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USE OF SOFTWARE FOR DATA ANALYSIS IN QUALITATIVE RESEARCH: APPROACH TO NVIVO, MAXQDA, AND IRAMUTEQ TOOLS

USO DE SOFTWARE PARA ANÁLISE DE DADOS EM PESQUISAS QUALITATIVAS: ABORDAGEM DAS FERRAMENTAS NVIVO, MAXQDA E IRAMUTEQ

USO DE SOFTWARE PARA EL ANÁLISIS DE DATOS EN INVESTIGACIONES CUALITATIVAS: ENFOQUE DE LAS HERRAMIENTAS NVIVO, MAXQDA E IRAMUTEQ

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Qualitative research explores human experiences that cannot be quantified or adequately represented by numbers alone[1]. The traditional view that the quantitative approach, rooted in positivist paradigms, is superior is no longer sufficient to explain the complexity of social and individual phenomena[2].

This is not a competition between methods; rather, it is a recognition that both approaches have value and a place in health sciences. The quality of a research study lies not in choosing one method over another but in how the investigation is conducted (rigor) and how the research questions are understood and addressed (relevance and clarity)[3].

Among the three aspects related to research quality - rigor, relevance, and clarity - rigor is often the most questioned in qualitative research, especially in data analysis[2]. However, it is important to note that rigor in qualitative research comes from the depth of analysis and consistency in data interpretation, which does not mean following the same standards as quantitative research but ensuring that the analysis is conducted systematically and thoroughly[1-2].

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In this context, the integration of technology into the qualitative analysis process has become one of the most effective solutions to minimize the subjectivity involved in data interpretation[2]. While the use of software for qualitative data analysis is sometimes questioned, it is essential to understand that these tools do not replace the researcher's role in interpreting the data; rather, they optimize processes such as organization, coding, and managing large volumes of information. The responsibility for contextualized data interpretation still lies with the researcher, who must relate the findings to the experiences and lives of the subjects studied[2,4].

With technological advancements, qualitative data analysis has evolved considerably. The use of software like NVivo, MAXQDA, and Interface de *R pour les Analyses Multidimensionnelles de Textes et de Questionnaires* (IRaMuTeQ), among others[5], epresents a significant leap forward, enabling researchers to organize, analyze, and interpret data more efficiently and effectively[4-5]. Previously, qualitative analysis required considerable manual effort and time[1]. However, these tools now allow for a more precise and systematic approach. Each software has its unique features, making them suitable for different types of analyses.

Table 1 - Especificities of NVivo, MAXQDA e IRaMuTeQ, Sao Paulo, 2024.

Software	Usability [Country]	Type of Analyses	Accepted Formats	Audio Transcription Support
NVivo [1999]	High [Australia]	Content, thematic, categorical, network, matrix, and cluster analyses	Texto: .doc, .docx, .txt, .rtf e .pdf; Áudio: .mp3, .wav e .wma; Vídeos: .mp4, .avi, .wmv e .mov; Imagens: .jpg, .bmp, .gif e .png; Planilhas: .xls e .xlsx	Yes, with automatic and manual transcription
MAXQDA [1989]	Medium [Germany]	Mixed data, discourse, word frequency analysis	Texto: .doc, .docx, .txt, .rtf e .pdf; Áudio: .mp3, .wav e .wma; Vídeos: .mp4, .avi, .wmv e .mov; Imagens: .jpg, .bmp, .gif e .png.	Yes, with automatic and manual transcription (AI Assist for audio/video transcription)
IRaMuTeQ [2009]	Medium [France]	Classic textual statistics, group specificity, hierarchical descending classification, similarity analysis, word clouds	Texto: .txt e .csv; Planilhas: .xls e .xlsx	No transcription support

Source: Prepared by the authors, based on information from the software[2,6-7].

The advantages of NVivo include its high integration with other software, excellent multimodal analysis (text, audio, video), and a user-friendly interface for beginners[6]. MAXQDA offers mixed analysis (quantitative and qualitative), interactive visualizations, advanced graphic resources, and wide compatibility with various data formats[7]. IRaMuTeQ stands out for being free

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and allowing the verification of data saturation - an essential aspect of qualitative research that has long lacked a practical method for confirmation. This verification occurs when the hapax (terms appearing only once) reaches a value ≤ 5%[2].

However, both NVivo and MAXQDA have high costs and require an initial learning curve to take full advantage of their advanced features. MAXQDA is less intuitive for users who only seek to perform qualitative analysis. IRaMuTeQ's drawbacks include its lack of multimodal analysis (audio and video), a less intuitive interface, a steeper learning curve, and fewer graphic resources compared to NVivo and MAXQDA.

Despite the advances these software tools have brought to qualitative research, challenges remain. Researchers may struggle with understanding and using the tools, which can delay the analysis process. NVivo and MAXQDA have extensive functionalities[6-7], that, while advantageous, may be overwhelming for beginners. Although intuitive, their interfaces require time and practice to be used efficiently

Another challenge involves data integration. Researchers using multimodal data, such as video interviews or recorded audio, may face format compatibility or organizational issues within the software. Furthermore, residual subjectivity remains: even with software, data interpretation is still a human responsibility[1-2], and how data is coded and interpreted may vary between researchers[2].

Given these challenges, it is increasingly important to train researchers in the proper use of these technologies. Without familiarity, researchers may underuse the available resources or make errors in analysis[2,5].

Therefore, academic health curricula, particularly in graduate programs, must incorporate software use in qualitative disciplines, just as quantitative software (SPSS, R, Stata, Jamovi) is used in quantitative courses. This early exposure will ensure that future researchers develop technological competencies from the beginning of their careers[2,4].

The impact of this training will be twofold: on one hand, it will ensure greater efficiency in conducting qualitative research; on the other, it will strengthen the acceptance of the qualitative approach in the scientific community by bringing more rigor and structure to the analysis process[2,5]. Universities and research centers that adopt this approach will promote more robust research by integrating methodologies and technological tools that optimize the process of knowledge production.

In conclusion, qualitative analysis supported by software like NVivo, MAXQDA, and IRaMuTeQ is becoming increasingly consolidated in health sciences [5]. With proper training and

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the integration of these tools in academic environments, the challenges associated with their use can be overcome[2,4-5].

The use of these tools promotes greater accuracy, rigor, and transparency in qualitative data analysis[2], contributing to the evolution of qualitative research by providing the basis for developing policies and health practices informed by a deep understanding of human experiences.

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Declaration of conflict of interest

Nothing to declare.

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