Effectiveness of Humanities Research using AI: Testing the tools for text processing

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Abstract. The advent of Artificial Intelligence has introduced significant changes in numerous fields, including those within the humanities. The integration of digital tools has revolutionized research processes by offering new methods for idea creation, material location and archiving, project preparation, text analysis, and dissemination. This article evaluates the effectiveness of AI tools for text processing in humanities research, focusing on the potential for these tools to enhance the efficiency and integrity of academic endeavors. Through a methodology that juxtaposes manual analysis with AI-assisted processes, this study systematically investigates a range of free AI tools, examining their strengths and weaknesses, and performs a SWOT analysis to assess their application within humanities research contexts. Using thematic articles relating to teamwork and team roles as the basis for this study, the research navigates through a seven-step strategy, from concept grouping to the construction of text, highlighting both conceptual connections and standalone ideas. The outcome of this exploration is a carefully considered deliberation on the reliability of these tools, taking into account their limitations, including ethical implications, while also emphasizing their considerable benefits. The findings indicate that despite the constraints of free versions, AI tools can be valuable and reliable aids for humanities scholars, supporting their research goals while also underscoring the necessity for a responsible approach to their use.

Keywords. AI tools, Humanities, Text processing

1. Introduction

Digital tools offer new possibilities and affordances for humanities researchers and their use has become common and significant [1]. These tools are used to create ideas; locate and archive materials; prepare projects; analyze and write texts; and disseminate work [2]. Broadly, humanities researchers use different sets of digital tools in their research and are willing to use new tools if they prove useful [3].

In recent decades, the pervasive integration of Artificial Intelligence (AI) technologies has catalyzed transformative changes across various facets of human endeavors. From business operations to healthcare delivery, educational practices to scientific research, the utilization of AI has surged, reshaping traditional paradigms and unlocking unprecedented opportunities for innovation and efficiency.

Several AI tools for academic use have emerged, including for text processing, and are increasingly used, but the nature of how AI-generated texts should be combined with human inputs is still being defined [4]. These tools can increase efficiency and time saving, assist planning, studying and writing, but they also present dangers to academic integrity [5].

In this sense, the present investigation aimed to 1) investigate and evaluate a diverse range of free AI tools available for humanities research; 2) examine the advantages and disadvantages inherent in the

utilization of AI tools for humanities research, elucidating the potential benefits and limitations; 3) conduct a systematic comparison of selected AI tools, employing rigorous criteria to assess their performance, user-friendliness, and efficacy in addressing research objectives within the humanities domain and 4) perform a comprehensive SWOT (Strengths, Weaknesses, Opportunities, Threats) analysis of the identified AI tools, highlighting their respective strengths, weaknesses, opportunities for enhancement, and potential threats to adoption and implementation in humanities research contexts. To this end, samples of selected papers were used and participants tested differences between manual text processing and AI assisted process. We found that, despite the limitations of free versions, the tools studied are useful and reliable, but we also raise ethical concerns about their use.

2. Methodology

Considering that the accuracy of using AI tools as a method to analyze articles and write texts is still difficult to measure, the approach used in this study is based on a human-manual level of analysis and compared to the results obtained in the AI assisted process, as described in this section.

Throughout the process, fortnightly meetings took place between the student-participants and the supervising professor, in a dialogue and reflective process.

2.1 Manual Analyses

In order to start the research, a set of articles were defined as the subject of this research based on the thematic of teamwork and team roles, considering the collectiveness of the development of this study. The articles were divided into three groups and each student-participant worked with a group of selected articles. After an initial reading of the articles and preparation of initial notes, a seven-step strategy was discussed and defined, as presented below.

1. Group articles according to concepts (reading abstract);
2. Scanning articles – creating the order of articles;
3. Getting main ideas and similarities and differences;
4. Systematisation of topics for further development;
5. Going deeper into the topics in relevant articles;
6. Construction of the text on various topics;
7. Implication to the goal of the research.

Initially, the papers were grouped according to concepts discussed on each of them, such as the concept of team work and its branches and the effectiveness of team players on task solving. Once the groups were made, the need of creating the order reading the selected literature took place. For that, the method of scanning articles was used to establish a logic to the reading process.

Once this process had started, it was necessary to extract the main ideas, the similarities and differences on the articles based on each group, alongside with building a systematization of topics that were discussed on each paper. Thinking about how this topic could be developed even further, a more thoughtful reading into relevant topics in the articles was applied aiming for clarity on the implication to the goal of the research.

Once the systematization was completed following the written steps of this section, the article's analysis was now processed by the AI tools.

2.2 IA analyzes

To test the use of AI tools, several tools were first selected to evaluate their potential uses. After that, each student-participant tested the tools using the same seven-step strategy, and made notes on how the tools responded and what results were generated.

When it comes to the usability of the tools, each of them focus on some aspects of the research. For instance, Scholarcy reads and summarizes articles, reports, and book chapters in order to help the user to keep up with the latest research and quickly assess how relevant any document is to your work and it also identifies key information and breaks data down into relevant categories. Jenni, on the other hand, is an AI-powered text editor to write, edit, and cite. The user can enter the theme and the tool presents snippets of text with fonts. ChatPDF can make comparisons with the uploaded articles by the user, enabling them to group and build a systematization on the research steps chosen for the analysis. Scispace extracts information from each article and organizes it in a table, facilitating comparison between articles, as well as allowing you to ask questions for a set of papers.

Based on the manual analysis process, it was shown that not all of the selected tools were really useful for carrying out the research steps. Some tools were more appropriate for some steps, and other tools were capable of generating results for all steps. The results of the AI tools were then compared with the manual analyses.

3. Results

The table below shows whether the tools were able (plus sign) or not (minus sign) to perform the steps.

Tab. 1 - Performance of AI tools.

	Steps						
AI tools	1	2	3	4	5	6	7
ChatPDF	+	+	+	+	+	-	-
DeepL Write	-	-	-	-	-	+	+
EinBlick	-	-	-	+	+	-	+

Explain Paper	-	+	+	+	+	-	-
Jenni	-	-	+	+	+	+	-
Open Read	+	+	-	-	+	-	+
Scholarcy	-	+	+	+	+	-	+
Scispace	+	-	+	+	+	+	-

The results presented by the AI tools can be considered in terms correct and reliable compared to the manual approach as it matches in aspects of the results on the traditional approach. The caveat on this usage is that all the tools presented limitations of the free versions, whether limits on generated words or on article uploads, creating some difficulty to prove that this kind of analysis is as close to accuracy as the manual steps.

Some of the tools used could perform all the seven steps used in the manual research, but in case of some others, it was not possible to run a full analysis due to the limitations of the free version tier, as in Jenni's case. On the other hand, ChatPDF was able to perform all the steps but had a limitation on the amount of uploaded articles. The other tools were more useful for some of the planned steps. That indicates that, depending on the researcher's objectives, it would be more interesting to gather a set of multiple tools to build the required systematization of the text processing.

Although the results could be considered correct and reliable at some point, differences in style were observed. As an example, the results generated by a few tools showed a more generic result, while a few others can bring the topic with more detailed inputs with greater or lesser presentation of concepts. The way in which the tools were demanded also influenced the results generated, which indicates the importance of the researcher having prior knowledge about what they want to find in the articles selected for analysis.

In cases where the tools provide a chat to interact in order to obtain answers to the performed questions, it's necessary to understand - and also practice - the types of prompts that are applied, specially for the free version tier. Creating generic questions, such as "what's the methodology for the result" can provide a shallow explanation of this section of the article. On the other hand, asking "why was this methodology used for this article" can result in a depth of context and the reason for that approach considering the benefits and its limitations.

In these terms, there is a need to understand what are the benefits, limitations and other hiccups of using these sorts of tools. For that, a SWOT (Strengths, Weaknesses, Opportunities and Threats) report was ran for all methods used in this research, as it follows:

Manual

- S - Provide accuracy and is focus on the researcher objectives of reading
- W - Time consuming and sometimes language barriers
- O - Enables the research to strengthen their academic abilities
- T - The researcher might focus in one sort of analysis

ChatPDF

- S - Provides answers about a group of articles, interrelating them
- W - The free version has limits on uploading articles
- O - Helps understand the relationship between different articles
- T - Need to know what to ask to avoid leaving elements out

DeepL Write

- S - Give examples and synonyms, more strict and contextualized translation
- W - It's in the beta phase, it might contain errors, and I can't translate big texts as whole articles.
- O - Helps in understanding big concepts/ideas of the text based on context and improve our writing.
- T - Misuse based on not trying to understand what is in the text

EinBlick

- S - we can ask for charts, graphics, sheets only by inserting the data of our research
- W - linked to the "Databricks platform", in a way that it is not possible to say whether it will retain the same functions
- O - save time on the creation of visual elements for the articles
- T - the main focus of this tool was "exact sciences' such as IT.

Explain Paper

- S - Concise and directly - "Straight to the point), Exhibit "Related Resources/references" in the "Explain" feature.
- W - Chat feature is paid and we can't compare articles or create folders/groups.
- O - Identify and comprehend main topics, search further and make new connections
- T - Not updating and restricting the user based on user type, double-work, since only by highlighting the correct part will you get good results.

Jenni

- S - Enables user to interact with chat to provide deeper answers
- W - Limit on characters for the answer
- O - Investigate more of each section
- T - Not updating and restricting the user based on user type

Open Read

- S - variety of features, such as paper navigator, paper espresso (a summary of the main topics on the article), chat and notes.
- W - limited free plan and on Paper Express feature do not cite exactly where the info is, compared with Chat pdf
- O - find related paper feature which redirected you to that article and give you the percent of relation
- T - Not updating and restricting the user based on user type

Scholarcy

- S - Free user is pretty complete and provide a general idea of the article
- W - Doesn't break into most used sections for researches
- O - Bring other articles to complement
- T - Not updating and restricting the user based on user type

Scispace

- S - Extracts information from each article and organizes it in a table
- W - Difficulties in linking articles together
- O - Makes it easier to compare information between articles
- T - Provides texts with more generic and less detailed characteristics

During the testing of the AI tools, it was possible to identify different applications, which were grouped into six topics presented below.

1. To identify, search and select parts within articles: the tools help to summarize and extract concise information to check whether or not that article will be useful for a research.
2. To find articles related to a research in question: use of specific terms with the correct terminology and long-tail searches, many tools such as Open Read and Explain Paper have this function, including demonstrating the possible level of correlation that article may have with a research.
3. To understand: AI can help with the understanding and the explanation of concepts, theories and general ideas, as well as identifying the correct terminology that will later affect the writing.
4. To make comparisons between articles and/or general concepts: some tools make it possible to compare articles, showing commonalities and differences, always guided by the specific prompts in chat.
5. To elaborate visual elements: graphics, charts, tables, flowcharts with the purpose to analyze and exhibit the data found.
6. To organize and systematize: the tools can help in dealing with the quantity of information found by organizing all the results.

4. Conclusions

The tests demonstrated that AI tools can be powerful aids in the study process but could hardly, at the current stage of development, completely automate text processing. When it is considered that each tool has its strengths and weaknesses, a mixed approach seems to be the most advantageous and capable of improving final production, considering the usage of these tools as an extra effort for research in humanities.

As strengths, we can highlight that AI tools are time-saving, easy to use, and present reliable results. The main weaknesses are the limitations of the free versions. AI tools are an opportunity to complement studies, find insights, and better understand conceptual relationships, but they can also be a threat to learning, as the attempt to automate text analysis and writing procedures, completely replacing the traditional reading of articles, decreases the scope of learning.

There must be great responsibility and care when using such tools in the context of academic research. Certainly the use of this type of technology will not be strictly prohibited or restricted, but knowing how AI works and how to use it to assist in the effectiveness of research without compromising the validity of the information is indeed a challenge.

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