Factors influencing data saturation in qualitative studies

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ABSTRACT

This study aims to evaluate the factors that influence data saturation in qualitative studies. The study adopted a systematic literature review of 24 journal articles published between 2018 and 2022. The articles were obtained from a Google scholar database. The findings point to five factors that affect data saturation namely, pre-determined codes and themes, sample size, relevancy of research subjects (respondents), number of research methods, and length of data collection sessions. It is argued in this paper, therefore, that in order to attain data saturation, researchers should consider multiple factors that may affect data saturation in order to increase the validity of qualitative studies.

Introduction

In the process of collecting qualitative data, it is critical for a researcher to decide on whether the data have been sufficiently collected. This is, indeed, the question of data saturation which, according to Fusch et al., (2018) determines the achievement of intended research objectives. Validity of findings in qualitative studies tend to rely heavily on adequacy of data collected to answer research questions (Hennink & Kaiser, 2022).

Despite its importance there have been controversies on how one knows that the saturation has been reached (Sebela-Mpofu, 2020). Also, how a researcher reaches ‘the saturation point’ in the qualitative studies has been the point of discussion in many of the previous studies (Aguboshim, 2021; Guest et al., 2020; Aldiabat, & Navenec, 2018). The literature, however, has not been able to clearly address how this point is reached in practice. It is the lack of clarity in the literature that motivates this paper. Systematic literature review was employed to uncover various strategies that researchers used to determine data saturation. It is argued, in this paper that grounded theory is the foundation of qualitative studies, data collection methods, the results, discussion and conclusion of the study.

Qualitative and quantitative studies differ in their methods of data collection (Hennink et al, 2019). The differences can be spotted from objectives of qualitative studies to methods that are used in collection of data in achieving intended objectives (Leydesdorff, Ràfols, & Milojević, 2020; Antwi & Hamza, 2015). Saturation refers to a point at which the researcher finds out that all the needed data have been collected and there is no any new relevant information or data that can be collected from the respondents or subjects of the study (Fusch et al., 2018). Saturation normally signifies that a researcher has to stop collecting more data for a particular study. Data saturation has been widely used in social science studies and has become one of the important elements of qualitative approach which has its roots in grounded theory as developed by Glaser and Strauss (1967).

In conducting qualitative studies, saturation is one of the important aspects for consideration. In practice, saturation requires a researcher to collect data from informants to the point that no further information can possibly be collected. Saturation point not only assures the validity and credibility of information for the study but saves researchers’ time and energy in collecting the same. The
literature on saturation point, however, does not thoroughly and sufficiently address the question of how this point is reached. In view of this lack of clarity, this study aimed at identifying and discussing factors affecting data saturation in qualitative studies.

Theoretical and Conceptual Background

Grounded theory in qualitative studies

Grounded theory was originally proposed by Glaser and Strauss (1967) in their famous book *The Discovery of Grounded Theory: Strategies for Qualitative Research*. In undertaking scientific investigation, grounded theory underscores inductive approach as opposed to deductive approach. In the application of the theory, scholars hold different views. Scholar’s perspectives range from methodology and resultant theory. This paper, however, is guided by methodological perspective which allows systematic collection and processing of data to come-up with different outputs such as insights, discoveries and theories. In this regard, the theory challenges the traditional thinking that quantitative methodology is the only reliable, objective and best way of undertaking research activities. Purposive sampling is considered the most preferred technique in obtaining subjects for data collection which can be done using different data collection methods (Chun et al., 2019). The most common data collection method is interview. However, other methods such as focus group discussion, document analysis, and observation are often used. Data analysis involves coding that allows identifying themes to be included in qualitative analysis. Data collection progressively continues until saturation is reached. Unlike traditional quantitative approach, grounded theory allows flexibility in solving research problems.

Data collection tools in qualitative studies

Qualitative studies use different data collection tools to achieve the desired research objectives. Without appropriate data collection methods and tools, qualitative data cannot be adequately collected. Commonly used data collection methods are here under briefly discussed.

Interviews

Interview, which is considered to be the most common method of collecting qualitative data, involves conversations with informants for the purpose of collecting data. Interviews are often preferred because they allow researchers to easily understand the actual feelings of the respondents on the phenomenon under study. Interviews may either be structured, semi-structured or unstructured. In structured interviews, predetermined questions are designed to guide interview sessions and additional questions are not added as data collection process continues. In case there is more than one person involved as an informant, each person is asked the same questions. In semi-structured interviews, similarly, researchers prepare a list of questions to ask their subjects with an option to ask follow up questions for further clarification. This type of interview is more flexible than structured interview and may lead to collection of more data. Unstructured interviews, as opposed to other types of interviews, do not involve preparation of questions prior to the interview sessions but the researcher asks questions that he/she finds to be appropriate and relevant at a particular moment. With regard to saturation, when an interviewer finds repetition of the same information from the subjects, there is when saturation is considered to be reached (Saunders et al., 2018). In reaching the point, number of interviews conducted has an impact. Hennink and Kaiser (2022) argue that saturation is often reached between the 9th and 17th interview. This implies that on average saturation is reached by the 13th interview.

Focus group discussion

Focus group discussion involves collection of information though conversations that take place in established groups of study subjects. Usually, a researcher decides issues that will be discussed in focus groups and facilitates the process. The researcher has to carefully manage the conversations to ensure there is enough participation of each member so that adequate amount of data is collected. Like in interviews, when participants are found to repeat the same information, it indicates that the saturation has been reached. Since each focus group involves multiple people, chances of reaching saturation earlier than in interviews are usually higher. Focus groups tend to generate more information than interviews. Hennink and Kaiser (2022) argue that saturation is normally reached between the 4th and 8th focus group session. According to Hennink et al., (2019) saturation in focus groups may be influenced by factors such as study purpose, type of codes, group stratification, number of groups per stratum, and type and degree of saturation.

Observation

Observation involves using sense organs of the researchers to collect data from study subjects. Since information is obtained through seeing, hearing, touching, testing or/and smelling, a researcher has to spend his/her time with research subjects for data collection. Observation may either be participatory or non-participatory. The former requires a researcher to be part of the subjects he/she collecting data from and therefore considered as the community member while the later requires a researcher to collect data without involving in what the subjects do. Through observation, it is easier to describe characteristics of phenomena or research issues. However, in some circumstances such as when the direct involvement of the researcher may be harmful to him/her, this method is considered to be risky. With regard to saturation, literature has given little attention to how observation method could lead to saturation of data. However, suggestively, the observer may decide to stop collecting more data when adequate data have been collected. How to determine adequacy of data using observation method is yet another area to be empirically addressed. However, the literature shows that this is one of less used methods in data collection.
Document analysis

Document analysis involves data collection through analyzing already published materials to obtain useful information for a particular study. The method requires a researcher to carefully collect various written materials and systematically seek for information that may help to address research issues. Comparing to other methods, document analysis is considered to be a method that reduces unethical concerns because of accessibility of public documents that tend to be used for analysis. One can easily verify through cross checking the documents to see whether what was reported as an outcome of documentary analysis is what the documents contain (Morgan, 2022). The method is also less costly compared to other methods since one can use desk research to obtain the needed data without physically visiting the field (Bowen, 2009). However, researchers have less preference to document analysis and when it used, in many cases, the purpose is to supplement other data collection methods (Morgan, 2022; Bingham et al., 2019).

Methods

This paper used systematic literature review. Google scholar was used to search for qualitative studies which used saturation as a criterion for data adequacy. A total of 67 articles were initially downloaded and scanned. In the process of analysis, twenty-four (24) journal articles published in a range of five years from 2018 to 2022 were included in the review. Two stages of decision making on what articles to be included was used. The first stage involved identification of journal articles that used qualitative approach published between 2018 and 2022. This led to inclusion of the 67 journal articles. In the second stage, articles that used saturation principle were included and those that didn’t were excluded. The second stage led to a creation of a sample of 24 articles that were used for the review. The list of authors of reviewed articles and their respective countries are shown in the table hereunder.

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<tr>
<th>S/N</th>
<th>Authors</th>
<th>Country of Data Collection</th>
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<tr>
<td>1</td>
<td>Liu et al., (2022).</td>
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<td>2</td>
<td>Jebbour (2022).</td>
<td>Morocco</td>
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<td>3</td>
<td>Phutela, N. &amp; Dwivedi, S. (2020).</td>
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<td>4</td>
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<td>6</td>
<td>Wangmo et al., (2019).</td>
<td>Switzerland, Germany and Italy</td>
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<td>7</td>
<td>Hashemiparast et al., (2019).</td>
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<td>8</td>
<td>Weber et al., (2019).</td>
<td>Germany</td>
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<td>Holman et al., (2019).</td>
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<td>11</td>
<td>Same et al., (2020).</td>
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<td>12</td>
<td>Fowler et al., (2019).</td>
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<td>Mogre et al., (2018).</td>
<td>Ghana</td>
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<td>24</td>
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Findings

This section summarizes the major findings that were obtained as the result of a systematic review of selected papers. As per the review, the following are the main factors that influence saturation in qualitative studies:

Pre-determined codes and themes

While saturation is considered to be an important criterion for data adequacy, it is important to understand the scope of data that is expected be collected through identification of codes or themes. A study without a pre-defined scope may make it difficult for a researcher to understand whether collected data is sufficient or not. Research codes or themes are usually identified through literature review (deductive coding). Similar studies that have been previously considered may help in identification of codes and themes to be used in current studies. Theoretical framework may also assist in coding and identifying themes. It is worth noting that these pre-determined codes and themes should provide guidance in obtaining other themes since grounded theory offers flexibility. Relying on pre-determined themes only may limit the study from exploring new insights. Seventeen (17) articles admitted to use codes or pre-determined themes to make data collection process easier and manageable and ultimately reach saturation. Some studies, however, do not identify themes in advance rather use codes only drawn from collected empirical data which assist in discovering new themes.
Sample size

Sample size adequacy has been a matter of debate in qualitative studies. Researchers with constructivist thinking, for instance, believe that relatively small samples that are used in qualitative studies are not sufficient for generalization. Critics of qualitative studies consider this to be the major weakness of qualitative research. However, the need for in-depth data to be collected from relatively small samples is one of the justifications for the same. Within smallness of sample sizes in qualitative data there is an issue of number of respondents or subjects used to reach the saturation point. In the reviewed articles, it was found that the bigger the sample size the higher the chances of attaining data saturation. The smallest sample size in the reviewed articles had 10 subjects while the biggest sample size was 102 respondents making an average of 56 subjects per article. The fact that researchers kept on collecting data from more subjects until saturation point was reached implied that the increase of sample size is an important factor. The question that remains unanswered is whether many subjects as possible are recruited for data collection until saturation is reached or recruiting subjects and data collection should be done concurrently until saturation is reached. The reviewed articles, however, sampled the number subjects they considered to be enough for data collection then after data collection was done until saturation reached within the sample size they previously chose. This implies that, if data saturation cannot be reached with your sample size you are ought to increase more subjects to reach the saturation point.

Relevancy of research subjects (respondents)

Subjects or respondents forming sample sizes in qualitative studies are among the important focus when it comes to who should be included and what she or he can offer to a particular study. It is a settled principle that not everyone can be included in a study for investigation. Researchers have to be careful when choosing units of analysis for a particular study. This is the reason why qualitative studies tend to opt for non-probability sampling techniques to make sure relevant respondents are included in the study. All the reviewed articles (n=24) opted for non-probability sampling techniques to obtain data they intended to collect. Studies that include relevant respondents are more likely to reach a saturation point than those do not. Determining who the relevant respondents are varies from study to study depending on the purpose of the study. However, whether a person has information a particular study is seeking for is one of important factors in determining his or her involvement in a study. In the reviewed articles this has been cited as a major reason as to why non-probability sampling techniques were used to obtain subjects. Out of 24 reviewed articles, 21 used purposive sampling which is a non-probability sampling technique.

Number of research tools (Triangulation)

Using more than one data collection tool increases the chance of attaining data saturation. This is because it increases amount of data collected from different methodological perspectives. Qualitative studies may use one or more tools. Taking an example of a study that employs interview and observation at the same time, a researcher may easily confirm what has been said by a respondent with what he observes. Moreover, what could not be precisely captured by one research tool can be captured by the other and therefore increasing the chances of reaching saturation. Five studies among the reviewed articles used focus group discussions and interviews concurrently and reported that the use of more than one tools increased amount of data they collected and therefore made it easier for them to reach saturation. This indicates that the use of a single data collection tool may delay reaching the saturation point.

Length of data collection sessions

Qualitative studies tend to use various tools such as focus group discussions, interviews, document analysis and observations. The amount of time used in collecting data from one or more of these methods has a significant effect on data saturation. The more time a researcher spends in collecting data the higher the chances of achieving or reaching saturation. The reason is obvious; more data can be collected and therefore increasing the chances of reaching saturation. Averagely, data collection in the reviewed studies lasted for 59 minutes per each session with minimum of 15 minutes and maximum of 120 minutes per session. It was observed that the more time one spends in interviews or focus group discussions determine amount of information he/she likely to collect and hence increases the chance of reaching data saturation. It should be noted that a researcher may use short time per each session yet having multiple short sessions may increase amount of time he/she spends in data collection and consequently increasing amount of data.

Discussion of the findings

In undertaking qualitative study, the understanding of what affects saturation is of critical importance. Qualitative researchers, for instance, would seek ways that enable them reach the saturation point earlier. Considering more factors to reach saturation has some implications in research as well. The purpose of a particular study may dictate what factors to put into consideration as Hennink et al., (2019) recommends. Resources such as time and money may also be one of determining factors on deciding what to consider for enhancing earlier data saturation. Sample size, triangulation and lengths of data collection sessions may be affected by time, financial and material resources available for the researcher. In increasing the length of the data collection sessions, it should be noted that long sessions may affect the quality and relevancy of data since they may make subjects to lose interest, get tired and offer irrelevant information in some cases (Johnson et al., 2019; Loosveldt & Beullens, 2013). Consistent to the findings of this study, Fusch et al., (2018) recommend the use of triangulation as an easier method to attain saturation point. As previously noted, qualitative data collection methods tend to make researchers end up with bulky data; hence, it is important to consider how much data will be collected when triangulation is considered. Although there are numerous data collection methods that can be used in qualitative studies, this study found that interviews and focus groups were more dominant across all studies while document analysis and observation were
less preferred. The use of the two methods creates yet another research gap on how one can determine saturation point since the information on the same is scarce. Even when researchers use what this study considers as dominant data collection methods, there is no enough evidence on how saturation was precisely reached (Aguboshim, 2021; Guest et al., 2020; Aldiabat, & Navenec, 2018). We cannot ignore the ongoing debate on subjectivity of reaching saturation. Majority of researchers who use saturation as a criterion for adequacy of data remain silent on how saturation point was measured. Attempts to identify the sample size that is adequate to reach saturation are available. However, the suggestions on how many subjects are sufficient for saturation vary from one study to another (Guest et al., 2020; Hennink et al., 2019; Vasileiou, Barnett, Thorpe & Young, 2018). Fowler et al. (2019), for example, reported to reach saturation after collecting data from the 9th respondent after an attempt being made from other 8 respondents. Gentles, Charles, Ploeg and McKibbon (2015), on contrary, argues that it is not possible to precisely decide what sample size is sufficient for qualitative studies and recommend on-going sampling. On-going sampling implies that a researcher keeps on increasing the sample size until adequate information have been obtained.

The review has identified a number of interviews that have been suggested to reach saturation point in the process. The fact that recommendations have varied from one researcher to another, presents another challenge which can be undeniably expected due to flexibility in qualitative studies. Critics of qualitative studies, on contrary, have been consistently pointing out to variation and subjectivity as the major weaknesses of qualitative studies (Aspers & Corte, 2019; Mohajan, 2018). In this study, non-probability sampling specifically purposive sampling technique has been established to be a dominant technique. The use of purposive sampling increases the chances of a researcher to reach saturation because the subjects obtained through the technique have rich information of the issue that a particular qualitative study intends to address. This narrative is supported by Hennink et al., (2019); and Palinkas et al., (2015), among others.

Conclusion

The paper sought to identify factors that determine data saturation in qualitative studies. Reaching data saturation saves researchers’ time, money and resources which calls for qualitative researchers to consider all factors which affect data adequacy in qualitative studies. Previous studies on the same, underscores sample size as the major determinant of data saturation. Based on findings of this study, however, multiple factors influence data saturation. While the grounded theory allows for a great deal of flexibility in qualitative studies yet, a well-planned methodology with a clear understanding of the identified factors that influence data saturation is paramount. The paper, in this regard, offers additional insights on other factors that influences data saturation and underscores the need for considering multiple factors to enhance data saturation.

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References


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