with replicating the research. The smaller sample size in in qualitative research is not a representative of the entire population and generalizing the results becomes difficult.

VI. SUMMARY

This paper makes an effort to list all the crucial actions needed to carry out qualitative research studies effectively. As this document serves as a process guide, the authors have identified ten crucial steps from the literature that will aid new researchers who are interested in conducting qualitative research. The paper contains a number of examples of qualitative research in various sections, and readers are also given important references that can further their understanding of the entire process.

It is a good practice to proofread your document once it is finished and ready to avoid the obvious errors and mistakes in the document. Other quick and general advice for beginning researchers is to seek assistance from the best resources at your institution if your native language is not English and you have trouble drafting your ideas. Finally, use the writing centers at your school to help you make your document read concisely and clearly.

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