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How to Use Artificial Intelligence (AI) as a Resource, Methodological and Analysis Tool in Qualitative Research?

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Abstract

Artificial Intelligence (AI) has had far-reaching effects in research and the academic world. It has been used in many ways by the scientific community within the context of qualitative research, such as literature and systematic reviews, for conceptualization purposes, thematic and content analysis. It has however prompted concerns and questions about the potential for unreliable research, bias, and unethical behavior in the outcomes of AI-produced research. The purpose this paper is to examine the current use of AI in research, its strengths and limitations, dilemmas and ethical considerations from theoretical critical perspective principles, while delivering five key considerations for the appropriate, rigorous, and reliable use of AI in research practice. The first step is to become acquainted with the data generated by AI systems. The second is concerned with removing biased content and addressing ethical concerns when using AI, while the third is concerned with cross-referencing information generated by AI. The fourth step is to control the analysis process. The fifth and most important key consideration is the demonstration of cognitive input and skills by the researcher throughout the process of using AI in any qualitative research study and in reaching conclusions.

Keywords

artificial intelligence, AI, GPT, deep learning models, qualitative research

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How to Use Artificial Intelligence (AI) as a Resource, Methodological and Analysis Tool in Qualitative Research?

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Artificial Intelligence (AI) has had far-reaching effects in research and the academic world. It has been used in many ways by the scientific community within the context of qualitative research, such as literature and systematic reviews, for conceptualization purposes, thematic and content analysis. It has however prompted concerns and questions about the potential for unreliable research, bias, and unethical behavior in the outcomes of AI-produced research. The purpose this paper is to examine the current use of AI in research, its strengths and limitations, dilemmas and ethical considerations from theoretical critical perspective principles, while delivering five key considerations for the appropriate, rigorous, and reliable use of AI in research practice. The first step is to become acquainted with the data generated by AI systems. The second is concerned with removing biased content and addressing ethical concerns when using AI, while the third is concerned with cross-referencing information generated by AI. The fourth step is to control the analysis process. The fifth and most important key consideration is the demonstration of cognitive input and skills by the researcher throughout the process of using AI in any qualitative research study and in reaching conclusions.

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Introduction

Artificial Intelligence (AI) is used to describe the use of machines to mimic human intelligence in order to carry out human-typical tasks. Building AI entails creating computer programs and algorithms with human-like cognitive abilities (Zhang et al., 2023). AI has attracted increased attention in several fields, including healthcare, social sciences, academia, and in research. Its significance in research stems from its ability to process and analyze massive amounts of data, identify patterns and trends, generate insights, and automate complex tasks. For instance, artificial neural networks, of which "deep learning models" are a subset, aim to simulate the structure and behavior of the human brain. GPTs (Generative Pre-trained Transformers) for example, are types of deep learning models that are increasingly being used by the qualitative research academic community, for various reasons, such as to produce, translate, summarize, and analyze information (Conneau & Lample, 2019; Lund & Wang, 2023; Lund et al., 2023). More specifically, text summaries of research publications can be generated using GPTs, allowing researchers to quickly zero in on what is most relevant to their work, not necessarily though resulting in reliable or deep qualitative output.

AI has had significant technological and social effects. Communication between humans and machines, as well as between humans, have been profoundly altered by AI, with some possible unintended consequences including doing away with the necessity for human interaction and reducing the need for human labor across several sectors of differing industries

(Hunt et al., 2022; Khaliq et al., 2022). Furthermore, AI in the form of deep learning models (e.g., GPTs) while reflecting and perpetuating the biases and prejudices present in the training data, have raised questions about bias and ethics in AI. Considering this, there have been calls for greater openness and accountability in the creation and use of AI. For instance, GPT developers have admitted to the likelihood of bias and emphasized the importance of using diverse and inclusive training data (Brown et al., 2020). GPTs have had far-reaching effects on technical and social development around the world, and their potential uses and consequences are still being explored, argued, and critiqued. Most importantly, there is a severe dearth of dependable criteria for conducting research using AI among the academic research community.

The primary purpose of this paper is to take the reader through an examination from a critical perspective of the use of AI in qualitative research. It does not present empirical findings, but rather offer specific guidelines and practical implications for researchers and analysts, as the case of similar papers that have provided specific guidelines and useful recommendations to qualitative researchers (Belotto, 2018; Christou, 2023; Elliott, 2018). Critical perspective papers, as this paper, are valuable because they help researchers gain a more nuanced comprehension of contentious topics by exploring different perspectives, while allowing them to gain a deeper, more nuanced understanding of a topic while also contributing to the advancement of knowledge in a specific field (John-Mathews et al., 2022). In more detail, I have used a critical rationale, which involves analyzing information and arguments, noting their limitations and strengths, and coming to well-informed conclusions, as explained in more detail below. In the first part of the process of writing this paper, I specifically searched for specific notions, and key concepts such as “Artificial Intelligence” and “deep learning models” to comprehend these and gain a thorough understanding of how these are linked with qualitative research. During the second phase, I “instructed” a specific form of AI (i.e., ChatGPT) to search for studies that assisted with the theoretical discussion. In the third phase, I applied my knowledge and reasoning to the "output" (the results of the previous phases). Creswell and Creswell (2018) state that taking a critical stance in research necessitates an unbiased, open-minded approach to evidence and argument. Paul and Elder (2019) state that a critical research attitude requires the use of critical thinking, while Elder and Paul (2020) argue that critical thinking requires being able to assess the merits and drawbacks of alternative approaches and assessing evidence and arguments from multiple angles. To maintain a critical stance, I compared various sources/articles against one another, and I eliminated (not included for evaluation purposes) both superfluous content and questionable material from sources without substantial and rigorous justification. For instance, I chose to exclude empirical results from papers that did not pass from a rigorous peer evaluation (such as the case of chapters). During the fourth phase, relevant studies and academic papers were carefully considered and linked to on the basis of thematic analysis principles (Braun & Clarke, 2019; Christou, 2023), while the final phase involved the creation of conceptual linkages supported by a theoretical discussion, leading to the generation of specific guidelines.

Overall, my paper takes a critical perspective on AI and more specifically deep learning models, by meticulously examining their ontological and epistemological perspective, their current use in research, strengths and limitations, dilemmas and ethical considerations, in order to inform the creation of a practical guide for their suitable, rigorous, and defensible use in qualitative research practice.

An Ontological and Epistemological Perspective of AI in the Form of Deep Learning Models

Previously, it has been established that deep learning models, such as GPTs, are language models created to produce responses to textual stimuli that are indistinguishable from

those produced by a human. From an ontological stance, deep learning models can be understood as a distinct form of AI that coexists with other forms of AI in the environment. Ontology is the study of what makes things in the universe what they are, while epistemology is the study of how we learn about and make sense of those things (Smith, 1982). What are the bounds of our knowledge? and "How do we know what we know?" are important to an epistemological perspective. From an epistemological viewpoint we can investigate how we come to know things about the world, as opposed to just accepting their existence on faith (Foucault, 1972).

Understanding the nature and existence of AI in the form of deep learning models is the focus of an ontological viewpoint. Since deep learning models as GPTs are pre-trained on massive volumes of text data, which is generated by humans, they can be considered as part of a wider system of human and machine interactions from an ontological standpoint. Besides, GPTs are taught to mimic human reactions to textual stimuli using this preliminary training data. Hence, GPTs can be seen as an outcome of language use and a means to improve human communication and comprehension. In general, GPTs are seen as language models within a larger system of human and machine interactions in the ontological perspective. From this perspective, qualitative researchers can gain a deeper appreciation for the strengths and weaknesses of GPTs if they have this background knowledge. That is, it is necessary for qualitative researchers not only to understand the "existence" of AI as in the form of deep learning models in our contemporary society, but to also comprehend the impacts and effects of their use by the research community. Researchers must acknowledge the strengths of the use of AI for research purposes, but also its limitations and weaknesses. For instance, deep learning models (i.e., GPT) may not necessarily provide real, correct, or reliable information (Buruk, 2023; Liu et al., 2023; Saliba & Boitsios, 2023), therefore leading qualitative researchers to incorrect propositions, false systematic reviews and conceptualizations of phenomena under investigation.

The epistemological view of AI in the form of deep learning models considers how they are used to construct and generate knowledge (an important element of any qualitative study), as well as the potential limits and biases of such a view. In more detail, they are not apolitical instruments; rather, they reflect the biases present in the data they are trained on. An epistemological view of GPTs would need investigating the possibility for further entrenchment of existing power systems and constraints placed on knowledge construction by these models. Bender and Friedman (2018) stress the importance of considering how these models are trained. The usage of deep learning models (in the form of GPTs) and other epistemological considerations are discussed by Crawford and Calo (2016) in the context of AI research. They propose that academics should be more open about the data they use to train their models and that the limits and biases of the algorithms should be thoroughly investigated. Commercial facial recognition systems employ the same machine learning algorithms as GPTs, and Buolamwini and Gebru (2018) investigate their shortcomings and biases. They argue for an epistemological stance that recognizes the influence of social and cultural factors on the data used to train these models, as well as the risk that these models will serve to further entrench existing prejudices and hierarchies, dilemmas and aspects that are discussed in the proceeding sections. Also, Bender and Friedman (2018) stress the importance of researchers being open and honest about the limitations and biases of language models. Hence, qualitative researchers need to be cautious about a variety of issues related to their use of AI to generate new knowledge, including (but not limited to) how they insert commands into an AI model, what information they use to generate new knowledge (as in the case of a new theory, for instance), and what AI they use to analyze information derived from interviews or posts on social media, for example.

The Use of AI in Literature/Systematic Reviews, Theoretical Discussions, in the Analysis of Data and Conceptualization

Analyzing and summarizing a large body of previously published research in each field is what literature reviews are all about. A comprehensive literature review, however, can be time-consuming and difficult to complete. AI and more specifically deep learning models (e.g., GPTs) are helpful and commonly used in conducting literature reviews because of their programming to automatically identify key concepts and themes in the literature and to summarize large bodies of information (Watson et al., 2022). In addition to generating research questions and suggesting related research topics, deep learning models can be used to help with literature reviews in other ways (Mathew, 2023). Yet, what about the "quality" of work being generated through such models?

There are several caveats and criticisms associated with using such models in theoretical discussions and literature reviews. For example, because they are based on statistical patterns in large amounts of data rather than on expert knowledge or critical analysis, they may not always provide accurate or reliable information (Grimmer et al., 2021). If the training data is skewed or the model is not calibrated correctly, a GPT could produce inaccurate results. They might not "understand" the subtleties and complexities of academic writing or know how to differentiate between reliable and unreliable sources. Additionally, GPTs might not be able to spot errors or inconsistencies in the literature or could even create fake information and articles (Buruk, 2023; Liu et al., 2023; Saliba & Boitsios, 2023). Lastly, certain researchers have argued that using them in writing literature reviews can cause researchers to lose their independence of thought and critical-thinking skills if they rely too heavily on the model (Grimmer et al., 2021) and this is particularly the case of qualitative researchers who are often required to employ their expertise and skills in creating linkages, conceptualize work and develop propositions.

By analyzing existing research and theoretical frameworks, AI may help inform the creation of novel theoretical conceptualizations. For instance, there are studies that have used AI to generate (i.e., create output) textual data for qualitative research in the social and behavioral sciences (Gururangan et al., 2020). Language, culture, communication, and management are just some of the areas that can benefit from the use of AI to analyze and generate text data. Researchers have used AI to analyze social media images, looking for recurring visual themes and using those themes to write captions (Kesavan et al., 2019). Nonetheless, it is important to highlight the shortcomings and criticisms of AI, such as the potential bias towards data or perspectives. This is especially true if AI in the form of a deep learning model is trained using a dataset that itself contains biased information, which could then lead to the generation of biased responses. The lack of oversight could be problematic in situations in which the generated responses could have serious consequences. Because of this lack of clarity, analyses based on a deep learning model can be challenging to interpret. Additionally, deep learning models require massive amounts of data for effective training, which can give rise to privacy and security worries, especially in situations in which sensitive or personal information is at stake (Sousa & Kern, 2023).

Conceptual studies (a common form of qualitative research) can be enhanced through AI in the form of deep learning models (i.e., GPTs) because they generate textual data and offer suggestions for language and structure. One of the most direct is the assistance provided with writing since researchers may use GPTs to produce paper introductions, abstracts, and conclusions, which can greatly facilitate the writing process (Lund et al., 2023) of their papers. Also, researchers may use AI to generate new knowledge (see Chowdhury et al., 2023; Kovalerchuk et al., 2022). For example, in addition to technical support, such as helping with grammar, punctuation, and syntax, GPTs are used to help researchers spot holes in the literature

that researchers may use to identify unexplored areas, initiate new lines of inquiry, and contribute to expanding the knowledge base on the topic, or theory. Despite these roles, their value may extend to the conceptualization procedure, as discussed below.

The term "conceptualization" is used to describe the procedure of elaborating on and refining the ideas and concepts that are central to a study. It entails settling on and detailing the study's central determinants, such as its variables, constructs, and relationships, that is, "the process of specifying what we mean when we use particular terms and how those terms relate to other concepts or ideas," write Creswell and Creswell (2018, p. 38). It is a crucial stage because it ensures that everyone involved in the study has a common understanding of the central ideas and factors at play. Theoretical and conceptual research, in which novel theoretical frameworks or conceptual models are sought places a premium on conceptualization. The theoretical constructs and relationships to be investigated in such studies are defined and refined through conceptualization (Maxwell, 2013). By generating text-based data and identifying key themes and concepts, GPTs can be used to facilitate conceptual research. For instance, finding important themes and concepts in a mountain of text can be a formidable task for any researcher. The researcher may process and analyze the textual data while using AI. For instance, GPTs may analyze the data provided to produce a short summary that draws attention to the most important ideas in the source material that eventually may inform the basis of a conceptual paper. Furthermore, AI has potential applications in research idea and theory construction, specifically in the generation of textual data and the identification of central concepts and relationships as previously explained, yet it may be argued the extent to which such models may provide researchers with brainstorming prompts. Besides this, there are caveats to their application in theoretical investigation. The inability to modify user-generated content is one of the drawbacks. Researchers may not have full control over the content generated by deep learning models because of how they are programmed to respond to text-based prompts. This lack of oversight can be problematic in conceptual research, in which using correct terminology while building theoretical frameworks or conceptual models is essential. In such instances, the cognitive skills and expertise of a researcher are extremely important to exclude undesirable, unreliable, and problematic output generated by an AI system. Pre-training data is also filled with biases. Due to the pre-training on massive amounts of text data, AI in the form of deep learning models (such as GPTs), are prone to inaccuracies and biases. As a result, the generated content may reflect these biases and provide only partial or incorrect conceptualizations. Also, there is inadequate support for complex data. GPTs can mimic human intelligence in their responses, but they may struggle with more nuanced information or concepts that call for human (i.e., cognitive and emotional) understanding. This restriction can be especially troublesome in conceptual research, which typically aims to create novel theoretical frameworks or conceptual models (Christou, 2020).

A Step-by-Step Guide for Using AI in Qualitative Research and as a Methodological Method

A methodological method can be understood as a particular strategy or procedure that is used to carry out research in a specific field or discipline. It may entail applying a predetermined set of guidelines or principles in an organized manner in order to guarantee the validity and dependability of the findings of the research (Creswell, 2014; Creswell & Creswell, 2018). As previously explained, AI may be used by researchers in qualitative studies or studies of qualitative nature, such as for example, in critical and conceptual papers and systematic reviews. Nonetheless, qualitative researchers may choose to use AI as part of their methodological approach (e.g., use a specific AI system for the analysis of their qualitative findings). Following are some key considerations based on the previously discussed

implications, strengths, and limitations of AI and deep learning models in qualitative research. These key considerations may act as a useful guide on how to use AI for qualitative research purposes (such as, part of the methodological approach of a study). Conceivably the phases that follow are determined by the type of research study being conducted and the reasons the researcher chose to use AI as part of the methodological tool. For instance, a study that uses a deep learning model (i.e., GPT) for the generation of specific content (such as, the extraction of information from articles that discuss a particular phenomenon/event that may be used for a systematic review), differs from an empirical study that makes use of a specific AI system that analyzes information derived from a qualitative study. Despite this, the key considerations that are about to be described can serve as a helpful guide and the researcher/analyst can modify them as necessary, depending on the specifics of each qualitative study.

Familiarization with the Information Generated by AI

A crucial part of research is familiarizing oneself with the data, which may have been gathered through interviews, focus groups, or observations and field notes. Researchers can better understand the content, context, and meaning of the data by becoming familiar with the data and looking for patterns and themes (Braun & Clarke, 2019). According to Braun and Clarke (2019), getting to know the data requires doing things like reading or listening to it multiple times, taking mental notes, circling key passages, and writing summaries or memos to remember key points. It is important that researchers become intimately acquainted with their data in order to ensure the goodness, trustworthiness, and rigor of their research. This allows them to gain a thorough understanding of the data and to recognize any biases or preconceptions that may influence the analysis (Miles et al., 2014).

As the researcher becomes more acquainted with the information generated through the help of AI, he/she must take greater responsibility for ensuring that all "inserted" and "extracted" information contributes to the goals of the qualitative study. For example, if a specific AI-deep learning model (e.g., ChatGPT) is not given specific commands (e.g., “Discuss the notion of philanthropy”) to generate a desired set of results, the researcher may find themselves at the “mercy” of its output. That is, the system may provide any information and/or any studies from any source, not necessarily correct, reliable or helpful. Consequently, it is incumbent upon the researcher to issue commands that are suitable for and helpful in achieving the goals of the study (e.g., “Explain the notion of philanthropy within the business context”). Following the command, it is crucial to guarantee a thorough review of the output (check that the produced information by the system is indeed helpful in describing the phenomenon under investigation, in this case the notion of “philanthropy”). Nonetheless, it is possible that the AI system generates “false content,” such as results from studies that do not actually exist. The steps to follow in such instances are discussed below. Also, the researcher has an active role to play in case a specific AI program (e.g., one that creates clusters) is used to analyze specific qualitative primary information, such as information derived from interviews. This is more thoroughly discussed in the phase of the analysis.

Eliminating Biased Content and Addressing Ethical Concerns while Using AI

Zhu et al. (2022) stress the importance of ethics and the notion of trustworthiness in the context of responsible usage of AI in research. In more detail, once researchers/analysts become acquainted with the generated information, they must delve deeper into the content of what has been produced by the AI, in order to eliminate criticism based on its usage, the delivery of biased content, or the failure to address ethical concerns. For example, because deep learning models can produce biased or harmful content, their use has sparked several ethical

concerns. They are trained on huge swaths of text and that text may itself be biased toward groups of people or language. Due to this, the model may produce information that is unfairly biased or discriminatory, thus contributing to the maintenance of harmful stereotypes and inequalities (Bolukbasi et al., 2016). In addition, deep learning models may produce plausible fake new stories, which can be used to spread disinformation and propaganda (Lee, 2022; Qiu, 2023). Sensitive information, such as emails or social media posts, can be used to train deep learning models, which can then be used to generate similarly private content, having people worried about their personal information being compromised (Schwartz et al., 2020). Despite such issues, researchers may deliberately avoid mentioning the use of AI for the generation of output (e.g., the use of GPT for conducting a systematic review), in order to avoid criticism. Researchers and developers employing AI need to ensure diverse and unbiased training data, implement transparency and accountability measures, and be transparent about the limitations and potential harms of such AI generated content in order to alleviate these ethical dilemmas.

In this regard, the researcher plays a crucial part; The researcher can address this problem in a few ways, such as for instance, to acknowledge the use of AI, perhaps in the study methods section (depending on the nature of the study), explain what purpose it serves, and how it has been implemented. Also, check the sources of the information produced, read the AI output critically and eliminate or disregard content that may be false or not be appropriate to be used in the study. Besides, there is evidence to suggest that AI systems in the form of deep learning models (e.g., GPTs) may not produce reliable information, while they may also produce fake articles/news (Zhou, 2023). Finally, if there are any doubts about any AI-created content, then the qualitative researcher/analyst should double-check facts by consulting alternative sources, as explained in greater depth below.

Cross-Referencing Information Produced by AI

Cross-referencing is a technique used in academic research for checking and verifying data and information by comparing it across multiple sources. Researchers validate the accuracy and reliability of the information by identifying and analyzing connections and relationships among various sources. Also, when conducting qualitative research, it is common practice to compile information from a variety of sources to gain a more complete picture of the phenomenon being studied (Christou, 2023; Creswell, 2014; Maxwell, 2013). To make sure their interpretation of the data is correct and supported by multiple sources of evidence, a researcher conducting a case study might, for instance, cross-reference interview data with observations or document analysis. The first of Maxwell's (2013) three steps in cross-referencing is to spot any inconsistencies or contradictions among various data or information sources. The second step is to look for discrepancies or similarities among the various sources, and the third is to use these discoveries to back up or adjust the original interpretation of the data. By comparing and contrasting information from different sources, researchers can make sure their findings are accurate and trustworthy. Qualitative researchers can benefit from cross-checking their information. When the latter is the case, researchers may employ triangulation—the process of comparing information from different sources or methods to ensure the accuracy of their results—by cross-referencing. As a result, their findings are more likely to be accurate and valid (Creswell & Plano Clark, 2017). It is also possible to analyze relationships among groups or variables by cross-referencing data. This can strengthen inferences made from the data and help identify patterns, trends, or differences among groups (Cohen et al., 2013). Since AI, such as that in the form of deep learning models is often used in niche situations, it is essential that researchers verify the accuracy of the data they collect using other methods. For instance, arguably the empirical findings from a qualitative study presented at a conference may not carry the same weight as those presented and published in a reputable academic journal

after undergoing a rigorous peer-review process. Nonetheless, it is extremely important for researchers to check and eliminate false material generated by AI, since a researcher may "request" (i.e., insert a command about specific studies) and be presented (i.e., output produced by the AI system) with fake/false articles that are not real and do not actually exist even if these are presented in a very trustworthy manner (i.e., with page and volume numbers assigned to them).

The Phase of the Analysis

The use of AI as an analytical tool is on the rise (Kariyapperuma et al., 2022) with AI being applied to the tasks of sentiment analysis and opinion extraction from textual materials (Acheampong et al., 2021). Key elements in the phase of a qualitative analysis procedure are components of quality, the data/information, and the analysis (Dix et al., 2020). The identification and interlinkage of these components are important to be established during the phase of the analysis. It is hard to establish precisely what is considered as "quality" output produced by an AI system. As explained earlier in this paper, AI systems such as in the form of GPTs may produce unreliable or even false content (e.g., information about a specific scientific study that does not exist). For example, the following instruction is given to a specific AI (GPT) system: "Give an example of a recent study from an academic journal that discusses the use of AI in qualitative research."

Following the instruction (by the researcher), the AI system lets the researcher know that it does not have the ability to browse journals, hence provides a "hypothetical example." These words may escape the attention of the researcher, while the researcher may instead focus on the title of the given/provided article and the abstract of it that follows it, hence make use of that "fake/incorrect" information:

> Title: "Enhancing Qualitative Research with AI: A Comparative Analysis of Natural Language Processing Techniques"
>
> Abstract: This study presents a comprehensive investigation into the application of artificial intelligence (AI), specifically natural language processing (NLP) techniques, to enhance qualitative research methodologies....

In instances, such as the above, the expertise of the researcher is required, to check the produced output (content) as well as cross-reference information from various sources. This is an important step to ensure that reliable, accurate, and trustworthy information is then used for the analysis process that may inform the formation of propositions and conceptualizations. This process becomes even more challenging when the system does not inform the researcher that the output is a "hypothetical" study, but instead one that exists. As an illustration, a simple cross-reference and check via "Google scholar" may reveal the search— "Enhancing Qualitative Research with AI: A Comparative Analysis of Natural Language Processing Techniques"—did not match any articles.

Nonetheless, there are instances, which AI may be used specifically for the analysis of information/data. One such example is "InfraNodus" AI system, that is specifically designed to perform textual data analysis tasks, such as categorize information, create clusters, and deliver visual graphs. In such cases, data (e.g., in the form of information derived from interviews, ethnographic field notes, or posts from social media) are inserted into an AI system. The AI may then be instructed by the user (researcher/analyst) to perform a specific type of analysis, such as cluster analysis. Indeed, AI systems can perform complex analyses like

determining how words and concepts relate to one another in the text, while specific forms of AI, such as GPTs mine text data for themes and patterns using machine learning algorithms, allowing them to learn on their own without any prior training (Radford et al., 2018). Even so, researchers stress the need for specific training and fine-tuning of AI systems by the researcher to achieve optimal performance (Devlin et al., 2019). Some level of manual coding or categorization by the researcher may be necessary because analytical software or AI systems may use pre-defined rules or algorithms to identify specific patterns, themes, or keywords within the text data. These methods tend to be more organized and are frequently driven by pre-existing questions or hypotheses (Neuendorf, 2016). Despite this, the researcher should take a more "active role" after being presented by the AI system with the analysis results, as explained in more detail in the following section. Furthermore, the researcher needs to provide thorough documentation of the analysis methodology, justification, and exact execution procedure followed. The researcher must be able to explain what rationale and algorithms the AI used to perform the analysis, while some degree of cognitive evaluative skills on behalf of the researcher in the analytical process and in reaching conclusions may add value to the qualitative study, as discussed in more detail below.

The Cognitive Input of the Researcher Throughout the Process and in Reaching Conclusions

It could be argued that AI requires rudimentary or surface-level cognitive input from the researcher in order to generate information and analyze it. There is however substantial evidence that suggests any analysis, whether "manual," or technologically assisted (as in, "software or AI-generated") may involve, at least to some extent, the interpretation and analysis of the data based on the researcher's understanding and knowledge of the research topic (Braun & Clarke, 2019; Guest et al., 2012). Scholars stress that the researcher's critical thinking is crucial to the success of thematic analysis. Braun and Clarke (2019) argue that themes must be interpreted and analyzed by the researcher in order to accurately reflect the complexities and nuance of the data. In more detail, an important part of thematic analysis is inductive and deductive coding, which Fereday and Muir-Cochrane (2006) describe as being guided by the researcher's understanding of the research topic. Besides, using thematic analysis to answer practical research questions requires the researcher's expertise and contextual knowledge, as emphasized by several researchers (Christou, 2023; Guest et al., 2012). Because the researcher's interpretation and analysis of the data is grounded in their understanding and knowledge of the research topic, the researcher's cognitive input is crucial for thematic analysis. Even so, it is difficult to determine where a researcher's duty to demonstrate cognitive input begins and ends in the context of an AI-performed thematic or content analysis. In the end, the AI is "responsible" for producing the aggregated themes and summaries. Nonetheless, Christou (2023) emphasizes that even in the case of an analysis performed by a sophisticated software or by any other technologically advanced means (e.g., AI) a researcher/analyst has an active role to play. This could mean, for example, that the researcher excludes (for valid and justifiable reasons) certain content categories and groups that are not accurate representatives of a specific cluster. The active and cognitive input of a researcher using a priori and extensive knowledge of a phenomenon under investigation may give more depth in the discussion section of any qualitative study supported by AI means and in reaching conclusions, compared to a simplistic command: "summarize findings."

Conclusion

The contribution of AI in content creation, research, and analysis have had far-reaching technological and social consequences. However, they have prompted concerns about bias and ethics in AI and calls for more transparency and responsibility in the field, as previously discussed. There are also not adequate or comprehensive guides for using AI in qualitative studies, such as critical reviews, systematic reviews, conceptual papers, and empirical studies that use thematic analysis. In my paper, I took a critical stance (Creswell & Creswell, 2018) toward AI by examining thoroughly their current applications in the scientific community, advantages, disadvantages, and ethical dilemmas. I argue that AI can be used in qualitative research (as in the case of systematic reviews, qualitative empirical studies, and conceptual studies), but only if certain key considerations and guidelines are adhered to. More specifically, the researcher must become well-versed in the data in order to comprehend it completely and identify any inherent biases or preconceptions. For AI (as in the form of GPTs) to produce relevant to each study results, researchers must input specific commands into the AI system, and the results must be thoroughly reviewed by the analyst, before any theoretical or conceptual discussion can take place. Ethical dilemmas should and can be avoided if researchers take steps to ensure diverse and unbiased training data, implement transparency and accountability measures, and are honest about the shortcomings and potential harms of any AI-generated content. Any content produced by the AI should be cross-referenced to ensure its accuracy and credibility. Finally, the researcher's active and cognitive input while using their a priori and extensive knowledge of a phenomenon under investigation may give more depth to the discussion section of the qualitative study and in reaching conclusions, than a simplistic "command," and this is true at every stage of the research process, including the AI-performed thematic or content analysis process.

As a final note, in this paper I have provided key practical considerations toward ensuring the ethical, relevant, and justifiable use of AI in scientific qualitative inquiry. However, more research is needed to fully explore the research-related outcomes of using AI, while additional research is required to fully understand the best ways to incorporate AI into research planning and execution. Although AI has had a profound impact on the modern world, academia and research community, I argue that, in addition to its current state and fascinating research opportunities, qualitative studies that make use of AI must adhere to accurate, reliable, justifiable, and ethical considerations and by actively involving researchers with their cognitive evaluative skills in monitoring, documenting processes and reaching conclusions.

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