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AN ARTIFICIAL INTELLIGENCE (AI)-ASSISTED SCOPING REVIEW OF EMERGING USES OF AI IN QUALITATIVE RESEARCH AND ITS ETHICAL CONSIDERATIONS

UMA REVISÃO DE ESCOPO ASSISTIDA POR INTELIGÊNCIA ARTIFICIAL (IA) SOBRE USOS EMERGENTES DE IA NA PESQUISA QUALITATIVA E SUAS CONSIDERAÇÕES ÉTICAS

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Abstract: The aim of this article is to conduct a scoping review of academic materials that discuss the application of artificial intelligence (AI) based on large language models to support qualitative research, as well as the ethical considerations involved in such applications. To this end, a scoping review of 31 articles published between 2018 and 2023 in journals and conferences indexed in SCOPUS and Web of Science,

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and available on preprint servers due to the novelty of the topic, was conducted based on relevant terms. To demonstrate this potential, we decided to experiment with ChatPDF, an AI tool based on natural language processing, to support the review. The results of the review indicate more consolidated uses of AI for summaries, abstracts, and code generation, but there are indications of uses for topic generation, sentiment analysis, and data extraction and processing. The ethical discussion takes on a more normative and cautious dimension in the use of AI for qualitative research.

Keywords: Qualitative research with artificial intelligence; Qualitative data analysis; Large language models; ChatGPT; ChatPDF; Ethics in qualitative research

Resumo: Este artigo tem como objetivo conduzir uma revisão de escopo de materiais acadêmicos que discutem a aplicação de inteligência artificial (IA) baseada em grandes modelos de linguagem para auxiliar a pesquisa qualitativa assim como considerações éticas envolvidas em tais usos. Para tanto, foi feita uma revisão de escopo de 31 artigos publicados em periódicos e congressos indexados na SCOPUS e Web of Science e presentes em servidores de *preprint*, devido à novidade do tema, de 2018 a 2023, com base em termos associados. Como forma de demonstrar tal potencial, optamos por realizar uma experimentação com o ChatPDF, uma ferramenta de IA baseada no processamento de linguagem natural, para assistir na revisão. Os resultados da revisão indicam usos mais consolidados de IA para resumos, sumários e geração de códigos, porém há indicativos de empregos para geração de temas, análises de sentimentos, além de extração e tratamento de dados. A discussão ética assume uma dimensão mais normativa e cautelosa no uso de IA para pesquisa qualitativa.

Palavras-chave: Pesquisa Qualitativa com Inteligência Artificial; Análise de dados qualitativos; Modelos grandes de linguagem; Ética na Pesquisa Qualitativa.

1 Introduction

In November 2022, OpenAI released the third version of ChatGPT (Chat Generative Pre-Trained Transformer), an AI-based chatbot[10] designed to interact with users through text in a human-like manner. ChatGPT excelled at generating high-quality responses and maintaining long conversations, significantly outperforming earlier chatbots and personal assistants such as Siri and Alexa.

ChatGPT is one of several large language models (LLMs) developed from recent advancements in artificial intelligence, particularly Natural Language Processing (NLP). NLP aims to enable machines to understand human language and generate meaningful responses (outputs) based on user prompts (inputs). These technologies can be used in web search engines to provide optimal answers (or products) and in chatbots designed to interact with humans, such as ChatGPT, Copilot, Gemini, and Claude, among others.

According to Almeida, Mendonça, and Filgueiras (2023), large language models (LLMs) are sophisticated computational systems engineered to comprehend and generate natural language with a level of sophistication akin to human capabilities. These models

[10] In this article, we adopt a broad perspective that defines artificial intelligence as the ability of machines to mimic human intelligence, encompassing activities such as logical reasoning, learning, problem-solving, and decision-making. AI is achieved through machine learning algorithms, enabling machines to perform cognitive tasks independently with varying degrees of skill and autonomy (Almeida; Mendonça; Filgueiras, 2023).

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undergo rigorous training on extensive text datasets to predict sentence continuations, recognize linguistic patterns and structures, and produce coherent and meaningful responses. Through the use of generative models, which consist of sets of rules and instructions governing word combinations, LLMs aim to replicate real-world language usage, despite its inherent subtleties and complexities, by continuously refining their abilities as they process new texts and engage in more interactions.

The model generates text word by word, based on the likelihood of a human using that specific combination of words. Consequently, these models never produce identical responses and occasionally fail to generate accurate answers, a phenomenon referred to as hallucinations (Hacker; Engel; Mauer, 2023). Hallucinations arise when the machine generates a syntactically plausible probability, despite being factually and data-wise incorrect (Alkaissi; McFarlane, 2023).

Given the striking precision with which ChatGPT's responses resemble human-generated content, there was an immediate and widespread excitement about the potential application of this technology across various professions, including Law (Gandhi; Talwar, 2023), Education (Farrokhnia *et al*. 2023), Journalism (Santos *et al*. 2022), Marketing (Paul; Ueno; Dennis, 2023), Healthcare (Biswas, 2023; Tustumi; Andreollo; Aguilar-Nascimento, 2023), and essentially all roles requiring consistent content production. Naturally, this also extends to scientific research.

The scientific community promptly embarked on studying this new AI tool. Since its inception, researchers worldwide have published numerous articles conducting tests and reflections on large language models in general, and ChatGPT in particular. These studies have explored various issues, including the potential of such tools for tasks such as writing, automating, or streamlining technical activities such as composing emails, filling out forms, generating standard texts, paraphrasing, translating, summarizing, synthesizing, organizing, and structuring texts, as well as transcribing audio, “creating” and correcting programming scripts, among others, through the use of basic commands in everyday language known as prompts (Dwivedi *et al*. 2023; Sok, Heng, 2023; Susarla *et al*. 2023).

In addition to technical considerations, the use of large language models and other artificial intelligence systems for complex research issues has also been a topic of discussion and empirical testing. These include tasks such as literature review, reading academic material, and even data analysis, alongside scientific writing itself (Sampaio *et al*. 2023; Ramos, 2023; Salvagno; Taccone; Gerli, 2023), These discussions also address

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the challenges posed by AI "hallucinations", where language models generate linguistically plausible but ultimately false results (Alkaissi; McFarlane, 2023; Rahman *et al*. 2023). Furthermore, several discussions have also emerged regarding the ethical boundaries of employing AI for such tasks (Cotton; Cotton; Shipway, 2023; Ray, 2023).

As language models are designed to identify and simulate conversation patterns, researchers have naturally turned to evaluating their performance in qualitative research. After all, a considerable portion of qualitative research depends on extensive textual content, often gathered through qualitative data collection techniques such as interviews, ethnographies, and focus groups.

Our research in this paper aims to conduct a scoping review of the academic literature focused on analyzing the use of artificial intelligence (AI) based on large language models to support qualitative research and the ethical considerations surrounding its application. Additionally, we will conduct tests[11] with AI-based natural language analysis to assist our review process.

Our research entailed a scoping review of the initial wave of publications in journals and events indexed in the SCOPUS and Web of Science databases, along with preprint repositories. The objective was to examine how contemporary studies have addressed practical methodologies, potential applications, and ethical considerations related to the use of AI, including challenges and research agendas. After reviewing titles and abstracts and applying relevant inclusion and exclusion criteria, we identified 31 articles for our analytical corpus.

For our analysis, we developed an evaluation form to capture discussions about or even practical applications of large language models throughout various stages of qualitative research. These stages include participant recruitment, conducting interviews or surveys, content summarization, generating codes for qualitative analysis, identifying themes, sentiment analysis (automated assessment of message valence as positive, negative, or neutral), dialogic or deductive analysis, data extraction and processing, analysis validation, as well as experimental methods.

In addition to the literature review itself, we conducted an experimental test utilizing what we could call an AI-assisted review. Each article was evaluated using the prompt based ChatPDF[12] tool, inspired by the questions formulated for the human reading sheet. However, human coders made the final decisions. We assumed that this experiment

[11] We cannot label this test as an experiment due to the absence of several variable control requirements.
[12] https://www.chatpdf.com. Retrieved on March 31, 2024.

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could enable us to move beyond a traditional literature review by investigating how AI performs in assisting with locating and categorizing excerpts from scientific articles.

Our findings suggest that the most established uses of AI at this early stage involve summarization, abstract generation, and initial content coding. Additionally, there are indications of potential applications for theme generation (for thematic analyses), sentiment analysis, conversational analysis, and data extraction and processing. Regarding ethical discussions, the articles tend to adopt a more normative and cautious stance toward the use of such tools.

2 Materials and Methods

Our present study is based on a scoping review of scholarly literature examining the intersection of artificial intelligence and qualitative research methods. Specifically, we aim to investigate how academic literature has addressed the use of artificial intelligence tools in research employing qualitative methodologies, as well as the ethical considerations surrounding their use. However, given the expansive nature of the artificial intelligence field, which could potentially divert our investigation toward techniques and tools unrelated to recent developments in generative AI, we have chosen to focus our review on the latest landscape of tools, with a particular focus on large language models and pre-trained transformer chatbots. As the first version of GPT was released in 2018, we narrowed our search to the period between 2018 and 2023. We conducted our search on August 31, 2023, and we utilized the following query as our baseline, comprising various terms associated with these tools:

> ("chatgpt" OR “llama” OR chatbot OR "large language model" OR “large language models” OR "transformer" OR "GPT") AND ("qualitative methods" OR "qualitative research" OR "qualitative approach" OR "qualitative study" OR "qualitative case study" OR "qualitative data analysis" OR "qualitative interview" OR "focus groups" OR "grounded theory” OR "ethnography" OR "action research" OR "participatory research" OR "CAQDA" OR "participant observation").

We utilized this query to explore and gather metadata from publications indexed in two major databases: Web of Science (WoS) and Scopus. These databases compile articles and abstracts published in scientific journals and conference proceedings worldwide. Both WoS and Scopus are renowned databases known for indexing highly relevant journals within the scientific community, employing selection criteria such as the h-index and h5, CiteScore, SCImago Journal Rank (SJR), Source Normalized Impact

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per Paper (SNIP), and Journal Citation Reports (JCR)[13]. Our search, considering unique entries filtered by the DOI of each publication, yielded 87 documents in WoS and 205 in Scopus, all of which were in English. After merging the two databases and eliminating redundancies and overlaps, the final dataset comprised 214 references.

For this research, we adopted the following inclusion criteria: (a) studies analyzing the practical application of AI in qualitative research; (b) studies exploring the empirical application of AI as a technique or stage in qualitative research; and (c) studies discussing the ethical implications of using AI. Conversely, we applied the following exclusion criteria: (a) generalist articles that only tangentially address the topic of AI in qualitative research or with a historical and/or theoretical focus lacking a description or analysis of empirical uses; (b) case studies evaluating only a single tool or a specific dimension of a particular AI; and (c) studies that employ exclusively quantitative approaches in their analyses.

After reading the titles and abstracts and applying the inclusion and exclusion criteria, we discarded 203 entries that did not align with the scope of our investigation. Most of these excluded articles discussed artificial intelligence in a general sense or presented case studies focusing on specific dimensions of AI without proposing the use of tools for qualitative methodological approaches. A small portion of the publications in this original database discussed the use of AI in research focused on quantitative methods rather than qualitative methods. In the end, this process resulted in a final total of only 11 articles published in scientific journals or proceedings indexed by either WoS or Scopus.

Due to the scarcity of papers and intending to enhance intending to enhance our dataset for a more comprehensive analysis, we also conducted searches on various preprint repositories. A preprint refers to a draft of a scientific article or a scientific article that has not yet been officially published and thus has not undergone peer review. While the practice of incorporating articles that have not undergone peer review in literature reviews is debatable – as some of these may never be published at all or may have their data and results completely altered upon publication – we decided to include them in the final corpus of our investigation after careful consideration. We considered two main factors in this decision: the small number of articles effectively published on this subject and the novel developments in this new type of tool. Consequently, we added 20

[13] As this is a very novel and experimental theme, we opted not to include local databases, such as SciELO, at this time.

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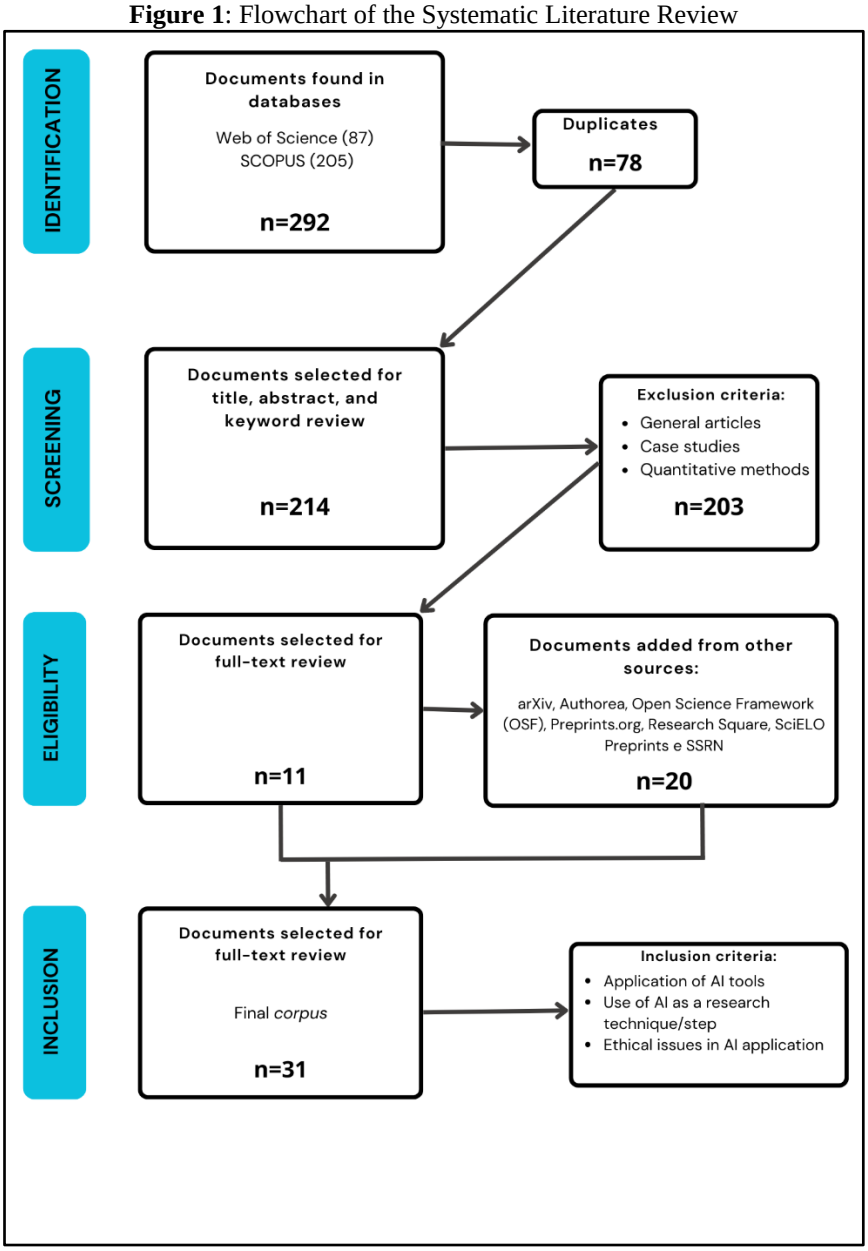
documents resulting from searches for preprints on arXiv[14], Authorea[15], Open Science Framework (OSF)[16], Preprints.org[17], Research Square[18], SciELO Preprints[19], and SSRN[20] to the full-text reading stage, resulting in a final corpus of 31 articles from which we conducted our literature review (see Appendix 1). Figure 1 shows the flowchart followed to compose our final corpus of analysis.

Figure 1: Flowchart of the Systematic Literature Review



Source: Created by the authors (2023).

[14] https://arxiv.org/. Retrieved on September 25, 2023.
[15] https://www.authorea.com/. Retrieved on September 25, 2023.
[16] https://osf.io/. Retrieved on September 25, 2023.
[17] https://www.preprints.org/. Retrieved on September 25, 2023.
[18] https://www.researchsquare.com/. Retrieved on September 25, 2023.
[19] https://preprints.scielo.org/. Retrieved on September 25, 2023.
[20] https://www.ssrn.com/index.cfm/en/. Retrieved on September 25, 2023.

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The next step was to create a reading sheet for the selected papers, focusing on (a) the AI tools mentioned or employed in the research, (b) the research techniques referenced from the use of AI tools, and (c) the authors' observations regarding the ethical implications of using AI tools in research. The general script comprised approximately 20 questions (see Appendix 2). Each article was read by at least one human coder and subsequently subjected to AI-assisted review.

For this stage, we converted the original set of 20 questions into command prompts capable of eliciting a response from the consulted chatbot. Questions such as "Does the article discuss the use of AI to generate text summaries or abstracts? Is AI used to condense substantial amounts of text into a few key ideas?" or "Does the article raise ethical concerns about the use of AI?" comprised the set of commands directed to the AI-assisted review (see Appendix 3). After conducting tests and exploring various tools, we ultimately chose ChatPDF. Developed by Mathis Lichtenberger, ChatPDF is a German application that utilizes natural language processing (NLP) to respond to user prompts about a specific document previously loaded into the tool's memory in PDF format. In this case, the system's NLP attempts to read and decipher textual materials, usually translating them into human language. ChatPDF is typically used to react to questions and inquiries about PDF documents and generates responses through the ChatGPT API (Application Programming Interface).

In the realm of research, authors such as Chubb (2023) have proposed using ChatPDF to assist in qualitative research, either to condense transcriptions or to automate the process of reading through large volumes of documents. The responses provided by ChatPDF are typically directly related to highlighted passages from the text under review, and the tool usually bases its responses on direct citations from the analyzed document to ensure consistency.

Our study subsequently conducted an individual AI-assisted review for each of the 31 mapped articles, using prompts inspired by the questions developed for the human reading sheet. We fine-tuned all prompts after an initial trial with two articles loaded into the application's memory to make the responses more objective and precise. Responses varied in length and language: although ChatPDF can be queried in Portuguese, it often chose to answer more complex questions in English, given that all the texts are in that language. We tried to keep the interactions in Portuguese, and depending on the tool's reactions, a human coder interpreted its responses and applied the appropriate labels. For

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binary logical variables, for example, the tool often indicated “yes” or “no” in its responses. However, in some cases, we had to interpret the tool’s response to fit the appropriate categories. Throughout the entire process, therefore, the final decision was human, albeit assisted by AI. Human interpretation focused on objectively observable aspects in the AI’s responses. Whenever a response raised doubt or seemed unclear, human coders did not have the autonomy to decide independently. Instead, they had to reformulate the prompt to clarify the AI’s response, similar to the initial calibration process.

At the end of this procedure, we compared the results from the human reading of the texts with those from the AI-assisted reading. While human reading ensured greater qualitative consistency in the review, AI-assisted reading facilitated content analysis through deductive coding of the texts. Overall, our findings are as follows.

3 Findings

Among the 31 articles analyzed, 11 were formally published: 8 in scientific journals and 3 in conference proceedings. The rest of the sample consists of preprints or unpublished texts. The journals that most frequently featured discussions on AI and qualitative methods were the *International Journal of Qualitative Methods* (2 articles) and *The Qualitative Report* (2 articles). Regarding the years of publication, there was a notable increase in 2023, with 31 articles in total, 8 of which were published in journals, as shown in Table 1.

Table 1: Reviewed Publications

	Articles in Journals	**Articles in Conference Proceedings**	***Preprints***	**Total**
2023	8	-	19	27
2022	-	1	-	1
2021	-	2	1	3

Source: Created by the authors (2023).

As previously noted, ChatGPT and other large language models only gained prominence between late 2022 and early 2023, making it difficult to definitively interpret

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these numbers. Nevertheless, this current snapshot indicates a clear rising trend in the debate, as discussions about the intersection of LLMs and qualitative methods were practically non-existent between 2018 and 2020. Notably, there has been a substantial rise in the number of publications in journals sourced directly from the indexing databases WoS and SCOPUS. Furthermore, the number of preprints suggests that many of these unpublished articles will likely see publication, indicating ample potential for further exploration in the field.

Among the tools most frequently mentioned in the literature, ChatGPT appeared in 21 articles, therein including references to the ChatGPT chatbot (16 mentions) and its engine, GPT or versions GPT-3.5 and GPT-4.0 (5 mentions). Additionally, the language model BERT was mentioned in 3 articles. Many articles refer to large language models (LLMs) and chatbots in general, without specifying a particular tool or model. However, some papers also allude to tools such as Copilot, ChatPDF, Hubert.AI, Robo-Assistant, InstructGPT, Midjourney, and nCoder, as well as natural language processing metrics such as Rouge, AQUA, METEOR, BLEU, BigQuery, among others.

Even at this early stage of research, it becomes evident that AI tools have a wide range of applications in qualitative research. Some studies propose using these resources for tasks such as systematizing literature, mapping concepts, content and thematic analysis, text mining, sentiment analysis, transcribing interviews, and analyzing data from open-ended surveys. The studied populations vary widely, but there is a prevalent focus on education, including experiments conducted with undergraduate students and teachers. However, in general, the literature in our study corpus deliberately emphasizes the application of AI in qualitative research rather than in classroom settings. Therefore, our aim was to investigate which qualitative techniques or approaches were most affected or could be impacted by adopting AI-based tools. Table 2 below summarizes these findings.

Table 2: Use of AI Across Different Techniques and Processes

Technique	**Responses**	**N**	**Percentage**
Recruitment	*Yes*	1	3.3%
	No	30	
Interviews, Surveys	*Yes*	1	3.3%
	No	30	

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Experimental Methods	*Yes* *No*	0 31	0.0%
Abstracts, Summaries	*Yes* *No*	21 10	67.7%
Code Generation	*Yes* *No*	22 9	70.9%
Theme Generation	*Yes* *No*	8 23	25.8%
Sentiment Analysis	*Yes* *No*	8 23	25.8%
Dialogic or deductive analysis	*Yes* *No*	11 20	35.4%
Data Extraction and Processing	*Yes* *No*	11 20	35.4%
Analysis Validation	*Yes* *No*	13 18	41.9%

Source: Created by the authors (2023).

While qualitative research encompasses a wide range of methodological approaches, from interpretative methods like discourse analysis or ethnography to more objectivist techniques such as content analysis or survey applications, we found that the use of AI in qualitative methods tends to concentrate on specific techniques or processes. For example, there is a relative scarcity of studies on the use of AI for participant recruitment and selection, which are crucial stages for ethnographies, focus groups, interviews, and other techniques involving interactions with individuals. Only one study (3.3% of the total) addressed this topic (Hamilton *et al*. 2023). Similarly scarce are the

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number of studies devoted to the use of AI in conducting or assisting with interviews/surveys or experiments. Only one article (3.3%) mentions such usage (Abbas; Pickard; Atwell; Walker, 2021) in the former case, and none in the latter.

On the other hand, among the most established uses we find the application of AI for text coding techniques based on patterns or labels (N = 22 / 70.9%) and producing summaries or synopses from large volumes of text into concise ideas (N = 21 / 67.7%). This indicates a clear trend in the literature towards using AI tools to autonomously and efficiently extract meaning from textual materials (e.g. Chew *et al*. 2023; Li; Dohan; Abramson, 2023). Dergaa *et al*. (2023) note that "summarizing lengthy academic papers can be a time-consuming process, but ChatGPT can be trained to automatically generate them [12, 14, 15]. This feature guarantees an objective and unbiased summary, generated by a machine instead of a human" (Dergaa *et al*. 2023). Silveira and Bhattacherjee (2021, p. 277) note that "with a 10,000 sentences collection, SRoBERT reduced the time to find the most similar pair of sentences from 65 hours to about 5 seconds". Consequently, techniques such as content analysis, thematic analysis, and even discourse analysis can benefit from this particular use of AI tools.

A relatively smaller proportion of studies have further explored this more direct use of AI for code generation in inductive analyses. In these cases, the goal is not just to encode a small excerpt from the text, but rather to produce a semantic aggregate of these codes into larger themes and more substantial debates (N = 8 / 25.8%, e.g., Gamieldien, Case, Katz, 2023; Paoli, 2023). Some studies even "propose a new method utilizing LLMs to improve QDA [Qualitative data analysis] by automating key points extraction and relevance evaluation tasks" (Zhao *et al*. 2023, p. 333). In addition to Li's study, Doham, and Abramson (2021) utilize AI:

> To adapt machine learning to the task of applying codes or classificatory tags to primary qualitative human subject data, we reframe the coding of interviews at the paragraph level as a binary classification task where a paragraph is classified as relevant or irrelevant to a given code. […] which shows how deployment of a purposefully selected set of algorithms that work at smaller set sizes than typically encountered in "big data" analyses can produce reliable coding (Li; Doham; Abramson, 2021, p. 11).

Sentiment and valence analysis techniques are also underrepresented (N = 8 / 25.8%, e.g., Gao *et al*. 2023; Hitch, 2023), although, in the latter case, it is plausible that this approach bridges the blurred line between qualitative and quantitative methods.

The reviewed studies moderately reference three other stages of qualitative research. First is conversational analysis, where researchers engage in dialogue with AI

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or use AI to interact with research materials and methods. This technique allows researchers to provoke responses that qualitatively interpret the data. Instead of merely summarizing text, it establishes a dialogue, much like the AI-assisted literature review proposed here. Nearly one-third (N = 11 / 35.4%) of the texts use or mention this technique (e.g., Costa, 2023; Hayes, 2023).

In turn, 11 out of the 31 studies (35.4%) mention using AI tools for tasks such as data extraction, data processing, database cleaning, transcription, or captioning. One such example is Taylor (2023), who employed AI.

> [...] to clean the Microsoft Word transcriptions using Chat GPT, I entered the command, "Clean this transcription:" followed by the full text of the unclean transcription. In prior pilot studies, I used various commands such as "Correct this transcription:" or "Fix errors in this transcription:" but I found that "Clean this transcription:" was best at maintaining the same semantic and syntactic features of the spoken sentences of the interviewees, rather than synthesizing ideas and replacing semantic or syntactic features of the spoken sentences, resulting in inauthentic and inaccurate cleaned transcriptions (Taylor, 2023, p. 6).

Regarding the use of AI in qualitative research, Tai *et al*. (2023) advocate the use of AI to extract and analyze databases composed of nominal data.

> An LLM can be used as a research instrument because it is designed to pull vast amounts of data and converge to a solution. This characteristic of LLMs works well with the considerations of qualitative research, which aims to identify meaning and trends within non-ordinal data (Tai *et al*. 2023, p. 23).

Finally, 13 studies (41.9%) explore using AI for validating analyses. In techniques such as content analysis, researchers often focus on reliability indices, statistics, and the validation of qualitative data. These studies justify the use of AI to (a) correct or improve procedures typically carried out by humans, or (b) confirm the validity of human-conducted procedures. Several works have advocated for the use of AI not just in task automation, but also in validating interpretations (e.g., Li; Dohan; Abramson, 2021; Pattyn, 2023), in an attempt to ensure greater transparency in methodological procedures.

In this context, Li, Dohan, and Abramson (2021) contend that AI can serve for both interpretation and validation, thus saving time and resources. However, they propose that a hybrid approach, integrating both machine and human input, might be the best solution:

> [...] Our study shows that a hybrid approach that iteratively integrates machine learning into interpretative qualitative analysis can save hundreds of hours of human effort on a modestly sized project, while potentially improving coding reliability. It creates unique possibilities for scaling human coding to large volumes of primary data where human-only coding would be time or cost prohibitive and machine-centered coding would be inadequate (Li; Doham; Abramson, 2021, p. 31).

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Hamilton et al. (2023), meanwhile, advocate for triangulating human analysis with analysis conducted by AI tools. They assert that this approach to data validation can "help identify oversights, alternative frames, and personal biases" (Hamilton *et al*. 2023, p. 13) in qualitative research:

> Overall, the human-generated themes provide a comprehensive and holistic understanding of participants' experiences, taking into account the broader social, economic, and cultural contexts that shape their lives. The AI-generated themes, while offering efficiency and scalability in data processing, may lack the nuanced understanding and interpretive flexibility that human researchers bring to the analysis. Combining the strengths of both human and AI analysis can lead to a more comprehensive and nuanced understanding of qualitative data (Hamilton *et al*. 2023, p. 11).

We also find discussions regarding the potential for AI to enhance human perception of the topics under study, as in the case of coding tasks. Chew *et al*. (2023) argue that validation by AI can broaden coding possibilities:

> Additionally, we found that [model-generated] reasons can help human coders reflect on their own coding decisions, which can in turn inform revisions to measure definitions. Anecdotally, we find that the process of making the codebook more explicit for the model also tends to help improve the instruction readability and comprehension for human coders (Chew *et al*. 2023, p. 14).

While the results indicate a burgeoning trend of debate on the use of certain specific techniques and approaches, nearly two-thirds of the studies (N = 23 / 74.2%) acknowledge limitations and challenges in improving these techniques to attain greater analytical safety, transparency, and rigor (e.g., Bano, Zowghi, Whittle, 2023; Christou, 2023). Many of these studies emphasize the necessity for further research development, including additional testing and refinement of language models.

Naturally, beyond the application of the techniques themselves, the use of AI in qualitative research raises several ethical questions and concerns (e.g., Costa, 2023; Marshall; Naff, 2023). The analyzed literature heavily reflects these concerns, with 25 studies (80.6%) mentioning them, compared to only 6 (19.4%) that do not. While the depth and detail of these discussions vary, the vast majority of studies address ethical considerations regarding the use of AI. Though not all instances of the use of IA are viewed apprehensively by researchers, there is an explicit demand for transparency, integrity, and accuracy in the results (Alzaabi *et al*. 2023; Qasem, 2023).

Regarding transparency, the most frequently voiced demand concerns the formal requirement for researchers to clearly disclose the use of AI in their research or analytical processes, detailing the steps and procedures undertaken with the assistance of these resources (Costa, 2023, p. 72). A lack of transparency in adopting these tools could raise

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questions about the validity of the results. For instance, Marshall and Naff (2023) highlight the importance of assessing the use of interviewees' data by AI platforms, stressing that participants in qualitative research are not always informed about how their data will be processed or the risks of uploading it to third-party platforms. The authors emphasize that:

> Should qualitative inquiry move in the direction of AI collected interview data, even with advancements within the technology, the demonstrated benefits of active interviewing may be undermined, and the richness of the data may therefore be diminished. Furthermore, the ethical question persists of how participants expect their data (audio and written) to be used and protected (Marshall; Naff, 2023, p. 6).

As for integrity, a common criticism concerns the accuracy and efficiency of research, especially regarding potential analytical biases. The effect of convergent expectation on responses provided by generative AI during dialogic interactions is well-known. Essentially, artificial intelligence seeks acceptance and adjusts itself to tutors, resulting in reactions that can change when faced with disagreements. Given this effect, it is crucial to ensure that data interpretation does not solely reflect the cognitive, affective, and evaluative dimensions of researchers.

Regarding rigor, the main criticism in the analyzed literature pertains to the flaws and hallucinations that current AI systems are prone to, as many of them have a tendency to "invent" data or autocomplete diagnoses (Glaser; Gehman, 2023; Tai *et al*. 2023).

These and other guiding concerns are recurring themes in the studies we analyzed[21]. Therefore, we also sought to gauge the researchers' attitudes toward these ethical concerns. For the sake of simplicity, our investigation identified the three most prevalent stances in the literature.

Firstly, many studies focus on the normative dimension of AI usage, prescribing ethical behaviors and emphasizing necessary precautions and desirable outcomes. In these cases, authors often include value judgments about what constitutes appropriate behavior or usage. A typical example of normative reasoning regarding ethical issues in AI use might be: "Researchers can automate tasks with AI, but they must do so transparently and clearly". For instance, Costa (2023, p. 72) emphasizes that researchers using AI tools should consider issues such as data privacy, security, and transparency. Costa also addresses bias in AI-based research, noting that "AI algorithms may reproduce

[21] These guidelines are currently reflected in the guidelines of leading scientific associations and publishers. As Spinak (2023) explains, authors must transparently disclose their use of AI, take responsibility for all content generated, and ensure that these tools are not listed as co-authors of the work.

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and even amplify biases in the data used to train them, potentially leading to biased research results" (Costa, 2023, p. 72). In a similar vein, Marshall and Naff (2023) argue that AI-generated data tends to disproportionately represent perspectives on race and social class compared to reality. The authors contend that this presents "a clear concern for AI-generated qualitative data analysis to be culturally misaligned with participants from minoritized, marginalized, and underrepresented backgrounds, which is particularly dangerous if AI qualitative analyses begin to be interpreted as 'truth'" (Marshall; Naff, 2023, p. 7).

A second, less common but recurring stance falls under what we designate as a realist dimension. In these studies, we find a practical approach to AI usage, with less focus on normative expectations. The tone steers clear of value judgments on practices and instead offers an objective view of issues and procedures. Authors use descriptive rather than evaluative language, refraining from drawing normative conclusions and favoring a more pragmatic approach. A typical example of this perspective might be: "The use of AI may change certain routines in qualitative data analysis" or "AI itself isn't inherently good or bad; its usage determines the outcomes". For instance, Taylor (2023) concludes that:

> Ultimately, this study demonstrates that Chat GPT may represent an incredible efficiency for qualitative researchers who need to clean interview transcriptions. However, as this study suggests, human beings still have a place in qualitative data cleaning processes, and prior research has questioned the morals and ethics of completely replacing human transcription (Hennessy et al., 2022). As a result, our collective future will continue to be shaped by artificial intelligence, and in the realm of research, Chat GPT may shape the work that qualitative researchers do, freeing them to do more pressing, more important, more humanistic work than cleaning audio transcriptions (Taylor, 2023, p. 9).

Lastly, a third common dimension is what we term as futurist, which concentrates on outlining future agendas for utilizing AI in qualitative methods. The tone often involves attempting to observe and predict behaviors, analyze trends, and suggest directions or avenues for debate. A typical example of this approach is: "The use of AI can significantly impact qualitative research practice, due to X and Y" or "In the future, we may envision such and such uses". As articulated by Costa (2023):

> Just as word processing programs have become common tools to increase productivity, digital tools incorporating AI will become standard for researchers, like a superpower that democratises content creation. It will not replace researchers' tasks but transform and reshape them (Costa, 2023, p. 74).

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Table 3: Ethical Considerations in Research Using IA

Ethical Issues	*Yes*	25	80.6%
	No	6	
Normative Dimension	*Yes*	18	58.1%
	No	13	
Realist Dimension	*Yes*	9	29.0%
	No	22	
Futurist Dimension	*Yes*	1	3.2%
	No	30	

Source: Created by the authors (2023).

Based on these frameworks, the analysis of the materials gathered in this research suggests the prevalence of the normative dimension in discussions regarding the use of AI in qualitative research (see Table 3). While these dimensions may coexist within the same study, observations made at various points throughout the texts reveal that authors generally express a critical and somewhat hesitant perspective towards the ethical and methodological challenges posed by artificial intelligence in academic research (N = 18 / 58.1%). Additionally, the realist approach, which focuses on describing uses and practices, was also reasonably common (N = 9 / 29.0%). This approach emphasizes the practical benefits of AI usage, especially when compared to other tools that require a deeper understanding of technical jargon (Chubb, 2023, p. 13), and considering "our large and growing corpora of user-generated text content such as SEC filings, online reviews, social media posts, and so forth" (Silveira; Bhattacherjee, 2021, p. 282). Lastly, despite being a relatively new topic often characterized by an optimistic and integrated perspective with strong expectations about significant impacts on scientific practices, the futurist ethical approach was the least common among these discussions (N = 1 / 3.2%).

3.1 Experimenting with ChatPDF

The ChatPDF-assisted review process proved successful overall. However, we found that properly framing command prompts plays a crucial role for obtaining clear and

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direct responses. Thus, researchers must carefully calibrate their initial questions to ensure they receive satisfactory feedback. Additionally, we occasionally encountered redundancies or evasive answers. In such cases where responses did not align directly with established criteria or were not easily interpretable by coders, we modulated a new set of questions. It is also important to note that despite the positive results from the AI-assisted review, this technique does not negate the need for qualitative interpretation by a human coder. AI-generated responses, as objective as they may be, often require additional contextual layers and are not always straightforward "yes" or "no" answers. Overall, our experience echoed similar findings to those of Chubb (2023), who concluded that:

> While not as good as a human research assistant, Chat PDF was a supportive friend who helped move work ahead [...] the function of ChatPDF to assist QDA [qualitative data analysis] is only as good as the information you feed it. The prompts in ChatPDF to summarize, generate, and re-story qualitative data must accurately reflect design decisions in a study. Cautionary usage is key (Chubb, 2023, p. 13).

Evidently, one can raise questions not only about the validity of the results but also the ethical use of AI for conducting this type of theoretical review. Relying solely on artificial intelligence to read and process data from the analyzed studies poses the risk of introducing hallucinations into the data. In our review, we addressed this concern by ensuring that at least one human coder reviewed each text to validate the AI-generated outputs. Therefore, we recommend the use of mixed techniques to mitigate any potential shortcomings arising from AI.

4 Discussion

Despite the relatively small analytical corpus analyzed in this review, we observe a noticeable recent surge in this type of literature, likely driven by the launch of ChatGPT and the buzz surrounding this new ecosystem of generative AIs. Based on the timeline outlined in this review, these studies are likely to continue gaining momentum in the years ahead. However, there is a notable research focus on the suggested or intended uses of AI within qualitative research, particularly emphasizing coding experiences and extracting meaning from texts, processes that benefit from recent advancements in natural language processing (NLP) metrics. As for the ethical considerations arising from the use of AI, studies still prioritize a clear and strict normative horizon, highlighting both (a) the recent emergence of these models and (b) the need for further exploration and the development

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of new tests to eventually establish greater security in usage conditions. This involves, among other things, promoting greater transparency, integrity, and rigor in research practices.

The prominence of an ethical normative debate indicates the novelty of these texts, driven by a critical perspective on the general use of AI in research. Beyond its multidisciplinary usages – including for unethical purposes such as plagiarism – generative artificial intelligence in general, and LLMs in particular, reproduce premises and decisions made during their creation and development processes. Thus, not only do AI tools reproduce and reflect the ideas of their developers, but the results of AI-assisted investigations may also be influenced by training bias and interpretation from the researchers themselves. These limitations, however, mirror similar shortcomings found in processes performed by human coders.

One example is the experiment we conducted for this study, with assistance from an NLP-based AI called ChatPDF. This tool effectively extracted useful information from academic texts, responding well to our prompts and finding relevant excerpts from our questions. While it unsurprisingly made some errors or assumptions, the experiment demonstrated the potential of such AIs to "interact" with various types of textual or audiovisual files. This capability is particularly promising for qualitative research, which naturally generates large amounts of content through its collection techniques.

However, we do not believe that such usage should be undertaken uncritically. Some articles, for instance, claim that AIs could "revolutionize" qualitative data analysis by swiftly and consistently processing extensive volumes of textual data, thereby reducing the time and effort required for analysis (Hayes, 2023). Much of the hype surrounding LLMs centers around their potential to serve as assistants or even co-pilots for various daily tasks, promising more time for creative and meaningful activities. In practice, however, it's crucial to approach these narratives with caution and thoughtful consideration.

First and foremost, as several analyzed articles have cautioned (Alzaabi *et al*. 2023; Bano, Zowghi, Whittle, 2023; Chew *et al*. 2023; Glaser; Gehman, 2023; Paoli, 2023; Pattyn, 2023), in their current state, LLMs can still hallucinate and invent various types of data. Therefore, even when given a simple request, such as a summary, the machine may produce words or passages that do not align with the original text, potentially resulting in significant errors. In cases such as the one presented here, where we sought to verify the presence or absence of complex concepts, we occasionally

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encountered unreliable responses that could not be used and required careful human verification. The importance of crafting a good prompt and the AI's tendency to change its mind when challenged are additional issues that cannot be overlooked.

Currently, most LLMs and companies developing PDF reading applications are based in Silicon Valley, in the United States, or follow its operational logic. Consequently, there are numerous murky and ethically questionable dimensions arising from the algorithms employed, as well as the datasets used to train these models (Dwivedi et al. 2023; Hacker; Engel; Mauer, 2023), including the exploitation of cheap labor from developing nations for human validation of such models (Crawford, 2021). Scientifically speaking, this suggests that the Anglo-Saxon model of producing science is the most prevalent in the training and responses of these systems. As a result, these models and tools might lack sufficient training in qualitative research and, if not properly adjusted, may not function adequately for our research purposes, in the Global South. Additionally, these companies, often massive corporations such as Google, Microsoft, and OpenAI, usually protect their heuristic decision models under the guise of trade secrets, arguing that transparency would jeopardize their competitive edge. In qualitative research, integrating such tools into investigative procedures means accepting these risks, even if implicitly. This might explain why researchers have tended to use AI for more targeted tasks, characterized by a certain degree of objectivity.

However, beyond technical considerations regarding potential errors and biases of AI models in research, we must also reflect on the underlying logic embedded in them. Qualitative research typically demands direct engagement from the researcher with the phenomena studied, often involving not just objects but subjects who may actively contribute to shaping the research outcomes (Minayo, 2021). Care must be taken to ensure that using AI does not become a mere outsourcing of analysis, leading to a sudden surge in the quantity of studies and articles. After all, a crucial dimension of qualitative analysis involves a meticulous process of reading, note-taking, highlighting, coding, recoding, and aggregating. It is precisely through this process that researchers delve into the meanings expressed by participants, seeking to understand their feelings, perceptions, opinions, positions, and behaviors, while engaging in reflexivity (Bicudo, Costa, 2019). Although this procedure can sometimes feel tedious and slow, it is essential for achieving a thorough understanding of the phenomena under examination and for generating meaningful insights and conclusions. Relying on AI to take shortcuts may indeed result in increased research output, albeit with a potential compromise in quality.

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Therefore, the point is not just to assert that AI serves as a tool to enhance human analysis, expediting certain tasks in qualitative research. If used solely for this purpose, there are no significant differences between this AI usage and existing automated textual analyses, which have been around for some time. It seems to us that a more compelling use of LLMs would be to enhance the analytical capacity of human researchers. This could involve comparing human coding with that performed by AIs, exploring alternative analytical approaches, clustering codes and themes, and even interpretations (e.g. Chubb, 2023). In essence, as articulated by Paoli (2023), the scenario "is not one of the human analysts being replaced by AI analysts, but one of a Human-AI collaboration" (Paoli, 2023, p. 19).

In other words, we are not dismissing the use of AI to expedite tasks in qualitative research, which can indeed be laborious, time-consuming, and resource intensive. However, this does not mean we should unquestioningly accept that this acceleration will inevitably lead to positive and productive results. At this early stage, it seems premature to make such a declaration. Thus far, human analysis remains entirely irreplaceable in all stages of qualitative research.

5 Concluding Remarks

The current study sought to shed light on how scholarly literature has explored the use of artificial intelligence, particularly large language models (LLMs), in qualitative research. We conducted our research by analyzing 31 academic materials, comprising published papers, conference materials, and preprint articles. Overall, these studies have incorporated or reflected on various AI-assisted procedures, especially automating processes such as initial coding of materials and analysis validation. We also found indications of more sophisticated analyses, including theme generation (for thematic analysis), sentiment analysis, and even data extraction and processing. These uses or potential uses are accompanied by ethical discussions regarding practical issues such as biases and errors of AIs, as well as broader questions concerning scientific practice in qualitative research.

As in other studies, our literature review also has significant limitations. The first concerns the use of AI to assist in data interpretation. To mitigate potential acquiescence bias, we adjusted the prompts employed to make them more direct. Furthermore, artificial

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intelligence served only as an assistant, not the main actor, since a human coder always verified the coding process.

Lastly, another limitation in our review pertains to the limited number of publications in scientific journals indexed in the two databases analyzed, Web of Science and SCOPUS. To address this, we included preprint texts to provide a more comprehensive perspective of the field. Nevertheless, the number of texts grew considerably in 2023, indicating a rapidly expanding field. Future research at the intersection of qualitative research and AI tools, models, and systems will undoubtedly find fertile ground for exploration. Additionally, the inclusion of supplementary indexing databases, such as PubMed and SciELO, could be beneficial, particularly for examining the debate on AI and qualitative research in Brazil and Latin America.

With the rapid emergence of large language models, generative AIs, and related applications, these tools are poised to become commonplace in our daily work routines[22]. Furthermore, contemporary society is generating ever-increasing amounts of data from digital platforms, governments, institutions, and civil society, particularly with movements advocating for greater transparency and open data. As a result, we can anticipate a growing demand to process and refine these vast data reservoirs.

Declaration

No part of this text was generated by a generative artificial intelligence. The use of AI was restricted to the experimentation with ChatPDF, as previously described.

References

ABBAS, N.; PICKARD, T.; ATWELL, E.; WALKER, A. University Student Surveys Using Chatbots: Artificial Intelligence Conversational Agents. *In:* HCI INTERNATIONAL CONFERENCE, 23, evento virtual, jul. 24-29, 2021. **Learning and Collaboration Technologies: Games and Virtual Environments for Learning**. New York: Springer Cham, 2021. p. 155-169. DOI: https://doi.org/10.1007/978-3-030-77943-6_10

ALKAISSI, H.; MCFARLANE, S. I. Artificial Hallucinations in ChatGPT: Implications in Scientific Writing. **Cureus**, *[S. l.]*, v. 15, n. 2, p. e35179, 2023.

ALMEIDA, V.; MENDONÇA, R. F.; FILGUEIRAS, F. ChatGPT: tecnologia, limitações e impactos. **Ciência Hoje**, Rio de Janeiro, p. 1–11, 2024. Disponível em: https://cienciahoje.org.br/artigo/chatgpt-tecnologia-limitacoes-e-impactos/#. Acesso em: 17 mar. 2024.

[22] Copilot, an AI model based on GPT-4, is now available for Windows and Office. https://news.microsoft.com/pt-br/apresentamos-o-microsoft-365-copilot-o-copiloto-para-o-trabalho/. Retrieved on April 2, 2024.

ISSN 2525-8222
DOI: http://dx.doi.org/10.33361/RPQ.2024.v.12.n.30.729

ALZAABI, A.; ALAMRI, A.; ALBALUSHI, H.; ALJABRI, R.; AALABDULSALAM, A. ChatGPT applications in Academic Research: A Review of Benefits, Concerns, and Recommendations. **bioRxiv The Preprint server for biology**, *[S. l.]*, 2023. Disponível em: http://biorxiv.org/content/early/2023/08/18/2023.08.17.553688.abstract. Acesso em: 17 mar. 2024.

BANO, M.; ZOWGHI, D.; WHITTLE, J. Exploring Qualitative Research Using LLMs. **arXiv**, *[S. l.]*, p. 1–16, 2023. Disponível em: http://arxiv.org/abs/2306.13298. Acesso em: 17 mar. 2024.

BICUDO, M. A. V.; COSTA, A. P. (org.). **Leituras em pesquisa qualitativa**. São Paulo: Livraria da Física, 2019.

BISWAS, S. ChatGPT and the Future of Medical Writing. **Radiology**, Chicago, United States, v. 307, n. 2, p. e223312, 2023. DOI: 10.1148/radiol.223312.

CHEW, R.; BOLLENBACHER, J.; WENGER, M.; SPEER, J.; KIM, A. LLM-Assisted Content Analysis: Using Large Language Models to Support Deductive Coding. **arXiv**, *[S. l.]*, 2023. Disponível em: http://arxiv.org/abs/2306.14924. Acesso em: 17 mar. 2024.

CHUBB, L. A. Me and the Machines: Possibilities and Pitfalls of Using Artificial Intelligence for Qualitative Data Analysis. **International Journal of Qualitative Methods**, Canada, v. 22, p. 1–16, 2023. DOI: 10.1177/16094069231193593. Disponível em: https://doi.org/10.1177/16094069231193593. Acesso em: 29 abr. 2024.

COSTA, A. P. Qualitative Research Methods: Do Digital Tools Open Promising Trends?. **Revista Lusofona de Educacao**, Lisboa, v. 59, n. 59, p. 67–76, 2023. Disponível em: https://doi.org/10.24140/issn.1645-7250.rle59.04. Acesso em: 29 abr. 2024.

COTTON, D. R. E.; COTTON, P. A.; SHIPWAY, J. R. Chatting and cheating: Ensuring academic integrity in the era of ChatGPT. **Innovations in Education and Teaching International**, Londres, v. 61, n. 2, p. 228–239, 2023. DOI: 10.1080/14703297.2023.2190148.

CRAWFORD, K. **The atlas of AI**: Power, politics, and the planetary costs of artificial intelligence. Yale: Yale University Press, 2021.

CHRISTOU, P. How to Use Artificial Intelligence (AI) as a Resource, Ow Methodological and Analysis Tool in Qualitative Research?. **Qualitative Report**, *[S. l.]*, v. 28, n. 7, p. 1968–1980, 2023. DOI: https://doi.org/10.46743/2160-3715/2023.6406.

DERGAA, I.; CHAMARI, K.; ZMIJEWSKI, P.; BEN SAAD, H. From human writing to artificial intelligence generated text: examining the prospects and potential threats of ChatGPT in academic writing. **Biology of Sport**, Poland, v. 40, n. 2, p. 615–622, 2023. DOI: 10.5114/biolsport.2023.125623.

DWIVEDI, Y. K. et al. Opinion Paper: "So what if ChatGPT wrote it?" Multidisciplinary perspectives on opportunities, challenges and implications of generative conversational AI for research, practice and policy. **International Journal of Information Management**, *[S. l.]*, v. 71, p. 1-63, 2023. DOI: https://doi.org/10.1016/j.ijinfomgt.2023.102642.

FARROKHNIA, M.; BANIHASHEM, S. K.; NOROOZI, O.; WALS, A. A SWOT analysis of ChatGPT: Implications for educational practice and research. **Innovations in Education and Teaching International**, Londres, p. 1–15, 2023. DOI: 10.1080/14703297.2023.2195846.

ISSN 2525-8222
DOI: http://dx.doi.org/10.33361/RPQ.2024.v.12.n.30.729

GAMIELDIEN, Y.; CASE, J. M.; KATZ, A. Advancing Qualitative Analysis: An Exploration of the Potential of Generative AI and NLP in Thematic Coding. **SSRN Electronic Journal**, *[S. l.]*, 2023. Disponível em: https://www.ssrn.com/abstract=4487768. Acesso em: 29 abr. 2024.

GANDHI, P.; TALWAR, V. Artificial intelligence and ChatGPT in the legal context. **Int J Med Sci**, v. 75, n. 1, p. 1-2, 2023. Disponível em: https://ijmsweb.com/content/101/2023/75/1/pdf/IJMS-75-001.pdf. Acesso em: 29 abr. 2024.

GAO, J. et al. CollabCoder: A GPT-Powered Workflow for Collaborative Qualitative Analysis. **arXiv**, *[S. l.]*, 2023. Disponível em: https://doi.org/10.48550/arXiv.2304.07366. Acesso em: 29 abr. 2024.

GLASER, V., GEHMAN, J. **Chatty Actors: Generative AI and the Reassembly of Agency in Qualitative Research**. Preprint, 2023. Disponível em: https://www.researchgate.net/publication/371756110_Chatty_Actors_Generative_AI_and_the_Reassembly_of_Agency_in_Qualitative_Research. Acesso em: 29 abr. 2024.

HACKER, P.; ENGEL, A.; MAUER, M. Regulating ChatGPT and other Large Generative AI Models. **arXiv**, *[S. l.]*, 2023. Disponível em: https://doi.org/10.48550/arXiv.2302.02337. Acesso em: 29 abr. 2024.

HAMILTON, L.; ELLIOTT, D.; QUICK, A.; SMITH, S.; CHOPLIN, V. Exploring the Use of AI in Qualitative Analysis: A Comparative Study of Guaranteed Income Data. **International Journal of Qualitative Methods**, Canada, v. 22, p. 1–13, 2023. DOI: 10.1177/16094069231201504.

HAYES, A. S. "Conversing" with Qualitative Data: Enhancing Qualitative Sociological Research through Large Language Models *(LLMs)*. **SocArXiv**, *[S. l.]*, p. 1-20, 2023. Disponível em: https://doi.org/10.31235/osf.io/yms8p. Acesso em: 29 abr. 2024.

HITCH, D. Artificial Intelligence (AI) Augmented Qualitative Analysis: The Way of the Future? **SSRN Electronic Journal**, *[S. l.]*, 2023. Disponível em: https://doi.org/10.2139/ssrn.4451740. Acesso em: 29 abr. 2024.

LI, Z.; DOHAN, D.; ABRAMSON, C. M. Qualitative Coding in the Computational Era: A Hybrid Approach to Improve Reliability and Reduce Effort for Coding Ethnographic Interviews. **Socius**, *[S. l.]*, v. 7, p. 1–4, 2021. DOI: 10.1177/23780231211062345.

MARSHALL, D. T. NAFF, D. B. The Ethics of Using Artificial Intelligence in Qualitative Research. **SocArXiv**, *[S. l.]*, p. 1-24, 2023. Disponível em: https://doi.org/10.31235/osf.io/3rnbh. Acesso em: 29 abr. 2024.

MINAYO, M. C. Ética das pesquisas qualitativas segundo suas características. **Revista Pesquisa Qualitativa**, São Paulo, v. 9, n. 22, p. 521-539, 2021.

OPENAI. **ChatGPT** (Sep 11 version). [Large language model]. 2023. Disponível em: https://chat.openai.com/chat. Acesso em: 29 abr. 2024.

PAOLI, S. Can Large Language Models Emulate an Inductive Thematic Analysis of Semi-Structured Interviews? An Exploration and Provocation on the Limits of the Approach and the Model. **arXiv**, *[S. l.]*, 2023. Disponível em: https://doi.org/10.48550/arXiv.2305.13014. Acesso em: 29 abr. 2024.

PATTYN, F. **Generative AI for Qualitative Research: A Paradigm Shift Towards Cost-Effectiveness (4x), Throughput Time (15x) and Reliability (Cohen's Kapp)**. 2023. Disponível em: https://doi.org/10.13140/RG.2.2.11414.52800. Acesso em: 29 abr. 2024.

PAUL, J.; UENO, A.; DENNIS, C. ChatGPT and consumers: Benefits, pitfalls and future research agenda. **International Journal of Consumer Studies**, *[S. l.]*, v. 47, n. 4, p. 1213-1225, 2023. DOI: https://doi.org/10.1111/ijcs.12928

QASEM, F. ChatGPT in Scientific and Academic Research: Future Fears and Reassurances. **Library Hi Tech News**, *[S. l.]*, v. 40, n. 3, p. 30–32, 2023. Disponível em: https://doi.org/10.1108/LHTN-03-2023-0043. Acesso em: 29 abr. 2024.

RAHMAN, M.; TERANO, H.J.R.; RAHMAN, N.; SALAMZADEH, A.; RAHAMAN, S. ChatGPT and Academic Research: A Review and Recommendations Based on Practical Examples. **Journal of Education, Management and Development Studies**, Philippines, v. 3, n. 1, p.1–12, 2023. DOI: https://doi.org/10.52631/jemds.v3i1.175.

RAMOS, A. S. M. Generative Artificial Intelligence based on large language models - tools for use in academic research. **SciELO Preprints** [Preprint], 2023. DOI: https://doi.org/10.1590/SciELOPreprints.6105.

RAY, P. P. ChatGPT: A comprehensive review on background, applications, key challenges, bias, ethics, limitations and future scope. **Internet of Things and Cyber-Physical Systems**, *[S. l.]*, v. 3, p. 121-154, 2023. DOI: https://doi.org/10.1016/j.iotcps.2023.04.003.

SALVAGNO, M.; TACCONE, F. S.; GERLI, A. G. Can artificial intelligence help for scientific writing? **Critical Care**, *[S. l.]*, v. 27, n. 1, p. 1-5, 2023. Disponível em: https://ccforum.biomedcentral.com/articles/10.1186/s13054-023-04380-2. Acesso em: 29 abr. 2024.

SAMPAIO, R. C.; NICOLÁS, M. A.; JUNQUILHO, T. A.; SILVA, L. R. L.; FREITAS, C. S.; TELLES, M.; TEIXEIRA, J. S. ChatGPT and other AIs will change all scientific research: initial reflections on uses and consequences. **SciELO Preprints**, 2023. DOI: 10.1590/SciELOPreprints.6686. Disponível em: https://preprints.scielo.org/index.php/scielo/preprint/view/6686. Acesso em: 26 mar. 2024

SANTOS, M. F. de L.; MESQUITA, L.; PEIXOTO, J. G. de M.; CAMARGO, I. Digital News Business Models in the Age of Industry 4.0: Digital Brazilian News Players Find in Technology New Ways to Bring Revenue and Competitive Advantage. **Digital Journalism**, *[S. l.]*, p. 1–25, 2022. DOI: 10.1080/21670811.2022.2037444.

SILVEIRA, A. de O.; BHATTACHERJEE, A. An Unsupervised Algorithm for Qualitative Coding of Text Data: Artifact Design, Application, and Evaluation. *In*: THE NEXT WAVE OF SOCIOTECHNICAL DESIGN 2021, **Anais** [...]. : Springer Cham, 2021. p. 272–284. Disponível em: https://link.springer.com/chapter/10.1007/978-3-030-82405-1_27#citeas. Acesso em: 29 abr. 2024.

SPINAK, E. Inteligência Artificial e a comunicação da pesquisa [online]. **SciELO em Perspectiva**, 2023 [recurso eletrônico]. Disponível em: https://blog.scielo.org/blog/2023/08/30/inteligencia-artificial-e-a-comunicacao-da-pesquisa/. Acesso em: 29 abr. 2024.

SOK, S.; HENG, K. ChatGPT for Education and Research: A Review of Benefits and Risks. **SSRN Electronic Journal**, *[S. l.]*, 2023. Disponível em: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4378735. Acesso em: 29 abr. 2024.

ISSN 2525-8222
DOI: http://dx.doi.org/10.33361/RPQ.2024.v.12.n.30.729

SUSARLA, A.; GOPAL, R.; THATCHER, J. B.; SARKER, S. The Janus Effect of Generative AI: Charting the Path for Responsible Conduct of Scholarly Activities in Information Systems. **Information Systems Research**, Maryland, USA, v. 34, n. 2, p. 399–408, 2023. DOI: 10.1287/isre.2023.ed.v34.n2.

TAI, R. H.; BENTLEY, L. R.; XIA, X.; SITT, J. M.; FANKHAUSER, S. C.; CHICAS-MOSIER, A. M.; MONTEITH, B. M. Use of Large Language Models to Aid Analysis of Textual Data. **bioRxiv The Preprint server for biology**, *[S. l.]*, 2023. Disponível em: https://www.biorxiv.org/content/10.1101/2023.07.17.549361v1.abstract. Acesso em: 29 abr. 2024.

TAYLOR, Z. W. Using Chat GPT to Clean Interview Transcriptions: A Usability and Feasibility Analysis. **SSRN Electronic Journal**, *[S. l.]*, 2023. Disponível em: http://dx.doi.org/10.2139/ssrn.4437272. Acesso em: 29 abr. 2024.

TUSTUMI, F.; ANDREOLLO, N.; AGUILAR-NASCIMENTO, J. Futuro Dos Modelos De Linguagem Nos Cuidados Em Saúde: O Papel Do Chatgpt. **ABCD. Arquivos Brasileiros de Cirurgia Digestiva (São Paulo)**, v. 36, p. e1727, 2023. Disponível em: https://doi.org/10.1590/0102-672020230002e1727. Acesso em: 29 abr. 2024.

ZHAO, F.; YU, F.; TRULL, T.; SHANG, Y. A New Method Using LLMs for Keypoints Generation in Qualitative Data Analysis. *In*: IEEE CONFERENCE ON ARTIFICIAL INTELLIGENCE (CAI) 2023, Santa Clara, CA, USA. **Anais** [...]. Santa Clara, CA, USA p. 333–334.

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ISSN 2525-8222
DOI: http://dx.doi.org/10.33361/RPQ.2024.v.12.n.30.729

Annex 1 - Corpus

ABBAS, N.; PICKARD, T.; ATWELL, E.; WALKER, A. University Student Surveys Using Chatbots: Artificial Intelligence Conversational Agents. *In:* HCI INTERNATIONAL CONFERENCE, 23, evento virtual, jul. 24-29, 2021. **Learning and Collaboration Technologies: Games and Virtual Environments for Learning**. New York: Springer Cham, 2021. p. 155-169. DOI: https://doi.org/10.1007/978-3-030-77943-6_10

ABDÜSSELAM, M. Qualitative Data Analysis in the Age of Artificial General Intelligence. **International Journal of Advanced Natural Sciences and Engineering Researches**, *[S. l]*, v.7, n.4, p. 1–5, 2023. Disponível em: https://doi.org/10.59287/ijanser.2023.7.4.454. Acesso em: 29 abr. 2024.

ALZAABI, A.; ALAMRI, A.; ALBALUSHI, H.; ALJABRI, R.; AALABDULSALAM, A. ChatGPT applications in Academic Research: A Review of Benefits, Concerns, and Recommendations. **bioRxiv The Preprint server for biology**, *[S. l.]*, 2023. Disponível em: http://biorxiv.org/content/early/2023/08/18/2023.08.17.553688.abstract. Acesso em: 17 mar. 2024.

BANO, M.; ZOWGHI, D.; WHITTLE, J. Exploring Qualitative Research Using LLMs. **arXiv**, *[S. l.]*, p. 1–16, 2023. Disponível em: http://arxiv.org/abs/2306.13298. Acesso em: 17 mar. 2024.

CHEW, R.; BOLLENBACHER, J.; WENGER, M.; SPEER, J.; KIM, A. LLM-Assisted Content Analysis: Using Large Language Models to Support Deductive Coding. **arXiv**, *[S. l.]*, 2023. Disponível em: http://arxiv.org/abs/2306.14924. Acesso em: 17 mar. 2024.

CHRISTOU, P. How to Use Artificial Intelligence (AI) as a Resource, Ow Methodological and Analysis Tool in Qualitative Research?. **Qualitative Report**, *[S. l.]*, v. 28, n. 7, p. 1968–1980, 2023. DOI: https://doi.org/10.46743/2160-3715/2023.6406.

CHRISTOU, P. How to Use Artificial Intelligence in Qualitative Research: Enhancing Conceptual Studies with Deep Learning Models. **The Qualitative Report**, *[S. l.]*, v. 28, n. 9, p. 2739-2755, 2023. DOI: https://doi.org/10.46743/2160-3715/2023.6536

CHUBB, L. A. Me and the Machines: Possibilities and Pitfalls of Using Artificial Intelligence for Qualitative Data Analysis. **International Journal of Qualitative Methods**, Canada, v. 22, p. 1–16, 2023. DOI: 10.1177/16094069231193593. Disponível em: https://doi.org/10.1177/16094069231193593. Acesso em: 29 abr. 2024.

COSTA, A. P. Qualitative Research Methods: Do Digital Tools Open Promising Trends?. **Revista Lusofona de Educacao**, Lisboa, v. 59, n. 59, p. 67–76, 2023. Disponível em: https://doi.org/10.24140/issn.1645-7250.rle59.04. Acesso em: 29 abr. 2024.

DERGAA, I.; CHAMARI, K.; ZMIJEWSKI, P.; BEN SAAD, H. From human writing to artificial intelligence generated text: examining the prospects and potential threats of ChatGPT in academic writing. **Biology of Sport**, Poland, v. 40, n. 2, p. 615–622, 2023. DOI: 10.5114/biolsport.2023.125623.

GAMELDIEN, Y. et al. Advancing Qualitative Analysis: An Exploration of the Potential of Generative AI and NLP in Thematic Coding. **SSRN Electronic Journal**, 2023. https://doi.org/10.2139/ssrn.4487768.

GAO, J. et al. CollabCoder: A GPT-Powered Workflow for Collaborative Qualitative Analysis. **arXiv**, *[S. l.]*, 2023. Disponível em: https://doi.org/10.48550/arXiv.2304.07366. Acesso em: 29 abr. 2024.

GLASER, V., GEHMAN, J. **Chatty Actors: Generative AI and the Reassembly of Agency in Qualitative Research**. Preprint, 2023. Disponível em: https://www.researchgate.net/publication/371756110_Chatty_Actors_Generative_AI_and_the_Reassembly_of_Agency_in_Qualitative_Research. Acesso em: 29 abr. 2024.

GOLDMAN, A. et al. QuAD: Deep-Learning Assisted Qualitative Data Analysis with AI Diagrams. *In*: 2022 CHI CONFERENCE ON HUMAN FACTORS IN COMPUTING SYSTEMS 2022, New York, NY, USA. **Anais** [...]. New York, NY, USA: Association for Computing Machinery, 2022. DOI: 10.1145/3491101.3519863.

HAMILTON, L.; ELLIOTT, D.; QUICK, A.; SMITH, S.; CHOPLIN, V. Exploring the Use of AI in Qualitative Analysis: A Comparative Study of Guaranteed Income Data. **International Journal of Qualitative Methods**, Canada, v. 22, p. 1–13, 2023. DOI: 10.1177/16094069231201504.

HAYES, A. S. "Conversing" with Qualitative Data: Enhancing Qualitative Sociological Research through Large Language Models *(LLMs)*. **SocArXiv**, [*S. l.*], p. 1-20, 2023. Disponível em: https://doi.org/10.31235/osf.io/yms8p. Acesso em: 29 abr. 2024.

HITCH, D. Artificial Intelligence (AI) Augmented Qualitative Analysis: The Way of the Future? **SSRN Electronic Journal**, *[S. l.]*, 2023. Disponível em: https://doi.org/10.2139/ssrn.4451740. Acesso em: 29 abr. 2024.

JANGJARAT, K.; KRAIWANIT, T.; LIMNA, P.; SONSUPHAP, R. Public perceptions towards ChatGPT as the Robo-Assistant. **Online Journal of Communication and Media Technologies**, *[S. l.]*, v. 13, n. 3, p. 1–14, 2023. DOI: 10.30935/ojcmt/13366.

LI, Z.; DOHAN, D.; ABRAMSON, C. M. Qualitative Coding in the Computational Era: A Hybrid Approach to Improve Reliability and Reduce Effort for Coding Ethnographic Interviews. **Socius**, *[S. l.]*, v. 7, p. 1–4, 2021. DOI: 10.1177/23780231211062345.

MARSHALL, D. T. NAFF, D. B. The Ethics of Using Artificial Intelligence in Qualitative Research. **SocArXiv**, *[S. l.]*, p. 1-24, 2023. Disponível em: https://doi.org/10.31235/osf.io/3rnbh. Acesso em: 29 abr. 2024.

MESEC, B. The language model of artificial inteligence chatGPT - a tool of qualitative analysis of texts. **Authorea**, *[S. l.]*, p. 1–13, 2023. Disponível em: https://www.authorea.com/users/608503/articles/638305-the-language-model-of-artificial-inteligence-chatgpt-a-tool-of-qualitative-analysis-of-texts. Acesso em: 29 abr. 2024.

PAOLI, S. Can Large Language Models Emulate an Inductive Thematic Analysis of Semi-Structured Interviews? An Exploration and Provocation on the Limits of the Approach and the Model. **arXiv**, *[S. l.]*, 2023. Disponível em: https://doi.org/10.48550/arXiv.2305.13014. Acesso em: 29 abr. 2024.

PATTYN, F. **Generative AI for Qualitative Research: A Paradigm Shift Towards Cost-Effectiveness (4x), Throughput Time (15x) and Reliability (Cohen's Kapp)**. 2023. Disponível em: https://doi.org/10.13140/RG.2.2.11414.52800. Acesso em: 29 abr. 2024.

ISSN 2525-8222
DOI: http://dx.doi.org/10.33361/RPQ.2024.v.12.n.30.729

QASEM, F. ChatGPT in Scientific and Academic Research: Future Fears and Reassurances. **Library Hi Tech News**, *[S. l.]*, v. 40, n. 3, p. 30–32, 2023. Disponível em: https://doi.org/10.1108/LHTN-03-2023-0043. Acesso em: 29 abr. 2024.

SILVEIRA, A. de O.; BHATTACHERJEE, A. An Unsupervised Algorithm for Qualitative Coding of Text Data: Artifact Design, Application, and Evaluation. *In*: THE NEXT WAVE OF SOCIOTECHNICAL DESIGN 2021, **Anais** [...]. : Springer Cham, 2021. p. 272–284. Disponível em: https://link.springer.com/chapter/10.1007/978-3-030-82405-1_27#citeas. Acesso em: 29 abr. 2024.

SUDHEESH, R.; MUJAHID, M.; RUSTAM, F.; MALLAMPATI, B.; CHUNDURI, V.; DÍEZ, I. de la T.; ASHRAF, I. Bidirectional encoder representations from transformers and deep learning model for analyzing smartphone-related tweets. **PeerJ Computer Science**, *[S. l.]*, v. 9, p. 1–30, 2023. DOI: 10.7717/peerj-cs.1432.

TAI, R. H.; BENTLEY, L. R.; XIA, X.; SITT, J. M.; FANKHAUSER, S. C.; CHICAS-MOSIER, A. M.; MONTEITH, B. M. Use of Large Language Models to Aid Analysis of Textual Data. **bioRxiv The Preprint server for biology**, *[S. l.]*, 2023. Disponível em: https://www.biorxiv.org/content/10.1101/2023.07.17.549361v1.abstract. Acesso em: 29 abr. 2024.

TANG, L. et al. Evaluating large language models on medical evidence summarization. **Npj Digital Medicine**, *[S. l.]*, v. 6, n. 1, p. 1–8, 2023. DOI: 10.1038/s41746-023-00896-7.

TAYLOR, Z. Using Chat GPT to Clean Interview Transcriptions: A Usability and Feasibility Analysis. **SSRN Electronic Journal**, *[S. l.]*, 2023. Disponível em: http://dx.doi.org/10.2139/ssrn.4437272. Aceesso em: 29 abr. 2024.

XIAO, Z.; YUAN, X.; LIAO, Q. V.; ABDELGHANI, R.; OUDEYER, P-Y. Supporting Qualitative Analysis with Large Language Models: Combining Codebook with GPT-3 for Deductive Coding. *In*: INTERNATIONAL CONFERENCE ON INTELLIGENT USER INTERFACES, 28, 2023, New York, NY, USA. **Anais** [...]. New York, NY, USA: Association for Computing Machinery, 2023. p. 75–78. Disponível em: https://doi.org/10.1145/3581754.3584136. Acesso em: 29 abr. 2024

ZHAO, F.; YU, F.; TRULL, T.; SHANG, Y. A New Method Using LLMs for Keypoints Generation in Qualitative Data Analysis. *In*: IEEE CONFERENCE ON ARTIFICIAL INTELLIGENCE (CAI) 2023, Santa Clara, CA, USA. **Anais** [...]. Santa Clara, CA, USA p. 333–334. DOI: 10.1109/CAI54212.2023.00147.

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ANNEX 2 - READING RECORD

Reading Record for article on the use of LLMs in qualitative research

General Guidelines

The articles should be read in their entirety. For those with little familiarity with English, it is possible to use translators, but it is vital to save the original excerpts. The goal is not merely to provide a summary of the article but to present excerpts that are relevant to our research interests concisely.

Essentially, the main objective is to understand how artificial intelligences based on large language models, such as ChatGPT, Bard, Copilot, Claude, and Lllama, can contribute to qualitative research. Our focus is on identifying practical and potential uses, as well as ethical concerns related to these applications. We highlight the issues that concern us, and we expect each evaluator to analyze the presence or absence of the categories and concepts listed below in the reading record. If present, we ask that you copy and paste the original excerpts that justify your decision and note the page number (using the pagination of the article, not the PDF!). Try to paste at least two excerpts per section.

Important

Under no circumstances should you use any AI tool to assist you in the classification!

Exceptions and Observations

I. Note that not all fields can be filled in, as we may have very specific articles, such as one entirely dedicated to ethical issues, or one that only addresses a specific aspect of qualitative application. In these cases, fill in "not applicable." Check the text several times to avoid excessive use of the code.

II. Some texts are not specific to qualitative methods but rather to the general repercussions of ChatGPT or AI in science/research/academia. In these cases, evaluate only the excerpts that refer exclusively to qualitative research.

III. We do not expect this to happen, but eventually, an article may be in the corpus and not be suitable. If this is the case, point it out directly to the coordinator for a second external evaluation.

ISSN 2525-8222
DOI: http://dx.doi.org/10.33361/RPQ.2024.v.12.n.30.729

Reading Record

1. General Identification

Journal: copy and paste the name

Year of Publication: copy and paste the year

Main Tools Mentioned: Indicate if there is explicit mention of any AI tool and which one: ChatGPT, Bard, Copilot, Claude, Lllama or even other models, etc.

2. Summary of the Article

Define in one or two lines what the article is about. Do not merely summarize the abstract, but try to elaborate on how the article makes use of or reflects on the use of AI in qualitative research, including the area of expertise, if relevant.

Examples:

"The article analyzes the potential of LLMs for qualitative thematic analysis."

"The article proposes an LLM/machine learning model for qualitative data analysis."

"The article compares the analysis done by AI and humans on a particular subject."

3. Practical and Potential Uses:

Here, we think of various stages of qualitative research, and we want you to try to see how much the articles mention applications, practical uses or even reflections on the potential. For an entire article on a technique or application example, try to get an excerpt that explains it and the evaluation of the results. If it's a more essayistic, reflective text, paste the excerpts of these potentials into each category below.

3.1 Recruitment and Selection of Participants:

Many qualitative research techniques, such as ethnographies, focus groups and interviews, are based on interactions with individuals. So, how to reach out and how to select people are laborious steps. Add excerpts that indicate uses of AI for this.

3.2 Administration of the Qualitative Technique

As mentioned, qualitative research is often based on interactions. Here, the interest is whether any chatbot or similar technology is used to assist in these interviews/interactions. Surveys can fall into this category as long as there is some qualitative aspect to the application.

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3.3 Use in Experimental Method

AI tools can be employed to conduct experiments or to elicit experimental questions. In these specific cases, AI can function as input for conducting focus groups, or as a control or experimental group for comparative analyses. In experiments, one or a few variables are usually isolated for observation. Therefore, experimental analyses tend to bring very specific hypotheses. Observe whether the hypotheses in the text specifically refer to a cause-and-effect relationship from the use of AI. Example 1: A focus group is organized to discuss the applications of AI in qualitative methods. Example 2: A series of AI-produced interview transcriptions is produced, and the perception of the result is compared with human transcriptions.

3.4 Summaries/Abstracts

Qualitative data analysis techniques are usually based on the idea of condensing large amounts of text into a few ideas. So, the automatic generation of summaries or abstracts by AI would fall into this category.

3.5 Generation of Codes (codes, tags)

Various techniques such as content analysis and thematic analysis are based on coding texts, looking for patterns, relevant issues and the like. So, place here excerpts that indicate the use of AIs for the inductive generation of these codes (from texts provided, the AI suggests the codes). Note that this may be related to item 3.6. If in doubt, paste in both.

3.6 Theme Generation

In thematic analysis and eventually in some inductive content analyses, after the generation of codes, the next step would be to generate themes. Themes would be larger units of analysis that group several codes and would convey the true meaning of the more substantive issues observed in the content. Paste excerpts here if AI is used to generate these themes. Note that this may be related to item 3.5. If in doubt, paste in both.

3.7 Sentiment Analysis

Many automated text analysis techniques seek to verify the sentiment of some text. Whether it is negative, positive or neutral towards a particular instance (a person, a party, a product, etc.). The goal is to see uses of AI for this. Note that sentiment analyses are often very quantitative. Paste the applicable excerpts. If necessary, write a caveat ("the

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use was for many Twitter messages and in a more quantitative logic"), which we will evaluate.

3.8 Deductive/Dialogic Analysis

As an example of what we do, you often want the text to answer certain questions. So, we want to see if there are examples of using AI to capture certain concepts or even to "dialogue" with qualitative data. Note that this is different from 3.4, which would be a general summary of the content, while here it would be more the answer that the AI gives about a particular theme, concept or question. For example, we could upload our digital democracy interview files and ask the AI to make an assessment of perspectives for the future of all interviewees, or compare the views on aspects of the negative scenario of initiatives, etc.

3.9 Validation of Analysis (and Human vs Machine)

Just as we are concerned with reliability testing or validation of qualitative data, we believe that AIs could eventually be used as an external validation of our analyses. In this case, we look for studies that present justifications for using AI as a way to (1) correct or improve procedures usually undertaken by humans; (2) confirm the validity of procedures performed by humans. Note that this does not simply refer to articles that make some kind of human vs machine (AI) analysis comparison. Some comparisons may be made for experimental purposes, to compare, and not to validate. But there may be overlap between this group and 3.3.

3.10 Is AI used as a resource for data extraction or processing?

Does the study discuss the use of AI for collecting data or processing it, cleaning databases, transcribing or subtitling materials?

3.11 Challenges and Agendas:

As this is a very new topic, several articles are likely to point out challenges for improving these techniques, for using them with greater safety, transparency and rigor. We also imagine that some articles will point out agendas for the future, such as new research, more testing, how to improve technologies, etc.

4. Ethical Questions

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The use of artificial intelligence is still viewed with much apprehension by all researchers, after all there are issues of transparency, integrity, and even rigor in the results, since AIs can hallucinate and invent data. So, we believe that a good part of the texts should eventually touch on ethical issues and dilemmas for the use of AI in qualitative research. We would like to evaluate three dimensions of the ethical debate concerning AIs.

4.1 Normative Dimension

In this case, the studies revolve around the correct use, usually dictating ethical behaviors in a prescriptive way, with observation of care to be taken, and desirable results. There is often an embedded value judgment in the authors' considerations of what would be appropriate behavior or use. A typical example of normative reasoning on ethical issues concerning AI would be: "The use of AI by researchers implies automation of tasks, but it must be presented in a transparent and clear manner."

4.2 Realistic Dimension

In this case, the studies take the practical and current use of AI as their point of view, without a strong concern for normative expectations or horizons. The tone generally avoids value judgments about practices and presents an objective reading of issues and procedures. The evaluative mode is replaced by the descriptive, and the authors refrain from drawing value conclusions in favor of the readers' opinion. This is a pragmatist dimension. A typical example of this reasoning: "The use of AI can alter such and such routines with regard to qualitative data analysis" or "AI, by itself, is neither good nor bad, it is the use that dictates the results."

4.3 Futurist Dimension

In this last case, the study focuses on describing future challenges and agendas for the use of AI in qualitative methods. The tone is often more associated with an attempt to observe and predict behaviors, analyze trends and suggest referrals or avenues for debate. A typical example of this reasoning is: "The use of AI can cause significant impacts on the practice of qualitative research, because of this and that."

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ANNEX 3 - PROMPTS FOR CHATPDF

• What are the main AI tools mentioned in the text?

• How does the article make use of or reflect on the use of AI in qualitative research?

• Does the article discuss the use of AI for recruitment and selection techniques for qualitative research participants?

• Does the article discuss the use of AI to administer qualitative research techniques, such as assisting in conducting interviews or other interactions with research subjects, producing surveys, etc.?

• Does the article discuss the use of AI to conduct experiments or raise questions related to experimental methods?

• Does the article discuss the use of AI to generate summaries or abstracts of texts or about texts? Is AI used to condense large amounts of text into a few ideas?

• Does the article discuss the use of AI for content analysis or thematic analysis, or specify its use for generating codes, categories or variables for content analysis or thematic analysis?

• Does the article discuss the use of AI to generate themes as larger units of analysis that group different codes or categories in a more substantive way?

• Does the article discuss the use of AI for sentiment analysis?

• Does the article discuss the use of AI to capture certain concepts or converse about the text and compare points of view?

• Does the article discuss the use of AI to validate, correct or improve the interpretation of data by humans, to function as a control or experimental group, or to test or allow testing the reliability of coding?

• Does the study discuss the use of AI for collecting data or processing it, cleaning databases, transcribing, or subtitling materials?

• Does the article mention challenges for improving qualitative research techniques involving AI for use with greater safety, transparency, and rigor?

• Does the article raise ethical questions about the use of AI?

• When raising ethical issues, does the article take a normative point of view, discussing what would be the correct use of AI in a prescriptive way, with observation of care to be taken and desirable results?

• When raising ethical issues, does the article take a realistic point of view, discussing the practical and current use of AI without a strong concern for normative expectations or

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horizons, avoiding value judgments about practices and presenting an objective reading of issues and procedures?

• When raising ethical issues, does the article take a futurist point of view, focusing on describing future challenges and agendas for the use of AI in qualitative methods, with a tone associated with an attempt to predict behaviors and trends and suggest referrals?