QUALITATIVE DATA ANALYSIS USING NVIVO SOFTWARE

Muktar Bashir

Department of Political Science, Usmanu Danfodiyo University, Sokoto

Corresponding Author's email: muktarbashir20@gmail.com

Abstract

Nvivo is a qualitative software often used by qualitative researchers in analyzing data. The software serves as a computer aided application that helps the researcher to manage and analyze large amount of data systematically. Therefore, the objective of this paper is to showcase how Nvivo software is been employed in qualitative data analysis. Secondary sources such as books, articles, pamphlets and other relevant documentary sources were used in addressing the paper. It is however found that, the Nvivo software has helped in making qualitative data analysis more valid, reliable and easier. It has also helped in saving a lot of time in categorizing the data into various themes and sub-themes where inferences can be drawn during the analysis. It is recommended that Nvivo can be frequently utilized by researchers as a computer aided software in analyzing data instead of traditional manual analysis of qualitative data.

Keywords: Data Analysis, Method, Nvivo Software, Qualitative, Research

Introduction

Technology has changed the way analysis is done especially in the field of qualitative research. In the olden days, analysis of qualitative data is done manually which was monotonous in nature and time consuming, it takes longer time to complete analysis manually. The introduction of softwires such as Nvivo has lessen the work of researchers using qualitative research, a novice researcher can do his or her analysis within a very short period of time. Nvivo is an interesting qualitative date analysis that support unstructured and semi structured interviews. It can be used for mixed methods data analysis and users friendly. It is important to note that, no research is complete without data analysis; this is in order to ensure that meaning is extracted from the data. Therefore, data analysis is a component of research technique and relate to the innermost layer of the research methodology. The purpose of data analysis has been observed by Burns (2000) to include finding meaning in the collected data from the field, which is done systematically by arranging and presenting the information. However, in making the collected data becoming meaningful to the phenomenon in question, the analysis done requires both a clear explanation of how it was done, and a demonstration of how the raw data was transformed into a meaningful conclusion.

It was however instructive to note that, the analysis of data in qualitative research are getting more and more sophisticated as those in quantitative research. Large amount of data that can be analyzed manually within some days, weeks or even months can now be examined more systematically using computer-aided software within a limited period of time. Moreover, regardless of the type of computer software a researcher decided to employ in his analysis, they

all serve as tools that help in managing and analyzing the data. Researchers have started using computer-aided softwares in qualitative data analysis since the mid-1980s (Puvenesvary, Radziah, Naidu, Badzis Mat Nayan & Abd Aziz, 2016). Researchers from developed countries started employing the use of different softwares including the Nvivo in analyzing the collected data. The reason behind the utilization of the computer aided software in research is to strengthen the quality of research and to go in line with the global trend of digitalization. This is necessary considering the fact that, Information and Communication Technology (ICT) has dominated every aspect human life, research inclusive. This is on account of the fact that, the world has turned to be a global village, where ICT is the driving force. The centrality of using the software in data analysis is so enormous to the extent that it helps the researchers to analyze large amount of data within a limited period of time. In addition, it equally helps in providing the average accuracy in the analysis as well as minimize errors. Not only that, it simplifies and arrange the data systematically during the analysis. This was made possible by the serious efforts of both researchers and computer programmers. Moreover, some of the softwares available for qualitative data analysis included: QSR Nud*ist, QSR Nud*ist Vivi, Nvivo, ATLASti, Code-A-Text, Ethnograph, Maxqda, MECA among others. However, it is important to note that, Nvivo software not only support qualitative analysis but can also be employed in quantitative and mixed method analysis. But most importantly, it is more attached the qualitative data analysis. By way of justification, different studies have been put forward by several scholars with limited focus to the use of Nvivo in qualitative data analysis. It is on this note, this study attempt to fill in the academic gap created in the literature, by examining the use of Nvivo in qualitative data analysis.

Qualitative Data Analysis

In presenting data analysis, data have to be organized in the first place before beginning the analysis. The analysis can be done either deductively where categories are predetermined based on literature, or theories or inductively where the categories, patterns, themes emerge out of the data. This contains both qualitative and quantitative data analysis. However, for the purpose of qualitative data analysis, its procedure is not rigid rather arty and intuitive. Patton (1987: 154) noted that**:** the effort of uncovering patterns, categories and themes is a creative process where judgments are carefully made about what is significant and meaningful in the data. This shows that, the researcher is the instrument using intuitive thinking in unraveling the patterns, categories and themes resulting to generating a clear meaning from the data.

Boyatzis (1998); Paton, (1987) in Puvenesvary et. al, (2016) identified the following steps to be employed in doing data analysis:

(i) Pull together all the data that address the issue you are investigating
(ii) Read through the data severally and write comments about the main ideas that emerged.
(iii) Categories the ideas into themes and sub-themes
(iv) Define the themes appropriately, by identifying the features of the themes and those that distinguishes them, thereafter, give them codes. The codes can be those mentioned by the respondents or those deductively constructed by the respondents based on theories, and previous research.
(v) The next step is the identification of the unit of analysis. i.e what the researcher intends to study.
(vi) Classify the raw data appropriately; this is done by grouping the topics that fit together under more manageable and meaningful categories or themes.
(vii) Create matrices by cross-classifying different categories or dimensions to generate new insights about how the data can be organized and look for new themes. Therefore, the use of

software packages for data analysis like Nvivo and NUDISTS can be useful in creating these matrices. On a final note, interpret the themes in a way that contributes to the development of knowledge that is in context of conceptual frameworks or theories (Boyatzis, 1998).

Computer Software and Qualitative Data Analysis

Computer software has been used severally by different scholars in analyzing data either quantitatively or qualitatively. For instance, Tobi (2016) noted that as Information Technology becomes an important approach in handling data, many writers and researchers agreed that computer software applications are seen as a way to facilitate the analysis of data qualitatively. The software helps the researcher to manage large amount of data in a systematic and structured way. However, such software needs to be treated as an aided tool (Nacos, 1991) and not as a replacement for highly developed human capabilities of reading, transcribing and translating written matter. It is very necessary in this modern digitalized era, for the researcher to challenge his/her analysis by undergoing a manual procedure to ensure the reliability and validity of conducting research. Many authors in qualitative research that included Krippendorf, 2004; Miles & Huberman, 1994; Stake, 2006; Haigh, 2007; Ormerod, 2009 have agreed on the step-by-step procedure which ought to be followed by the researcher in the conduct of his analysis. This could be done while brainstorming the qualitative data to accomplish the research objectives. It is indeed important to note that, researchers have to bear in mind that, only them knows what they are trying to seek from the collected data, and how they could possibly manipulate the data towards the direction of answering the research question. Miles and Huberman (1994) provided the procedures to be followed in qualitative computer analysis as shown below:

(i) Making notes in the field.
(ii) Transcribing the notes.
(iii) Reading through the note severally, with the intention to edit and correct note where necessary.
(iv) Coding: attaching key words or tags to the data for better organization.
(v) Storage: keeping text in an organized database.
(vi) Search and retrieval: locating relevant segment of the data and making them available for inspection.
(vii) Data linking: connecting relevant data segments with each other, forming categories, clusters or networks of information.
(viii) Memoing: writing reflective commentaries on some aspects of the data, as a basis for deeper analysis.
(ix) Content analysis: counting locations of words and phrases.
(x) Data display: placing selected or reduced data in a condensed, organized format, such as matrix or network, for inspection.
(xi) Conclusion drawing and verification: aiding the analyst to interpret displayed data and to test or confirm findings.
(xii) Theory building: developing systematic, conceptually coherent explanations of findings; testing hypotheses.
(xiii) Graphic mapping: creating diagrams that depict findings or theories.
(xiv) Preparing interim and final reports.

Moreover, Tesch (1989) captured that computer aided analysis can reduce time spent doing the analysis, cut out much drudgery, make procedures more systematic and explicit. In addition, it ensures completeness and refinement, and also permits flexibility and revision in following the procedures of the analysis.

Key Terms in Nvivo Software

Home: This tab allows you to **code** whole data files, run basic **queries**, generate **visualizations** and create or import **classifications.**

Import: This tab allows you to import data such as word documents, PDFs, transcripts, datasets, audio and video files, classification sheets, academic articles and even your reference library**.**
Create: This tab allows you to import data such as word documents, PDFs, transcripts, datasets, audio and video files, classification sheets, academic articles and even your reference library**.**

Explore: Here is the full menu to run queries, generate data visualizations, charts, and create project maps (such as mind maps).

Share: This is a new tab in NVivo 12 that allows you to create reports and extracts of your Nvivo analyses, export and copy your **project**, **print** items and export items to save in other applications.

Data: This could be transcripts or field notes, as well as academic articles, research plans, pictures, audio recordings, videos, notes, and online materials.

File: Component of data where you import **PDF**, **articles**, **video**, **audio** etc.

File Classification: Lebel with descriptive information attached to file e.g bibliographical information.

External: Link to data you cannot import in Nvivo e.g. Web sites, books etc.

Code: Codes are made up of Nodes, Relationships and Relationship Types.

Relationship: Relationships linking different components of your project.

Maps: You can create visual representations of various aspects of your project. These might include relationships, coding structures, and many other dynamic aspects of your analysis. You can also build static maps or models from scratch using the relatively simple and user-friendly modelling tools. Once you have made a map, you can export it for use in other programs.

Node: A node is a container in which wholes or parts of sources are kept for analysis. Relationships are connections you can mark in your project between two items. node).

Memos: Memos provide avenue on note and reflection about your project.

Framework Matrices: Table that summarizes your data.

Coding is the process of gathering material by topic, theme or case. For example, selecting a paragraph about water quality and coding it at the theme node 'water quality'.

Use of Nvivo Software in Qualitative Data Analysis

Nvivo as we have highlighted above is a qualitative software often used by qualitative researchers in the analysis of raw data. Therefore, the use of computer aided software like Nvivo is to carry out analysis and to develop the cognitive mapping using the 'Maps' application in the Nvivo. Miles and Huberma (1994) were in agreement with Tobi (2016) when they pointed that 'it is fair to say

that the researcher who does not use software beyond word processor will be hampered in comparison with those who do. This showcases the fact that, using computer aided software like Nvivo in qualitative analysis adds value to the researcher as he/she gains more skills compared to others.

In view of the use of Nvivo software in qualitative data analysis, the following steps have to be followed when analyzing interviews using the software. At the beginning, new project will be created by clicking 'File' on the menu toolbar. Only one project will be created for one research work like M.Sc. Thesis or PhD Dissertation. However, you can have several cases (multiple case studies), several interviews, all related literature and all sources related to your research work. Therefore, all information, sources and data are kept in one Nvivo Project. Thereafter, the researcher will transcribe his interview data before beginning the analysis. The analysis of the data will be done by filtering the transcript as well as capture (code) only a significant statement that represent the information that will be literally derived from the early work that has been previously done by the writer (deductive). The analysis also needs to be handled in parallel with the construct of new information (knowledge) that helps to expand the new literature (as inductive knowledge). Therefore, as a qualitative researcher you will no doubt discover new thing (new information which is considered new knowledge-inductive process). A summary of the analysis is shown below as captured by Tobi (2016):

- **Display data will be used to display the findings**, which will help the researcher to identify the pattern matching, to compare and develop a network where possible (i.e main theme & sub-themes). This can equally be done using Microsoft word and can be generated automatically using Nvivo tools under framework matrices, which can later be exported to Microsoft Excel.
- **Identifying codes**- it will be necessary at this point to identify the themes and sub-themes through the coding process in order to develop a code or coding categories. In the Nvivo 11, the 'Code' is known as 'Node'. This strategy is very much related to display data.
- **Reducing information will be necessary by filtering the vast amount of data**. This will help to highlight only the relevant data (winnowing process) that will contribute towards the expected result. By reducing the large amount of data in transcript, it helps the researcher to seek the similarity and the contrast between respondents or cases. This will be done by sorting the materials into categories.
- **Relating categories**, this will show how the main themes are developed and all sub-themes are clustered to the respective main themes. This process is about factoring, noting relations among variables, rating importance, making assertions in order to build a logical chain of evidence.

In view of the foregoing, it is worthy to note that, using Nvivo software helped the researcher to identify the codes, develop and relate the thematic categories. Later, the materials will be sorted into categories. The coding process will then be done by looking at the frequency of words and codes which appeared from the materials. When a pattern is identified, a code will be assigned from the provisional list of codes developed through theory, or a new code can be assigned. This process will be carried out in repetitive cycles until no new pattern is identified. The process will help the researcher to become more familiar with the interview transcripts and to generate new patterns from the data. Thereafter, the coding will be done by using the descriptive keywords where they will be chosen from the original words and phrases used in the transcripts. These structures with the main themes and sub-themes will be developed based on the research

objectives and research questions. The researcher will firstly deploy the manual procedure to look deeper into identifying the findings from the merged patterns while scrutinizing the interview transcripts. In line with this, Stake (2006) added that where merged findings were generated as child nodes from the coded nodes, it will be taking from free nodes, representing free ideas (the initial idea that was first coded).

There is the need according Pat & Kristi (2013) to highlight the following components of Nvivo software for a better analysis, thus;

Opening a new project

When you open the program, you will see a "welcome" screen that list all your recent projects, and has a button for blank project, open other project a dialogue box will open asking for a file name and description for the project. You then enter a file name, then you click ok and the project will open.

Import data into Nvivo

Data can be imported into Nvivo using the file menu right click on the file it will give you options of documents, videos, audios then you import into Nvivo, thereafter you play them for transcription. In addition, you can also import into Nvivo from external source by selecting the kind of material you want to import such as documents, images, videos, audios and spread sheet. You can also import Twitter content, webpages, facebook wall posts and comments and linkedIn

Create a Child Node

Right-click on one of your existing nodes and select new node from the drop-down list. The new node will be created as a child of the selected node, which then become the parent.

Coding whole files

You can also code whole files to nodes by selecting a file (or multiple files) in the data list view and then click code in the home tab.

Uncoding

You can remove coding from references or parts of references coded in a file. You can uncode a reference through the home tab, by selecting the passage you want to uncode, right-clicking and selecting uncode at the relevant node, or by switching on coding stripes (in the Document tab that opens when you open a file), and then right-clicking on the coding stripes you are interested in and clicking on "uncode".

Running a word cloud

A researcher will click on the file, open document, then out of the top options of the screen a display of different word clouds will manifest for the researcher to choose. The bigger the word the more tendency of using it as a theme or sub-theme in the analysis.

Developing Themes and Sub-themes

From the word cloud, the bigger words signify how often an interviewee talked about them, which qualifies them to be used as a theme and the smaller once as sub-themes.

Conclusion

The paper examined the process of data analysis with special reference to the use of Nvivo software. The software is a computer aided application that helps the researcher to manage large amount of data, reduce time wastage in the analysis and arrive at logical conclusion based on the objective of the study. This is possible considering the fact that Information and Communication Technology (ICT) has become an integral part of our daily lives. There is hardly any area of human existence that can effectively be managed without the assistance of ICT, research process and analysis inclusive. The software contributed a lot in making sure that qualitative analysis become more and more easy, reliable and effective compared to qualitative manual data analysis.

Recommendation

The paper recommends among other things that, researchers are encouraged to use Nvivo software in their data analysis which will no doubt makes the analysis easier, reliable and systematic. Not only that, the software will reduce error compared to the traditional manual analysis of data.

References

Boyatzis, R. E (1998). Transforming Qualitative Information: Thematic Analysis and Code Development. Thousand Oaks: Belmont CA: Wadsworth publishing.

Burns, R. (2000). Research Introduction to Research Methods. London: Sage Publications Ltd.

Diamond Square, Jalan 1/50, off Jalan Gombak, Kuala Lumpur, Malaysia. ARAS Publisher.

Krippendorff, K. (2004) *Content Analysis: an introduction to its methodology.* 2nd ed. California and London*:* SAGE.

Miles, M. B & Huberman, A. M (1994) Qualitative Data Analysis: An expanded Sourcebook 2nd ed. Thousand Oaks, CA: SAGE.

Nacos, B. L *et al* (1991) Content analysis of new reports: Comparing Human Coding and a Computer-assisted Method. *Communications.*

Ormerod, M (2009) Qualitative Research and Data Analysis. *In Buhu, PGR Training.* The University of Salford.

Pat, B & Kristi, J (2013) Qualitative Data Analysis with Nvivo. Thousand Oaks, Sage Publication. Califonia.

Patton, M. O (1987) How to use Qualitative Methods in evaluation. Newbury Park, CA: Sage Publications Inc.

Puvenesvary, Abdul Rahim, Naidu, Badzis, Nayat & Abd Aziz (2016) Qualitative Reseach: Data Collection & Data Analysis Techniques. Universiti Utara Malaysia. UUM Press.

Stake, R. E (2006) Multiple Case Study Analysis. New York: The Guilford Press.

Tobi, S. U. M (2016). Qualitative Research, Interview Analysis and Nvivo 11 Exploration.