

A case study in artificial intelligence-assisted qualitative analysis: The use of ChatGPT prompts with UNESCO texts

Un estudi de cas en l'anàlisi qualitativa assistida per intel·ligència artificial: l'ús de «prompts» de ChatGPT en textos de la UNESCO

María Paz Sandín Esteban^a

Angelina Sánchez Martí^b

^a Universitat de Barcelona

A/e: mpsandin@ub.edu

<https://orcid.org/0000-0003-1836-6126>

^b Universitat Autònoma de Barcelona

A/e: angelina.Sanchez@uab.cat

<https://orcid.org/0000-0002-4719-4688>

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María Paz Sandín Esteban i Angelina Sánchez Martí

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Abstract

This article presents the practical application of a range of ChatGPT 3.5 prompts in the qualitative analysis of United Nations Educational, Scientific and Cultural Organization (UNESCO) and United Nations (UN) reports and blogs on ethics, education and artificial intelligence, giving details of the text structure and the results yielded. The prompts were designed to extract relevant information, identify patterns and trends, and facilitate the understanding and processing of the data. Through this exploratory study, we endeavor to show their usefulness as a tool for analyzing academic and research texts. The combination of approaches, bringing together both the advantages of AI and human research experience, reveals the importance of comprehensive education for researchers on scientific integrity and ethics in research in general and in qualitative research in particular, in order both to reap the benefits of AI with confidence in its scientific validity and to avoid its pitfalls through rigor and sound judgement.

Keywords

Qualitative analysis, artificial intelligence, ChatGPT, prompts, UNESCO, education.

Resum

L'experiència que presentem exemplifica l'aplicació pràctica de diversos prompts en ChatGPT3.5 dissenyats per dur a terme els procediments associats a l'anàlisi qualitativa d'informes i blogs de l'Organització de les Nacions Unides per a l'Educació, la Ciència i la Cultura (UNESCO) i les Nacions Unides sobre l'ètica, l'educació i la intel·ligència artificial, detalla l'estructura dels textos i els resultats obtinguts durant la tasca d'anàlisi. Aquests prompts han estat formulats per extreure informació rellevant, identificar patrons i tendències, i facilitar la comprensió i el processament de les dades. A través d'aquesta exploració, pretenem mostrar-ne la utilitat com a eina per a l'anàlisi de documents textuais en l'àmbit acadèmic i de recerca. La combinació d'enfocaments, utilitzant els avantatges que ens proporciona la IA juntament amb l'experiència investigadora humana, posa de manifest la importància d'incentivar des de la formació investigadora coneixements progressivament més profunds en integritat científica i ètica de la recerca en general, i qualitativa en particular, per a poder aprofitar-ne amb seguretat i validesa científica els beneficis i sortejar-ne amb criteri i rigor els perills.

Paraules clau

Anàlisi qualitativa, intel·ligència artificial, ChatGPT, prompts, UNESCO, educació.

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1. Introduction

The use of natural language processing (NLP) technologies in social science and education research has been gaining ground in recent years (Tabone & De Winter, 2023; Zhang, 2023). The ChatGPT language model, developed by OpenAI and based on GPT 3.5 and subsequent models, has particularly emerged as an attractive tool for qualitative data analysis in educational sciences since it can be used as an assistant, as is occurring in other fields (Hamilton *et al.*, 2023). This possibility calls for more in-depth analysis of its functionalities in tasks that lead to the interpretation and construction of human meanings.

Data and information analysis techniques and procedures in education research are closely linked to the methods used to examine and understand the data collected. These techniques and procedures make it possible to organize and interpret information and draw meaningful conclusions, with the aim of answering the specific research questions posed (Mason, 2018). In qualitative research there is no exclusive set of methods or practices, although it generally makes use of narrative data produced by observations, interviews, texts, images, videos, letters, emails, social media, stories, artifacts, etc. “The art of practice and interpretation, evaluation and presentation” in qualitative research, as Denzin and Lincoln (2018) call it, can hardly be generalized and it is always recommended to refer to manuals giving analytical guidelines for the particular study perspective adopted. It is generally agreed, however, that qualitative research involves large amounts of information that usually take varied and unstructured forms, and that therefore the analytical approaches we choose should facilitate inquiry, enabling us to examine the data systematically in order to delineate its dimensions and to discover the relationships between them and with the whole. In short, all analysis seek to gain a greater knowledge of the situation studied and, as far as possible, to advance through description and understanding towards the development of explanatory conceptual and theoretical models (Sandín, 2003).

Broadly speaking, the analytical strategies used to make sense of data (Miles *et al.*, 2020; Taylor *et al.*, 2016) are: (a) notes, memos, reflective writing and “assembly”; (b)

categorization, such as coding and thematic analysis; and (c) connection strategies, such as narrative, discourse or network analyses.

In this context, ChatGPT appears as a potential tool for facilitating qualitative analysis tasks, as the scientific community has indicated in its contributions to the dialogue between AI and qualitative research (Zhang, 2023). The ability of AI to generate real-time responses can help researchers identify emerging patterns, themes and trends in qualitative data (Hamilton *et al.*, 2023). This can be done by generating automatic summaries, identifying key themes and exploring connections and relationships between different aspects of the data. The ChatGPT model is trained to generate text based on a given prompt or set of instructions. A prompt is a natural language instruction given to a generative artificial intelligence (AI) tool to guide its production of outputs (i.e., responses; Gao, 2023). It has the function of an informational input in which the researcher specifies the context and the task that the tool is expected to complete. On receiving the prompt, the AI model produces an output (or result) based on what the researcher has stipulated. A well-formulated prompt will result in the production of more relevant and coherent answers and enable the model to adapt to the user's specific needs.

By incorporating ChatGPT into qualitative data analysis, researchers can streamline and enrich the process, enabling a more agile and in-depth exploration of the education phenomena studied from various perspectives. Its use can also contribute to addressing the challenges of managing and organizing large volumes of information, identifying hidden patterns and producing significant insights from the data. Through the use of prompts, ChatGPT generates automated reports that can assist in the content and thematic analysis of texts (Braun & Clarke, 2006; Krippendorff, 2018). Lopezosa and Codina (2023), for example, illustrate the use of ChatGPT for analyzing interviews, identifying the following possibilities (p. 9):

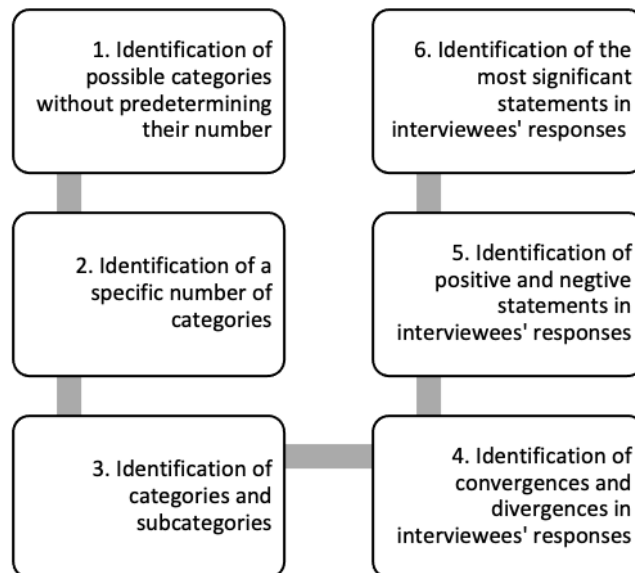


Figure 1. Uses of ChatGPT for analyzing interviews. Source: Own elaboration.

Prompts can also be used for analyzing other texts obtained with qualitative approaches: documents and discussion groups, for example. In general, the usefulness of ChatGPT in qualitative analysis is in facilitating the processes of identifying key ideas, summarizing information, identifying positive, negative or neutral tones in a text, giving ideas for the initial codes in the coding process or comparing codes with those created by researchers. Lastly – and this list is not exhaustive – it enables us to organize our data into tables by showing the main themes identified in the text, with the related codes, their definitions and relevant quotations (although we should always be aware that some of its answers may contain errors).

It should be noted, however, that the algorithms cannot identify key ideas per se but work by searching for the most frequent words or terms representing categories constructed via statistical lexical classification, with outcomes that are not necessarily meaningful as they are simply quantitative results guided by the prompts. Hence, these processes require great care on the part of the researcher. While AI tools like ChatGPT may seem smart, capable and reliable, they have many limitations. Often their responses do not have any intentional semantic significations or interpretations similar to the human processes of cognition and identification of meanings but may be inaccurate, biased or meaningless (Hamilton *et al.*, 2023). Their purely mathematical

approach to reasoning is not equivalent to human intelligence, since they use a self-regression model which has no introspective capacity or access to the external resources that a person has and which cannot monitor its own coherence or correct itself (European Council, 2023).

Therefore, the main objective of this paper is to demonstrate how artificial intelligence (AI), and in particular ChatGPT 3.5, can be used as a generative tool for qualitative data analysis, specifically through the use of prompts. Thus, we seek to illustrate how AI can aid in this process by providing a guide that facilitates researchers' initial tasks of data description and interpretation. At the same time, we also aim to raise awareness of certain unresolved ethical issues and challenges in the use of these tools, which require great caution on the part of the research community.

2. Context

The context of the study presented here focuses on the exploration and application of a range of prompts which, while specifically formulated to assist qualitative data analysis on a specific topic, could also be used for any other subject (for example, education, sustainable development, culture, etc.). To test ChatGPT 3.5, it was decided to start with a number of UNESCO reports and blogs, since they usually contain a large amount of textual information that can be challenging to analyze manually.

These prompts were designed with the aim of assisting the qualitative analysis of data during different phases of the process, including the identification of emerging themes, the categorization of relevant information and the detection of connections or relationships between different sections or concepts within the reports and blogs, thereby facilitating the processing and understanding of the documents in question. It should be remembered that the language model of ChatGPT works to achieve these tasks by learning statistical models from large amounts of textual data, which allows it to recognize semantic relationships, infer intent and tailor responses to the specific context of a conversation.

Thus, the study presented here involved implementing the prompts and analyzing the results from a number of official UNESCO and United Nations documents on ethics,

education and artificial intelligence (UNESCO, 2019; 2022; 2023), in addition to other blogs and press releases on the same topics both from the UN (United Nations, 2023a; 2023b; 2023c; 2023d) and from UNESCO (2023, June 8; 2023, October 16).

Through this study, the versatility of ChatGPT 3.5 as a generative tool for beginning the qualitative analysis of textual documents in the academic and education research field is demonstrated. Accordingly, the purpose of this article is not to explain the technical details of how ChatGPT works but to explore the tool as a “black box” capable of processing natural language queries with a dataset that can generate various responses.

Before doing so, however, the first steps of using ChatGPT in qualitative analysis should be explained. Firstly, whatever version is chosen, we need to create an account on the platform. Second, it is necessary to define the type of tasks to carry out with the application – since it is on this basis that the tests will be run – through the use of prompts or instructions to obtain various types of outcomes. At this point, it is important to have a fairly clear idea of how to proceed and which references to use before starting to ask the tool questions. The more precise the instruction, the more likely it is that the result will be accurate. To this end, we recommend training ChatGPT with various short test excerpts and data types to explore its versatility. One way to do this is through roleplay, since prompts in this form allow ChatGPT to produce answers from the standpoint of specific scenarios and contexts. Among possible prompts, you may instruct it, for example, as follows: “Imagine that you are a qualitative researcher”, “Imagine that you are the author of an educational research report”, “Imagine that you are an expert on this subject and that you need to perform a data analysis” or “Imagine that you are an expert on analytical topics”. Assigning such roles to ChatGPT can improve the quality of the output, although in fact quality has more to do with the iteration of questions that explore the data from multiple perspectives, as is common in qualitative research, than with the real ability of the tool to provide truthful and reliable results.

3. Exploring the potential of ChatGPT for analyzing qualitative data: implementation and reflections

Without a basic understanding of qualitative data analysis, even with the assistance of CAQDAS (Sabariego, Vilà, & Sandín, 2014), one's ability to properly take advantage of generative AI tools is severely limited and can lead to many errors. When using these applications, therefore, a familiarity with the basics of qualitative data analysis is absolutely essential (Sandín, 2016). This (as noted above) generally involves procedures that include: (a) reducing and synthesizing information in order to answer specific research questions; (b) representing this information in various formats such as tables, graphs and diagrams; and (c) interpreting data on different levels of theorization (always bearing in mind that AI cannot substitute for any of these procedures: Miles & Huberman, 1994; Miles *et al.*, 2020). During this process, the essential activities performed by the researcher include identifying relevant information, coding, grouping codes into categories or themes, and identifying patterns in the data.

Below we explain in more detail the analytical approaches that we suggest can be assisted by AI. All of them form part of a process that can facilitate subsequent human interpretive analysis on different levels (Figure 2), bearing in mind that the proposed prompts only simulate an interpretation of the content of the articles provided and/or the understanding of a text or text summary. AI produces segments of words organized by algorithms of transformation, prediction and generation of the order of words, without perceiving or thinking about their meanings; its "understanding" is limited to natural language processing and text generation based on learned patterns and does not entail understanding in the broader human sense, which involves consciousness, experience and abstract reasoning.

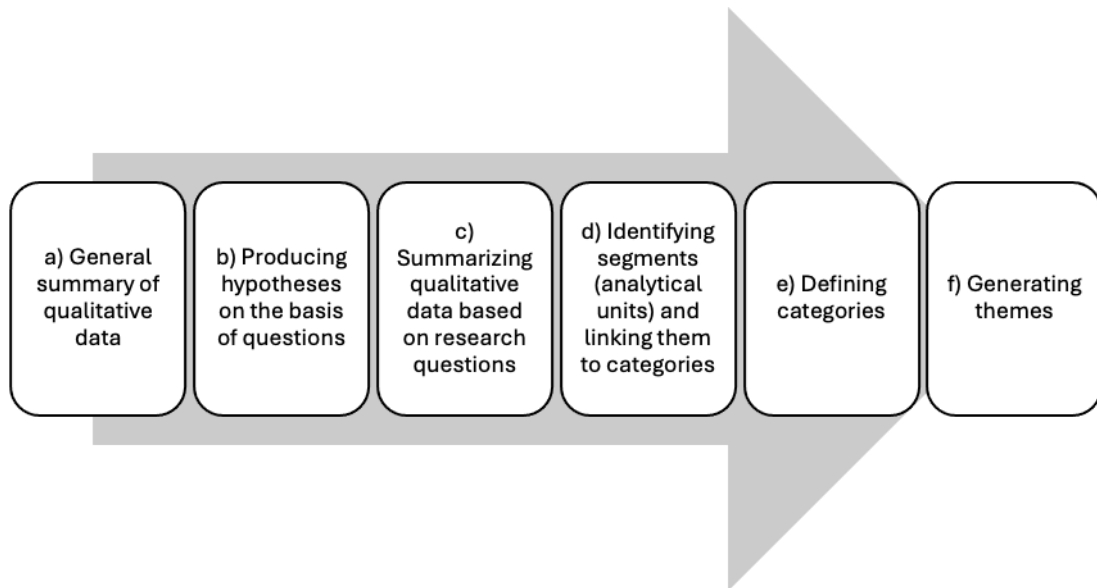


Figure 2. AI-assisted analytical procedures. Source: Own elaboration.

In order to explore the application's operation and outputs, a specific prompt was designed for each of the analytical procedures, indicating that it should be applied to the sample of the UNESCO and United Nations materials mentioned above. In general, the characteristics and structure of the prompts were as follows:

Table 1: Structure of prompts

Role that ChatGPT was to adopt (optional, but this provides more precise outcomes)	For example, if a medical, juridical or educational response is required.
Task (clear and specific)	Summarize, create codes, define, select, create, etc.
Context or broader view of the task (if necessary)	For example: consider the following research question { }
Output	Characteristics and format that we wish to give to the information solicited. For example: organization in three-column table, codes of two to five words, 150-200 word summary, etc.

Source: Own elaboration.

3.1 General summary of qualitative data

Sometimes what is needed to start the analysis of a data corpus is to have an overview of the material, a global snapshot of the information. In this example, we requested a summary of the UNESCO Beijing Consensus Report (2019) on how artificial intelligence (AI) is transforming education and how we can make the most of the opportunities it offers. The information obtained from this type of prompt can be used as a memorandum associated with the documents analyzed. A summary of a document can also become a new document in the analytical corpus of a study. Figure 3 shows the prompt used (both the length and the instruction itself can always be adapted to the researcher's specific needs).

ChatGPT Prompt:
Summarize the transcript below in 200 words.

Figure 3. Example of prompt for generating a summary. *Source:* Own elaboration.

The output obtained is shown below:

 **ChatGPT**

The International Conference on Artificial Intelligence (AI) and Education, held in Beijing in May 2019, gathered government officials, international representatives, and stakeholders to discuss AI integration in education. Participants reaffirmed commitments to Sustainable Development Goal 4 (SDG 4) and its targets, emphasizing the need for innovative education approaches. They recognized AI's complex impact on society and education, stressing the importance of ethical AI development centered on human values. Recommendations included aligning AI policies with education objectives, investing in AI implementation, and leveraging AI for education management, teacher empowerment, and learning enhancement. The document also highlighted the necessity of addressing gender disparities in AI, ensuring equitable access, and promoting inclusive education. It emphasized ethical AI use, data privacy, and the importance of monitoring AI's impact on education. The recommendations urged international cooperation, capacity-building, and resource mobilization to bridge AI disparities and promote AI's role in achieving SDG 4. Additionally, UNESCO was invited to establish an AI for Education platform, develop guidelines for AI integration in education policies, and reinforce its leadership in AI education initiatives globally.

Figure 4. Summary generated by ChatGPT

In the case of multiple interviews, for example, ChatGPT would yield an individualized summary of each, thereby giving us a preliminary understanding of the participants before going into further depth in the analysis of the same data.

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3.2 Generating hypotheses using questions

Another interesting possibility for exploratory data analysis is the formulation of hypotheses. Using a prompt like that in Figure 5 below, ChatGPT can not only provide various hypotheses (Figure 6) but also classify the segments or analytical units of a document (Figure 7).

ChatGPT Prompt:
Propose hypotheses that can help guide the research and analysis of this interview by providing possible explanations or interpretations of the themes and messages present in it. Formulate three hypotheses about the following question: "What could the overall impact of the introduction of artificial intelligence be, in terms of socioeconomic inequality, ethics, government regulation and human rights?"

Figure 5. Example of a prompt for generating hypotheses. Source: Own elaboration.

Although we are aware that the sentences stating the AI-generated hypotheses may not be exhaustive, or not always plausible, they can be of interest for reflecting on the data.

1. Hypothesis 1: The introduction of artificial intelligence technology may exacerbate socioeconomic inequality by widening the gap between those with access to advanced technology and those without, leading to unequal opportunities for economic advancement and social mobility.
2. Hypothesis 2: Ethical considerations surrounding the use of artificial intelligence technology may become increasingly complex and contentious, as the potential for biases, discrimination, and privacy violations raises concerns about fairness, accountability, and transparency in decision-making processes.
3. Hypothesis 3: Government regulation of artificial intelligence technology may struggle to keep pace with rapid technological advancements, resulting in inadequate safeguards to protect human rights, such as privacy, freedom of expression, and non-discrimination, thereby leaving individuals vulnerable to exploitation and abuse.

Figure 6. Hypotheses generated. Source: Own elaboration.

Also, by rephrasing the prompt, the analytical units can be generated in table format (Figure 7). The resulting chart, as shown below, organizes the text in terms of the hypotheses generated, with the relevant supporting citations.

Hypotheses	Supporting Excerpts from the Interview
Hypothesis 1: Socioeconomic Inequality	"With the information we have so far, it would seem that they are increasing or at least not being used to reduce the gaps because we have half of the world's population that is either not connected to the internet, or connected to low-quality internet, or lacks the skills to use technology more effectively."
Hypothesis 2: Ethical Concerns	"Given that artificial intelligence has the potential to amplify biases and discrimination inherent in data sets and algorithms..."
Hypothesis 3: Government Regulation	"The fact that they currently have this spirit of self-regulation, and that many of them are lobbying against the adoption of any regulation, does not mean that the State is powerless and that governments do not have the tools to improve things."

Figure 7. Excerpts from documents classified according to the hypotheses generated.

Source: Own elaboration.

3.3 Summarizing qualitative data based on a research question

This third strategy also involves using ChatGPT as a tool for a preliminary examination of qualitative data before doing a thorough line-by-line analysis when coding. In this case, it allows us to explore the content of the data through a summary provided by the application addressing a specific research question. The following example shows how the prompt includes a question about "skills needed in the age of AI", which guides the analytical focus for the three summaries that ChatGPT will generate from the UNESCO reports (2020, 2021 and 2022). In the prompt we specify the format and length of the output required (Figure 8).

ChatGPT Prompt:
Summarize the three transcripts based on the research question, "What competencies are required in the AI era, and what strategies are needed to prepare everyone to live and work effectively with AI?" Generate a table containing the summary of the three forums. Each summary should not exceed 150 words.

Figure 8. Example of a prompt for generating summaries based on a research question.

Source: Own elaboration.

The output is shown in Figure 9 below:

 ChatGPT

Forum	Summary
UNESCO 2020	The forum emphasized the importance of understanding AI's implications for education and society. It highlighted the need to teach young people about the theory of the artificial mind, emphasizing computational thinking and human control over AI. AI integration in education was discussed, addressing challenges like bias and surveillance. It underscored the necessity of inclusive AI education to ensure informed decision-making and prepare students for the future.
UNESCO 2021	This forum focused on promoting gender equality and empowering women and girls with AI competencies. It highlighted the widening gender gap in digital skills and emphasized the importance of equitable access to technology and AI skills for women and girls. Strategies discussed included mentorship programs, targeted training initiatives, and collaborations with the private sector to create opportunities for women and girls in AI-related fields.
UNESCO 2022	The forum discussed AI competencies for teachers, emphasizing the need for teachers to understand AI both as a subject and as a tool for teaching. Competencies ranged from basic AI understanding to designing AI-enhanced classroom environments. Strategies for upskilling teachers included incorporating AI education into teacher training programs and providing in-service training through various models and collaborations.

Figure 9. Results of the prompt in table format. Source: Own elaboration.

As may be seen, the table gives the requested information based on the research question, a result which will always need to be checked since the algorithm gives answers but does not guarantee veracity. This enables us to capture the core themes regarding AI discussed in the UNESCO forums. The summaries prioritize one salient idea for each document, namely: accounting for AI competences in education to prepare students for the future (UNESCO, 2019); focusing on strategies for developing gender-related AI competencies (UNESCO, 2021); and addressing AI competencies among teachers and in teacher education programs (UNESCO, 2022).

3.4 Identification of segments (analytical units) and association with categories

The analysis of qualitative data involves the selection and organization of the information to be analyzed. This means selecting relevant, quality information. For this reason, Taylor and Bogdan (1987) recommend careful, close, continuous reading and re-reading of the data in order to gradually reflect on them, classify them, measure them, and establish themes, concepts, categories and relationships.

3.4.1 Identification of segments with inductive code generation

ChatGPT was also of use in identifying relevant fragments in the text, based on our research question, through the prompt below (Figure 10). An exploration of possible associated codes was also included in the prompt so that it could provide ideas for setting up the system of categories and for starting the categorization and coding process.

ChatGPT Prompt:

Review the text. (1) Extract all portions addressing the following research question “What are the challenges posed by the introduction of artificial intelligence (AI) in the education system?” (2) Generate codes that best represent the excerpts identified. Each code should be from two to five words. Provide a code for each extract. List each excerpt along with its suggested code.

Figure 10. Example of a prompt for identifying segments and creating initial categories.

Source: Own elaboration.

The results are shown in Figure 11 below:



-  ChatGPT
1. **Excerpt 1:**
 - **Code:** Privacy Concerns
 - **Excerpt:** "In the educational context, concerns about data privacy and security are paramount. With AI systems collecting vast amounts of student data, there are significant risks of privacy breaches and unauthorized access to sensitive information."
 2. **Excerpt 2:**
 - **Code:** Bias and Discrimination
 - **Excerpt:** "Another challenge is the potential for AI algorithms to perpetuate bias and discrimination. If these algorithms are trained on datasets that reflect societal biases, they may inadvertently reinforce existing inequalities in education."
 3. **Excerpt 3:**
 - **Code:** Accessibility Issues
 - **Excerpt:** "Accessibility is a major concern when integrating AI into education. Not all students have equal access to technology, and there is a risk that relying too heavily on AI-driven tools could exacerbate existing disparities in access to quality education."
 4. **Excerpt 4:**
 - **Code:** Ethical Dilemmas
 - **Excerpt:** "Ethical dilemmas also arise with the use of AI in education. For example, there are questions about the appropriate use of student data, the transparency of AI algorithms, and the implications of relying on AI for tasks traditionally performed by human educators."
 5. **Excerpt 5:**
 - **Code:** Teacher Training
 - **Excerpt:** "A significant challenge is ensuring that teachers are adequately trained to integrate AI tools into their teaching practices. Many educators may lack the necessary skills and knowledge to effectively leverage AI for educational purposes."

Figure 11. Identification of excerpts based on a research question, with proposed codes.

Source: Own elaboration.

As seen earlier, the information can be obtained in tabular format by adding an additional request to the system or by including it in the initial prompt (Figure 12).

 ChatGPT

Code	Excerpt
Privacy Concerns	"In the educational context, concerns about data privacy and security are paramount. With AI systems collecting vast amounts of student data, there are significant risks of privacy breaches and unauthorized access to sensitive information."
Bias and Discrimination	"Another challenge is the potential for AI algorithms to perpetuate bias and discrimination. If these algorithms are trained on datasets that reflect societal biases, they may inadvertently reinforce existing inequalities in education."
Accessibility Issues	"Accessibility is a major concern when integrating AI into education. Not all students have equal access to technology, and there is a risk that relying too heavily on AI-driven tools could exacerbate existing disparities in access to quality education."
Ethical Dilemmas	"Ethical dilemmas also arise with the use of AI in education. For example, there are questions about the appropriate use of student data, the transparency of AI algorithms, and the implications of relying on AI for tasks traditionally performed by human educators."
Teacher Training	"A significant challenge is ensuring that teachers are adequately trained to integrate AI tools into their teaching practices. Many educators may lack the necessary skills and knowledge to effectively leverage AI for educational purposes."

Figure 12. Table generated through an additional instruction to organize excerpts and codes into two column. Source: Own elaboration.

3.4.2 Identification of segments on the basis of already established codes

Adopting a theory-oriented or deductive analytical approach, it is also possible, for example, to request the identification of excerpts that respond to a code and a prior definition established by the researcher (Figure 13 below).

ChatGPT Prompt:
 Extract quotes from the data offering insights into “personalized learning” within the framework of AI integration in the education system. “Personalized learning” in the context of AI integration involves tailoring educational experiences to individual students’ needs, abilities and interests, and leveraging technology to optimize engagement and learning outcomes.

Figure 13. Example of a prompt for generating category definitions. Source: Own elaboration.

3.5 Category definition

Another task that ChatGPT can carry out is to define categories for research. For example, focusing on excerpts previously identified by the researcher, we requested the software to write a definition of a code based on the empirical data and to provide an example. In this type of task, the relevant excerpts need to be entered in ChatGPT, and a prompt of this type can be used (Figure 14):

Figure 14. Example of a prompt for generating category definitions

The result is shown in Figure 15 below:



ChatGPT

Definition:

"Ethical dilemmas" refer to moral conflicts or issues arising from the introduction of artificial intelligence (AI) in the educational system, where ethical principles, values, or concerns are at stake.

Example:

One example from the excerpts is the discussion about the potential biases and discrimination perpetuated by AI algorithms in educational settings. For instance, the concern raised about algorithms reinforcing stereotypes or limiting access to opportunities based on biased data.

Segments that might not fit:

Some segments discussing the benefits of AI in education, such as enhancing personalized learning experiences or improving educational outcomes, might not directly address ethical dilemmas. While these segments are relevant to the broader discussion about AI in education, they do not specifically focus on the moral conflicts or ethical concerns associated with its introduction.

Figure 15. Results of a prompt for generating category definitions

3.6 Generating themes

Following a systematic process of analysis, we can ask ChatGPT to review the categories and generate themes based on them. In the context of qualitative data analysis, a theme can refer to any recurring concept, idea or pattern relevant to the research objective that is identified in the data. These themes may represent key ideas or concerns, shared experiences or any other significant feature found in the data that can be systematically analyzed and categorized to better understand the phenomenon under study.

Themes can be explored in an initial synthesis of the documents (interviews, diaries, focus groups, etc.; see section a) and can also be constructed from a code listing provided by ChatGPT (section c).

In the following example, we generated themes from a list of codes. First, four documents were analyzed (UNESCO, 2019; 2021; 2022; 2023), requesting the generation of codes and identification of excerpts that answered the research question: "How does the integration of artificial intelligence (AI) affect the education system in terms of equity, accessibility and quality of education?" ChatGPT produced a

total of 20 codes with their corresponding excerpts. Figure 16 below shows part of the list created:

Excerpts	Codes
The integration of artificial intelligence in education can improve equity by offering personalized resources for students with different needs.	Equity Improvement
AI can increase educational accessibility by providing adaptive learning tools that cater to each student's preferences and abilities.	Adaptive Learning
Educational quality can be enhanced through the use of AI to analyze student performance data and provide instant, personalized feedback.	Quality Enhancement
Introducing AI in the classroom could level the playing field for students of diverse abilities and socioeconomic backgrounds.	Leveling Effect

Figure 16. Example of excerpts and categories provided by ChatGPT

Based on this information, we wanted the program to propose themes representing different aspects of how the integration of artificial intelligence affects equity, accessibility and quality in education (Figure 17).

ChatGPT Prompt:
 Categorize codes leading to development of themes addressing the following research question: "What are the risks and benefits of the introduction of artificial intelligence (AI) into the education system?" Each theme should be from two to five words.

Figure 17. Example of a prompt for generating themes. Source: Own elaboration.

It should be remembered, once again, that the researcher will always have to examine, verify and analyze the results to make sure that the categories emerging in each of the themes are relevant.

The result is shown below:

Theme	Codes
Equity Enhancement	Equity Improvement, Leveling Effect, Democratization, Learning Gap Reduction, Needs Identification
Accessibility Advancement	Adaptive Learning, Online Accessibility, Special Needs Support, Rural Access, Mobile Accessibility
Quality Improvement	Quality Enhancement, Objective Assessment, Interactive Learning, Student Retention
Personalization Promotion	Personalized Learning, Individualized Learning, Adaptive Platforms
Language Barrier Mitigation	Language Barrier

Figure 18. Table resulting from a prompt for generating themes. Source: Own elaboration.

With a few additional instructions, ChatGPT can provide a more complete table, including third and fourth columns with illustrative excerpts and the source document (Figure 19).

Theme	Codes	Excerpts	Document
1. Equity Enhancement	Equity Improvement	"AI promotes equity by providing personalized learning experiences tailored to each student's needs."	Document 1
	Leveling Effect	"The introduction of AI helps level the playing field by offering resources and support to underprivileged students."	Document 2
	Democratization	"AI in education leads to the democratization of knowledge, making high-quality learning accessible to all."	Document 3
	Learning Gap Reduction	"One of the benefits of AI integration is the reduction of learning gaps among students, ensuring equal opportunities for all."	Document 4
	Needs Identification	"AI systems excel in identifying individual student needs, allowing educators to provide targeted support."	Document 5

Figure 19. Table resulting from a prompt for generating themes and linking them to analytical units. Source: Own elaboration.

4. Findings

Our findings on the usefulness and limitations of ChatGPT in qualitative analysis, resulting from the exploration of the application's versatility, are discussed below.

The first observation was that the use of this tool in qualitative analysis is particularly helpful in the initial stages of analysis, when approaches are brought into play that help us summarize the data and start the processes of categorization, thematization and coding of the analytical units. AI tools like ChatGPT are useful because they can quickly turn large segments of text into numbered or bullet points, which can make it easier to understand and process the information in the dataset. Thus, although it is clear that it is important to use tools like ChatGPT with great caution, we found it interesting that the debate on these strategies, rather than focusing on whether their analyses may become superior to human ones, centers on the investment of time needed to start using them and on comparing results in diverse ways. Precisely at the current moment, when the postmodern and post-experimental movements have caused qualitative research to bring increasing attention to bear on new forms of creation such as literary texts, rhetoric, art, narratives, and visual and multimodal approaches to data analysis (Denzin & Lincoln, 2018), the iterative querying of a dataset using AI tools becomes interesting not only to aid interpretation but also for researchers to advance their understanding and representation of the phenomena studied.

However, it is also clear that directly copying the ChatGPT prompts used in this study would not always be the most effective strategy. In fact, the generation of outputs and their quality involves a back-and-forth engagement with the data that requires multiple iterations and the design of multiple prompts (adjusting them as necessary) as the data is explored. This highlights the importance of using ChatGPT as it is; i.e., a chatbot: a tool that enables us to iteratively converse with the data and to explore it in order to refine and improve the results it provides as we progress to deeper levels of qualitative analysis.

At this point, we should also mention the differences between the free and paid versions of ChatGPT, as well as between versions 3.5 and 4.0. The small-scale study described here also stresses the importance of testing these different versions and

specific features of ChatGPT when interpreting and analyzing results, since these will always be different and more or less refined depending on the version used. Similarly, as AI-assisted research gains more importance in tandem with the exponential growth of online information, it also poses challenges in terms of assessing the quality and reliability of the data gathered, which in turn means that the researcher needs extensive training and should maintain a constantly critical awareness of automatically generated outputs. In fact, the tool itself points out in its interface that “ChatGPT can make mistakes. Consider checking important information” (OpenAI, 2023). Hence, it is recommended to avoid depending on it and the results it generates.

Furthermore, we would also emphasize the need to thoroughly explore and study one’s own qualitative data rather than relying solely on the analysis generated by ChatGPT. It is absolutely necessary for researchers to read, re-read, explore and study their data, making use of the literature, memos, diagrams, art, design, and all the approaches at their command for manually seeking relationships, labelling, categorizing, etc., and at the same time comparing these with automatically generated outputs. Therefore, in qualitative analysis under no circumstances would we recommend carrying out analytical procedures solely with AI and copying and pasting the results into a report. As always, qualitative analysis requires us to go far beyond what emerges on the surface of the data.

Lastly, we wish to close this section by highlighting the importance of experimentation and creativity when using and testing ChatGPT in qualitative analysis. The more different functionalities one asks of the tool by exploring its various functions (emojis, graphs, tables, etc.), the richer and more interesting the exploration of the data will be, the more the tool will adapt to the specific needs of the study, and the more closely it will conform to the ontological and epistemological perspective of the researcher. The most relevant results depend on the approach and the queries of the person behind the data; a person who needs to adopt an active attitude of exploration and ongoing learning rather than relying on the automated results of prompts.

5. Conclusions and discussion

In the light of the above, we should not fail to mention that in this study we have collected only a few non-exhaustive examples of prompts for using ChatGPT in analyzing qualitative data, and that these can and should be adapted on the basis of the capacity and flexibility of the system, which currently can be used to generate new scenarios in a wide variety of tasks and projects.

Whatever approach is adopted, what we propose here is essentially that the use of AI involves strategies and methods, some of which may be automated and perhaps faster, and that these strategies and methods should continue to be seen as sensitive activities, always demanding engagement with the data, and not as a set of ready-made AI procedures that lay out the route for us to take. Thus, in all cases, we should be aware that the results offered by AI are not the outcome of a cognitive or argumentative process of comprehension of the documents in our study corpus, but that they vary depending on statistics of word usage, organized by algorithms using predictive mathematics without understanding the meanings of the words. Consequently, when using AI we should exercise great caution, always insuring monitoring by the researcher.

Furthermore, it would be meaningless to use AI for its own sake, or because it is fashionable or simply because it exists. Indeed, these are the real risks we may run if we let ourselves be over-impressed by the ever-expanding range of AI potentials. These can be interpreted as an easy route to qualitative research, without thinking seriously about what they can offer us either as researchers or for the particular study at hand. As researchers (in training or otherwise), we should be aware of the increasingly wide range of possible methods, learn from them and continue to ask ourselves why we wish to use a particular tool, what kind of data or insights it can provide in relation to our research objectives; what degree of veracity is ensured by the results yielded, how we can check the information we obtain, etc. Likewise, it is essential to bear in mind that, despite the advantages that these tools offer, we should be aware that AI models are not infallible or fully reliable and may inherit biases from the data, algorithms or interpretations with which they are constantly trained.

The rapid evolution of AI and its creative potential in various fields (Sánchez-Santamaría & Olmedo, 2023), including both text creation and art forms like painting

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and music, is not only producing a fundamental change in our way of seeing activities that until now were the preserve of human beings but also raises legal and regulatory issues related to copyright, intellectual property and authorial rights. In particular, the application of AI to text analysis may entail the processing and reinterpretation of copyrighted material, which therefore involves both ethical and legal issues. The automated nature of content generation by artificial intelligence systems can further complicate the delineation of responsibilities and due attribution of authorship. Hence, it is crucial to develop clear protocols for the use of protected data and for safeguarding intellectual property rights in the field of academic research. This will ensure not only regulatory compliance but also integrity and transparency in the production and dissemination of scientific knowledge. In the current context of exponential technological advances, it is essential that we should remain abreast of the field in terms of legal and regulatory developments in copyright and intellectual property and the editorial policies of the journals in which research is published.

In relation to the above, it should be remembered that in December 2023 the European Parliament passed the Artificial Intelligence Act (AI Act), which will go into force in May 2025, with the aim of regulating the uses and risks arising from the use of AI. Among the obligations it sets out, this law requires risk assessment and reduction, transparency and precision when reporting AI-assisted procedures, and constant human supervision.

In conclusion, this study has provided detailed insight into the use of AI (which generates responses that reflect the conditional probabilities of word sequences based on learned statistical patterns) in qualitative research, through its practical application to the analysis of the official discourse of organizations such as UNESCO, a body that has particularly recommended bringing attention to bear on the lack of regulation of the use of data and the ensuing ethical issues that need to be addressed by society (UNESCO, 2023). As we have seen, these analytical AI tools enable progress in line with the most recent and, in many ways, diverse developments in qualitative research. At the same time, we face multiple unresolved ethical issues and challenges relating to the veracity, privacy and security of data, which should be addressed by establishing practices and policies that protect rights and the privacy of information while at the

same time harnessing the potential of AI technologies for qualitative data analysis. For this reason, it is necessary to thoroughly review the conditions and implications behind the use of these tools in order to ascertain to what extent it is possible and advisable.

6. Bibliography

- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77-101. <https://doi.org/10.1191/1478088706qp063oa>
- Denzin, N. K., & Lincoln, Y. S. (2018). *The SAGE handbook of qualitative research*. Sage.
- European Council (2023). ChatGPT in the public sector – overhyped or overlooked? https://www.consilium.europa.eu/media/63818/art-paper-chatgpt-in-the-public-sector-overhyped-or-overlooked-24-april-2023_ext.pdf
- Gao, A. (2023). Prompt engineering for large language models. *SSRN*. <https://dx.doi.org/10.2139/ssrn.4504303>
- Hamilton, L., Elliott, D., Quick, A., Smith, S., & Choplin, V. (2023). Exploring the use of AI in qualitative analysis: a comparative study of guaranteed income data. *International Journal of Qualitative Methods*, 22, 1-13. <https://doi.org/10.1177/16094069231201504>
- Krippendorff, K. (2018). *Content analysis: an introduction to its methodology* (4th edition). Sage.
- Lopezosa, C., & Codina, L. (2023). *ChatGPT y programas CAQDAS para el análisis cualitativo de entrevistas: pasos para combinar la inteligencia artificial de OpenAI con ATLAS.ti, Nvivo y MAXQDA*. Universitat Pompeu Fabra. Departament de Comunicació. <http://hdl.handle.net/10230/55477>
- Mason, J. (2018). *Qualitative researching*. Sage.
- Miles, M. B., & Huberman, A. M. (1994). *Qualitative data analysis: an expanded sourcebook*. Sage.
- Miles, M. B., Huberman, M., & Saldaña, J. (2020). *Qualitative data analysis: a methods sourcebook* (4th edition). Sage.
- Sandín Esteban, M. P., & Sánchez Martí, A. (2024). A case study in artificial intelligence-assisted qualitative analysis: The use of ChatGPT prompts with UNESCO texts. *Revista Catalana de Pedagogia*, 26, 38-63. <https://doi.org/10.2436/20.3007.01.209>

- OpenAI (2023). ChatGPT 3.5 [artificial intelligence model]. <https://openai.com/chatgpt>
- Sánchez-Santamaría, J., & Olmedo, E. (2023). El despertar de la inteligencia artificial: implicaciones para la competencia investigadora en educación. *Aula Magna 2.0*. <https://cuedespyd.hypotheses.org/13719>
- Tabone, W., & De Winter, J. (2023). Using ChatGPT for human-computer interaction research: a primer. *Royal Society Open Science*, 10(9), article 231053. <https://doi.org/10.1098/rsos.231053>
- Taylor, S. J., & Bogdan, R. (1987). *Introducción a los métodos cualitativos de investigación*. Paidós.
- United Nations (2023a, May 3). El debate de la ética de la IA no es tecnológico sino social. <https://news.un.org/es/interview/2023/05/1520557>
- United Nations (2023b, July 26). Un informe sobre educación aconseja un uso adecuado de la tecnología en las escuelas. <https://news.un.org/es/story/2023/07/1522972>
- United Nations (2023c, September 7). Un niño debe tener al menos 13 años para empezar a utilizar la inteligencia artificial en las aulas. <https://news.un.org/es/story/2023/09/1523892>
- United Nations (2023d, November 8). El poder de la inteligencia artificial y sus desafíos en el marco de las Naciones Unidas. <https://unric.org/es/el-debate-de-la-inteligencia-artificial-en-la-onu>
- United Nations Educational, Scientific and Cultural Organization (UNESCO) (2019). *Beijing Consensus on artificial intelligence and education. Outcome document of the International Conference on Artificial Intelligence and Education: "Planning education in the AI era: Lead the leap"*. <https://unesdoc.unesco.org/ark:/48223/pf0000368303>
- Miao, F., & Holmes, W. (2021). *International forum on AI and the futures of education: developing competencies for the AI era (7-8 December 2020). Synthesis report*. United Nations Educational, Scientific and Cultural Organization (UNESCO). <https://unesdoc.unesco.org/ark:/48223/pf0000377251>

United Nations Educational, Scientific and Cultural Organization (UNESCO) (2022). *International forum on AI and education: ensuring AI as a common good to transform education (7-8 December 2021). Synthesis report.* <https://unesdoc.unesco.org/ark:/48223/pf0000381226>

United Nations Educational, Scientific and Cultural Organization (UNESCO) (2023, June 8). *Una encuesta de la UNESCO revela que menos del 10% de las escuelas y universidades disponen de orientaciones formales sobre IA.* <https://www.unesco.org/es/articles/una-encuesta-de-la-unesco-revela-que-menos-del-10-de-las-escuelas-y-universidades-disponen-de>

United Nations Educational, Scientific and Cultural Organization (UNESCO) (2023, October 16). *La inteligencia artificial en la educación.* <https://www.unesco.org/es/digital-education/artificial-intelligence>

United Nations Educational, Scientific and Cultural Organization (UNESCO) (2023a). *International Forum on AI and Education: Steering AI to Empower Teachers and Transform Teaching.* <https://unesdoc.unesco.org/ark:/48223/pf0000386162?locale=en>

United Nations Educational, Scientific and Cultural Organization (UNESCO) (2023b). *ChatGPT and artificial intelligence in higher education.* UNESCO. <https://unesdoc.unesco.org/ark:/48223/pf0000385146>

Zhang, H., Wu, C., Xie, J., Lyu, Y., Cai, J., & Carroll, J. M. (2023). Redefining qualitative analysis in the AI era: utilizing ChatGPT for efficient thematic analysis. arXiv 2309.10771. <https://doi.org/10.48550/arXiv.2309.10771>