USE OF ATLAS.TI SOFTWARE AS A METHODOLOGICAL RESOURCE IN THE STRUCTURING OF DATA IN QUALITATIVE STUDIES

USO DO SOFTWARE ATLAS.TI COMO RECURSO METODOLÓGICO NA ESTRUTURAÇÃO DE DADOS EM ESTUDOS QUALITATIVOS

USO DEL SOFTWARE ATLAS.TI COMO RECURSO METODOLÓGICO EN LA ESTRUCTURACIÓN DE DATOS EN ESTUDIOS CUALITATIVOS

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ABSTRACT

Use of ATLAS.ti Software as a Methodological Resource in the Structuring of Data in Qualitative Studies" presents the practical experience of faculty members and students from the Professional Master's Program in Radiological Protection at the Federal Institute of Santa Catarina in the use of ATLAS.ti software to support qualitative analyses. The central objective is to demonstrate how the tool contributes to methodological rigor, the organization of large volumes of data, and the enhancement of research quality in the field of radiological protection. The study describes the software usage process, including installation, project creation, document import, code development, citation generation, network creation, and report export. ATLAS.ti is presented as an essential technology for contemporary qualitative research, especially in interdisciplinary health contexts. Its use facilitates data categorization, occurrence analysis, visualization of conceptual relationships, and analytical traceability, while maintaining fidelity to the theoretical frameworks defined by the researcher. The article highlights tools such as the document manager, code groups, Sankey diagrams, analytical memos, and networks, which expand the understanding of phenomena investigated in radiological protection and related areas. In addition to presenting practical examples from

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dissertations that used the software, the article discusses limitations, such as the risk of excessive and mechanized data segmentation, emphasizing that critical interpretation remains the researcher's responsibility. It concludes that ATLAS.ti is an effective, accessible tool aligned with the scientific rigor required in qualitative research, contributing to the advancement of radiological protection and patient safety.

Keywords: Qualitative Analysis. ATLAS.ti Software. Radiological Protection. Health Information Technology. Radiological and Imaging Nursing.

RESUMO

Uso do Software ATLAS.ti como Recurso Metodológico na Estruturação de Dados em Estudos Qualitativos" apresenta a experiência prática de docentes e discentes do Mestrado Profissional em Proteção Radiológica do Instituto Federal de Santa Catarina, no uso do software ATLAS.ti para apoiar análises qualitativas. A proposta central é demonstrar como a ferramenta contribui para o rigor metodológico, a organização de grandes volumes de dados e a qualificação das pesquisas desenvolvidas na área de proteção radiológica. O estudo descreve o processo de utilização do software, incluindo instalação, criação de projetos, importação de documentos, elaboração de códigos, geração de citações, criação de redes e exportação de relatórios. O ATLAS.ti é apresentado como uma tecnologia essencial para pesquisas qualitativas contemporâneas, especialmente em contextos interdisciplinares da saúde. Seu uso facilita a categorização de dados, a análise de ocorrências, a visualização de relações conceituais e a rastreabilidade analítica, mantendo a fidelidade às bases teóricas definidas pelo pesquisador. O artigo destaca ferramentas como gerenciador de documentos, grupos de códigos, diagramas de Sankey, registros analíticos e redes, que ampliam a compreensão dos fenômenos investigados na radioproteção e em áreas correlatas. Além de apresentar exemplos práticos de dissertações que utilizaram o software, o artigo discute limitações, como o risco de segmentação excessiva e mecanizada dos dados, ressaltando que a interpretação crítica continua sendo responsabilidade do pesquisador. Conclui afirmando que o ATLAS.ti é uma ferramenta eficaz, acessível e alinhada às exigências de cientificidade das pesquisas qualitativas, contribuindo para a evolução do campo da proteção radiológica e da segurança do paciente.

Palavras-chave: Análise Qualitativa. Software ATLAS.ti. Proteção Radiológica. Tecnologia da Informação em Saúde. Enfermagem Radiológica e de Imagem.

RESUMEN

Uso del software ATLAS.ti como recurso metodológico en la estructuración de datos en estudios cualitativos" presenta la experiencia práctica de docentes y estudiantes de la Maestría Profesional en Protección Radiológica del Instituto Federal de Santa Catarina en el uso del software ATLAS.ti para apoyar análisis cualitativos. La propuesta central es demostrar cómo la herramienta contribuye al rigor metodológico, a la organización de grandes volúmenes de datos y a la cualificación de las investigaciones desarrolladas en el área de la protección radiológica. El estudio describe el proceso de utilización del software, incluyendo la instalación, creación de proyectos, importación de documentos, elaboración de códigos, generación de citas, creación de redes y exportación de informes. El ATLAS.ti se presenta como una tecnología esencial para las investigaciones cualitativas contemporáneas, especialmente en contextos interdisciplinarios de la salud. Su uso facilita la categorización de datos, el análisis de ocurrencias, la visualización de relaciones conceptuales y la trazabilidad analítica, manteniendo la fidelidad a las bases teóricas definidas por el investigador. El artículo destaca herramientas como el gestor de documentos, grupos de códigos, diagramas de Sankey, registros analíticos y redes, que amplían la comprensión de los fenómenos investigados en la radioprotección y en áreas afines. Además de presentar ejemplos prácticos de disertaciones que utilizaron el software,

el artículo discute limitaciones, como el riesgo de una segmentación excesiva y mecanizada de los datos, subrayando que la interpretación crítica sigue siendo responsabilidad del investigador. Concluye que el ATLAS.ti es una herramienta eficaz, accesible y alineada con las exigencias de cientificidad de la investigación cualitativa, contribuyendo a la evolución del campo de la protección radiológica y de la seguridad del paciente.

Palabras clave: Análisis Cualitativo. Software ATLAS.ti. Protección Radiológica. Tecnología de la Información en Salud. Enfermería Radiológica y de Imagen.

1 INTRODUCTION

The present study aims to share the practical experience in the use of the ATLAS.ti software as a tool for qualitative analysis within the scope of the Professional Master's Degree in Radiological Protection, of the Graduate Program of the Federal Institute of Education, Science and Technology of Santa Catarina. Emphasis is placed on the contributions to the strengthening of methodological rigor and to the qualification of professional practices in radiological protection in the multidisciplinary context and in nursing.

In addition to the dissertations that made use of the tool, on the occasion, the special topic entitled Technology and Operational Techniques in the Research Process was offered, instrumentalizing the methodological resource adopted.

The use of technological tools in qualitative research has been increasingly relevant, especially in stricto sensu training programs, such as the Professional Master's Degree in Radiological Protection. In this context, the ATLAS.ti software stands out for being developed based on the principles of Grounded Theory, offering resources that enhance the inductive methodological approach. Its application allows the researcher to carefully organize the data, facilitating the categorization, interpretation and theoretical construction based on the information collected. By providing greater analytical rigor and data traceability, ATLAS.ti consolidates itself as an effective methodological resource for professors and students engaged in qualitative investigations, contributing significantly to scientific advancement and to the quality of research developed in radiological protection.

Currently, technologies affect several areas of knowledge, especially the research process. Computational resources emerged in the 1980s and since then software has been available in its diversity for use in qualitative and quantitative research (ATLAS TI, 2023; SORATTO; PIRES; FRIESE, 2020).

Atlas.ti is a computer tool used in qualitative research to assist in the analysis, interpretation, and organization of data from interviews, focus groups, user research, and literature review, in a rapid way to obtain research results (ATLAS TI, 2025).

Developed between 1989 and 1992 by Thomas Muhr and collaborators at the Department of Psychology of the Technical University of Berlin, its first version was marketed in 1993. Several researchers have used this software in their analyses, ensuring its potential in the most diverse areas of knowledge (GONDIM et al., 2018; SILVA JUNIOR; LEÃO, 2018).

The software has the ability to store documents of various formats and allow encoding, marking, annotations on these files, allowing the crossing of data and organization of information (FRIESE, 2014). Its objective is to help researchers to discover and analyze, in a systematic way, relevant phenomena hidden in unstructured data. ATLAS.ti offers

instruments that make it possible to identify, codify and record the results found in the data, evaluate their importance and observe the interrelationships (CORUJO; RELAY; SILVA, 2019). ATLAS.ti has been used in the areas of education, engineering, criminology, administration, anthropology, as well as health professionals such as nurses, doctors and psychologists. The application can be used with different theoretical approaches and multiple data analysis processes ((FRIESE, 2019; SORATTO; PIRES; FRIESE, 2019).

In the professional master's degree in radiological protection, the use of the software is indicated for integrative and literature reviews, for analysis and organization of data from interviews, documents, diaries and observation notes, among other research data collection instruments. Radiological protection is intended for the study of the safe handling of radiation. In the health area, it aims to minimize radiation exposure for both patients and occupationally exposed individuals (TAUHATA, 2014). This is a very important theme in some medical specialties, but it has not been shown to have the same relevance in the practice of medicine (VANO, 2011).

With the tools made available by the software for the organization and categorization of data on radiological protection, it was possible to realize how fast and facilitating the Atlas Ti represents.

In the context of the Professional Master's Degree in Radiological Protection, the use of technological tools to support qualitative research has been shown to be essential to ensure methodological rigor, data reliability, and in-depth analysis. The ATLAS.ti software, widely recognized in the area of applied human and social sciences, has been incorporated as a strategic instrument for the organization, categorization and interpretation of large volumes of textual, audiovisual and documentary data. Its application enhances the understanding of complex phenomena, such as professional practices, perceptions about biosafety and patient safety, allowing the researcher to integrate evidence with clarity and systematization. In the field of radiological protection, this approach contributes directly to the strengthening of safe practices, based on evidence and supported by in-depth analyses of the professional reality experienced in health services.

How does the use of the ATLAS.ti software contribute to the organization, analysis and systematization of qualitative data produced by professors and students of the Professional Master's Degree in Radiological Protection at the Federal Institute of Santa Catarina?

1.1 OBJECTIVES

To share practical experience in the use of the ATLAS.ti software as a tool for qualitative analysis in research developed within the scope of the Professional Master's

Degree in Radiological Protection, of the Graduate Program of the Federal Institute of Education, Science and Technology of Santa Catarina.

2 METHOD

This description shows the main tools offered by the atlas ti version 25 software, and practical examples of the usefulness of the software used in the dissertations of students in the Professional Master's Degree in Radiological Protection.

Initially, the activities using the software consisted of its installation. When accessing the software website (https://atlasti.com/pt) it was necessary to download it to the computer with desktop applications on Windows and macOS or Web version for browsers, using the license in the free version or purchasing a paid license. In the free version, ATLAS.ti 25 (trial), requires the following conditions: the license expires 20 calendar days after the request, within this period, you can use the software for up to 5 days of active use, which do not have to be consecutive, that is, you can start, pause and return to using ATLAS.ti on different days, until you complete the 5 days allowed within the total 20 days.

After the end of the evaluation period, ATLAS.ti moves to a limited mode of use ("read-only"), in which you can view the projects, but you will not be able to edit them if they exceed certain limits (more than 10 documents, 50 citations, 25 codes, 2 memos) (MUHR, T. 2023; MILES, M. 2014).

It is worth mentioning that after the expiration of the free license, there is a need to obtain a paid license key, which gives full access to all the features of the software, as well as the possibility to export the project (bundle). The procedures described below are specified starting with versions 22 and 24:

Step 1 – Creating a new project, at this point the project will be named according to the theme or the name of the research, e.g., Radiological Protection Review. Step 2 - All documents, files will be inserted in the document tab, they can be inserted in word, pdf or odt format. After all the files are indexed, they can be grouped as well, in case the searcher wants to segment by

content, such as by authors, countries, journals or the researched base, according to the interest of the researcher oriented by the research objective. The entire view of the documents is carried out in the "manage documents" tab, where it is possible to add, remove, rename, comment, open and renumber the files.

Step 3: Creation of codes, usually in qualitative research, codes are generated, which are short expressions oriented according to a theoretical framework, linked to a speech excerpt, in the case of interviews, or an abstract in the case of articles. To create codes click

on "new code", then name the code and then click on create. After creating the codes, each piece of text that is pertinent to the created code, click on the left mouse button or on the code manager and apply the new code.

Step 4: Citations are the selected excerpts (interviews, article texts, images) and coded. Through the citation manager, it is possible to create different types of analysis, such as a report or word cloud, this tool presents an image with the most used terms in the selected studies, emphasizing the word that proved to be the most frequent.

Step 5: Creation of the networks, the networks provide a didactic visualization of the analyzed data, such as the citations according to the codes linked to it or only the codes and their interrelationships. To create a network, open the code manager, select the codes to be listed, and then click show on network, generating it.

The software also makes it possible to export the data compiled during the analysis in text files or spreadsheets, in addition to allowing the export of the project as a whole to another researcher, through the "export" tool and "project packages". This feature is very useful for teamwork, collaborations between researchers, and for backing up projects without losing any research data.

3 RESULTS AND DISCUSSION

The results represent some of the tools offered by the software for the analysis of articles. Some of the dissertations, intentionally chosen on health and nursing work in the scope of "Radiological Protection", will be presented.

The process of organizing and managing qualitative data from interviews in ATLAS.ti version 25 follows some fundamental steps. Below, we describe a practical script aligned with the recommended procedures in the qualitative research assisted by him.

In ATLAS.ti 25, a new project is created, which will serve as the basis of all the analysis. It is important to name the project with the title of the survey or an identifier that facilitates its management.

When it comes to interviews, the most used instrument in the dissertations presented, these must be transcribed in full in electronic text format, preferably in .docx or .pdf formats, compatible with ATLAS.ti., it is recommended to review the transcripts before inserting them into the software, ensuring fidelity to the participants' discourse. Anonymous identifiers may be entered (e.g. Interviewee 1, Interviewee 2) to ensure ethical confidentiality. Next, the interview files are inserted through the "Import > Documents" tab. Each interview becomes a Primary Document. ATLAS.ti organizes these documents in an internal library, allowing for quick and secure access.

It is possible to assign metadata to the primary documents: participant's name, study group, age group, gender, etc. The metadata is useful later for segmenting analyses by subgroups. Before formal coding, the researcher can perform exploratory readings and produce initial memos in the software itself. Memos serve as reflective notes, recording preliminary impressions, hypotheses, or emerging categories.

The coding of the relevant excerpts from the interviews begins:

Open coding: creation of free codes while reading, representing concepts, categories or units of meaning.

Pre-coding: if there is a theoretical framework or defined categories, codes can be created before and applied during reading.

In ATLAS.ti 25, encoding can be done by text selection and direct association with the created code. You can organize the codes into Code Groups. After coding, relational analysis begins: Identification of patterns, co-occurrences and relationships between codes. Creation of visual Networks in the software, allowing to map the conceptual connections and support the analytical construction.

Also in ATLAS.ti 25 it allows you to generate reports of codes, coded segments, frequency of occurrence and overlapping of categories. These reports support the interpretative analysis and writing of the results. It is recommended to perform periodic backups of the project, and it allows you to export the complete project for backup or sharing with co-advisors.

At the end of the analysis, the researcher can export, according to the need, the code report, the conceptual networks, the citation lists and the data for inclusion in the dissertation and publications.

ATLAS.ti 25 brought greater integration with the cloud (ATLAS.ti Cloud) and better graphic usability, which facilitates the monitoring of the project by the advisor and favors collaborative analysis within the scope of professional master's programs.

After identifying the search strategies in the determined databases, the analysis of the articles found was carried out. These will be displayed illustrating the tools available in the software that contribute to the organization of the data. It is essential to emphasize that the process of creating and coding, as well as the organization of the networks, are not determined by the program, but by the researcher according to the theme, methodology and theoretical framework or need of the research, from the files inserted in the software.

In its operationalization, it offers a basic model formed by objects: primary documents (primary data from various sources: articles, interviews, photos, music, films, maps, etc.); quotations (fragments of audiovisual images, text or audio); codes (concepts arising from

external and/or internal reference through what is being analyzed at the moment); notes (record of reflections, observations and interpretations of the material being evaluated); families (grouping of objects such as codes, notes, or primary documents) and networks (associations that allow you to visualize the connections between encoded information).

The elements mentioned above make up the Hermeneutic Unit (HU) which refers to an electronic space that organizes the entire database and the concepts, comments, notes and citations that emerge from the analyses, shown in figure 01.

Figure 1

Document Manager
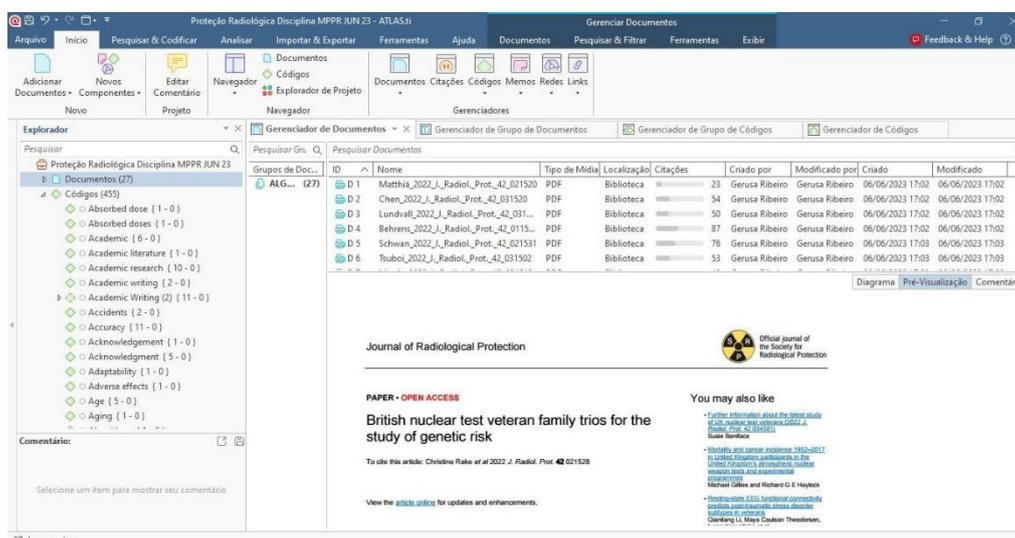
Source: by the authors (2025).

It is through the document manager that ATLAS.ti is able to integrate a large number of documents into its workspace, in addition to keeping control over all the notes, codes and comments that are produced during the analyses. It also allows you to work with various formats of text, audio, video, geographic data and image files.

The software helps in the organization of qualitative data with different objectives, optimizing the information analysis process. We emphasize that the organization of a network occurs through all the relationships between codes and all the discussion and subsequent conclusion is due to the theoretical foundation of the researcher.

The main software tools that were used in the simulation can be described, according to Friese (2012), as follows: - Project: place within the software that will store all the data collected in the research, which will be saved and named at the researcher's discretion; - Documents: the researcher has the possibility to import documents in various formats into the software, files in PDF, word and odt format; - Codes: the researcher creates and defines the codes, considering the objectives and references that underlie the theoretical context.

The codes translate through small sentences the most important expressions within the texts, figure 02 exposes the codes as an example "occupational safety" relating each occurrence on occupational health identified in the articles.

Figure 2

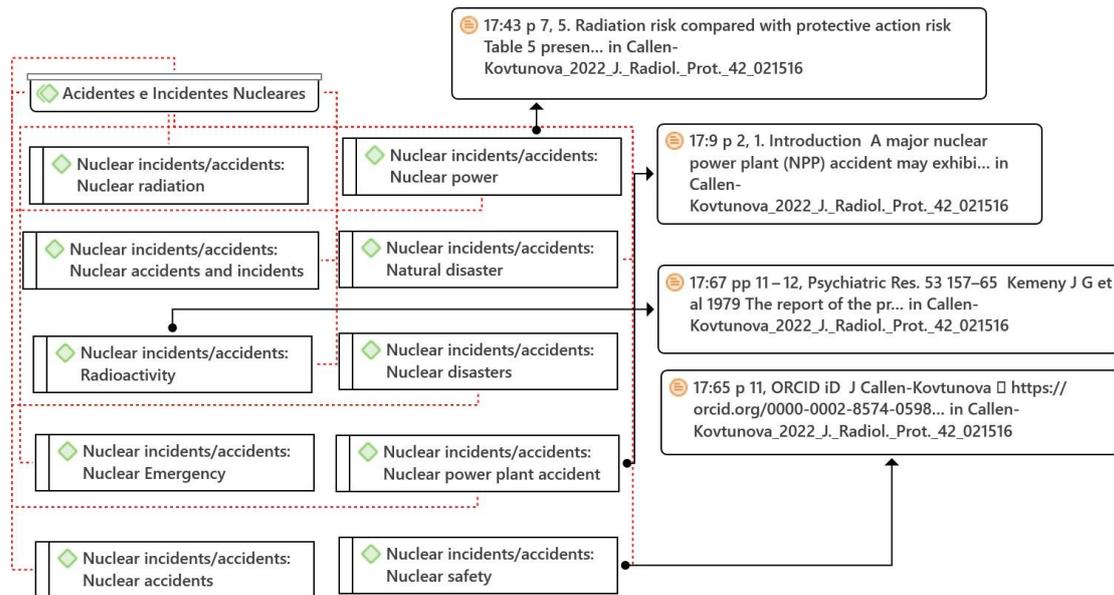*Network showing the codes identified in the documents*
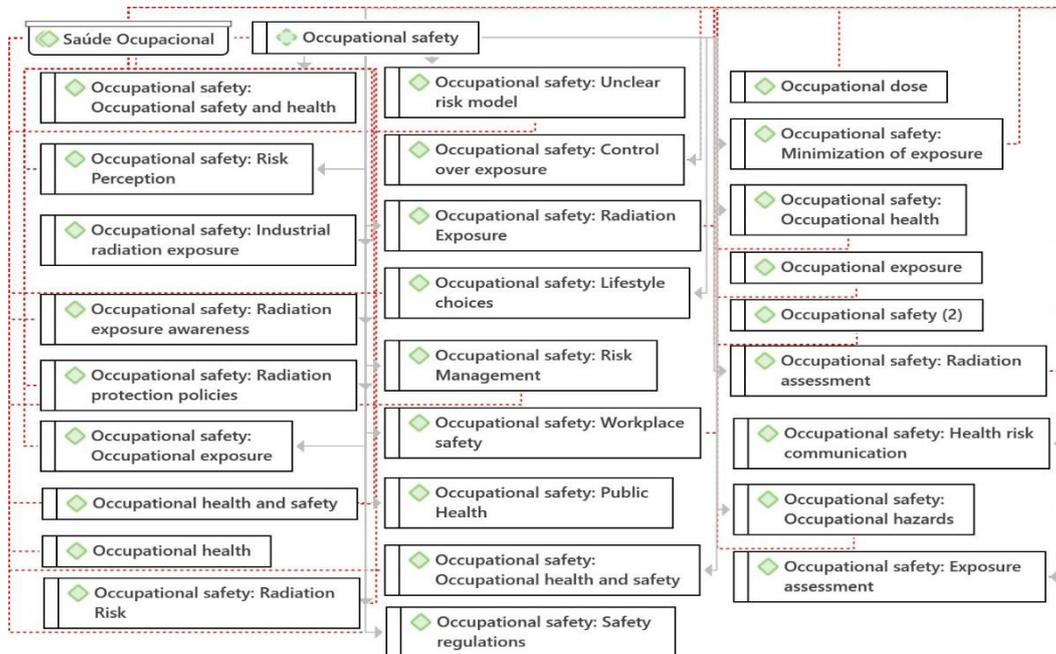
Source: by the authors (2025).

- Citations: are parts of the texts highlighted by the researcher stored within the software and also in the format of the networks created and shown in the software, as shown in figure 03.

Figure 3

Illustration of codes and citations
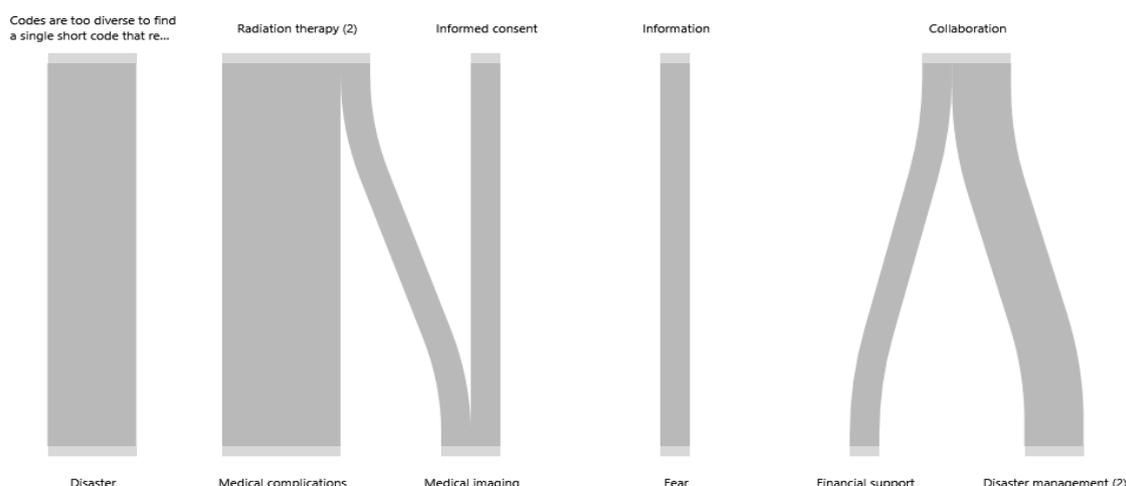

Source: by the authors (2025).

- Group of codes: according to the researcher's objective, this tool organizes the codes, with the association of expressive terms within the text. - Networks: illustrations created based on stored documents, codes and citations, as well as groups, created by the researcher. In general, the software fulfills its role well, which is to assist in the organization of data by assisting in the process of analysis in qualitative research of information obtained through the stored data. This fact allows the display of the layered information of the files within the software.

ATLAS.ti has practical operational resources, in addition to networks, showing other distribution formats and relationships between codes, possibilities and offering the researcher autonomy to innovate, exemplifying results visualized in graphic form (GONDIM et al., 2018).

The sankey diagram is one of these alternatives, obtaining a look at the distribution and frequency with which the codes appear, the graphs when interconnected demonstrate combination and relationship, called co-occurrence, observed in figure 4.

Figure 4

Sankey Diagram of Co-Occurrence of Codes

Source: by the authors (2025).

In the figure, co-occurrence can be observed, that is, relationships between the codes, radiation therapy (radiological therapy) versus informed consent (informed consent) related to medical complications (disease condition), related to medical imaging (description of a region visualized by the physician).

Figure 5 illustrates the citations and codings, and allows you to view the excerpts from the articles with their codes, frequency, and number of codes assigned to each of the citations. From the selection of a paragraph in the document, or an expression, it is possible to view the frequency and numerical distribution of the encodings assigned in the respective citation. This format can be extracted from the software as a report in excel format, obtaining the list of codes and/or citations, gathered or separated.

Figure 5

Citations with their respective codes

Source: by the authors (2025).

In figure 5, it shows us the citation linked to the expressive code disaster assigned 51 times, and the tool allows us to view the document from which each of the citations was identified and its reference.

Of the many tools available to the software, there are counterpoints that emphasize the fear that the researcher will produce too many and mechanical cuts that distance him from the general context and the meanings produced by it (CORUJO; RELAY; SILVA, 2019). The precautions that must be considered in this process are peculiar to other qualitative approaches, since the data do not speak for themselves and the meanings that emerge from them are part of the researcher's perspective.

To assist the process of organizing large volumes of information data from research, computational technologies (CAQDAS – Computer Assisted Qualitative Data Analysis Software) emerge, with different types of software for data analysis, which in their versatility have been used in research management, facilitating the analysis process, mainly by organizing large amounts of data, to optimize time and contribute to rigor and scientificity, especially in qualitative research. Artificial intelligence has helped humanity in different sectors of life, including the academic universe, providing researchers with the opportunity to optimize time in management and facilitating the process of data analysis, maintaining scientific and methodological rigor, enabling them to be more available to play the main role of critical and reflective analyst of research.

4 FINAL CONSIDERATIONS

The functionality of the Atlas.ti. software is an important tool that facilitates the storage and analysis of data, contributing to the challenge of providing quality and credibility in qualitative studies. The use of the software proved to be suitable for use in different approaches, especially in the qualitative one, saving time and facilitating the organization and analysis of data. In addition to being an uncomplicated operationalization, the software allows the researcher the possibility of analyzing qualitative data in less time and with greater reliability. In the set of articles analyzed, the contribution of research on the evolution of radiological protection over the years in the establishment of radiological protection standards and legislation is highlighted.

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