

SciSpace for Finding Relevant Literature in English Language Education Contexts: A Technology Review

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ABSTRACT

Writing a literature review part might be a challenging task for university students as they have to sit for some time to find recent literature that is closely relevant to their research topics. In that case, the authors spot the potential of utilizing *SciSpace*, Artificial Intelligence technology, to support the students in their literature review activities. In this study, the authors aim to review the potential benefits and challenges of using *SciSpace* to find recent literature relevant to students' research topics, framed under the task engagement principles. To achieve that study goal, the authors used a recent technology review approach to do the review and conducted rigorous peer debriefing activities to ensure that the review results are credible and trustworthy. The review results showed the benefits of using *SciSpace*, which included fostering task authenticity, maintaining students' interest, facilitating social interaction, supporting autonomy, and providing effective scaffolding. Meanwhile, the challenges of using *SciSpace* involved content accuracy and relevance, updating tailored content, handling complex queries and visuals, and offering context-specific feedback. Recommendations for maximizing the application's potential include improving content filtering, expanding interactive features, and providing specialized feedback. Future research agendas also are presented.

Keywords: academic writing, AI tools, EFL teaching, *SciSpace*, task engagement,

INTRODUCTION

In higher education contexts, such as those in English Language Education Programs, academic writing is an important skill to master by students before they write their research proposal, start their actual research, collect their research data, write their undergraduate thesis, and eventually finish their study (Mali, 2023b). Among various aspects of academic writing, writing a literature review part might be a challenging and boring task for students as they have to sit for some time to find recent literature that is closely relevant to their research topics (Mali, 2022; Mali, 2023a; Wang & Yang, 2012). Writing a sound literature review is essential to show students' deeper understanding of perspectives and discourses in the previous studies related to their study (Suryatiningsih, 2019). In that case, the authors see the potential of utilizing Artificial Intelligence (AI) technology, namely *SciSpace* to support the students in finding the literature for their writing. In this study, the authors aim to explore *SciSpace* and discuss the benefits and challenges of using the technology. The results of the review should provide lecturers or university students with a thorough understanding of using *SciSpace* to find recent literature relevant to students' research. Discussions and ideas



presented in this study should also benefit university students or researchers who are working on the literature review of their research proposals, theses, and articles they wish to publish in academic journals. The authors will continue with a brief literature review providing a general overview of *SciSpace* and discussing task engagement principles that the authors use to review the technology.

LITERATURE REVIEW

General Overview of the Scispace

SciSpace (<https://typeset.io>) is AI generated platform that has been named as one of the must-go-to literature sources, especially in academic reading and scientific writing (Jain et al., 2024; Pinzolit, 2023; Roy et al., 2024; Sagre & Ahlawat, 2023; Souifi et al., 2024; Wu et al., 2023). It compiles ample writings from scholars' research of various fields of study to serve as a literature library — with metadata of 200 million+ papers and 50 million+ Open Access full-text PDFs for other researchers to refer to. As a derivative of its 2015 parent AI platform, *Typeset* (<https://typeset.com>), *SciSpace* was built by Shaikiran Chanda and Shanu Kumar to fill the gaps of an essential need for a purpose-built workspace that enables researchers, publishers, and institutions to collaborate and work efficiently, automate repetitive tasks, and discover information quickly (PubGenius, 2024). Not only does it cleverly pull out the related literature as the keywords and commands are inputted, but it also provides a summary, explanation, and framework of the literature, which then connects it to other relevant papers (Pinzolit, 2023; Giglio & Costa, 2023; Sagre & Ahlawat, 2023).

With its simple and versatile look, the *SciSpace* white background homepage only includes the necessary buttons to cohort with relevant AI tools such as *Copilot* (Roy et al., 2024; Souifi et al., 2024), *Literature Review*, *Paraphraser*, and *Citation Booster*. The access is free for basic service (Souifi et al., 2024), with options for premium service at certain prices and terms. The simplicity helps users, especially students, navigate the machine easily and facilitates reading and writing activities (Pinzolit, 2023). The platform also includes articles on updated trends in digital technology and various AI platforms, as well as current issues in academic reading and writing skills.

Task engagement principles

In the context of English Language Teaching (ELT), it is necessary for teachers to constantly create captivating classroom tasks so that students can fully benefit from the opportunities presented to them (Mali, 2024a, 2024b). Egbert (2020) defines a task as an iterative process with a specific goal and objective, aiming to produce a clear outcome. Since tasks are inherently iterative, teachers are required to devise tasks that engage students to avoid boredom. Engagement has been understood as classroom participation and attainment, which aim to improve achievement (Finn & Zimmer, 2012; Trowler, 2010). Egbert and Shahrokni (2018) described six main principles of task engagement. They are 1) *authenticity*, where tasks help students connect to their real lives; 2) *social interaction*, where tasks promote collaboration with peers, teachers, experts, or others; 3) *interest*, holding students' deep interest and integrating their interests into tasks; 4) *autonomy*, giving students control over their learning based on their needs and preferences; and 5) *effective scaffolding*, offering timely feedback when needed; 6) *learning support*, perceived as sufficient support through available resources, clear and attainable goals, ample time, and feedback, typically from teachers but also from peers and experts. With these principles in mind, the authors aim to explore how far *SciSpace* can meet the engagement principles so that the technology can help the students make their literature review process engaging and successful experiences.

METHOD

This study explored the potential benefits and challenges of using *SciSpace* to find recent literature relevant to students' research topics. To achieve that goal, the authors adapted Santosa's (2023) technology review approach to provide an in-depth exploration of a

technology application. More specifically, the authors reviewed features that *SciSpace* has, provided images or screenshots of the features to support the review descriptions, and used the theory (i.e., the task engagement principles by Egbert & Shahrokni, 2018) as a framework for the review. The authors then conducted peer debriefing activities (by Ary et al., 2019) to ensure the quality of the review results. Practically, the first (W) and second author (A) wrote the review according to the schedule arranged by the third (C) author of this study. Then, C read closely the reviews made by W and A several times and gave some feedback for improvement. W and A then discussed the feedback with C and revised the review based on the feedback. The fourth author (N) then made a final check on the revised review, and necessary revisions were made. Figure 1 displays the peer debriefing activities done by the authors.

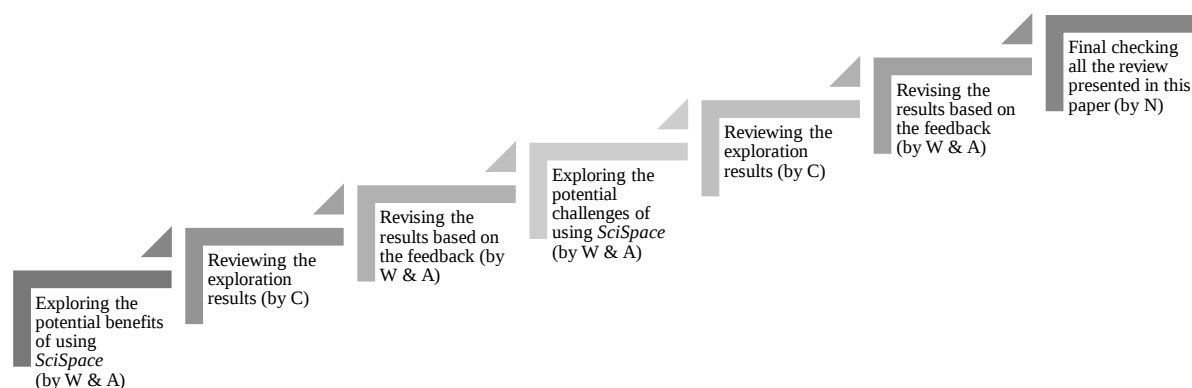


Figure 1. The peer debriefing stages

With this rigorous peer-debriefing activity, the authors are confident that the review results presented in the next sections are credible and trustworthy.

FINDINGS AND DISCUSSION

Potential benefits of using the application for EFL teaching

Authenticity

Embodying *authenticity* (Egbert & Shahrokni, 2018), *SciSpace* helps users connect to their real-world issues and foster self-efficacy by providing necessary information and data to the users in a matter of seconds. Reading and writing an academic paper requires an extensive amount of effort, time, and competency for literature research, which often feels daunting to some. By typing keywords and questions, *SciSpace* will generate all papers the machine thinks are relevant. The table of all papers generated by the machine is located at the bottom and is completed with insight and summarized abstracts. In a separate section on the top, the top five papers' insights are compiled and composed into a passage that includes the blue superscript numbers linked to the related paper.

Experimenting using *SciSpace*, a question with the keywords "What is the literature review for the use of *SciSpace* in academic writing?" is typed in. In the beginning, *SciSpace* only lists 20 papers, but it generates 130 papers the machine thinks are relevant to show in the table. Some have insights and summarized abstracts, but some have none. A passage of insights from five top papers is also included, with references marked with blue superscript numbers linked to the related paper in the table. The passage helps users save time and effort in collecting all the papers. Meanwhile, the insights and summarized abstracts help users screen and review the relevant papers. *SciSpace* has proven its authenticity, which helps users connect to their real-world issues and fosters self-efficacy.

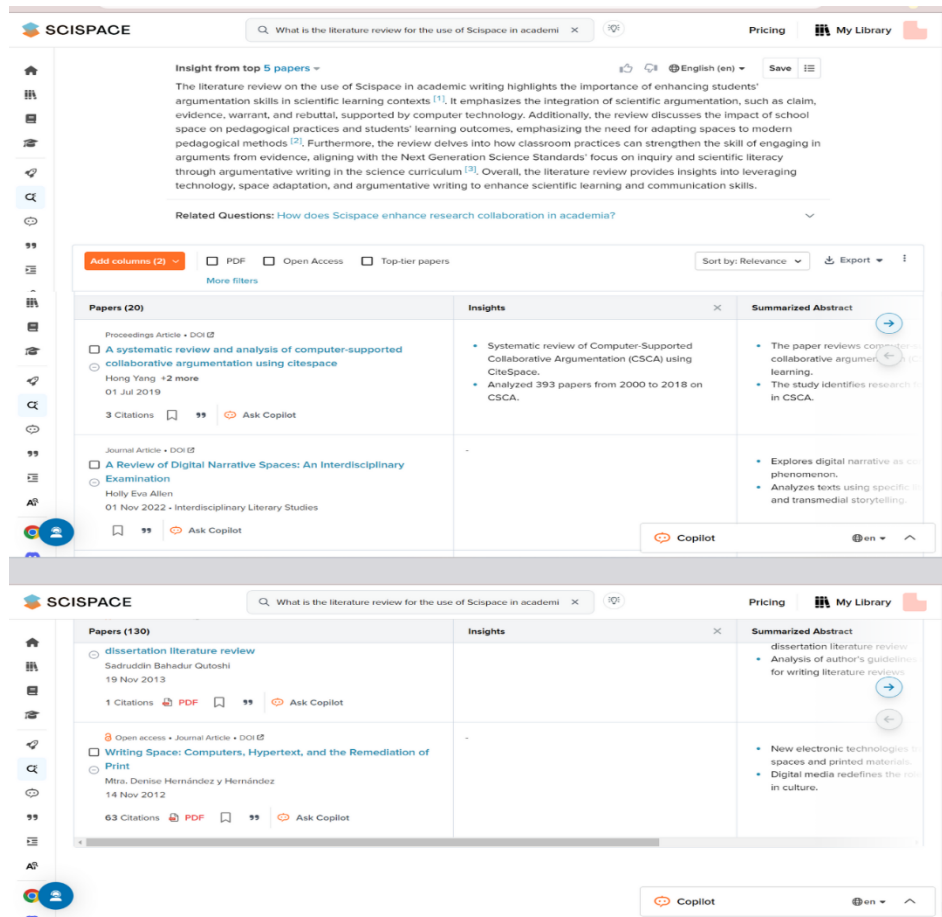


Figure 2. A question is typed in the search bar, resulting in a paragraph of insight

Interest

SciSpace has been armed with features that keep users' deep interest while integrating their interests into tasks (Egbert, 2020; Egbert & Shahrokni, 2018). Users can find relevant journal papers available online in *SciSpace* literature sources by typing keywords. Users can also simplify and extract the gist and excerpts of papers they own simply by uploading the pdf file, and *SciSpace* will read and work on the writing. Its *Paraphraser* feature is also available for users to personalize the original wordings. All in light of managing users using the platform at its best.

SciSpace also provides more features that invite users to adopt *SciSpace* as the primary tool that users use in both writing and reading academically. *Citation Booster* and *Citation Generator* features are available, providing in-text citation and citation references compelling to various standards and styles from APA 6 to MLA. Users can also store their papers in the *Library* feature, import them from *Zotero* (<https://www.zotero.org/>), and write their thoughts in the *Notebook* feature. With its *Academic AI Detector* feature, *SciSpace* acknowledges other tools that utilize deep learning AI, such as *Quillbot* (<https://quillbot.com/>), *ChatGPT* (<https://chatgpt.com/>), *AskJenni* (<https://jenni.ai/>), and other related tools. It allows users to check if any of those tools generated their text. *SciSpace* also provides a *Discord* (<https://discord.com/>) feature at the bottom of the display for communicative users who want to dialogue with others.

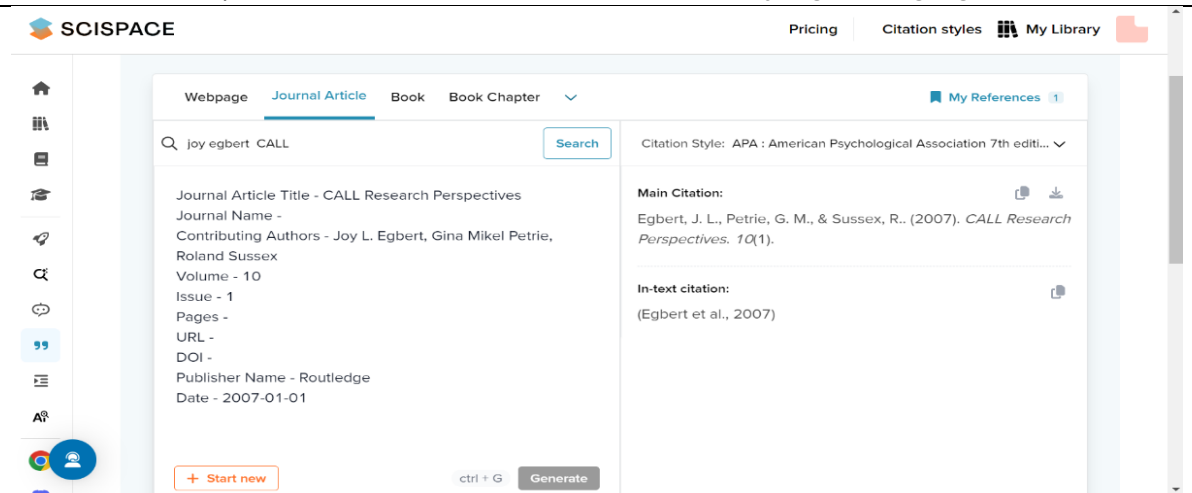


Figure 3. More features in SciSpace

Social Interaction

Egbert (2020) suggested that users' preferences must be considered when integrating social interaction into tasks. In *SciSpace*, users' preferences can be accommodated through questions students can ask within the platform. For example, if users want to know the process of second language acquisition between individuals, they can type a question in the *literature review* feature, such as "How does the process of language acquisition differ between individuals?" *SciSpace* then provides suggestions for several journal articles related to this topic. Users can further refine their search by selecting specific fields of interest related to second language acquisition.

Collaboration can be fostered through interactive features. In *SciSpace*, this is facilitated by the "Ask Question on PDF" feature, which allows users to upload their downloaded journals and pose questions related to their documents. Additionally, users can take advantage of the *Copilot* feature, an AI tool that explains or summarizes highlighted text. The *Copilot* feature responds to instructions in the right-hand column, and users can engage further by asking additional questions based on the information provided.

Autonomy

From searching journal articles to paraphrasing, *SciSpace* provides autonomy for its users. The most significant tool in *SciSpace* to support autonomy is the *SciSpace Literature Review*, which users can fully control. They can easily ask questions related to their interest, and *SciSpace* will suggest closely matched journal articles. To narrow down the search, users can click on "PDF" to display PDF-formatted journal articles, "Open Access" to show free journal articles, or "Top-Tier Papers" to highlight articles published in reputable journals. Additionally, the "Sort By" button allows users to organize search results based on specific criteria, such as relevance or alphabetical order.

SciSpace offers a feature to help users easily identify the most relevant journal articles by providing descriptive columns. These columns include suggested journal articles based on the search, with summaries of each article's content. Users can further customize their view by adding extra columns from various categories, allowing for more detailed options based on their preferences.

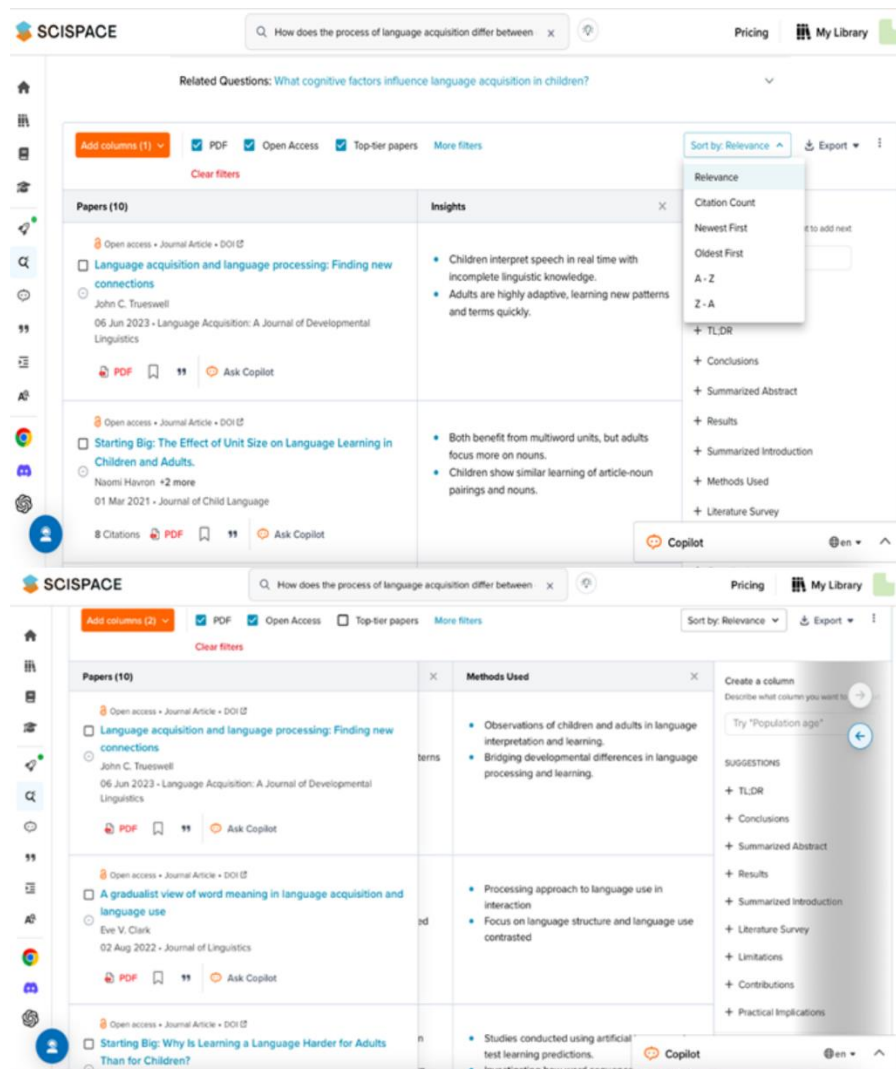


Figure 4. SciSpace literature review feature

Effective scaffolding

In scaffolding, the *SciSpace AI Paraphrasing Tool* can provide valuable feedback to users' writing. *SciSpace* claims that its paraphrasing tool is more advanced than its competitors, allowing it to rewrite text in a more human-like manner rather than sounding mechanical. The tool offers '*just in time*' feedback through its fast process, providing users with immediate paraphrasing recommendations. Although the tool does not explain why certain sentences need to be paraphrased, it encourages users to evaluate whether to accept the suggestions critically.

Potential challenges of using the application for EFL teaching Authenticity

Despite *SciSpace's* attempt to foster *authenticity* (Egbert, 2020; Egbert & Shahrokni, 2018), to help users connect to their real-world issues and foster self-efficacy by providing necessary information and data to the users in a matter of seconds, it does not guarantee that the suggested papers from the search are appropriately and correctly relevant to the topic. The machine generously interprets the keywords inputted and includes data across various fields of study and research with those nuances. The abundance of generated information might challenge users' reading competency, cognitive skills, and critical thinking.

As shown in Figure 1, from 130 titles of papers provided in the list, only a few are relevant and fit the keywords' context and goals. The original goal is to find the papers to answer this question, "What is the literature review for the use of *SciSpace* in academic writing?". However, the machine includes numerous papers under the keywords *space*,

writing, and literature review, resulting in misleading data generation. For example, listing a paper that discusses a different platform named *CiteSpace*, <https://citespace.podia.com/>, is an alarming error that users must filter and scrutinize before finally deciding to use the papers. Good-quality critical thinking management is crucial to apply (Darwin et al., 2024).

Interest

As a result of the above, *SciSpace* might struggle to provide content that meets users' interests and goals individually. With users coming from diverse backgrounds and evolving research areas, it is a considerable challenge for *SciSpace* to keep the content continuously updated and relevant, specifically tailored to individual users' unique needs and preferences (Roshanaei et al., 2023). When experimenting with the author's name, as shown in Figure 2, compared to other platforms or deep learning AI, *SciSpace* fails to generate more references than expected. *SciSpace* needs a remarkable amount of data to accommodate and maintain individual users' interests in using its service.

Even though the simplicity of *SciSpace*'s interface aims to help users stay interested, engaged, and focused on their tasks, it might also become a caveat for some users, especially the young ones. Young digital users' characteristics are more interested in eye-pleasing and interactive platforms and will perform better task engagements by working on a colorful, motioned -not static- platform. This proves a real challenge for *SciSpace* to stay versatile to all users with different levels of competencies, fields of study, and age.

Social interaction

Egbert (2020) emphasizes social interaction as the ability of learners to engage with fluent target language speakers, topic experts, and students in other locations. As such, this implies that an app must facilitate real-world interactions that feel as natural as human interactions. To evaluate the social interaction capability, we use the *Ask the PDF* feature by uploading a journal article titled "*ChatGPT as an AI L2 Teaching Support: A Case Study of an EFL Teacher*" (Octavio et al., 2024) and posing several prompt questions.

Our prompt questions ranged from basic inquiries, such as the content of the abstract, the methodology used, the participants involved, and the study results, to more advanced queries requiring information not directly available in the journal article. For instance, we asked, "*In which part of the journal article can this statement (copy of the statement) be found?*", "*What are the teachers' (participants') perspectives on the use of ChatGPT?*", and "*Who is the most frequently mentioned name in the references?*"

The results indicated that the AI feature responded accurately to inquiries directly addressed within the journal article. However, it faltered with more complex prompt questions, such as "*Who is the most mentioned name in the references?*" The feature suggested an incorrect name. When we further inquired about the name, the feature responded that it was not discussed in the paper.

In conclusion, regarding *SciSpace* as a social interaction facilitator, the feature works well for questions related to the uploaded journal article. However, it exhibits limitations when handling prompt questions requiring information beyond the article's content. Although the feature provides recommended questions that generally yield good answers, custom-tailored questions sometimes result in false information or an inability to provide answers.

Autonomy

First, *SciSpace*'s flexibility in structure is a limitation in facilitating autonomy. In the "*Ask the PDF*" feature, most suggested queries are predefined templates based on standard research paper sections (e.g., abstract, introduction, method, results, and discussion). While these templates cover common research paper components, some writers might prefer innovative formats or custom queries that suit their specific needs. For instance, they may need to include additional methodological details, extended literature reviews, or

supplementary materials that are not part of the standard template. The rigid templates can hinder such customizations.

Second, the handling of visual and graphic elements is another limitation. The *Copilot* feature in *SciSpace* cannot respond with charts, tables, or graphics. This is restrictive for writers who prefer their query responses to be presented in these formats. Additionally, the graphical interface of *SciSpace* is predefined, preventing users from adding tools or altering the layout within the platform or in their papers. This inflexibility can be a significant drawback for researchers who need unique formatting for their research papers.

Effective scaffolding

The "*paraphrasing*" feature in *SciSpace* tends to provide generic feedback rather than context-specific advice. Academic writing, particularly at the postgraduate level, often involves sophisticated arguments, specialized terminology, and complex theoretical frameworks. While generic feedback might highlight surface-level issues such as grammar, punctuation, or stylistic consistency, it often fails to grasp the deeper context of the work. For instance, an automated system might flag a sentence as unclear or awkward without recognizing that the terminology used is standard within a specific field or that the sentence structure is necessary to convey a complex idea accurately.

Additionally, *SciSpace* may lack access to all the necessary resources or databases that academic writers require for their research. This limitation can affect the platform's ability to offer extensive support, as writers depend on a wide range of reference materials, including specialized journals, books, and proprietary databases, to gather evidence, build arguments, and stay updated with the latest developments in their fields. Suppose *SciSpace* does not integrate with certain databases or lacks access to up-to-date and comprehensive research materials. In that case, users may need to supplement their work with additional resources from outside the platform.

CONCLUSION AND RECOMMENDATIONS

This paper has reviewed the potential benefits and challenges of using *SciSpace* to support students in finding recent literature relevant to their research topics in a more engaging way. The benefits include fostering task authenticity by connecting students to real-world issues, maintaining interest through various engaging features, facilitating social interaction via collaborative tools, supporting autonomy with customizable literature review options, and providing effective scaffolding with advanced paraphrasing tools. These potentials of collaboration, autonomy, and personalized learning have also been recognized by the reports and guides issued by governments such as the UK and the US Department for Education and world organizations such as UNESCO (Cardona et al., 2023; The Open Innovation Team and Department for Education, 2024; Miao & Holmes, 2023).

Meanwhile, the challenges are related to the accuracy and relevance of generated content, maintaining updated and tailored content to meet diverse user needs, handling complex queries and visual elements, and providing context-specific feedback. These challenges are closely related to the nature of Generative AI which has long been recognized as 'black boxes' in which their inner workings are not transparent or explainable, and thus users cannot determine where and how their outputs are determined and generated, and they often produce unexpected or undesired results (Miao & Holmes, 2023). In addition, Generative AI such as *SciSpace* largely depends on its training datasets, and thus it may generate outputs that are biased or outdated because it simply does not have the relevant, specific, or up-to-date datasets in its system (Cardona et al., 2023; Miao & Holmes, 2023).

To maximize *SciSpace*'s potential, specifically for English as a Foreign Language (EFL) teaching, it is crucial to enhance content relevance and accuracy by improving the AI's filtering capabilities to align with users' specific research needs. Expanding interactive and visual features, such as dynamic graphics, charts, and customizable templates, can make the platform more engaging for its users. Additionally, providing context-specific feedback by

developing the paraphrasing tool to recognize field-specific terminology and complex theoretical frameworks will better support advanced academic writing. However, these suggestions on improvements or additions to *SciSpace* largely depend on the capabilities of the website developers to train the system with more relevant and highly specified datasets, some of which will come from its users' feeds of academic articles. There have been concerns posed about such user-oriented datasets, namely the issue of biases and privacy (Cardona et al., 2023; Celik et al., 2022; Miao & Holmes, 2023; Popenici & Kerr, 2017). As a provider of service, *SciSpace* needs to provide a disclaimer and warning to its users to warn them of these issues.

For EFL research agendas, investigating the longitudinal impact of *SciSpace* on students' academic writing skills, engagement levels, and overall performance would provide valuable insights into its effectiveness. Comparative studies with other AI-driven academic tools can help identify best practices and areas for further enhancement, ensuring that *SciSpace* meets diverse learning needs and preferences and providing accurate data. Future research needs to explore long-term studies of *SciSpace* utilisations, implications on EFL students' self-efficacy and critical thinking skills, and ethical issues.

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