Research Article

Synthesising Advents and Detriments of Open AI Chatbots in Language Proficiency

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Abstract

This article synthesises the literature on advents and detriments of Open AI Chatbots in Language Proficiency. An exhaustive investigation (Study Selection Criteria, Literature Search, Selection, and Coding) of scholarly sources published from 2020-2023 led to the selection of fifteen reviews for analysis. The document analysis is used to examine the collected data with a conceptual framework of critical institutionalism for interpreting facts. The results of the analysis indicate mixed outcomes that Open AI Chatbots has great potential for advancing educational research, but it also raises great ethical concerns for the researchers which needs to be catered. The development of sophisticated responses to open-ended questions and personalised feedback for students allows Open AI Chatbots to reach its full potential. However, educational researchers should be wary of its application due to its reliance on pre-existing data and limited capacity to comprehend complex concepts. According to studies, Open AI Chatbots can influence language proficiency, assessment, educational research, and teacher training both positively and negatively. The field of educational research must examine Open AI Chatbots's potential applications in greater depth in future studies

Keywords: Open AI Chatbots, Language Proficiency, LLMs, Ethical Implications

Introduction

Artificial intelligence has ushered in a new era of innovation, particularly evident in the development of natural language chatbots. Gayed et al., (2022) emphasises the transformative impact of AI in language parameter. According to Kim et al., (2023) Open AI Chatbots, a significant player for stands out as a large language model (LLM) with advanced training. The model operates on the powerful GPT-3.5 architecture, a testament to the cutting-edge technology driving AI research (Ray, 2023).The advent of Generative Pre-trained Transformer (GPT) technology, exemplified by Open AI Chatbots, has marked a milestone in the evolution of AI. This technology has holds tremendous potential, particularly in the realm of education field (Labadze et al., 2023). The ability of Open AI Chatbots to engage in discussions, answer questions, and provide information speaks to the versatility of the GPT-3.5 architecture. The journey of Open AI Chatbots can be traced back to OpenAI's groundbreaking GPT-3 language model in 2020. This model, fueled by word prediction and trained on a massive 45-terabyte dataset, laid the foundation for the subsequent advancements (Gill, 2020). Dwivedi et al., (2023) shed light on the model's

prowess in generating well-reasoned sentences, a skill acquired through extensive training. Recognising the need for enhanced conversational abilities, OpenAI introduced Open AI Chatbots. This iteration, while still rooted in GPT-3 technology, underwent modifications (Copper, 2023). Trained on a smaller corpus of conversational text and finely tuned for specific tasks, Open AI Chatbots surpassed its predecessor in tackling complex challenges by grasping contextual nuances (Roumeliotis and Tselikas, 2023). Open AI Chatbots, akin to GPT-3, possesses the hallmark features of a transformer-based neural network. However, it distinguishes itself through strategic alterations. This ability to understand and adapt to conversational context sets Open AI Chatbots apart, reflecting a stride forward in the capabilities of AI language models. A critical aspect contributing to the success of Open AI Chatbots is its utilisation of self-attention within the transformer-based neural network (Gill, 2020). This mechanism allows the model to focus on the most relevant input text for a given problem, enhancing both precision and efficiency. The novel neural network architecture employed by Open AI Chatbots positions it as a trailblazer in the field of natural language processing. Education stands to benefit significantly from the advancements made by Open AI Chatbots.

According to Dwivedi et al., (2023) highlighted the interest of educational researchers in leveraging the model's capabilities for various applications within the educational landscape. The potential for Open AI Chatbots to enhance learning experiences, provide tailored information, and facilitate interactive engagements underscores its significance in reshaping educational

methodologies. The evolution of Open AI Chatbots represents a paradigm shift in AI research, fueled by the GPT-3.5 architecture and a commitment to refining conversational abilities (Clark, 2023).

The collaboration between transformative technologies and a deep understanding of natural language positions Open AI Chatbots as a frontrunner in the AI landscape. As the model continues to pave the way for future developments, its impact extends beyond research and into practical applications, particularly within the realm of education (Dwivedi et al., 2023). The synergy between Open AI Chatbots and GPT-3 exemplifies the continuous strive for precision, efficiency, and adaptability in the ever-evolving field of artificial intelligence. Hence the researchers decided to explore following research questions.

Research questions

1. What are the positive advents of Open AI Chatbots in Language Proficiency?

2. What are the detriments of Open AI Chatbots in Language Proficiency?

3. What are the Ethical Implications of using Open AI Chatbots in Educational Research?

Research Method

The selection process for the studies followed the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines to ensure systematic and transparent reporting of results (Moher et al., 2009). Initially, a total of 26 studies were identified from various databases, including Elsevier (02), Taylor and Francis (02), ResearchGate (02), Google Scholar

(10), and academic blogs (04). Four duplicate articles were removed prior to screening, leaving 22 articles for initial review. During the screening phase, one article was excluded for not meeting the inclusion criteria, reducing the number of articles to 21.

Of the 21 articles, four were not retrievable, leaving 17 articles for eligibility assessment. Upon further evaluation, two more articles were excluded—one due to inadequate comprehension of the study's context and another for a lack of detailed evaluation. This resulted in 15 studies that were ultimately included in the final review are as follows. (Abu Muna Almaududi Ausat, 2023; Cheong and Hong, n.d.; Cotton et al., 2023; Dwivedi et al., 2023; Eaton et al., 2023; Farrokhnia et al., 2023; Henri-Paul Rousseau, 2023; Kim et al., 2023; Lo, 2023; Mcgee, 2023; Mhlanga, n.d.; Salvagno et al., 2023; Shidiq, 2023; Labadze et al., 2023; Tajik, n.d.; Tlili et al., 2023). These studies were analysed for their relevance to the research questions and contribution to the understanding of OpenAI Chatbots in language proficiency.

This rigorous selection process ensured that the final set of studies was both relevant and representative of the current literature on the topic, reducing the risk of bias and improving the reliability of the review (Page et al., 2021).

Study selection criteria

The study selection process was guided by a set of predefined inclusion and exclusion criteria to ensure that only high-quality, relevant studies were incorporated into the review. The inclusion criteria required that studies focus specifically on the use of OpenAI or similar AI-based chatbots in the context of language learning or language proficiency improvement. To capture the most current research, only studies published between 2020 and 2023 were considered. Furthermore, the studies had to be peer-reviewed journal articles, conference papers, or academic research reports to ensure the inclusion of rigorously evaluated research. Both empirical data (qualitative or quantitative) and theoretical assessments of chatbots' roles in education were included. Additionally, only studies published in English were considered to maintain consistency in data analysis.

Studies were excluded from the review if they did not directly focus on AI chatbots or language proficiency. For instance, general discussions on AI in education without reference to chatbots were omitted. Articles that were identified but could not be accessed or retrieved through available academic databases were also excluded. During the identification phase, any duplicate articles retrieved from multiple databases were removed. Moreover, studies that lacked clear research design, sufficient data to support their conclusions, or did not provide a detailed evaluation were excluded. Finally, non-English publications were removed to avoid potential translation biases and inconsistencies.

This careful screening process, guided by these inclusion and exclusion criteria, ensured that the final set of studies included in the review were both relevant and representative of the current literature on OpenAI chatbots in language proficiency education.
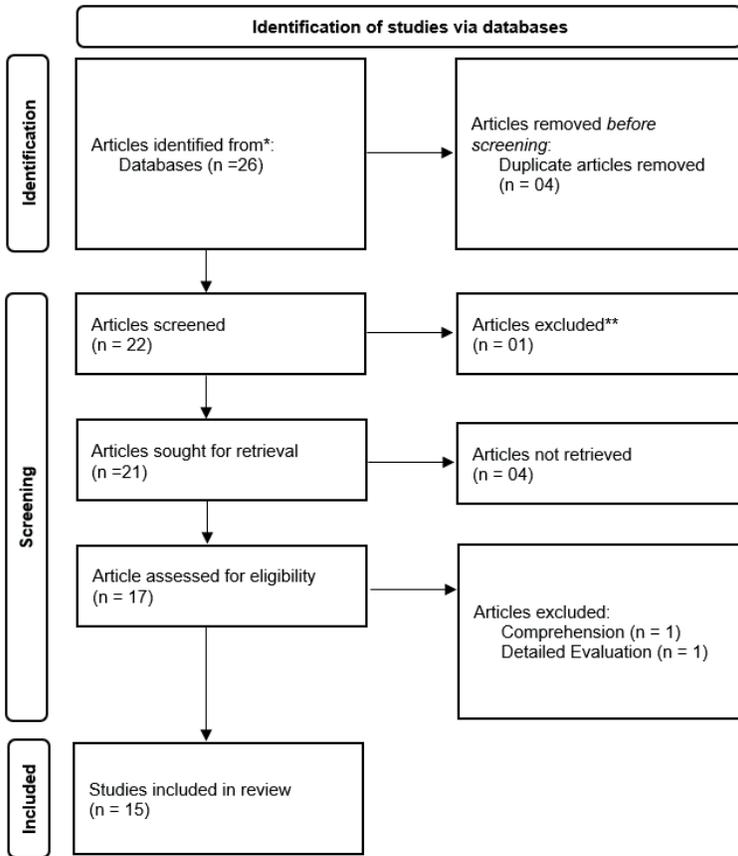
Identification of studies via databases

Articles identified from*:
Databases (n =26)

Articles removed *before screening*:
Duplicate articles removed (n = 04)

Articles screened (n = 22)

Articles excluded** (n = 01)

Articles sought for retrieval (n =21)

Articles not retrieved (n = 04)

Article assessed for eligibility (n = 17)

Articles excluded:
Comprehension (n = 1)
Detailed Evaluation (n = 1)

Studies included in review (n = 15)

Identification

Screening

Included

Fig.1: PRISMA 2020 flow diagram for searches of databases

Data collection and coding

The data from the final 15 studies were meticulously extracted and organised using inductive content analysis. This method allowed us to categorise the qualitative data into themes and draw conclusions from the findings. The open coding technique was used, where headings and notes were added to capture the main ideas from each study (Elo and Kyngäs, 2008). Categories were then formed based on themes of research questions. These 15 studies examined the pros and cons of Open AI Chatbots in language proficiency and its ethical implications in educational research met the eligibility requirements and were selected for the review. In the process of data collection, important details are meticulously recorded.

Data reduction and synthesis

The primary objective of this analysis was to ensure that the literature review conducted for this study was fully comprehended. During the data reduction phase, the collected data were organised, categorised, and discarded in a way that facilitated the identification of significant results and the drawing of conclusions shown in Figure 1. Due to the complexity and diversity of the data, analysis was required during the data reduction phase. The purpose of the reduction phase was to determine the significance of the information to the ultimate objective.

The document analysis was used to examine the collected data with conceptual framework of critical institutionalism for interpreting facts.

When conclusions are drawn from the collected data, the process is complete. The current phase concludes the qualitative data analysis procedure. Here, we ensured that the results of data reduction and data presentation aligned with the analysis's objective. This phase aims to find meaning in the collected data by identifying correlations, similarities, or differences so that solutions can be developed for existing problems. The used sources are deemed sufficient for drawing conclusions.

Publication bias

Additionally, studies were required to provide sufficient statistical data to assess publication bias. The objective of this article is to collect accurate and trustworthy information that will aid in comprehension. Publication bias was examined using funnel plots and Egger's test on only 10 studies. The funnel plot displayed effect sizes against precision (1/SE), and Egger's test was used to statistically examine the presence of publication bias in the study (Bax et al., 2007).
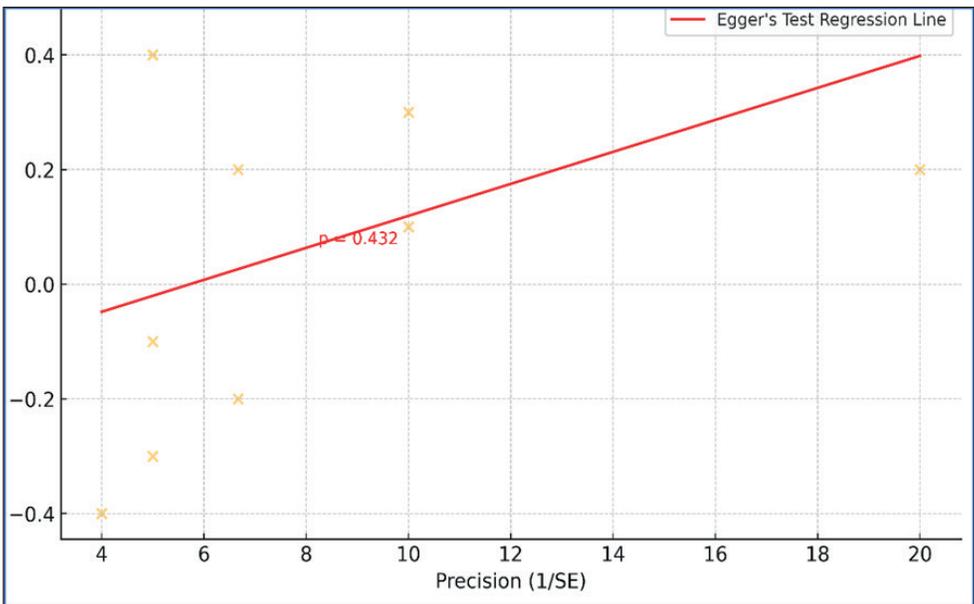

Fig. 2: Egger's test regression line

To statistically examine the presence of publication bias in the 10 included studies, a funnel plot was generated, the results of Egger's test for publication bias indicated that the intercept was not statistically significant (B = 0.333, SE = 0.408, p = .432), suggesting no evidence of publication bias in the studies.

Synthesis of the results

The researchers opted for inductive content analysis, and the next step involves organising the qualitative data. This process consists of open coding, forming categories, and abstraction. Open coding involves making notes and writing headings in the text while reading it. The material is then re-read, and as many headings as needed are noted in the margins to capture all aspects of the content (Hsieh and Shannon, 2005; Elo and Kyngäs, 2008). Hence articles were reviewed and synthesised by using the content analysis technique under following questions (Kumar, 2023).

Q.1. What are the positive advents of Open AI Chatbots in Language Proficiency?

The best thing about using Open AI Chatbots to learn a new language is that they can talk back and forth with you (Postings, 2023). The chatbot is programmed to mimic the subtleties of human communication. This makes the learning process more interesting and engaging for the user. So, people who are learning a second language can join chat conversations and get immediate feedback on their grammar, vocabulary, and pronunciation. This helps them learn the language faster (Caulfield 2023). One of the best things about Open AI Chatbots is that you can learn a new language at your own pace, which is one of the most important things. Open AI Chatbots makes lessons and exercises for each learner based on how well they already know the language. These lessons and exercises are made to help the learner improve in the areas where they are weakest. If the learner focuses on the parts of their language skills that need more work, they will be able to put in more effort and improve their language skills more quickly. Open AI Chatbots, in contrast to human tutors, are available around the clock, making it possible for language students to practise whenever it is most convenient for them. This is especially helpful for people who have a lot on their plates or who live in areas that are on different time zones (Eaton et al., 2023). Students have the ability to enhance their linguistic skills at any time of the day, including during their lunch break, when they have access to Open AI Chatbots. Using Open AI Chatbots is a great way to learn a language because it gives you immediate feedback. Learners are able to spot and fix mistakes in their language use, which makes their language skills better in the long run. Also, giving learners feedback right away helps to keep them interested in the process of learning and keeps them motivated (Tlili et al., 2023). Many people find it hard and nerve-wracking to learn a new language, especially those who are shy or who don't feel comfortable expressing themselves in front of others. But now, thanks to Open AI Chatbots, people learning a foreign language can improve their skills in a safe environment where they won't be judged (Kim et al., 2023). Students can use the platform to practise their speaking skills without worrying about making mistakes. This makes them feel more confident and helps them learn the language better. Open AI Chatbots is something to think about if you want to learn a language without spending a lot of money. Open AI Chatbots is a cheaper way to learn a language than hiring a human tutor or going to a language school. Open AI Chatbots can also help a wider range of students because it can be used on multiple devices. Smartphones and laptops are examples of these devices. Open AI Chatbots gives people who want to learn a language access to a wide range of resources. There are word lists, grammar rules, and audio recordings in these materials (Kim et al., 2023). Learners can use these tools whenever they need to and can practise their language skills with Open AI Chatbots. Students who are learning a foreign language will find that this feature not only helps them improve their language skills but also makes the process more fun. Many different Open AI Chatbots exist for students to choose from as they pursue higher education (Cheong and Hong, n.d.). Conversations can be had either verbally or in writing, so students can choose the mode that works best for them. Students can adapt their methods of study to meet the needs and preferences of their own unique learning styles (Labadze et al., 2023). People have found that utilising Open AI Chatbots makes learning a language more enjoyable, which in turn makes it simpler for them to pick

up additional tongues (Tlili et al., 2023). Students have the opportunity to earn points or other prizes by completing a variety of activities, including tests and challenges, which can be found on the classroom website. The process of learning a new language becomes more interesting and enjoyable (Clark, 2023). If the material is presented in an interesting way, it is much more likely that students will continue to be interested in the material and be motivated to learn it. It is also much more likely that students will learn it (Roumeliotis and Tselikas, 2023).

Q.2. What are the detriments of Open AI Chatbots in Language Proficiency?

Utilising OpenAI Chatbots as a tool for language proficiency raises significant concerns regarding the authenticity and effectiveness of the learning process. One primary apprehension is the potential deviation from authentic language use, as responses generated by the system may not always be accurate or true (Roumeliotis and Tselikas, 2023). Learners could inadvertently develop poor language habits and struggle to distinguish between artificial and genuine language constructs. Moreover, an overreliance on technology is a prevailing issue, as learners might become excessively dependent on the system, hindering the opportunity for real-world language interactions. The absence of genuine human interaction deprives learners of crucial social and cultural skills integral to language development (Cheong and Hong, n.d.). Interpersonal communication plays a pivotal role in refining language proficiency, and the limited interaction with OpenAI Chatbots may impede holistic language learning (Labadze et al., 2023). A personalised learning experience is another aspect that might be compromised when relying solely on OpenAI Chatbots. The system's generic responses may not cater to individual needs, potentially leading to a lack of tailored feedback on language skills. This dearth of personalised guidance could contribute to waning interest in language proficiency, impeding overall progress (Clark, 2023). Cultural sensitivity is also a pertinent concern, as open-source AI chatbots may struggle to comprehend and incorporate cultural nuances. Inadvertent cultural insensitivity in responses could lead to misunderstandings and negative perceptions, undermining the intended goal of fostering cross-cultural understanding through language learning (Kim et al., 2023). Technical glitches and limitations in the OpenAI Chatbots system pose additional challenges. In instances of technological malfunctions, learners may receive erroneous or irrelevant answers, causing confusion and hindering the learning process. The potential for such disruptions highlights the need for a robust and reliable platform to ensure seamless language learning experiences (Shidiq, 2023). Furthermore, the finite vocabulary within the OpenAI Chatbots system may impede learners from acquiring a comprehensive range of words (Eaton et al., 2023). This limitation might restrict their ability to effectively communicate in diverse situations, hindering language proficiency in practical contexts. In conclusion, while OpenAI Chatbots offer a novel approach to language learning, it is crucial to acknowledge and address the aforementioned concerns to ensure a more comprehensive and effective language proficiency experience.

Q.3. What are the Ethical Implications of Open AI Chatbots in Educational Research?

Open AI Chatbots makes language learning more enjoyable for people, which facilitates their ability to learn new languages. Students can earn points or other prizes by completing a variety

of exercises, tests, and challenges, which makes the process of learning a new language more enjoyable and entertaining for them (Roumeliotis and Tselikas, 2023). Students are more likely to remain interested in the material and motivated to learn if it is presented in an enjoyable manner. Automated feedback is given to students' written assignments using Open AI chatbots. Language experts review student writing and offer comments. For instance, Soukup et al. (2021) used Open AI Chatbots to give non-native English speakers feedback on their assignment writing. According to research, automated feedback encourages students to write better. Open AI chatbots have been employed to develop educational platforms that offer responses to queries. These systems can answer questions from students in a timely and precise manner. Open AI Chatbots was put to use in order to organise text for educational purposes into groups (Labadze et al., 2023). For example, the written assignments of students according to how well they knew English by using Open AI Chatbots. The researcher found that the classification was inaccurate, and that it could be used to determine which students have a greater need for assistance with their language skills. One of the most significant ethical concerns regarding Open AI Chatbots is that the generated language may be biased (Lawton, 2023). Similar to other machine learning algorithms, GPT-3.5 examines the provided data to identify patterns and draw conclusions. It is possible that the model will detect any bias in the data used to train it and then reflect that bias in its output. Another ethical concern with Open AI Chatbots is that it may spread false information. Because the model can generate text that appears very convincing, it could be used to disseminate false information or propaganda. In some cases, such as if the model is programmed to provide politically biased answers, this could

be done on purpose. In other cases, it may not be on purpose, such as when the model provides answers based on incomplete or incorrect data. Open AI Chatbots raises privacy concerns as well. Users may share personal or sensitive information, such as medical or financial information, when interacting with the model (Labadze et al., 2023). There is a chance that this information will be saved and misused, such as for targeted advertising or identity theft. Furthermore, if the model is used at work, there may be concerns about employee privacy and monitoring. The ability of Open AI Chatbots to create very convincing text concerns me because it could be used to deceive people (Roumeliotis and Tselikas, 2023). For example, the model could be used to make phishing scams appear legitimate or to impersonate someone else in an online conversation. The model could also be used to change people's minds, for example by posting fake reviews or comments on social media that look real. Lastly, some people worry that Open AI Chatbots will limit people's freedom. As the model gets better and can make more convincing text, it could be used to control or change people's behaviour in unethical or even dangerous ways. For instance, the model could be used to make propaganda that is very convincing or to trick people into making choices that are not in their best interests.

Discussion

The study highlights that OpenAI chatbots, such as ChatGPT, offer substantial educational potential. These tools are capable of providing personalised feedback, particularly in real-time language learning, by delivering tailored exercises and corrections on grammar, vocabulary, and conversational skills. The round-the-clock availability of these chatbots is particularly advantageous for students

in different time zones or those with tight schedules, enabling a flexible approach to learning (Eaton et al., 2023). Moreover, the ability of AI models to engage users in interactive dialogue is key to enhancing learner interest and motivation (Caulfield, 2023). A significant positive outcome is the creation of an interactive, judgment-free environment where second-language learners can practice and receive immediate feedback. This immediate feedback mechanism is highlighted as critical in language acquisition, helping learners gain confidence (Postings, 2023; Tlili et al., 2023). It also addresses several critical limitations and concerns regarding the use of OpenAI chatbots. A prominent issue is the potential for these models to misinterpret data and propagate biases inherent in their training sets (Lawton, 2023). Since these AI models rely on large, pre-existing datasets, there is a risk of spreading misinformation if these datasets contain biased or inaccurate information (Shidiq, 2023). This is a major ethical concern, especially in educational settings where precision and accuracy are paramount (Kim et al., 2023).

Additionally, the risk of over-reliance on AI systems may prevent learners from engaging in essential human interactions and cultural learning, both of which are crucial to comprehensive language proficiency. The absence of real-world interaction is flagged as a significant detriment to the development of well-rounded language skills (Labadze et al., 2023). The study further highlights the methodological inconsistencies across different studies evaluating chatbot performance. Since these studies use various models and training datasets, it is challenging to form universal conclusions about the efficacy of these tools in education (Dwivedi et al., 2023). Additionally, the limitation of the review to studies published between 2020 and 2023 constrains long-term projections

of AI's role in education (Kumar, 2023). One significant observation is the challenge of cultural sensitivity. OpenAI chatbots may fail to grasp cultural nuances in language, which is crucial for effective cross-cultural communication. As a result, language learners may not fully develop the skills needed to understand or participate in authentic cultural contexts (Kim et al., 2023). This gap in language nuance and cultural understanding can be a significant barrier for students learning foreign languages. The discussion also raises concerns about privacy and data security. Learners interacting with chatbots may unintentionally share personal or sensitive information, which could be exploited or misused, raising privacy concerns (Labadze et al., 2023). Additionally, there is a risk that these AI systems could be leveraged to spread false information, manipulate public opinion, or engage in phishing attempts due to their ability to generate convincing human-like text (Roumeliotis and Tselikas, 2023). This potential misuse of AI-generated content poses ethical challenges that require careful management.

In conclusion, while OpenAI chatbots present promising opportunities for improving language proficiency, their implementation in educational settings must be approached with caution. Ethical concerns such as bias, misinformation, privacy risks, and the absence of human interaction need to be carefully addressed. The potential benefits of these systems must be balanced with ongoing research to mitigate these limitations, ensuring a more comprehensive understanding of their role in education (Dwivedi et al., 2023; Labadze et al., 2023).

Limitations of the study

This review does not look at everything. First, the analysis only looked at a small

number of studies, which makes it hard to draw broad conclusions from the results. Second, the Open AI Chatbots models used in the studies were different, which makes it hard to draw broad conclusions about how Open AI Chatbots technology affects learning. Third, all of the studies in the review were published from 2020 - 2023. This makes it hard to draw conclusions about how Open AI Chatbots technology will affect educational research in the long run.

Conclusion

The study's findings indicate that Open AI Chatbots have a significant opportunity to contribute significantly to the advancement of educational research (Labadze et al., 2023). This could be accomplished by providing intelligent responses to open-ended questions, providing individualised feedback to students, and utilising intelligent tutoring systems. Be aware, however, that if you are using Open AI Chatbots for academic research purposes, there are a number of limitations that you should be aware of. Both the accuracy of the data used to train the model and the likelihood that the model will produce skewed results necessitate extreme caution on the part of the researchers (Kim et al., 2023). More research is needed to determine how Open AI Chatbots could be used in educational research and how flaws in the system could be addressed and corrected. It is also necessary to determine how these flaws can be addressed. Some of the factors that limit the usefulness of this technology are not particularly knowledgeable, people who are unaware of the context and nuance of a situation, and people who are concerned about their own privacy and security. If researchers and developers are aware of the Open AI Chatbots' capabilities as well as their limitations, they will be able to work to improve the chatbots' performance and reduce potential risks.

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