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## CHATGPT IN COMMUNICATION: A SYSTEMATIC LITERATURE REVIEW

### Abstract

*This systematic literature review examines the role of ChatGPT in communication. ChatGPT's ability to imitate human-like interactions has broad implications in various sectors, such as education, healthcare, and customer service in the digital-based economy. The authors used a systematic and structured manuscript selection method in this research to collect and analyze literature on the use of ChatGPT in a communication context. A systematic literature review (SLR) method was used, involving an extensive search through the Scopus and Google Scholar databases with the keywords "ChatGPT" and "communication." Manuscript selection required strict inclusion and exclusion criteria. Of the 623 articles found, 30 were selected for further review. The research results show that using ChatGPT in communication has had both positive and negative impacts. Positive impacts involve increasing the efficiency and effectiveness of communications, especially in education, marketing, ethics, and health. However, challenges such as ethical considerations, the risk of plagiarism, and a limited understanding of context and emotional interactions were also identified. The use of ChatGPT in education, health, and various other fields has demonstrated great potential to improve communication processes, decision-making, and work efficiency. However, to ensure responsible and sustainable use, we must address specific ethical challenges and risks. This study provides a comprehensive overview of recent developments in using ChatGPT in communications, while also highlighting the practical and ethical implications that must be considered. With careful consideration of the advantages and limitations, ChatGPT in communications can significantly contribute to various fields.*

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## 1. INTRODUCTION

Developments in the field of artificial intelligence have brought significant advances in natural language processing technology. As computing power and the amount of data available increases, language models such as ChatGPT have become essential milestones in advancing this technology (Kalla et al., 2023; Taecharungroj, 2023). ChatGPT, "Chat Generative Pre-trained Transformer," is one of the latest examples of a machine-based model that has succeeded dramatically. This model is rooted in deep learning and uses big data to train itself in understanding human language. The result is an impressive ability to answer questions, participate in conversations, and provide increasingly human-level responses in communication (Das et al., 2023; Temsah et al., 2023). Over the past few years, ChatGPT has attracted widespread attention from various sectors, including information and communications technology, education, healthcare, and business.

ChatGPT's ability to interact with humans in a communication context has resulted in innovative and exciting applications in various domains. From virtual assistants that help users complete daily tasks to chatbots that provide more efficient customer service, ChatGPT has created new potential in human-machine communication (Ghosh & Bir, 2023; Nguyen & Pepping, 2023; Ali, 2023; Khowaja et al., 2023; Santandreu-Calonge et al., 2023). Therefore, a deep understanding of the role and impact of ChatGPT in communications becomes increasingly crucial in facing an era that is increasingly dependent on this technology. In the education sector, for example, ChatGPT has been used to create more dynamic and responsive learning environments, enabling students to live more interactive and engaging learning experiences (Zhu et al., 2023). In the business world, using ChatGPT in customer service has resulted in more efficient and responsive service, improving customer experience and helping companies increase customer retention (Raj et al., 2023; Shaji George & Hovan George, 2023). In an era where digital communications increasingly dominate everyday life, a deep understanding of ChatGPT's role in communications becomes increasingly important (Kung et al., 2023; Van Dis et al., 2023). Therefore, in-depth research and systematic analysis regarding the use of ChatGPT in various communication contexts is highly relevant and essential to understanding its impact in changing how we communicate and interact with the ever-evolving digital world.

To have a thorough understanding of ChatGPT in communications, one might refer to multiple sources. The amazing capacity of ChatGPT, an extensive transformer-based language model created by OpenAI, to produce conversational-style responses in response to user input has garnered a lot of attention. Based on the GPT-3.5 architecture, this model has been demonstrated to have ramifications for a number of sectors, including science writing, education, medicine, and health (Gilson et al., 2023; Hung et al., 2023; Sütçüoğlu & Güler, 2023; Alhasan et al., 2023; Hirosawa et al., 2023; Strong et al., 2023; Alkaissi & McFarlane, 2023; Koubaa et al., 2023). As technology develops, it is essential to critically review its capabilities and limitations to ensure its responsible and effective use in various fields (Gladstone, 2023).

Although ChatGPT shows excellent potential in improving human-machine interactions, understanding its use in communication contexts still requires further exploration. Despite the existing literature, many questions still need to be answered, and a systematic evaluation of the existing literature can help fill knowledge gaps in this field. Previous research on ChatGPT has focused on various aspects, but there has been no comprehensive systematic

literature review on its advantages, challenges, and impact on communication. Therefore, there is a clear need to complement previous research with this Systematic Literature Review, which will investigate, identify, and compile relevant findings from various scientific articles.

This research aims to conduct a systematic literature review (Xiao & Watson, 2019) regarding the use of ChatGPT in a communication context. The authors answer the following research questions to achieve this goal:

- How is ChatGPT used in the context of human-machine digital communication?
- What are the advantages of using ChatGPT in a communication context?
- What are the main challenges faced in adopting ChatGPT in a communication context?
- What is the impact of using ChatGPT in a communication context?

## **2. LITERATURE REVIEW**

ChatGPT is an OpenAI-developed big-language model architecture based on the GPT-3.5 standard, aimed at engaging users in natural language talks on a variety of themes. It is capable of understanding and reacting to a variety of linguistic patterns and idioms due to its training on a vast corpus of Internet content (Bhattacharya et al., 2023; Goar et al., 2023). The model is designed to generate human-like text and can be used for tasks such as text completion, text generation, and conversation simulation. ChatGPT has been implemented in numerous programs such as customer support systems, virtual assistants, and chatbots, and has shown promising results in generating creative content, showcasing its versatility and potential for future applications (Albonico & Varela, 2023; Roumeliotis & Tselikas, 2023). It has the potential to be used for fostering classroom discussions and addressing student needs in education. ChatGPT is a versatile AI tool with applications in various domains, but it also comes with limitations and ethical considerations that need to be carefully addressed.

ChatGPT, as an AI-powered language model, exhibits significant potential across various domains, including communication, education, and healthcare, while simultaneously raising concerns about academic integrity and ethical considerations (Keshamoni, 2023; Raza & Hussain, 2023). Its utility spans tasks such as drafting emails, articles, and code, as well as enhancing medical education through virtual patient simulations and quizzes (Gutiérrez-Cirlos et al., 2023). However, the integration of ChatGPT into these fields necessitates careful attention to ethical aspects, including the risks of generating inappropriate content, plagiarism, and the potential erosion of evidence-based practices (Eysenbach, 2023). Consequently, ensuring responsible usage and preserving academic integrity are paramount as ChatGPT continues to influence these critical areas.

## **3. METHODOLOGY**

### **3.1. Study design**

This systematic literature review aims to examine the role and impact of ChatGPT in the context of communication. To achieve this, an extensive search of peer-reviewed articles

published in English between 2020 and 2023 will be conducted using databases such as Scopus, Google Scholar, Web of Science, and IEEE Explore. Search terms include ('ChatGPT' or 'Language Model' or 'Natural Language Processing') and ('Communication' or 'Human-Machine Interaction' or 'Digital Communication'). Studies will be selected through title and abstract screening, followed by full-text screening and data extraction using a standardized tool. The quality of the included study will be assessed using the Newcastle-Ottawa scale. Data synthesis will involve thematic analysis and narrative synthesis of results. The study design is subject to limitations, including language bias, publication bias, and timeline bias. Following this study design, a comprehensive overview of ChatGPT's applications, benefits, and challenges in the context of communication will be available.

### **3.2. Data collection**

Data collection involves extensive exploration of peer-reviewed articles using databases such as Scopus, Google Scholar, Web of Science, and IEEE Explore. Search terms include ('ChatGPT' or 'Language Model' or 'Natural Language Processing') and ('Communication' or 'Human-Machine Interaction' or 'Digital Communication'). Only peer-reviewed articles published in English between 2020 and 2023 will be included, focusing on ChatGPT or similar language models in the context of communication. Non-peer-reviewed articles, studies that do not focus on ChatGPT, and articles not related to the context of communication will be excluded. Data will be extracted from the included research using a standardized form capturing the characteristics of the research, the ChatGPT application, and the context, benefits and challenges, and impact on communication. The extracted data will be stored in a secure database and managed in accordance with the Data Management Plan, ensuring that clean, coding and analysis procedures are followed.

### **3.3. Data analysis**

Data analysis involves a thematic analysis of the extracted data, using a qualitative approach to identify patterns and themes related to ChatGPT's role and impact in communication contexts. The analysis focuses on identifying advantages and challenges of using ChatGPT, as well as its applications and effects on communication. A narrative synthesis of findings is also conducted, summarizing the results in a clear and concise manner. The analysis is conducted using a standardized coding framework, ensuring consistency and reliability. The coding framework includes categories such as "advantages", "challenges", "applications", and "impact", allowing for a comprehensive analysis of the data. The results of the analysis are presented in a clear and transparent manner, using tables, figures, and text to illustrate the findings.

### **3.4. The manuscript selection process**

A Systematic Literature Review (SLR) method is used in scientific research to systematically collect, investigate, and analyze relevant literature on a particular topic (Cocchia, 2014; Rother, 2007; Van Laar et al., 2017). In our research entitled "ChatGPT in Communication: A Systematic Literature Review," we have adopted a systematic and structured manuscript selection method to ensure the relevance and quality of the included literature. Initially, we conducted an extensive literature search through recognized academic

databases, specifically Scopus and Google Scholar, using carefully defined keywords such as "ChatGPT" and "communication." The next step involved applying strict inclusion and exclusion criteria, placing importance on articles that discuss ChatGPT in a communication context, published in English, with full access, and published in reputable scientific journals. Articles that did not meet these criteria or had low methodological quality were explicitly excluded from the review.

### **3.5. Manuscript selection process**

The manuscript selection process was conducted in a systematic and structured manner to ensure the relevance and quality of the included literature. The authors began with an extensive literature search using recognized academic databases, specifically Scopus and Google Scholar, employing carefully defined keywords such as "ChatGPT" and "communication." The search was limited to articles published in English with full-text access and those published in reputable scientific journals.

The selection process consisted of two stages:

**Initial Selection:** Titles and abstracts were screened to ensure relevance to the research topic and adherence to predetermined inclusion criteria. Articles that did not meet these criteria or exhibited low methodological quality were excluded.

**Final Selection:** Articles that passed the initial selection were subjected to a more in-depth analysis to verify their suitability. This involved a thorough examination of the full text to ensure alignment with the research objectives and quality standards.

Following this comprehensive selection process, we identified 199 articles from Scopus and 424 from Google Scholar. These were further narrowed down to the 30 most relevant articles for in-depth review. Figure 1 presents the complete article selection process.

### **3.6. The data coding and analysis processes**

Next, in coding and analyzing data, we extracted vital information from each article, such as the year of publication, author, research methodology, and main findings. This data was then grouped and coded using qualitative methods to identify emerging themes. This descriptive analysis of the coded data allows us to detail trends in using ChatGPT in communications, uncover advantages and challenges from the literature, and dig deeper into the impact of using ChatGPT in various communication contexts. Through this methodology, we aim to present comprehensive and accurate findings that reflect the use of ChatGPT in communication.

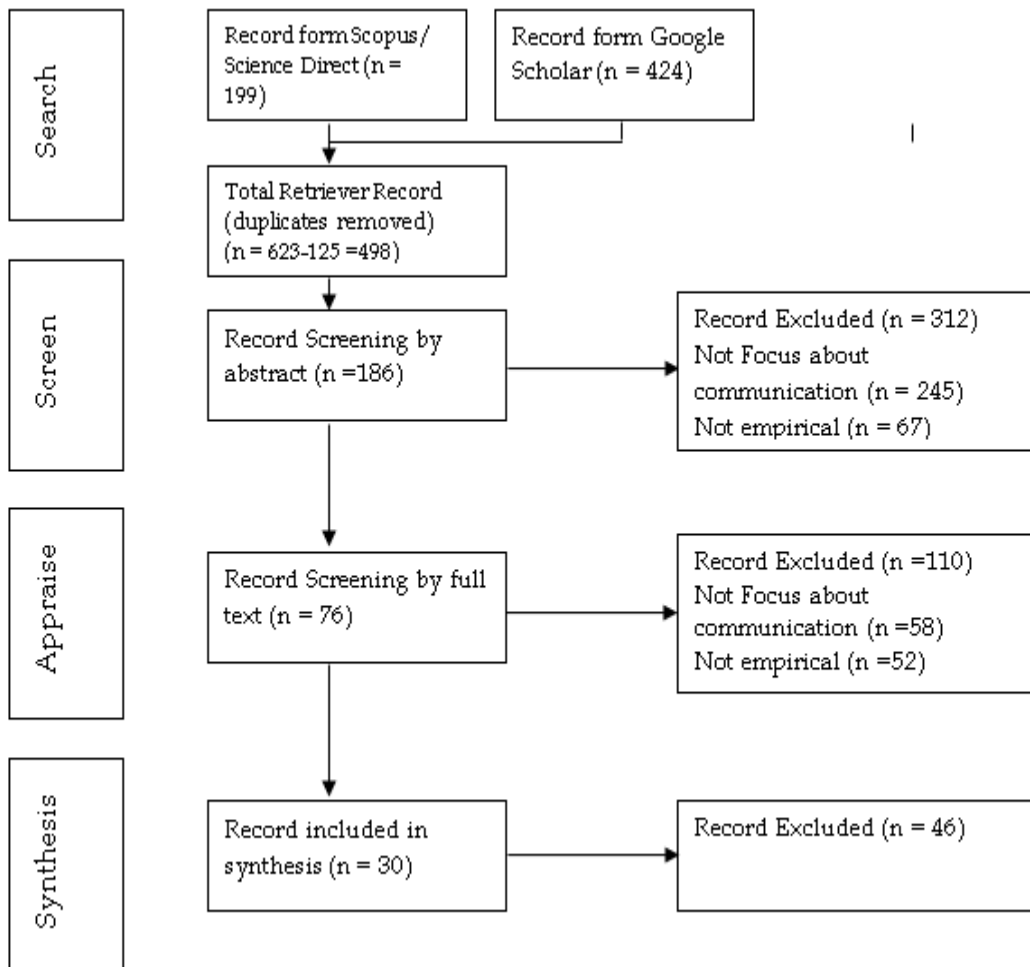


Fig. 1. Flowchart article selection process, adapted from

### 3.7. Addressing methodological limitations

The authors acknowledge that the SLR method has inherent limitations, such as the potential for publication bias and the exclusion of non-English language studies. To mitigate these limitations, a rigorous selection process was applied and strict inclusion criteria were maintained. Furthermore, it was ensured that the analysis was transparent and reproducible, clearly documenting each step of the selection and coding process.

### 3.8. Ethical considerations

In conducting this SLR, the authors adhered to ethical research practices by ensuring the proper attribution of all sources and by critically evaluating the methodological quality of the included studies. The authors also considered the broader ethical implications of

ChatGPT's use in communication, particularly in terms of academic integrity and the potential for misuse.

## **4. RESULT**

### **4.1. How is ChatGPT used in the context of human-machine digital communication?**

In recent years, interest in the application of ChatGPT in human-machine communication has increased. Several studies have explored various ways of using ChatGPT to improve communication. Studies in journalism and communication education (Wu, 2023). This study provides insight into how ChatGPT is integrated into educational environments to facilitate communication and content creation; the paper discusses the development of journalism and communication education in the context of ChatGPT, focusing on digital development models, project-based teaching scenarios, and "publicity".

Another aspect of using ChatGPT in communication is ethical issues. The ethical ramifications of ChatGPT in relation to decision-making and leadership were examined by Basir et al. (2023). This study is to investigate the moral dilemmas raised by ChatGPT use and develop an ethical framework to direct the responsible and advantageous use of ChatGPT. It highlights how crucial it is to take ethical considerations into account when integrating ChatGPT into decision-making and communication processes.

The multifaceted advantages and possible disadvantages of ChatGPT are examined by Paul et al. (2023) in the context of marketing and consumer studies. While this article primarily focuses on marketing research, it highlights how ChatGPT can be used in communications with consumers for various purposes, such as generating content and answering customer questions. In this context, this article discusses the multidimensional benefits and potential pitfalls of using artificial intelligence-based Chat Generative Pre-trained Transformer (ChatGPT). It provides many ideas for future research in consumer and marketing studies.

According to (Hopkins et al., 2023) research, ChatGPT exhibits a remarkable capacity to generate understandable solutions to a variety of topics, from basic fact-based inquiries to complicated clinical questions. This ability appears to lessen the risk of alerts when compared to Google's featured snippets .

Within the academic realm, scholars, investigators, and learners have employed Large Language Models (LLM) like ChatGPT to accomplish a range of academic and non-academic assignments, such as composing essays, crafting formal and informal speeches, analyzing literature, and producing (Rahman et al., 2023).

The purpose of this study is to assess ChatGPT's performance on questions related to the US Medical Licensing Examination Steps 1 and 2, as well as to examine answers for potential user interpretation. This study assesses the reliability and quality of academic responses produced by ChatGPT, specifically concentrating on queries pertaining to chemistry (Fergus et al., 2023).

These studies collectively contribute to a broader understanding of the application of ChatGPT in communication contexts, ranging from education to ethical and marketing considerations, highlighting the versatility and potential impact of ChatGPT in improving communication processes.

ChatGPT has shown that it can increase productivity and quality in the drafting of scientific communications. ChatGPT facilitates the creation of outlines, adds information, expedites the writing process, and enhances writing style. Additionally, by offering recommendations for enhancements to grammar, style, and structure, it can drastically cut down on the time and effort needed to edit and proofread manuscripts (Huang & Tan, 2023).

When creating simulations or samples of clinical conversations for use in healthcare communication research, ChatGPT can be quite helpful. These simulations provide data for experimental studies that test methods for teaching communication or look into particular facets of communication (Menichetti et al., 2023).

The use of ChatGPT in scientific research stands out for its ability to produce coherent and sophisticated text through natural language interaction capabilities. It enables the automation of tasks such as synthesizing information and schematics, improving scientific communication, and aiding the writing of computer code. However, there is caution in its application due to a lack of complete understanding of the context (Ferrante & Lanera, 2023).

In medical scientific writing, the integration of ChatGPT has been explored, with comparative analysis demonstrating its role in the production of medical scientific articles. The ability of technology to support the writing process in this domain is becoming more prominent as the use of artificial intelligence tools in medical research becomes more widespread (Benichou, 2023).

These articles collectively provide insight into the versatile applications of ChatGPT in various communications-related fields, underscoring the growing importance of these applications as tools for improving efficiency, quality, and innovation in communications practices.

#### **4.2. What are the advantages of using ChatGPT in a communication context?**

ChatGPT, a conversational AI platform, has attracted attention due to its potential benefits in various communication contexts. ChatGPT, among other large language models (LLMs), has been known for its ability to improve efficiency and accuracy in conversational and writing tasks (Eysenbach, 2023). In addition, social influence and context of use are key factors influencing users' intention to use ChatGPT (Li & Zhang, 2023). ChatGPT has been investigated as an educational tool for digital development, project-based learning situations, and "publicity" in journalism and communications teaching (Wu, 2023). Furthermore, ChatGPT has been acknowledged for its capacity to enhance communication and decision-making, although it also presents ethical issues that require attention (Basir et al., 2023).

In the healthcare space, ChatGPT has been identified as helpful in simplifying workflows and improving personalized medicine, potentially improving patient care (Sallam, 2023). Additionally, ChatGPT can help medical education, enabling conversations on various topics and facilitating the spread of knowledge. Nevertheless, there are apprehensions surrounding the potential for plagiarism, copyright infringements, and the absence of interpersonal and emotional engagement that is crucial for cultivating effective communication abilities in health education.

In the academic field, ChatGPT has the potential to benefit writers of all backgrounds, especially non-native English users, by assisting with academic writing and language translation (Lin, 2023). It has also demonstrated commendable performance in clinical



medicine entrance examinations, achieving high levels of compliance and generating innovative insights into various problems (Liu et al., 2023).

Overall, although ChatGPT offers several benefits such as increased consumer engagement, improved customer service, and cost-effectiveness, it is essential to address ethical considerations, limitations in specific domains such as medical research, and the need for personal and emotional interactions in educational and communication contexts. As the use of ChatGPT continues to grow, it is essential to consider its benefits and challenges in various communication contexts carefully.

#### **4.3. What are the main challenges faced in adopting ChatGPT in a communications context?**

Applying ChatGPT in a communication context presents several challenges that must be addressed carefully. An important obstacle to the broad use of ChatGPT in organizational settings is the ethical concerns related to data protection, security, transparency, and accountability (Ayinde et al., 2023). In addition, there are apprehensions surrounding the possible hazards of plagiarism, copyright infringements, and academic deceit, notably in the fields of academia and health research. The absence of personal and emotional interaction required for the development of adequate communication skills in health education was also emphasized as a difficulty.

Additionally, the interpretation of large language models (LLMs) such as ChatGPT poses significant challenges, especially in medical education and knowledge assessment, where the implications of LLMs for learning and assessment must be carefully considered. In academic research and publishing, researchers should be careful when using ChatGPT, as its elusive nature challenges the role of gatekeepers and can impact the integrity of academic research (Bonsu & Baffour-Koduah, 2023). Additionally, the potential for bias, reduced accuracy, and the spread of misinformation are concerns that need to be addressed when leveraging ChatGPT for research and communications in various domains.

Potential obstacles to the successful integration of ChatGPT in educational environments include issues such as flawed research, data privacy concerns, security risks, the dissemination of false information, misreading of student comprehension, and limited customisation. Additionally, there are limitations to ChatGPT in understanding communication strategies used by non-native speakers, raising concerns about its suitability for second language teaching. (Raman et al., 2023).

The use of ChatGPT in healthcare also presents challenges, such as the need for further research into its ability to handle unstructured clinical information and potential limitations in structured clinical scenarios (Sakai, 2023). Additionally, the lack of emotional intelligence and limited understanding of sociolinguistic expressions by non-native speakers are challenges that need to be overcome when considering the application of ChatGPT in health communication and education (Qu et al., 2023).

In summary, the challenges of implementing ChatGPT in a communication context include ethical considerations, interpretability, potential bias, limitations in understanding non-native communication, and its impact on academic integrity and educational effectiveness. Overcoming these challenges is critical to harnessing ChatGPT's potential while mitigating its limitations in various communication domains.

#### **4.4. What is the impact of using ChatGPT in a communications context?**

The impact of using ChatGPT in a communication context is multifaceted, spanning domains such as education, healthcare, consumer engagement, and academic research. ChatGPT has been recognized for its potential to generate human-like conversations, improve communication, and improve decision-making processes (Halaweh, 2023). ChatGPT has demonstrated benefits in cost savings, documentation, personalized medicine, and increased health literacy, potentially improving patient care and outcomes (Sallam et al., 2023). However, there are concerns regarding the potential negative impacts of generative AI technology on education, including ethical and privacy implications (Emenike & Emenike, 2023).

Within the realm of academic writing, ChatGPT holds the capacity to streamline research processes, offer immediate access to up-to-date information, and enhance marketing campaigns. However, it also gives rise to worries over its influence on the genuineness and reliability of academic work (Dergaa et al., 2023). ChatGPT has been recognized as a valuable tool in nursing education, capable of augmenting student learning, enhancing clinical decision-making, promoting collaboration and communication, and facilitating personalized learning (Vitorino & Júnior, 2023). Moreover, the utilization of ChatGPT in medical facilities can enhance communication, leading to enhanced patient care and outcomes, as well as cost reduction.

However, implementing ChatGPT in various contexts also presents challenges. Concerns have been raised regarding its impact on the authenticity and credibility of academic work, reduced creativity, and breaches of academic integrity. ChatGPT's potential limitations in understanding non-native communication and its impact on academic integrity have been highlighted as potential barriers to its effective implementation. Additionally, the use of ChatGPT in healthcare and academic research has raised concerns about potential risks of plagiarism, copyright issues, and academic dishonesty.

Overall, the utilization of ChatGPT in a communication environment is marked by its capacity to enhance communication, decision-making, and learning procedures. Nevertheless, it is crucial to confront the difficulties and ethical concerns linked to its implementation in several domains in order to fully harness its potential.

## **5. DISCUSSION**

### **5.1. How is ChatGPT used in the context of human-machine digital communication?**

ChatGPT is used in a communication context as a versatile tool to increase efficiency and effectiveness in various fields, including education, ethics, marketing, and scientific research. Following are some of the critical applications identified from the research findings:

- Education: ChatGPT facilitates communication in educational settings, including content creation in journalism and communications, digital development, and project-based teaching scenarios.

- Leadership context: Research has explored the ethical implications of using ChatGPT, especially in leadership and decision-making contexts, highlighting the importance of considering ethical aspects in its application.
- Consumer and Marketing Studies: ChatGPT is also used in marketing communications, such as content generation and customer interactions, emphasizing the benefits and potential drawbacks.
- Scientific Communication Writing: In the scientific field, ChatGPT helps improve the efficiency of writing, outline development, and adding details, as well as reducing the time and effort required for editing and proofreading manuscripts.
- Health and Medical: ChatGPT is used in healthcare research to generate simulations of clinical interactions, support experimental research, and assist in scientific communication and code writing.
- Academic Research: ChatGPT supports academic tasks such as essay writing, summarizing literature, and preparing for medical licensing exams, as well as evaluating the quality and accuracy of academic answers.

The use of ChatGPT in educational settings has been the subject of extensive research and exploration. ChatGPT facilitates communication in educational scenarios, particularly in journalism and communications, digital development, and project-based teaching (Lo, 2023; Pavlik, 2023). In educational contexts, ChatGPT has been studied for its potential use in undergraduate chemistry laboratories, academic content evaluation, and as a tool for generating general chemistry exam questions (Adeshola & Adepoju, 2023; Tyson, 2023). Additionally, research has investigated the ethical implications of using ChatGPT, especially in leadership and decision-making, emphasizing the importance of considering ethical aspects in its implementation (Abdulai & Hung, 2023; Sun & Hoelscher, 2023). Additionally, the ethical and acceptable use of large language models in scientific writing has been debated, with concerns over the potential creation of pseudo-experts in the medical field and the generation of dubious "expert" opinions via ChatGPT (Fatani, 2023).

In conclusion, the use of ChatGPT in educational and leadership contexts has been extensively researched, with research focusing on its application in fields such as journalism, communications, and health education. While its potential benefits in facilitating communication and content creation are clear, ethical considerations and concerns regarding its impact on decision-making processes have also been highlighted. The application of ChatGPT in communications offers the ability for task automation, synthesis of complex information, and enhanced interactions through natural language, with the caveat that its application must be accompanied by a proper understanding of context to avoid misunderstandings and errors.

## **5.2. What are the advantages of using ChatGPT in a communication context?**

Discussion of research findings regarding the advantages of using ChatGPT in a communication context can be described as follows:

### **1. Efficiency and accuracy in communication:**

ChatGPT, as a Large Language Model (LLM), is proven to increase efficiency and accuracy in conversation and writing tasks. It indicates that ChatGPT can handle large volumes of inquiries and messages quickly and accurately, which is especially important in environments such as customer service and education.

## 2. Social and contextual influences:

Studies show that factors such as social influence and context of use play a significant role in a person's intention to use ChatGPT. It suggests that acceptance and adoption of ChatGPT can be increased by understanding and integrating the platform into the social context and user habits.

## 3. Improved journalism and communication education:

ChatGPT has been recognized for its contributions to journalism and communications education, mainly through digital development and project-based teaching scenarios. It reflects the potential of ChatGPT to complement traditional teaching methods and provide new tools for multimedia education.

## 4. Improved decision making and ethical considerations:

In the context of decision-making, ChatGPT offers the possibility to enrich the process by providing fast and in-depth data analysis and assisting in communicating those decisions. However, these improvements require solid ethical considerations, emphasizing the importance of responsible use.

## 5. Benefits in health services:

In the healthcare sector, ChatGPT has the potential to simplify workflows and support personalized medicine, which in turn can improve patient care. This feature allows healthcare professionals to spend more time on the human aspects of care and less on administrative tasks.

## 6. Support for medical education:

ChatGPT can facilitate learning and knowledge dissemination in medical education by providing a platform for discussing and learning various topics. However, risks such as plagiarism and a lack of emotional interaction necessary to develop appropriate communication skills must be managed carefully.

## 7. Support for academic writers:

ChatGPT supports academic writing and translation for writers, especially non-native English users, enabling increased accessibility and inclusion in academic communications.

## 8. Performance in medical entrance examination:

ChatGPT has demonstrated its ability to achieve high compliance in clinical medicine entrance exams, demonstrating its potential as a study and exam preparation tool.

The potential for efficiency and accuracy in ChatGPT communications has become a concern in various fields. ChatGPT has been recognized for simplifying workflows and improving communication in different contexts (Sullivan et al., 2023). The use of ChatGPT in education, research, and healthcare practice has been highlighted for its usefulness in simplifying workflows, saving time, and improving documentation and personalized treatment (Hosseini et al., 2023; Perera Molligoda Arachchige, 2023; Sallam et al., 2023). In addition, ChatGPT offers benefits like as rapidity, efficacy, and cost-efficiency by eliminating the need for human involvement. Nevertheless, there are apprehensions over the security and long-term consequences of ChatGPT, despite its capacity to enhance productivity (Abdulai & Hung, 2023; Deng & Lin, 2023; Derner & Batistič, 2023).

In the context of academia, the launch of ChatGPT has sparked discussions about the potential negative impacts and risks it poses to education (Emenike & Emenike, 2023; Sinnappan et al., 2023; Tlili et al., 2023). Moreover, the utilization of ChatGPT in higher education has sparked apprehensions regarding academic integrity, student acquisition of knowledge, and the possibility of enhancing engagement and achievement among students

from underprivileged backgrounds (Neumann et al., 2023; Rudolph et al., 2023). Although ChatGPT has been recognized for its ability to offer justification and background data for answers, there are concerns regarding its ability to position itself as the primary epistemic authority without a sufficient evidentiary foundation (Cooper, 2023; Ivanov & Soliman, 2023).

In conclusion, ChatGPT's potential to simplify workflows and improve communications has been recognized in various fields, including healthcare, academia, and higher education. While its speed, efficiency, and cost-effectiveness are transparent, ethical and safety issues have been raised, highlighting the need for balanced consideration of its implications. Overall, these findings confirm that while ChatGPT offers substantial benefits in various aspects of communication, its use must be weighed against ethical considerations, potential impact on work authenticity, and the need for authentic human interaction.

### **5.3. What are the main challenges faced in adopting ChatGPT in a communications context?**

The application of ChatGPT in a communication context does face several main challenges, which can be described as follows:

#### **1. Ethical and privacy considerations:**

The first challenges faced are ethics, privacy, and data security. When using ChatGPT within an organization, there is a need to ensure that all processed data is protected and regulated by applicable privacy laws. Additionally, transparency in how data is processed by these models and accountability for results are essential for building user trust.

#### **2. Risk of plagiarism and academic dishonesty:**

Plagiarism and academic dishonesty pose a substantial risk in academic and healthcare settings. Utilizing ChatGPT for academic writing and publishing might lead to plagiarism without appropriate acknowledgment, so undermining academic integrity.

#### **3. Lack of personal and emotional interaction:**

The importance of personal and emotional interactions in the development of communication skills, particularly in health education, cannot be fully simulated by ChatGPT. It may limit its ability to replace human interaction in learning and decision-making processes.

#### **4. Interpretation and understanding context:**

Another big challenge is ChatGPT's ability to truly understand and interpret context, especially in medical education and knowledge assessment. There is concern that language models may not fully capture the nuances and complexity of human language and domain-specific knowledge.

#### **5. Academic research integrity:**

In academic research and publishing, the difficulty of understanding language models can challenge traditional gatekeeping roles, such as peer review, and potentially impact research integrity.

#### **6. Potential bias and accuracy:**

Another challenge is the potential for bias in models and the spread of misinformation. ChatGPT, like all LLMs, is trained on existing data that may contain historical and systemic bias. It can result in the reproduction of such biases in communication and research.

Limitations in Education:

In education, some concerns are that using ChatGPT could lead to inaccurate research, data security issues, the spread of misinformation, and decreased personalization.

#### 7. Communication with non-native speakers:

ChatGPT may have limitations in understanding communication strategies used by non-native speakers, which raises concerns about its suitability for second language teaching and cross-cultural communication.

#### 8. Challenges in healthcare:

In healthcare, there is a need for further research into ChatGPT's ability to handle unstructured clinical information and its limitations in structured clinical scenarios.

#### 9. Lack of emotional intelligence:

ChatGPT and similar models may lack the emotional intelligence to manage sociolinguistic nuances in health communications, especially when interacting with non-native speakers.

Concerns regarding ethical issues such as plagiarism, bias, and inaccurate content explore the impact of ChatGPT on academia and libraries, emphasizing the need for responsible and ethical use of the technology (Lund & Wang, 2023). It focuses on the challenges and risks of bias in large language models like ChatGPT, emphasizing the importance of addressing bias and fostering fair and responsible AI systems (Ferrara, 2023). While ChatGPT shows promise in various applications, including healthcare and academia, addressing concerns regarding plagiarism, bias, and ethical considerations is crucial.

Several studies collectively suggest that ChatGPT may have limitations in personal and emotional interactions. Rad found that while chatbots like ChatGPT can provide convenience, they can also cause frustration and dissatisfaction when they fail to meet user needs. Participants in their research expressed concern about the potential for chatbots to replace human interaction. On the other hand, found that ChatGPT shows promising results in generating emotional responses, but its performance in understanding emotional dialogue may still lag behind supervised models (Zhao et al., 2023). These findings suggest that although ChatGPT may have some emotional dialogue capabilities, it may not fully meet expectations for personal and emotional interactions.

There is a need to develop thoughtful policies, improve models with more inclusive and ethical training, and build legal frameworks that ensure transparency and accountability of these AI systems.

### **5.4. What is the impact of using ChatGPT in a communication context?**

The use of ChatGPT in a communication context has had a significant impact, including increased efficiency and effectiveness of communications, as well as improvements in education and health services. The following are the positive and negative impacts of using ChatGPT in a communication context:

#### Positive impact:

- Human-Like Conversations: ChatGPT improves the quality of interactions between humans and machines, creating more natural and intuitive conversations.
- Healthcare Efficiency: ChatGPT has demonstrated cost efficiencies, improved medical documentation, more personalized treatment, and increased health literacy, all of which can improve patient care outcomes.

- Enhanced Learning: ChatGPT can support personalized learning, improve clinical decision-making, and facilitate collaboration and communication in education.
- Improved Research and Academic Writing: ChatGPT can simplify research, provide access to the latest data, and assist in academic writing and translation, improving the quality and accessibility of research.
- Improved Hospital Services: ChatGPT in healthcare institutions can improve communication between service providers and patients, leading to better services and improved patient outcomes.

The use of ChatGPT in various domains, including personalized learning, clinical decision-making, collaboration, communication, research, and academic writing, has been the subject of extensive research and exploration. ChatGPT has been recognized for its potential to support personalized learning, improve clinical decision-making, and facilitate collaboration and communication in education (Cheng et al., 2023; Silva & Janes, 2021; Zhu et al., 2023). In addition, the institution has been recognized for its ability to simplify research, provide access to up-to-date data, and assist with academic writing and translation, thereby improving the quality and accessibility of research (Biswas, 2023; Rahman et al., 2023).

Negative impact:

- Ethics and Privacy Implications: ChatGPT raises questions about ethics and privacy, particularly regarding how personal data is used and protected.
- Concerns Over Academic Authenticity: Some concerns are that using ChatGPT in academic writing may affect the authenticity and credibility of the work and may lead to reduced creativity and breaches of academic integrity.
- Risk of Plagiarism: In an academic context, there is a risk that ChatGPT could be used for plagiarism and academic dishonesty.
- Limitations of Non-Native Understanding: ChatGPT may encounter difficulties understanding and interpreting communications from non-native speakers, which could limit its effectiveness in second-language teaching and cross-cultural communication.
- Over-Reliance on Technology: ChatGPT can lead to over-reliance on technology, reducing human interaction, which is essential for developing communication skills and empathy, especially in education and healthcare.

Several studies collectively address the technology, applications, limitations, and ethical issues surrounding ChatGPT. Shahriar & Hayawi (2023) highlights the potential usefulness of ChatGPT in various fields but also emphasizes the ethical and privacy issues associated with the technology. focuses on the security risks of ChatGPT, including the generation of malicious text and the disclosure of personal data, and suggests strategies to mitigate these risks. Overall, this paper acknowledges the potential of ChatGPT but raises important questions about its ethical, privacy, and security implications. To maximize positive and minimize negative impacts, a careful and planned approach must be implemented, including strong policies, ethical oversight, and ongoing training for ChatGPT users.

## 6. CONCLUSION

Based on data and discussions, it was found that the use of ChatGPT in human-machine communication offers increased efficiency and effectiveness through task automation and increased interaction using natural language. ChatGPT is applied in areas such as education, marketing, ethics, and health, with benefits such as efficiency in communication, social and contextual influence, and support in academic writing and decision-making. However, this use also brings challenges such as ethical and privacy considerations, the risk of plagiarism, and limitations in understanding context and emotional interactions. The impact of its use includes improved quality of interactions and healthcare, personalized learning support, and improvements in academic research and writing. On the other hand, negative impacts include concerns about privacy and ethics, the risk of plagiarism, and the potential for over-reliance on technology. The article emphasizes the importance of a careful approach, solid policies, ethical oversight, and ongoing training for ChatGPT users to maximize benefits and minimize risks. Research should be limited to the literature available in English, limiting understanding of the use of ChatGPT in multilingual and cross-cultural communication contexts. The development of AI technology is rushing, and current findings may quickly become obsolete with the emergence of new and more sophisticated models. Further research is needed to explore the use of ChatGPT in different languages and cultural contexts, expanding understanding of its global applications. More in-depth research into integrating ChatGPT with existing privacy and ethics policies, as well as the development of a new framework if necessary.

### **Competing interests**

*The author(s) declare no competing interests.*

### **Ethical statements/Informed consent**

*This article does not contain any studies with human participants performed by any of the authors.*

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## REFERENCES

- Abdulai, A. F., & Hung, L. (2023). Will ChatGPT undermine ethical values in nursing education, research, and practice? *Nursing Inquiry*, *30*(3), e12556. <https://doi.org/10.1111/nin.12556>
- Adeshola, I., & Adepoju, A. P. (2023). The opportunities and challenges of ChatGPT in education. *Interactive Learning Environments*, 1–14. <https://doi.org/10.1080/10494820.2023.2253858>
- Alhasan, K., Al-Tawfiq, J., Aljamaan, F., Jamal, A., Al-Eyadhy, A., & Temsah, M.-H. (2023). Mitigating the burden of severe pediatric respiratory viruses in the Post-COVID-19 Era: ChatGPT insights and recommendations. *Cureus*, *15*(3), e36263. <https://doi.org/10.7759/cureus.36263>
- Ali, H. (2023). Letter 1 regarding "Assessing the performance of ChatGPT in answering questions regarding cirrhosis and hepatocellular carcinoma." *Clinical and Molecular Hepatology*, *29*(3), 813–814. <https://doi.org/10.3350/cmh.2023.0120>
- Alkaissi, H., & McFarlane, S. I. (2023). Artificial hallucinations in ChatGPT: Implications in scientific writing. *Cureus*, *15*(2), e35179. <https://doi.org/10.7759/cureus.35179>
- Ayinde, L., Wibowo, M. P., Ravuri, B., & Emdad, F. Bin. (2023). ChatGPT as an important tool in organizational management: A review of the literature. *Business Information Review*, *40*(3), 137–149. <https://doi.org/10.1177/02663821231187991>
- Basir, A., Puspitasari, E. D., Aristarini, C. C., Sulastri, P. D., & Almaududi Ausat, A. M. (2023). Ethical use of ChatGPT in the context of leadership and strategic decisions. *Jurnal Minfo Polgan*, *12*(1), 1239–1246. <https://doi.org/10.33395/jmp.v12i1.12693>
- Benichou, L. (2023). Rôle de l'utilisation de l'intelligence artificielle ChatGPT dans la rédaction des articles scientifiques médicaux The role of using ChatGPT AI in writing medical scientific articles. *Journal of Stomatology, Oral and Maxillofacial Surgery*, *124*(5), 101456. <https://doi.org/10.1016/j.jormas.2023.101456>
- Biswas, S. S. (2023). ChatGPT for Research and publication: A step-by-step guide. *Journal of Pediatric Pharmacology and Therapeutics*, *28*(6), 576–584. <https://doi.org/10.5863/1551-6776-28.6.576>
- Bonsu, E. M., & Baffour-Koduah, D. (2023). From the consumers' side: Determining students' perception and intention to use ChatGPT in Ghanaian higher education. *Journal of Education, Society & Multiculturalism*, *4*(1), 1–29. <https://doi.org/10.2478/jesm-2023-0001>
- Cheng, K., Li, Z., He, Y., Guo, Q., Lu, Y., Gu, S., & Wu, H. (2023). Potential use of artificial intelligence in infectious disease: Take ChatGPT as an example. *Annals of Biomedical Engineering*, *51*, 1130–1135. <https://doi.org/10.1007/s10439-023-03203-3>
- Cocchia, A. (2014). Smart and digital city: A systematic literature review. In R. P. Dameri & C. Rosenthal-Sabroux (Eds.), *Smart City* (pp. 13–43). Springer International Publishing. [https://doi.org/10.1007/978-3-319-06160-3\\_2](https://doi.org/10.1007/978-3-319-06160-3_2)
- Cooper, G. (2023). Examining science education in ChatGPT: An exploratory study of generative Artificial Intelligence. *Journal of Science Education and Technology*, *32*, 444–452. <https://doi.org/10.1007/s10956-023-10039-y>
- Das, D., Kumar, N., Longjam, L. A., Sinha, R., Deb Roy, A., Mondal, H., & Gupta, P. (2023). Assessing the capability of ChatGPT in answering first- and second-order knowledge questions on microbiology as per competency-based medical education curriculum. *Cureus*, *15*(3), e36034. <https://doi.org/10.7759/cureus.36034>
- Deng, J., & Lin, Y. (2023). The benefits and challenges of ChatGPT: An overview. *Frontiers in Computing and Intelligent Systems*, *2*(2), 81–83. <https://doi.org/10.54097/fcis.v2i2.4465>
- Dergaa, I., Chamari, K., Zmijewski, P., & Saad, H. B. (2023). From human writing to artificial intelligence generated text: examining the prospects and potential threats of ChatGPT in academic writing. *Biology of Sport*, *40*(2), 615–622. <https://doi.org/10.5114/BIOLOSPORT.2023.125623>
- Derner, E., & Batistič, K. (2023). Beyond the safeguards: Exploring the security risks of ChatGPT. *ArXiv, abs/2305.08005*. <https://doi.org/10.48550/arXiv.2305.08005>
- Emenike, M. E., & Emenike, B. U. (2023). Was this title generated by ChatGPT? Considerations for artificial intelligence text-generation software programs for chemists and chemistry educators. *Journal of Chemical Education*, *100*(4), 1413–1418. <https://doi.org/10.1021/acs.jchemed.3c00063>
- Eysenbach, G. (2023). The role of ChatGPT, generative language models, and artificial intelligence in medical education: A conversation with ChatGPT and a call for papers. *JMIR Medical Education*, *9*, e46885. <https://doi.org/10.2196/46885>
- Fatani, B. (2023). ChatGPT for future medical and dental research. *Cureus*, *15*(4), e37285. <https://doi.org/10.7759/cureus.37285>

- Fergus, S., Botha, M., & Ostovar, M. (2023). Evaluating academic answers generated using ChatGPT. *Journal of Chemical Education*, 100(4), 1672–1675. <https://doi.org/10.1021/acs.jchemed.3c00087>
- Ferrante, G., & Lanera, C. (2023). ChatGPT nella ricerca scientifica: guida all'uso consapevole. *Epidemiologia e prevenzione*, 47(3), 203–207. <https://doi.org/10.19191/EP23.3.A639.051>
- Ferrara, E. (2023). Should ChatGPT be biased? Challenges and risks of bias in large language models. *First Monday*, 28(11). <https://doi.org/10.5210/fm.v28i11.13346>
- Ghosh, A., & Bir, A. (2023). Evaluating ChatGPT's ability to solve higher-order questions on the competency-based medical education curriculum in medical biochemistry. *Cureus*, 15(4) e37023 <https://doi.org/10.7759/cureus.37023>
- Gilson, A., Safranek, C. W., Huang, T., Socrates, V., Chi, L., Taylor, R. A., & Chartash, D. (2023). How does ChatGPT perform on the United States medical licensing examination? The implications of large language models for medical education and knowledge assessment. *JMIR Medical Education*, 9, e45312. <https://doi.org/10.2196/45312>
- Gladstone, R. (2023). Using ChatGPT in the classroom. *Spicer Adventist University Research Articles Journal*, 2(1), 16–24. <https://doi.org/10.56934/sauraj.v2i1.143>
- Halaweh, M. (2023). ChatGPT in education: Strategies for responsible implementation. *Contemporary Educational Technology*, 15(2), ep421. <https://doi.org/10.30935/cedtech/13036>
- Hirosawa, T., Harada, Y., Yokose, M., Sakamoto, T., Kawamura, R., & Shimizu, T. (2023). Diagnostic accuracy of differential-diagnosis lists generated by generative pretrained transformer 3 chatbot for clinical vignettes with common chief complaints: A pilot study. *International Journal of Environmental Research and Public Health*, 20(4), 3378. <https://doi.org/10.3390/ijerph20043378>
- Hopkins, A. M., Logan, J. M., Kichenadasse, G., & Sorich, M. J. (2023). Artificial Intelligence chatbots will revolutionize how cancer patients access information: ChatGPT represents a paradigm shift. *JNCI Cancer Spectrum*, 7(2), pkad010. <https://doi.org/10.1093/jncics/pkad010>
- Hosseini, M., Gao, C. A., Liebovitz, D. M., Carvalho, A. M., Ahmad, F. S., Luo, Y., MacDonald, N., Holmes, K. L., & Kho, A. (2023). An exploratory survey about using ChatGPT in education, healthcare, and research. *MedRxiv: The Preprint Server for Health Sciences*, 2003–2023. <https://doi.org/10.1101/2023.03.31.23287979>
- Huang, J., & Tan, M. (2023). The role of ChatGPT in scientific communication: writing better scientific review articles. *American Journal of Cancer Research*, 13(4), 1148–1154.
- Hung, Y. C., Chaker, S. C., Sigel, M., Saad, M., & Slater, E. D. (2023). Comparison of patient education materials generated by chat generative pre-trained transformer versus experts: An innovative way to increase readability of patient education materials. *Annals of Plastic Surgery*, 91(4), 409–412. <https://doi.org/10.1097/SAP.0000000000003634>
- Ivanov, S., & Soliman, M. (2023). Game of algorithms: ChatGPT implications for the future of tourism education and research. *Journal of Tourism Futures*, 9(2), 214–221. <https://doi.org/10.1108/jtf-02-2023-0038>
- Kalla, D., Smith, N., Kuraku, S., & Samaah, F. (2023). Study and analysis of ChatGPT and its impact on different fields of study. *International Journal of Innovative Science and Research Technology*, 8(3), 827–833. <https://doi.org/10.5281/zenodo.10250455>
- Khowaja, S. A., Khuwaja, P., & Dev, K. (2023). ChatGPT needs SPADE (sustainability, privacy, digital divide, and ethics) evaluation: A review. *TechRxiv*. <https://doi.org/10.36227/techrxiv.22619932.v2>
- Koubaa, A., Boulila, W., Ghouti, L., Alzahem, A., & Latif, S. (2023). Exploring ChatGPT capabilities and limitations: A critical review of the NLP game changer. *Preprints*, 2023030438. <https://doi.org/10.20944/preprints202303.0438.v1>
- Kung, T. H., Cheatham, M., Medenilla, A., Sillos, C., De Leon, L., Elepaño, C., Madriaga, M., Aggabao, R., Diaz-Candido, G., Maningo, J., & Tseng, V. (2023). Performance of ChatGPT on USMLE: Potential for AI-assisted medical education using large language models. *PLOS Digital Health*, 2(2), e0000198. <https://doi.org/10.1371/journal.pdig.0000198>
- Li, Y., & Zhang, Y. (2023). Analysis of factors influencing ChatGPT users' willingness to use based on principal component analysis. In L. Yang & W. Tan (Eds.), *Sixth International Conference on Advanced Electronic Materials, Computers, and Software Engineering (AEMCSE 2023)* (p. 22). 127872J. <https://doi.org/10.1117/12.3004527>
- Lin, Z. (2023). Why and how to embrace AI such as ChatGPT in your academic life. *Royal Society Open Science*, 10(8), 230658. <https://doi.org/10.1098/rsos.230658>
- Liu, X., Fang, C., Yan, Z., Liu, X., Jiang, Y., Cao, Z., Wu, M., Chen, Z., Ma, J., Yu, P., Zhu, W., Abudukeremu, A., Wang, Y., Chen, Y., Zhang, Y., & Wang, J. (2023). Performance of ChatGPT on clinical medicine entrance examination for Chinese postgraduate in Chinese. *MedRxiv*. <https://doi.org/10.1101/2023.04.12.23288452>

- Lo, C. K. (2023). What is the impact of ChatGPT on education? A rapid review of the literature. *Education Sciences*, 13(4), 410. <https://doi.org/10.3390/educsci13040410>
- Lund, B. D., & Wang, T. (2023). Chatting about ChatGPT: how may AI and GPT impact academia and libraries? *Library Hi Tech News*, 40(3), 26–29. <https://doi.org/10.1108/LHTN-01-2023-0009>
- Menichetti, J., Hillen, M. A., Papageorgiou, A., & Pieterse, A. H. (2023). How can ChatGPT be used to support healthcare communication research? *Patient Education and Counseling*, 115, 107947. <https://doi.org/10.1016/j.pec.2023.107947>
- Neumann, M., Rauschenberger, M., & Schon, E. M. (2023). "We need to talk about ChatGPT": The future of AI and higher education. *5th International Workshop on Software Engineering Education for the Next Generation (SEENG 2023)* (pp. 29–32). IEEE. <https://doi.org/10.1109/SEENG59157.2023.00010>
- Nguyen, J., & Pepping, C. A. (2023). The application of ChatGPT in healthcare progress notes: A commentary from a clinical and research perspective. *Clinical and Translational Medicine*, 13(7), e1324. <https://doi.org/10.1002/ctm2.1324>
- Paul, J., Ueno, A., & Dennis, C. (2023). ChatGPT and consumers: Benefits, pitfalls and future research agenda. *International Journal of Consumer Studies*, 47(4), 1213–1225. <https://doi.org/10.1111/ijcs.12928>
- Pavlik, J. V. (2023). Collaborating with ChatGPT: Considering the implications of generative artificial intelligence for journalism and media education. *Journalism and Mass Communication Educator*, 78(1), 84–93. <https://doi.org/10.1177/10776958221149577>
- Perera Molligoda Arachchige, A. S. (2023). Early applications of ChatGPT in medical practice, education and research. *Clinical Medicine, Journal of the Royal College of Physicians of London*, 23(4), 429–430. <https://doi.org/10.7861/clinmed.Let.23.4.2>
- Qu, R. W., Qureshi, U., Petersen, G., & Lee, S. C. (2023). Diagnostic and management applications of ChatGPT in structured otolaryngology clinical scenarios. *OTO Open*, 7(3), e67. <https://doi.org/10.1002/oto2.67>
- Raman, R., Mandal, S., Das, P., Kaur, T., Jp, S., & Nedungadi, P. (2023). University students as early adopters of ChatGPT: Innovation Diffusion Study. *PREPRINT (Version 1) available at Research Square*. <https://doi.org/10.21203/rs.3.rs-2734142/v1>
- Rahman, M., Terano, H. J. R., Rahman, N., Salamzadeh, A., & Rahaman, S. (2023). ChatGPT and academic research: A review and recommendations based on practical examples. *Journal of Education, Management and Development Studies*, 3(1), 1–12. <https://doi.org/10.52631/jemds.v3i1.175>
- Raj, R., Singh, A., Kumar, V., & Verma, P. (2023). Analyzing the potential benefits and use cases of ChatGPT as a tool for improving the efficiency and effectiveness of business operations. *BenchCouncil Transactions on Benchmarks, Standards and Evaluations*, 3(3), 100140. <https://doi.org/10.1016/j.tbench.2023.100140>
- Rother, E. T. (2007). Systematic literature review X narrative review. *ACTA Paulista de Enfermagem*, 20(2). <https://doi.org/10.1590/s0103-21002007000200001>
- Rudolph, J., Tan, S., & Tan, S. (2023). ChatGPT: Bullshit spewer or the end of traditional assessments in higher education? *Journal of Applied Learning and Teaching*, 6(1), 342–363. <https://doi.org/10.37074/jalt.2023.6.1.9>
- Sakai, N. (2023). Native, non-native, or bilingual? A concise assessment of ChatGPT's suitability for second-language instruction as a native or non-native pedagog. *OSF Preprints*. <https://doi.org/10.31219/osf.io/hy9ju>
- Sallam, M. (2023). ChatGPT utility in healthcare education, research, and practice: Systematic review on the promising perspectives and valid concerns. *Healthcare*, 11(6), 887. <https://doi.org/10.3390/healthcare11060887>
- Sallam, M., Salim, N. A., Barakat, M., & Al-Tammemi, A. B. (2023). ChatGPT applications in medical, dental, pharmacy, and public health education: A descriptive study highlighting the advantages and limitations. *Narra J*, 3(1). <https://doi.org/10.52225/narra.v3i1.103>
- Santandreu-Calonge, D., Medina-Aguerreberre, P., Hultberg, P., & Shah, M. A. (2023). Can ChatGPT improve communication in hospitals? *Profesional de La Informacion*, 32(2). <https://doi.org/10.3145/epi.2023.mar.19>
- Shahriar, S., & Hayawi, K. (2023). Let's have a chat! A conversation with ChatGPT: Technology, applications, and limitations. *Artificial Intelligence and Applications*, 2(1), 11–20. <https://doi.org/10.47852/bonviewAIA3202939>
- Shaji George, A., & Hovan George, A. (2023). A review of ChatGPT AI's impact on several business sectors. *Partners Universal International Innovation Journal*, 1(1), 9–23. <https://puiij.com/index.php/research/article/view/11>
- Silva, A. de O., & Janes, D. dos S. (2021). The emergence of ChatGPT and its implications for education and academic research in the 21st century. *Review of Artificial Intelligence in Education*, 2(00), e06. <https://doi.org/10.37497/rev.artif.intell.education.v2i00.6>
- Sinnappan, G. S., Kolandaisamy, R., & Rajamanickam, L. (2023). ChatGPT and its impact on tertiary education in Malaysia. In P. C. Lai (Ed.), *Advances in Educational Technologies and Instructional Design* (pp. 146–164). IGI Global. <https://doi.org/10.4018/978-1-6684-9103-4.ch008>

- Strong, E., DiGiammarino, A., Weng, Y., Basaviah, P., Hosamani, P., Kumar, A., Nevins, A., Kugler, J., Hom, J., & Chen, J. H. (2023). Performance of ChatGPT on free-response, clinical reasoning exams. *MedRxiv*. <https://doi.org/10.1101/2023.03.24.23287731>
- Sullivan, M., Kelly, A., & McLaughlan, P. (2023). ChatGPT in higher education: Considerations for academic integrity and student learning. *Journal of Applied Learning and Teaching*, 6(1), 31–40. <https://doi.org/10.37074/jalt.2023.6.1.17>
- Sun, G. H., & Hoelscher, S. H. (2023). The ChatGPT storm and what faculty can do. *Nurse Educator*, 48(3), 119–124. <https://doi.org/10.1097/NNE.0000000000001390>
- Sütçüoğlu, B. M., & Güler, M. (2023). Appropriateness of premature ovarian insufficiency recommendations provided by ChatGPT. *The Journal of The Menopause society*, 30(10), 1033–1037. <https://doi.org/10.1097/gme.0000000000002246>
- Taecharungroj, V. (2023). "What Can ChatGPT Do?" Analyzing early reactions to the innovative AI chatbot on Twitter. *Big Data and Cognitive Computing*, 7(1), 35. <https://doi.org/10.3390/bdcc7010035>
- Temsah, O., Khan, S. A., Chaiah, Y., Senjab, A., Alhasan, K., Jamal, A., Aljamaan, F., Malki, K. H., Halwani, R., Al-Tawfiq, J. A., Temsah, M.-H., & Al-Eyadhy, A. (2023). Overview of early ChatGPT's presence in medical literature: Insights from a hybrid literature review by ChatGPT and human experts. *Cureus*, 15(4), e37281. <https://doi.org/10.7759/cureus.37281>
- Tlili, A., Shehata, B., Adarkwah, M. A., Bozkurt, A., Hickey, D. T., Huang, R., & Agyemang, B. (2023). What if the devil is my guardian angel: ChatGPT as a case study of using chatbots in education. *Smart Learning Environments*, 10, 15. <https://doi.org/10.1186/s40561-023-00237-x>
- Tyson, J. (2023). Shortcomings of ChatGPT. *Journal of Chemical Education*, 100(8), 3098–3101. <https://doi.org/10.1021/acs.jchemed.3c00361>
- Van Dis, E. A. M., Bollen, J., Zuidema, W., Van Rooij, R., & Bockting, C. L. (2023). ChatGPT: five priorities for research. *Nature*, 614, 224–226. <https://doi.org/10.1038/d41586-023-00288-7>
- Van Laar, E., Van Deursen, A. J. A. M., Van Dijk, J. A. G. M., & De Haan, J. (2017). The relation between 21st-century skills and digital skills: A systematic literature review. *Computers in Human Behavior*, 72, 577–588. <https://doi.org/10.1016/j.chb.2017.03.010>
- Vitorino, L. M., & Júnior, G. H. Y. (2023). ChatGPT and the teaching of contemporary nursing: And now, professor? *Journal of Clinical Nursing*, 32(21-22), 7921–7922. <https://doi.org/10.1111/jocn.16706>
- Wu, Y. (2023). Exploration of the development path of journalism and communication education in china in the context of ChatGPT. *International Journal of Education and Humanities*, 10(1), 226–228. <https://doi.org/10.54097/ijeh.v10i1.11140>
- Xiao, Y., & Watson, M. (2019). Guidance on conducting a systematic literature review. *Journal of Planning Education and Research*, 39(1), 93–112. <https://doi.org/10.1177/0739456X17723971>
- Zhao, W., Zhao, Y., Lu, X., Wang, S., Tong, Y., & Qin, B. (2023). Is ChatGPT equipped with emotional dialogue capabilities? *ArXiv, abs/2304.09582*. <https://doi.org/10.48550/arXiv.2304.09582>
- Zhu, C., Sun, M., Luo, J., Li, T., & Wang, M. (2023). How can to harness the potential of ChatGPT in education? *Knowledge Management and E-Learning: An International Journal*, 15(2), 133–152. <https://doi.org/10.34105/j.kmel.2023.15.008>