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Generative AI Chatbot for Engineering Scientific Journal

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Keywords:

AI Chatbot, AI training, FAQs, Scientific Journal Helper.

Highlights:

- Generative AI as a good tool for Scientific journals.
- AI demonstrates its ability to surpass linguistic and spelling errors in inquiries.
- The question should be asked in the simplest form.
- The necessity of human interaction to complement AI work is emphasized, especially in dealing with complex cases.
- The responses of artificial intelligence vary from good and incorrect responses to indirect answers and answers that need to be edited and improved.

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Abstract: This study focuses on exploring the potential of artificial intelligence as an alternative, effective, and user-preferred tool for answering inquiries, compared to traditional methods such as FAQs or email and ticketing systems. The study highlights how AI can enhance efficiency and accuracy in processing and responding to inquiries from readers, authors, and reviewers, by providing immediate and customized answers based on the analysis of information available on the journal's website and the data fed to the chatbot. Through in-depth discussions and an analysis of the inquiries received over a full six months, totaling about 3000 inquiries, the study demonstrates the good ability of the chatbot to understand complex inquiries and provide satisfactory answers. The study indicates that chatbots can reduce the workload on editorial teams of scientific journals by automating responses to routine inquiries, allowing staff to dedicate more time to editorial and academic tasks. One of the key aspects of training is teaching the chatbot to provide correct answers to various inquiries and to avoid responding to negative or redundant inquiries. The research explores the challenges of applying AI in this context, including the need to train smart models to understand specific academic language and ensure accuracy in responses, as well as addressing privacy concerns and data security. The importance of designing flexible and adaptable AI systems to meet the diverse requirements of different scientific journals and their users is emphasized. The study concludes that artificial intelligence is a promising tool for improving the interaction between academic journals and their communities, offering an effective alternative to traditional systems. It highlights the necessity for ongoing research and development to enhance AI capabilities. Notably, the AI tool currently lacks a direct method for correcting its wrong answers, which is one of the most effective learning tools used by parents to correct their children's answers. One of the key recommendations of the study is that AI training should be conducted in stages.

روبوت درشة الذكاء الاصطناعي التوليدي للمجلة العلمية الهندسية

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الخلاصة

تركز هذه الدراسة على استكشاف إمكانات الذكاء الاصطناعي كأداة بديلة وفعالة ومفضلة لدى المستخدم للرد على الاستفسارات، مقارنة بالطرق التقليدية مثل الأسئلة الشائعة أو أنظمة البريد الإلكتروني والتذاكر. تسلط الدراسة الضوء على كيف يمكن للذكاء الاصطناعي تعزيز الكفاءة والدقة في معالجة استفسارات القراء والمؤلفين والمراجعين والرد عليها، من خلال تقديم إجابات فورية ومخصصة بناءً على تحليل المعلومات المتاحة على موقع المجلة والبيانات التي يتم تغذيتها إلى برنامج الدردشة الآلي. ومن خلال مناقشات متعمقة وتحليل للاستفسارات الواردة على مدار ستة أشهر كاملة، والتي بلغ مجموعها حوالي 3000 استفسار، توضح الدراسة القدرة الجيدة لروبوت الدردشة على فهم الاستفسارات المعقدة وتقديم إجابات مرضية. وتشير الدراسة إلى أن روبوتات الدردشة يمكنها تقليل عبء العمل على فرق التحرير في المجالات العلمية من خلال أتمتة الردود على الاستفسارات الروتينية، مما يسمح للموظفين بتخصيص المزيد من الوقت للمهام التحريرية والأكاديمية. أحد الجوانب الرئيسية للتدريب هو تعليم الشات بوت تقديم إجابات صحيحة لمختلف الاستفسارات وتجنب الرد على الاستفسارات السلبية أو الزائدة عن الحاجة. ويكشف البحث تحديات تطبيق الذكاء الاصطناعي في هذا السياق، بما في ذلك الحاجة إلى تدريب النماذج الذكية لفهم لغة أكاديمية محددة وضمان الدقة في الإجابات، فضلاً عن معالجة مخاوف الخصوصية وأمن البيانات. تم التأكيد على أهمية تصميم أنظمة ذكاء اصطناعي مرنة وقابلة للتكيف لتلبية المتطلبات المتنوعة للمجلات العلمية المختلفة ومستخدميها. وخلصت الدراسة إلى أن الذكاء الاصطناعي أداة واعدة لتحسين التفاعل بين المجالات الأكاديمية ومجتمعاتها، مما يوفر بديلاً فعالاً للذكاء الاصطناعي. الأنظمة التقليدية. ويسلط الضوء على ضرورة البحث والتطوير المستمر لتعزيز قدرات الذكاء الاصطناعي. والجدير بالذكر أن أداة الذكاء الاصطناعي تفتقر حالياً إلى طريقة مباشرة لتصحيح إجاباتها الخاطئة، وهي إحدى أدوات التعلم الأكثر فاعلية التي يستخدمها الآباء لتصحيح إجابات أبنائهم. إحدى التوصيات الرئيسية للدراسة هي أن التدريب على الذكاء الاصطناعي يجب أن يتم على مراحل.

الكلمات الدالة: درشة الذكاء الاصطناعي، تدريب بوت الذكاء الاصطناعي، الأسئلة المتكررة، مساعد المجالات العلمية.

1. INTRODUCTION

Research and the review of research work have undergone a big shift, largely due to the advent of artificial intelligence (AI) tools. At its core, AI refers to systems or machines that exhibit intellectual capabilities similar to the human ability, such as learning, understanding, and reasoning. In the context of academic research and evaluation, AI signifies an evolving revolution, offering vast new opportunities to enhance efficiency, improve accuracy, and broaden access to high knowledge. One of the most notable uses of AI in academia is in handling inquiries from researchers and evaluators. AI systems, particularly those using deep learning, can understand and process natural language, allowing them to deliver detailed, well-referenced answers to complex questions. This capability is vital for quickly providing researchers with the information they need and for improving the quality of scientific research by offering more accurate and specialized data and references. Furthermore, the use of AI significantly improves the process of research evaluation. By automating the analysis of texts and data, AI can provide preliminary assessments of scholarly work, helping to accelerate the review process and increase its reliability due to its ability to process vast amounts of information with precision in a short time. This does not replace the crucial role of human experts in evaluating research but supports them with tools that enhance their efficiency and effectiveness. However, applying AI in this field comes with challenges, including issues related to privacy, data security, and the need to develop models that consider the nuanced and complex nature of academic research. Ensuring

the ethical use of AI and maintaining transparency in its application is paramount to fostering trust and acceptance among the academic community. In essence, the integration of artificial intelligence into academic research and evaluation demonstrates the potential of technology to augment human capabilities and transform traditional processes. As AI technologies continue to evolve and mature, their role in supporting researchers and evaluators is expected to grow, promising a future where access to knowledge is more streamlined, and the quality of research is continually enhanced. The integration of AI in scientific journal publishing is a transformative movement shaping the landscape of research and communication. This emerging paradigm leverages AI tools and technologies to streamline the publication process, enhance the quality of published research, and democratize access to scientific knowledge. AI applications in scientific journals encompass various functions, from automating manuscript screening to detecting plagiarism and facilitating peer review. These tools can significantly reduce the time from submission to publication, allowing research findings to be disseminated more rapidly. Furthermore, AI can assist in ensuring the integrity and reproducibility of scientific work by identifying inconsistencies or errors that may be overlooked by human editors. However, the incorporation of AI into scientific publishing also raises important ethical and practical concerns. Issues such as transparency, accountability, and the potential bias of AI algorithms must be addressed to maintain the

credibility and integrity of scientific literature. Journals and publishers are thus faced with the dual task of leveraging AI to improve the efficiency and accessibility of research while safeguarding the principles of scientific inquiry and ethics. The debate around the use of AI tools like ChatGPT in scientific publishing underscores the delicate balance between innovation and adherence to established scientific standards. As outlined in Nature, the integration of AI into scientific workflows demands clear guidelines to ensure that research remains transparent, reproducible, and true to the ethical foundations of science. There are very few studies that discuss the application of artificial intelligence in scientific journals, and they are almost non-existent according to the researcher's knowledge of the use of AI for responding to researchers' inquiries [1-5]. In summary, the use of AI in scientific journals represents both an opportunity and a challenge. It offers the potential to enhance the publication process and make scientific knowledge more accessible, but it also necessitates careful consideration of ethical standards and the integrity of research. As this technology continues to evolve, the scientific community must navigate these complexities to harness the benefits of AI while upholding the values of scientific discovery. To the researcher's knowledge, there are no

scientific journals that use artificial intelligence, but some global journals and publishing houses, such as Elsevier, have started issuing guidelines for researchers and reviewers regarding the restrictions that must be followed when using artificial intelligence, look to:-

- [The use of generative AI and AI-assisted technologies in writing for Elsevier](#)

- Elsevier: How to Review [Generative AI](#)

2.AI CHAT WITH AUTHORS AND REVIEWERS

Many websites offer a service to add an AI-powered chatbot to various sites. Although these sites have made good progress in developing this tool by leveraging user feedback, the focus has mostly been on e-commerce websites, showcasing products, marketing processes, and responding to customer inquiries. The current paper presents the unique and innovative experience of the Tikrit Journal of Engineering Sciences in this field.

-AI Assistant to chat with authors and reply to authors and reviewer questions by TJES
The Tikrit Journal of Engineering Sciences has started using the chatbot provided by Tawk after adding it to the journal's website, as shown in the figures below.



Fig. 1 TJES AI Chatbot.

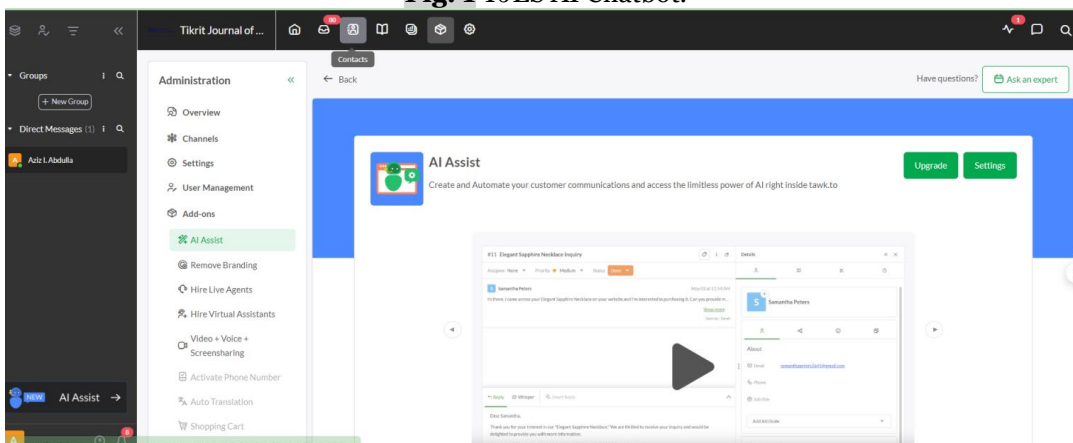


Fig. 2 Tawk AI Assistant.

The bot is fed information about the journal in the following ways:

- 1- **Short Description:** The short description helps AI assist in understanding your business or website better.
- 2- **Base Prompt:** The base prompt is what guides your AI to answer on your behalf, so the journal manager is explicit in telling it how to behave. The default prompt is:
 - If the message is an inquiry, could you answer the message only with information?
 - If unsure about an inquiry's answer, state that your knowledge is limited to this scientific's specific information.
 - If you have multiple questions, please answer them one by one.
 - Refuse to tell jokes.
 - Reply using the user's preferred language.

The TJES add the following according to user feedback:

- If someone asks whether we have articles in a specific category or on a topic, even if we do not have any yet published, but it is in the categories, advise whether they can be accepted and for more information please visit the author guidelines to see the journal categories: <https://tj-es.com/guide-for-authors-copy/>
- If someone asks about the status of an article or manuscript, advise him as to how he can check the status of the article by visiting: <https://tj-es.com/track-your-article/>
- Say sorry to any request about money transfers, financial transactions, bank checks, ... etc.

The journal provides the AI with the specializations it accepts, but one of the specializations may be accepted within the journal's scope, yet there has been no published research within this specialty so far; therefore, the above modification was added. Since the journal has not fed the AI with the status of the research because the referral of research continuously changes from evaluation to requesting modifications, and also because some of these steps are confidential and cannot be fed into the AI, the above modification was added. Any request related to financial transactions, methods of transfer, and banking information should be declined for an answer. Thus, journals should exercise caution to avoid extortion, money laundering, and other suspicious transactions or providing any information that may facilitate such activities.

- 3- **Data Source:** Combined with the Base Prompt, your AI Assist will only answer

questions based on the information you provide. The journal can use Knowledge Base as a data source and/or write or paste plain text. Note: Garbage in, Garbage out. So feed your AI Assist with relevant information, just as you would when training a real human.

"Garbage in, garbage out" is a phrase commonly used in computing and information technology to express the idea that poor-quality input will inevitably produce poor-quality output. If inaccurate or bad data is entered into a system, the results or output will be unreliable and incorrect. This concept underscores the importance of ensuring high-quality, accurate data is used, particularly in systems relying on data for decision-making, analysis, or operations. It highlights the foundational principle that the integrity and quality of output are directly tied to the quality of the input. There are five types of data sources as shown in Table 1.

3. TEST OF AI

The editor can proofread the AI Chatbot before or after its launch for use, and for each data source separately. In case of an error in the answer, the solutions are as follows:


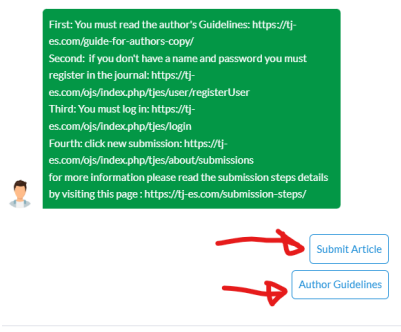
First: Monitoring where the bot retrieved the answer from (Click data source under the bot answer) and going to the page from which the bot fetched and edited the information, which is the best method.

Second: If the first method is not possible, resort to the following solutions:

- The shortcut method and placing a specific answer for several questions.
- If the bot reads information from the site, and the page includes the right answer, it is necessary to monitor the information that the bot reads and modify it from within the AI site because sometimes the bot does not read all the information available on the page.
- Create a CSV file containing necessary information from questions and answers or items and prices, etc.
- Creating or adding to the text files that were fed to the bot.

Questions about the status of the manuscript (under review, revisions required, accepted, rejected, etc.) were the top priority for authors. The status of the manuscript depends on the journal's management system as there is information that should not be disclosed to authors, such as reviewers' names. For example, the OJS system provides a CVS file with details of the status and history of the manuscript. Therefore, journal administrators should update this file and periodically upload it to the chatbot's database so that the bot can respond to authors' inquiries about the status of their manuscript.

Table 1 Tawk AI Data Source.

No.	Data source	item	Description	Example	note
1	Plain Text:	Plain text	plain text can include Q&A or general information	Did the journal have a FAQs page? -Yes please visit the following page: https://tj-es.com/faqs/	
2	Upload document	File and/or files	upload text or CSV file including plain text and/or Q&A.		
3	Shortcuts (shortcuts can be used to create perfect Q&A, by monitoring the AI answers, and in case of a defect in the answer, a shortcut is created.)	Name Answer element -Ticket Form -suggested message -file Actions -transfer chat -change tags Add questions	 <p>Add a button the reader can click on to get details and answers.</p> <p>Upload file (image, document, etc.)</p> <p>Transfer to a section editor or editor by adding a tag.</p> <p>The tag action in the shortcut feature allows you to categorize and organize your shortcuts for easier sorting and finding in the dashboard. By using tags, you can group related shortcuts together based on specific criteria, making it easier to manage and access them when needed. This can help you streamline your workflow and quickly find the right shortcut for a specific type of inquiry.</p> <p>Up to 4-question</p>	<p>-APC-Discount - TJES gives a discount for high-quality articles and well-known authors, for more information please visit: https://tj-es.com/publication-fee/</p>  <p>Is there any discount in APC? How much APC discount? How much APC discount for a well-known author?</p>	
4	Knowledge Base: Select specific categories as a data source.	Select or create pages.			
5	Website URL: AI will crawl your website and extract data automatically	Website and/or any page inside the website	AI Assist can amplify your responses by utilizing content from websites you specify.	www.tj-es.com www.tj-es.com/ojs up to 2-URL and can pay to increase it.	

4.MANY QUESTIONS FOR ONE ANSWER

The AI chatbot operates on the principle of one answer to several questions. For example:

The answer:

The researcher must submit three files from the initial research. The first represents the entire research and does not contain the names of the researchers or any information about them. The second called the title page, is the first page of the research with all the information about the researchers, the abstract, the keywords, and the highlights. The researcher must also submit a cover letter to the editor that includes the general and specific fields of study, and the main idea of the research and suggests three

reviewers for the journal to benefit from in subsequent research and to be able to determine the exact specialty of the research. This answer could be for several questions such as:

*How many files must the researcher submit to the journal?
What are the contents of the cover letter?
What does the title page contain?
What does the complete research file contain?
Does the research file contain information about the researchers?
Is it necessary to suggest reviewers?
Why suggest reviewers?
Will the research be sent to the same suggested reviewers?*

What information is required about the suggested reviewers?

Thus, there are a large number of questions for one answer.

Despite AI surpassing spelling and grammatical errors and also incomplete questions, it

sometimes provides incorrect answers due to the overlap of multiple questions for the same answer and the impossibility of feeding the AI with all possible questions for a specific answer. Example of AI answer: Table 2. List the type of answers

Table 2 Example of AI answer (Please ignore spelling of grammarian error in question).

No.	Type Q	A
1	Do you know the current Citescore of the journal?	TJES CiteScore 2022= 1.1, Q3, last update 8-June 2023. For more details, please visit the journal page in Scopus or see the footer of the journal homepage.
2	What does citescore mean? Or What is the meaning of CiteScore?	CiteScore is a metric that provides a comprehensive, transparent, and current view of a journal's impact. It is calculated by dividing the number of citations received in a given year by the number of documents published in the previous three years. This metric is used to assess the citation impact of journals and is provided by Scopus.
3	When was the TJES first published?	TJES was first published in 1994. If you have any more questions or need further assistance, feel free to ask.
4	How many issues are published each year? Did TJES publish 10 articles per year?	The journal publishes 40-60 articles per year, but the journal is planning to increase this number in 2024. If you have any more questions or need further assistance, feel free to ask.
5	How can I submit the article? or how can anyone submit research? Or Give me the steps to submit the article.	First: You must read the author's Guidelines: https://tj-es.com/guide-for-authors-copy/ . Second: if you don't have a name and password you must register in the journal: https://tj-es.com/ojs/index.php/tjes/user/registerUser Third: You must log in: https://tj-es.com/ojs/index.php/tjes/login Fourth: click new submission: https://tj-es.com/ojs/index.php/tjes/about/submissions for more information please read the submission steps details by visiting this page: https://tj-es.com/submission-steps/
6	Is this journal Q2 or Q4? Or I think TJES on Q2?	TJES CiteScore 2022= 1.1, Q3, last update 8-June 2023. For more details, please visit the journal page in Scopus or see the footer of the journal homepage.
7	Can I send my paper without formatting? TJES accepts articles not printed in journal format.	No, the article should be written according to the TJES template. The article should adhere to the stylistic and bibliographic requirements outlined in the Author's Guidelines.
8	Is there only one round of review? Or How many rounds of review before accepting?	The peer review process for manuscripts submitted to TJES involves multiple rounds of review, as it is a double-blind peer review system. This process helps ensure the quality and integrity of the published articles.
9	Is TJES a journal from Malaysia?	TJES is not a journal from Malaysia. It is published by the College of Engineering at Tikrit University, Iraq.
10	What is the time for the first decision for TJES? Or Duration to first decision? Or What is the review duration? Or What are the acceptance rates?	Please see the journal insight on the following page for information about the time to first decision: https://tj-es.com/journal-insights-2/
11	How can I complete the publication fee? How can I pay the fees?	For information on how to complete the publication fee, please visit the following link: https://tj-es.com/publication-fee/
12	Is this journal listed in SCIMAGO? Is this journal listed in Clarivate?	I'm sorry, but I don't have information about the journal's listing in SCIMAGO. For the most accurate and up-to-date information, please visit the SCIMAGO website or the journal's official website.
13	Is there a special issue at the moment?	I'm sorry, but I don't have information about any special issues at the moment. For the latest updates on special issues or themed topics, I recommend visiting the official website of the Tikrit Journal of Engineering Sciences or contacting the editorial office directly. If you have any other questions or need further assistance, feel free to ask.

Correcting the correct to the more correct or more detailed. The bot corrects the correct answer to a more correct answer if requested to do so by the users, as in the following example.

[10:16] V1706051335551179: what are the stylistic requirements?

[10:16] Tikrit Journal of Engineering Sciences AI has joined the conversation

[10:16] Tikrit Journal of Engineering Sciences AI: The stylistic requirements for the Tikrit Journal of Engineering Sciences can be found in the author's guidelines. You can access the guidelines at the following link: <https://tj-es.com/guide-for-authors-copy/>

[10:17] V1706051335551179: what are the stylistic requirements?

[10:17] Tikrit Journal of Engineering Sciences AI: The stylistic requirements for the Tikrit Journal of Engineering Sciences can be found in the author's guidelines. You can access the guidelines at the following link: <https://tj-es.com/guide-for-authors-copy/>

[10:19] V1706051335551179: I don't know what you mean by the stylistic requirements.

[10:20] Tikrit Journal of Engineering Sciences AI: The stylistic requirements refer to the specific formatting and writing style that authors need to adhere to when submitting their manuscripts to the Tikrit Journal of Engineering Sciences. This includes guidelines for formatting, referencing, and other stylistic elements. For detailed information, please refer to the author guidelines at the following link: <https://tj-es.com/guide-for-authors-copy/>

After about three hours, the question was asked again by another user and from another computer, and the result was as follows:

[13:13] V1706195637856777: what are the stylistic requirements?

[13:13] Tikrit Journal of Engineering Sciences AI has joined the conversation

[13:13] Tikrit Journal of Engineering Sciences AI: The stylistic requirements for the Tikrit Journal of Engineering Sciences include using 1.5 spacing, a 12-point font, and an A4 paper. Additionally, it is important to use either American or British spelling throughout the manuscript. All figures and tables must be placed within the text at the appropriate points, rather than at the end.

[13:17] V1706195637856777: tell me more

[13:17] Tikrit Journal of Engineering Sciences AI: For more detailed information on the stylistic requirements, you can visit the author guidelines to see the specific journal categories and the stylistic requirements for each category. You can find the author guidelines at the following link: <https://tj-es.com/guide-for-authors-copy/>

5.CONCLUSIONS

Several important conclusions can be drawn about using AI as an effective tool in responding to inquiries from readers, authors, and reviewers in scientific journals:

- 1- AI can be a powerful and effective tool in the field of scientific research and academic communication, provided that it is continually improved and updated to meet evolving challenges and needs.
- 2- Effectiveness in Handling Linguistic and Spelling Errors: AI demonstrates its ability to surpass linguistic and spelling errors in inquiries, facilitating communication with visitors who may have difficulties in accurately formulating their questions.
- 3- Artificial intelligence can alleviate the burden on the editorial teams of scientific journals by automating responses to routine inquiries, allowing staff to dedicate more time to more complex and important editorial and academic tasks.
- 4- Capability to Handle Multiple Inquiries with One Answer: AI can provide a comprehensive answer that serves multiple questions, increasing the efficiency of responding to visitor inquiries and reducing the need for repeated information.
- 5- Challenges in Addressing Complex and Overlapping Inquiries: AI faces difficulties in dealing with complex inquiries that may overlap in different subjects for the same answer, sometimes leading to inaccurate responses.
- 6- Need for Improved Feedback Mechanisms and Updates: The importance of updating AI databases and feedback mechanisms to ensure accurate and up-to-date answers is highlighted, especially in a field characterized by constant change like scientific research.
- 7- Challenge in Covering All Possible Inquiries: Despite AI's ability to process a large number of inquiries, it still faces the challenge of covering all possible questions for a specific answer due to the current limitations of machine learning technologies and databases.
- 8- Relative Importance of Human Interaction: The necessity of human interaction to complement AI work is emphasized, especially in dealing with complex cases or inquiries requiring

qualitative assessment or in-depth analysis.

- 9- The challenges of applying artificial intelligence, include the need to train smart models to understand specific academic language and ensure accuracy in responses, in addition to privacy concerns and data security. The research emphasizes the importance of designing flexible and adaptable AI systems that can meet the varying requirements of different scientific journals and the needs of their users.
- 10- The responses of artificial intelligence vary from good and incorrect responses to indirect answers and answers that need to be edited and improved.
- 11- The question should be asked in the simplest form, and if there is doubt that the bot did not understand the question, the question should be reformulated more clearly.
- 12- There was no delay in the response, so the time it takes for the bot to answer can be considered negligible.
- 13- Most of the researchers' questions over the past six months have focused on checking the status of their research and the timeframes required for acceptance and publication. In second place were questions about how to submit a manuscript to the journal and what files are required, while questions about publication ethics were very rare.

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