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ChatGPT Genesis: An Analytical Exploration through Systematic and Bibliometric Review

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Abstract

The paper under consideration comes up with a broad systematic literature review as well as a detailed bibliometric analysis of the research papers related to the application of the ChatGPT, which is a big generative language model developed by OpenAI. The focus of the study is to present the whole spectrum of the existing literature on ChatGPT and discover what the key needs and concepts are by means of topic and trend analysis. Eventually, then 328 works - both of them articles and scientific articles - were selected from the Scopus database for bibliometric analysis discussed: publishing trends, productive countries, keywords - these are the three main factors that will impact your Amazon sales. Also included, a systematic literature review using various search engines. That involves 34 relevant research papers which is the core of the research problem. The effects demonstrate that research studies in ChatGPT have reached an infant stage of study and many fields have been touched which include natural language processing, understanding and conversations, speech processing, recognition, learning, dialogue systems, chatbots, and responses generation. The US apparently has a considerable share of this market, and the words 'patient care', 'medical', 'higher education', and a few other variations lead one to believe that this issue corresponds to these categories. Apparently, this research corresponds to a beneficial tool for scholars and practitioners that look into the Chatbots at the initial stage, which helps to increase the existing knowledge in this domain. This report has especially shown the necessity of further investigation and innovation to dismiss these shortcomings and to make the ChatGPT tool to cover ethical and responsible use areas. On the one hand, carrying out meta-research on ChatGPT can be seen to be an added value. However, at the same time, there is a need to understand the subtleties of using it to its full potential.

Keywords: *ChatGPT; AI; Chatbot; Systematic Review; Bibliometric Review*

Introduction

The ChatGPT launch, an GPT chatbot evolved by OpenAI on 30th November, 2022, had revolutionized the way people perceived language models and this is the reason right now there is a steady growth in the industry. From the beginning that research was conducted mainly to understand its advantages, but now both camps of the people are using radical language and perceiving divide in their views that one camp is advocating in favor of its benefits out of which some are shouting its use in a poor radish or some people criticize it due to its shortcomings. Some argue ChatGPT, a conversation-based agent, is able to instantly generate human-like text. It may be quite accurate but can be marred by errors at times. AI is an exclusionary model that generates different content and not merely an analysis of given data. The history of artificial intelligence (AI) took its foundation at Dartmouth Conference 1956 where the word "artificial intelligence" was coined, marking the next level of the development of the field where numerous researchers and institutions continue to contribute to and research towards. Different AI methods like symbolic reasoning, knowledge engineering, or machine learning emerged and developed within the succeeding decades. However, it was the Logic Theorist and General Problem Solver deployed since the late 1950s which demonstrated earlier successes in the artificial intelligence research by making use of the means-end analysis.

The 1960s and 1970ss developed the symbolic AI approach, until the knowledge representation and logical reasoning became preeminent in an attempt of imitating human intelligence. On the other hand, in handling the uncertainties as well as the complexity of real-world problems, the accuracy of first generation has declined, resulting in the turn of connectionism to the third generation of ANN that (now) is trying to take the place of the connectionism. Inspired by the connectionist approach, which is similar to the spherical neural networks, phenomena were able to be solved in which the machine learned from data and as a result, there were strong machine learning algorithms developed.

Deep learning came to the forefront in the second decade of the 21th century, particularly for image and speech recognition. Its major drivers were the overriding success of the deep neural networks. These breakthroughs made way for the language models of wide magnitude which use deep learning architecture. The true meaning of the statement was also marked by the launch of ChatGPT, which turned out to be a breakthrough characterized by the remarkable language generation ability coupled with an excellent contextual learning facility. This, in turn, ushered in a new era of human-machine communicative interaction that is sure to advance shortly. Ramzan et al (2023) have claimed that motivation is a significant tool. It is helpful in learning (Chen and Ramzan, 2024) and in syntax understanding (Ramzan, & Alahmadi, 2024).

The potential applications of such technology span various domains, including journalism, education, technical fields like coding and cybersecurity, and creative industries such as marketing, music production, and art generation. ChatGPT's adoption has already made substantial impacts in marketing, cybersecurity, and coding, with early adopters reaping significant benefits.

The idea of ChatGPT being an innovation cannot be spread without concerns of embracing AI technology. The issues of protecting data privacy, data security, addressing biases, and coming up with the ethics that matters should be deliberated upon and suitable solutions found. Transparency, accountability and effectiveness of AI algorithms and systems need to be the primary considerations for promoting fairness and trust among AI stakeholders.

As the popularity of AI applications, especially ChatGPT, increases it becomes fundamental to understand it past, what it is being used for and what it may be uses in the future. Quality research is of paramount importance in terms of providing the intensely detailed depth regarding the topic, it also makes the stakeholders able to understand and deal with its depths and axieties. This article reviews the seminal studies in order to help researchers, practitioners, policymakers and AI companies who are involved in the use of the large-scale generative language models developed by Bing formulate a concrete roadmap.

Conceptual Underpinnings and Recent Debate on ChatGPT

Not only the AI-driven activities take the lead like ChatGPT which is widely disliked among sectors such as education, certain medical specialties, and academic parties. While using AI for tasks such as education or medicine raises questions regarding plagiarism and cheating, the quality of medical predictions, and the growing concern of a lack of human ability to reason for academic issues, AI still has power to augment human intelligence. Nonetheless, it is early to have a say on the use and approval of this method. Research in these areas on the whole studies the effects of ChatGPT and AI employment in education while pointing to advantages which comprise personalized learning experiences, administrative tasks automation, effective data analysis, etc.

On the other hand, the study emphasizes factors that seen as the obstacles such as critical logical thinking, the diffusion of inaccurate information, the re-occurrence of favoritisms and academic dishonesty. The request for clear boundaries, conscious use and improvement of digital literacy among the educational decision-makers as well as ethics consideration is particularly important. To successfully face the changing situation at a time of these turning-point technologies, the joint actions and flexible decision-making will be required.

ChatGPT itself admits that it is vulnerable to loose text when creating or cutting off classes which underlines the need to correct them on times. On one hand, questionable wisdom appears to be indicated mostly in systems with extremely biased answers; however, this still gives rise to the discussion about misplaced information delivery to the masses. The complex ethical issues arise and the reliability on ChatGPT for critical decisions at executive level raises questions. There is also the issue of the moral consistency and of the impact on decision making of the users. Individuals concerned about the effect of such computers on the quality of their decisions might overestimate the role of the systems in their thinking, which is a clear marker for the need for consideration of ethical and care issues when using AI systems.

Research questions

As ChatGPT represents a contemporary and advancing idea, it necessitates comprehensive literature review and thorough data collection across diverse functional domains, leading to three key research questions:

RQ1. What essential facts have been revealed by the ongoing endeavors and the ones that were already conducted from the past till the present regarding the inner workings of ChatGPT?

RQ2. Can theories and practical aspects related to the chatGPT's integration in educational and other functional environments be enlisted?

RQ3. Who are the protagonist publishing houses, Institutes, journals and subject fields are more active in researching ChatGPT’s impact?

Research Design

An initial step in the research of the systematic literature review is selecting a subject and understand the relevant goals to narrow the area of inquiry and avoid scattered/sidelined results. The criteria for sample studies from this initial phase of the process must be clear and objective as it will help to focus and comprehensively reexamine the subject Chintalapati & Pandey, 2022). The kickoff of penetrating for existing available work occurred by submitting the phrases "Chat GPT" and "ChatGPT" to various repute databases, that is Scopus and Google Scholar. The vast majority of manuscript reviews were conducted, having in mind the relevance to the title and keywords indicated by the authors. In tinting, no rule of the time limit was imposed because the idea has not been around that long. Each appraised study only availed those disclosed during the 2022-2023 period. Subsequently, on January 4th, 2023, 34 articles were shortlisted for systematic review based on the inclusion and exclusion criteria detailed below:

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Inclusion Criteria:

1) Chats featured as study key “Keywords: ChatGPT, Humanize the given sentence. Delete the conjunction and comma before
2) This title work is most often used together with these words: "ChatGPT" and "Chat GPT".
3) Studies published in 2022 or 2023.
4) Studies found in scholarly outputs that are reliable sources.
5) Demonstration experiments done in English.

Exclusion Criteria:

1) Surveys and studies on other engagements, besides the topic of the current inquiry are of interest, for example, exhausting medical researches.
2) Presentation of only non-overlapping paths by the number of digital object identifiers (DOIs) chosen on the result interface.
3) Reliance on job ranking systems that favor peer-reviewed journals either completely or predominantly.

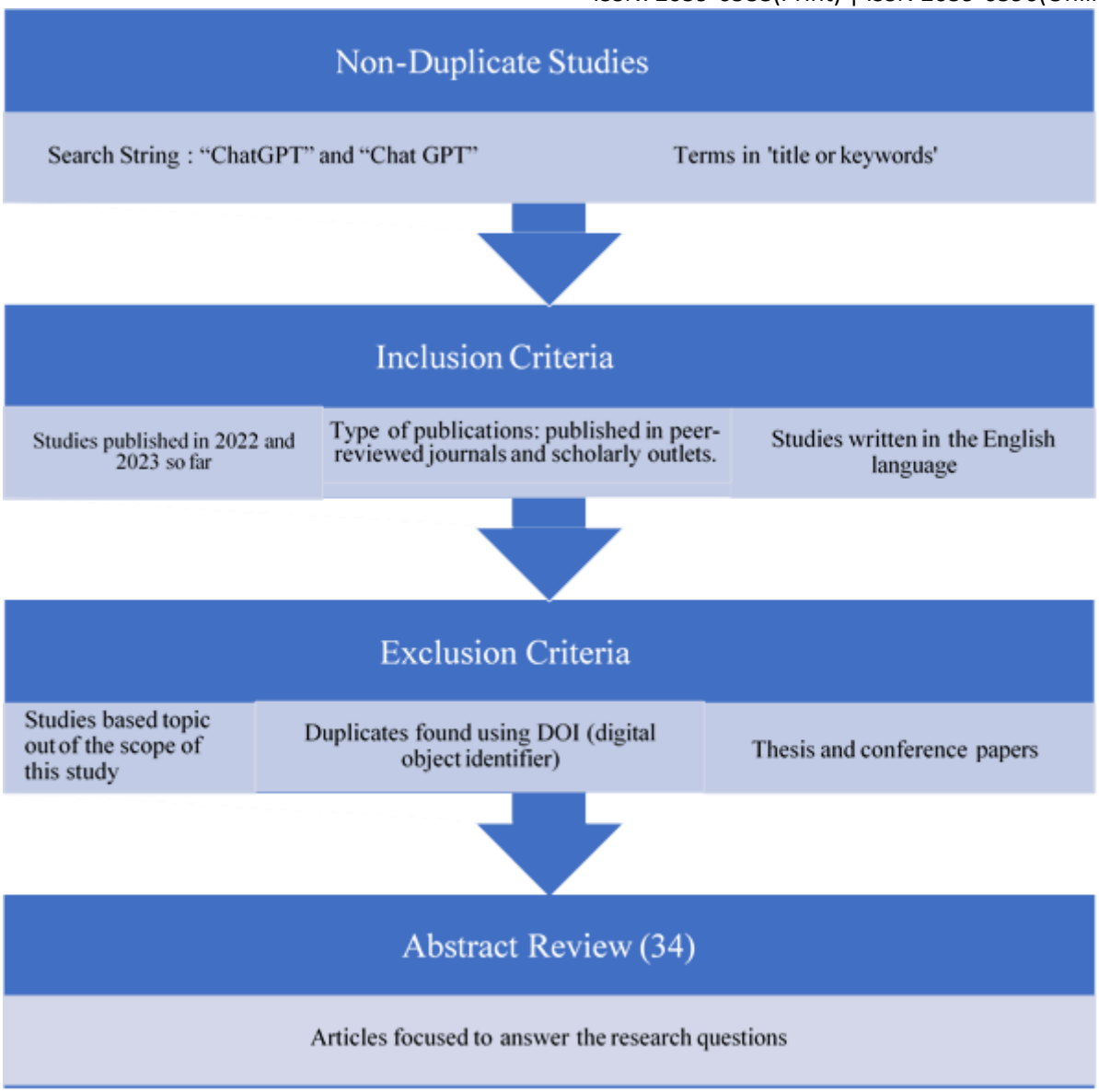

Figure 1. Systematic Literature Review Process

The bibliometric analysis for the study was actually only Scopus database-dependent, where the database is known for its reputation as a repository for scientific literature, with a focus on the matter "ChatGPT." Continuous searches were conducted throughout the process of reviewing the paper, to ensure the latest and the most relevant papers are included. Because of their quick character, last refinements were in demand to observe truthful and really different results. On 24 October, 2023, bibliometric analysis was completed with a final yield of 348 documents searched within the Scopus database.

Bibliometric analysis can act as a powerful challenge when it comes to analyze relative aspects such as country, institution, journal, subject categories, authors, keywords, and most-cited publications. It implies tracking new and up-to-date studies, thus seguing the complex topic that is under investigation and shows fluctuation. An open-ended search was made for articles using the search criteria that contained words 'ChatGPT' or 'Chat GPT' in title, keywords or abstract.

Article titles that appeared earlier than 2020 as well as materials written in other languages were excluded from the analysis resulting into 328 articles that were subjected to my software named VOSviewer. VOSviewer, the free software tool which is very popular among available tools, was used to make the graphical representations of the bibliometric data, and it also helps researchers analyze the complexity of relationship in their data set (Van Eck & Waltman, 2010).

Analysis and Synthesis of Systematic Literature

Understanding the nature of ChatGPT

ChatGPT, and other similar intelligent technologies, or they have the ability to use AI, but that will still affect the way people interact. There is a lot of debate about what will they be used for and how we should deal with these AI technologies, therefore, it is important to understand its limitations, especially if they are at the early stage of the product's development. AI should be considered as a tool that assists human abilities and not the one that obliterates every human endeavors. Humanity’s abilities are diverse, ranging from cognitive to emotional faculties, having close structural ties to social, cultural, and ethical constructs. These attributes constitute people's nature that let them to deal with the difficulties of the environment, make decisions, and to assess the consequences of the actions. AI on the contrary does’ job really efficiently and fast because of its ability to process enormous amounts of data but is very dependent on inputs and the parameters. Our task, therefore, is in the way we train AI which in turn can be compared to a process that seems to be a supervision of very gifted children, as eventually they will become what we teach them (Mo Gawdat, 2021). Thus, there is a must have algorithms train in an ethical and responsible way to xxx this end.

Mathematically advanced machine learning algorithms, core of AI systems, are used for identification of information in big data. Nevertheless, they have become heavily dependent on human inputs production of their data, which is usually sourced from the same. As a result, AIs undermine the biases that already exist in the training data, and therefore bias can be conveyed and normalized by AI algorithm itself, which raises applauds or ethical concerns and unjust raises. We need to recognize the strength as well the weakness of AI algorithms to facilitate their improvement (Gozalo-Brizuela & Garrido-Merchan, 2023).

The entities operating in AI design should enlist ethics to do proper publication and deployment of AI tools, which may be unto them harmful as a result of inadequate comprehensions of their restrictions (Nat Mach Intell, 2022; Ciaccio, 2023; Sallam, 2023).

With the advent of 'Generative AI', a variety of industries get a chance to implement it, and there exist as many as thousands of applications in multiple categories. The feedback of ChatGPT represents the increasing audience, which explains, at the same time, positive impression for its performance and challenges due to the outcomes. On the one hand, ChatGPT proponents see it as an AI platform that revolutionises the specific field of human-computer communication (Roose, 2022), and on the other hand, the potential hazardous effects on the democracy and job market are indicated (Cowen,2022; Krugman, 2022). Learning about them, especially the field of education and more, stems from reading and reviewing different studies, which enables observation of what is at the moment and an idea of what the future holds.

Application of ChatGPT in education and other areas

Application of ChatGPT in Education

The area of AI in Education (AIED) is gaining a rapid momentum lately, with AI seen as an important and effective tool in both learning process of students and teachers, especially if it is used properly. AI solutions are now increasingly being adopted in the education landscape where it is being utilized by primary and secondary schools to higher education institutions for the possibility of better experiences for a learner. Anyway, with some doubt about the implementation of AI technologies in education sector with the problems concerning privacy and according influence on training systems. This rejection, just like the following "tech-lash" against different AI apps, is a manifestation of the general distaste for technology.

In fact, the best way to see AI as a means to a better education rather than a threat to self-creativity of students is just to let educational professionals acknowledge it as a learning tool that helps students think sequentially and organize their thoughts into logical statements (Shidiq, 2023). Informing teachers and students on the issues of ethics and critical thinking in AI application is where the key place is for the full range of AI efficaciousness in the training and knowledge processes. Students will learn how to construct instruction and guidance on AI in the ethical way by employing programs like ChatGPT to create checklists, templates, and assignments for activities such composing essays and research (El-Seoud, 2023).

AI in academia holds the potential to help publishing and researchers explore their research with out switching it into publishing. (Wang et al., 2023). Though these can be considered to be some of many hurdles, banning or rejecting applications like ChatGPT is not the solution. ChatGPT recently have been showcased by researchers to be competent in the construction of search terms for systematic literary reviews. This reveals it as an efficiency tool applicable to both researchers and professionals.

Two particular directions stand out where ChatGPT can assist in education: one-on-one instruction along with tackling the equality problems in education (Lund et al., 2023). AI allows teachers to customize learning plans for each students' strengths and weaknesses so the availability of specialized resources that clear the way for academic growth and thus narrow the gap among students in the achievement. Yet, technology remains to be distributed inequitably, thereby leading to access inequality which is still a tip of iceberg in educational equity (Baber et al., 2022).

AI techniques in chatbot technology seem to be able to increase student interactions, involvement, and enrichment, thus improving observance results (D'Mello et al., 2014; Muñoz et al., 2023). On the other hand, the usual NLP models can assist in learning languages, writing skills enhancement, and make education fair for everyone through inclusivity (El-Seoud, 2023; Deng & Lin, 2022).

However, aside from the benefits the main problem of these technological developments like privacy violations and the algorithmic discrimination remain (Shelby et al., 2022). AI systems can sometimes mistakenly reproduce the biases contained in the training data as a result, thereby creating an unequal allocation of assets and thwarting the efforts of people from minority groups. AI implies the need for such extra attention and this consideration can help AI in its robust process. Therefore, it is important to address such concerns and rectify the educational goals in the context of limitations of AI technology (Selwyn, 2022).

Fundamentally, we can summarize that AI demonstrates a large capability of helping in education, however, it is not a cure-all of education in general. Both teachers and administrators bear the responsibility of being skilled in designing learning experiences that empower integration of AI as well as the reinforcement of critical competencies. Learning that is real on the other hand is majorly based on interaction of people and the involvement factor is always there in this manner of learning, something that AI cannot fully replace.

Application of ChatGPT in some other industries:

In this part of a systematic review, which was done on the topic, different industries were selected where ChatGPT can be applied. Some of these different industries which were studied as areas where ChatGPT find application were offered as part of the literature review.

Within the marketing area our GPT-chat is we are already being employed to form virtual assistants for the customer support, serving to generate fast and personal replies to user inquiries. Moreover, business organizations can get advantage of ChatGPT to create personified marketing content that helps businesses stand out when it comes to customer communication (Aydin et al., 2023).

Healthcare industry is seen to use ChatGPT to create medical recommendations, diagnose cases, and summarize patient EMRs. Furthermore, deep learning techniques can help doctors in decision-making processes and in the process of making decisions about the necessity of the observations conducted (Shen et al., 2023). They make this fact clear when they stress it as a potential educational, research, and clinical management tool (Khan et al. 2023). This highlights, however, the need for considering it as a supportive tool instead of being seen as a substitute for human competence.

Legal field is not the only aspect that gets the reporter's attention. In the legal domain, Shope (2023) offers advice how AI can be included in legal writing and what is the recommended practice for professors and publications

ChatGPT provides really clear picture of possible task organization and automation in software coding experiments according to that by Avila-Chauvet et al. (2023). They exemplify how the glue program can function as a tool for programming web-based behavioral tasks and boosting efficiency through accessing the right information.

In brief, it's research areas assessment related to ChatGPT is crucial for finding the emerging trends and areas need to get more improvement. The complex review of studies with the resulting data gives perhaps the most comprehensive and useful picture of the exact spread of web app ChatGPT usage across even respective fields as shown in Table 1. This systematic literature review constitutes a total package of literate material since in the literature review, it gives an unbiased characterization of the wider usage of ChatGPT and in the meanwhile, describe the application of the methodologies and analytical results from the last studies.

Table1. Summary of Studies

	Author	**Summary**

1.	Aljanabi et al. (2023)	Briefly described are some of the main pros and cons in using ChatGPT to assist with academic writing including using search engines, coding existing material, data security and the use of social media upshot.
2.	Aydin & Karaarslan (2022)	The study aimed to assess whether AI can generate academic content with originality and academic rigor. Focusing on digital twins in healthcare, abstracts from 2020 to 2022 papers were retrieved from Google Scholar and paraphrased by ChatGPT. Despite encouraging results, the Ithenticate tool flagged significant matches for the paraphrased passages.
3.	Azaria (2022)	The research was conducted to determine whether the AI could justify the content that is original and academics. Digital twin was the primary point of concern for all the abstracts from Google Scholar, which were either written or paraphrased by ChatGPT in 2020-2022. Although results for the paraphrased passage were incrementally encouraging, the Ithenticate tool had also indicated a number of closer matches.
4.	Cahan & Treutlein (2023)	The negative of how the data is shaped will affect the responses given by the ChatGPT since its ability in figuring out the digital is superior that the physical terms. Accordingly, the repeated decimal numbers printed by ChatGPT carry a signature number of humans commonly 7 occurring with the highest frequency. Furthermore, singularity of ChatGPT as a chatbot is highlighted and the limitations are revealed.
5.	Cotton et al. (2023)	The verdict drawn from ChatGPT's answers about system statistics in stem cell research showed that they were superficial and lacked detail. It is argued that the computational intelligence implemented in high-end machine learning models needs to be guided by valid and accurate theories in order to understand the causal relationship and thus deliver a complete picture.
6.	García-Peñalvo (2023)	And, though this paper undoubtedly acknowledges the various advantages of ChatGPT for the learning process, its main emphasis is rather on the issues and the consequences of ChatGPT for student academic abuses. The Facebook generation's undeniable passion to communicate via technology has led the other writers to speculate whether there will be essays at all in the near future.
7.	Gawdat (2021)	An analysis of the consequences for education and academia is discussed with ethical issues in the end. The potential benefits and disadvantages of the application are succinctly mentioned. Thus, no need to avoid the admission of ChatGPT applications.
8.	Gozalo-Brizuela & Garrido-Merchan (2023)	The book compares why AI fails, using his 15 years of experience as his resource. The record of positions he has held at Google [X] came in handy in this situation. The movie delineates what AI can do, like data ' processing at a much faster rate, predicting events, and giving insights into safeguarding humanity future.

9.	Jiao et al. (2023)	This presentation's main goal is to devise a simple and to the point framework that covers all the main models backgrounds selected in the very extensive area of generative AI. Such a scheme is being shown below and therefore, this paper has created a taxonomy based on these recent models.
10.	King & ChatGPT (2023)	In ChatGPT-delivered article the ChatGPT are used to outline such concepts as cybersecurity through preventing cheating using ChatGPT, plagiarism development problems in higher education, and misuse of AI and chatbots in academia. The Cogeneous of ChatGPT is responsible for the form to present the responses generated accordingly.
11.	Krügel et al. (2023)	A two-experiment stage was constructed, the first about the moral dilemma of sacrificing one individual for saving five, and the second subjects was asked the trolley problem toward understanding ChatGPT's response impacted moral judgment.
12.	Mariani et al. (2022)	Utilizing a data-driven method along with quantitative techniques, this research conducts a comprehensive review of the body of literature of ChatGPT applications in consumer research covering three areas: consumer buyer behavior, marketing management and services, with the aim of highlighting the changing intellectual landscape of AI in these areas. It defines eight main loci, namely memory and process flow, decision-making and cognitive modalities, neural networks, machine learning and semantic analysis, social media and text mining, content analytics for social media, adoption and acceptance of technology, and big data analytics and social robots.
13.	Mijwil & Aljanabi (2023)	Chat GTP is the digital co-thinking partner in developing strategies to resist cyber-crimes.
14.	Nat Astron (2023)	ChatGPT was assigned to write a 500-word editorial about the advantages and disadvantages of AI both in # astronomy related research. Although the language being used is the common one and the data presented quite clichéd ones, the information presented is otherwise quite factual, if at times it falls short of being precise. ChatGPT indeed warns preemptively of its own limitations, and most of the astronomy projections were erroneous that he provided.
15.	Nat Mach Intell (2022)	As encouragement to the community to partake in discussions and activities integral for ethics and responsibility in publishing, deliberating as a community about measures to avert misuse and giving consideration to data and model controlled release may become necessary.
16.	Nguyen (2023)	Moreover, to figure out whether AI can write scientific papers with long-term accuracy and reliability, experiments should not be discontinued. However, the experiments must be able to determine correct scientific language whether terms come from their natural environment or are made up by IAs themselves.

17.	Open AI. (2023)	Throwing light on technology's construction, education, working on its betterment and feedback followed by summing up the details indicating the shortcoming as the result of it.
18.	Patel and Lam (2023)	The capability of ChatGPT in assembling patient discharge summaries at the hospital is analyzed. On the other hand, the dilemmas pertaining to data governance, and the possibility of automated care system's dehumanization pose the greatest challenges to the integration of this system in health care practice.
19.	Shen et al. (2023)	The Institute of Electrical and Electronics Engineers (IEEE) sponsored an online session on its EthicsMetrics system for health professionals. It comprises of credentialing systems that use keywords, patient-centric information generation, Electronic Medical Records summarization, and clinical decision support. Furthermore, the establishment of ChatGPT textbooks and 3D printing revolution are described.
20.	van Dis et al. (2023)	Reflecting on the risk of LLMs misappropriation during research, the article highlights the need of attention to issues such as the accurate citation of sources; unintended platigiarism; and to maintain the research integrity, credibility and accuracy. The process of verifying and checking facts by experts is a crucial one in the efforts to resolve these problems and in the course of observing the regulations in the research industry.
21.	Wang et al. (2023)	This study carried out appraisal of ChatGPT's efficiency versus upgraded techniques used for generating as well as tuning complex query systems of evidence-based reviews. Generalized disclosures from goodness ChatGPT indicate an appropriateness for Boolean queries in the literature search for systematic reviews. The researchers found out that ChatGPT would be a nice and useful tool for conducting systematic reviews with its ability to understand and follow complex requests and make up precise queries. It will be incredibly useful especially with the rapid reviews which have some time limits.
22.	Williamson et al. (2023)	LLMs' education domain debates and thorough assessment of the problems associated with advantage and disadvantage of different AI and human writing collaborative approaches need to be pushed on the foreground of discussion to ensure sustainable and well-functioning future.
23.	Zhai (2023)	The research center here looks into whether ChatGPT can be applied to a wide range of learning monitoring problems, from giving interest-focused feedback until the point of given student needs. The study indicates that Chat GPT may soon be capable of various effective educational tasks, including automatic assessment formulation, grading, instructional guidance and choosing appropriate learning resources. Nevertheless, the research points out that a ChatGPT-like may not substitute a teacher and authors' knowledge should be focused on how teachers will be trained to employ such AI effectively in education.

24.	Zhai (2022)	The debate concerning the ethical aspects of utilizing ChatGPT by libraries is comprehensively addressed in this article. That demonstrates how the conversational AI technology ChatGPT through the tasks might have libraries' role as trusted information sources. This report looks at how ChatGPT can help library activities and places an emphasis on both the good and negative effects of technology.
25.	Lund et al. (2023)	The role of ChatGPT in student learning and clinical medicine is highlighted with the possibility that this AI can carry out essential non manual tasks including, automated grading, creating assignments, writing clinical notes and imparting diagnostic recommendations. article discusses as well problems and restrictions dealing without the functioning Chat GPT of these areas.
26.	Khan et al. (2023)	The robustness of ChatGPT is detected being able to beat some large datasets and leave space for some imperfections through adversarial perturbations and prompt injections. The study examines ethical issues related to large-scale language models, (LLMs) and makes emphasis on the urgent need to enforce the ethical code in developing and deploying these models.
27.	Zhuo et al. (2023)	The advantages of Chat Pre-trained Transformer model (ChatGPT) are described, hereby covering those sectors ChatGPT might be able to play in healthcare. Ethical concerns in ChatGPT'S utilization like bias and the risk of creating or using fabricated or plagiarized data are also known."
28.	Patel et al. (2023)	Positive impacts and key ethical issues surrounding using ChatGPT in the hospitality and tourism education are highlighted, raising awareness of its benefits as a tool for information, personalized learning, and industry knowledge, among other things, and dealing with such concerns as bias, privacy, and so on.
29.	Ali et al. (2023)	The essay goes on to highlight the education transformations that could be brought about by ChatGPT (both in the sense of classroom activities and individual career progression, as well as auto-didactic experience) but also the difficulties we might face, such as plagiarism (probably the most important issue) as well as what we expect from technology use.
30.	Luan et al. (2023)	The effects of writing with the help of ChatGPT are analyzed, topics which could be its strong points (grammar, syntax), and there are also parts that could be its weaknesses, like generating original ideas. In the discussion, the author also tackles the growing complexity of language-generation technology and its role in writing practices and examining plagiarism.
31.	Bishop et al. (2023)	Studies that assess ChatGPT's effect on student's drives and coping suggest positive outcomes, prompting educational authorities to pay more attention to it as a possible tool for learning. Moreover, the investigation equally highlights the fact that information on the old theories as well as the new theories must be considered for appeasement.
32.	Muñoz et al. (2023)	This research examines the role of ChatGPT in students' motivation and activities in the classroom. The outcomes of tests and the thoughts of educators and students about how well it suits learning are studied. There is evidence that ChatGPT is positively affecting students' commitment and appreciation which is a call to action to educational policymakers to add it to their curriculum for

		its improved learning outcomes.
33.	Jandrić (2023)	The current research focuses on the linkage between information literacy, data literacy, privacy literacy, and using ChatGPT as interest. Findings suggest that literacies related to these literacies are the probabilities of interest in ChatGPT. Thus, the most important aspects are age, gender, education and the Internet usage.

Bibliometric Analysis

Analysis of publication outputs by Countries, Institutions, Journals, and Subject Area

The table 2 conveys the countries that have benefited most from the ChatGPT publications. The results indicate that amongst US, China, and India, lead in both quantity and influence in terms of the publications. By using a ranking which is categorized by country affiliation of each author, the article provides descriptive statistics of various indicators such as migration and education. U.S. leads the highest issuing and getting cited but followed by China with issuing and India have the highest cited parts. Among other things, even though Italy is fifth in terms of publication number, still it succeeds either by citation than China and the average rate of its article citation is higher than China, India, and United Kingdom. This gap between the top country of the World Power Index (United States) and the following country (China) is insignificant (65). As yet another point, we scrutinized the most impactful universities conducting this type of research. The Agency can benefit by this data and also, early-career scientists, students, future post graduate programs in the field and scholars seeking collaboration opportunities in the field. Duke University School of Medicine (US), Duke University, and Tianjin Medical University with 9 publication each (China) top the list while Beijing Sport University, Università degli Studi di Sassari, Stanford University (all US, each with 6 publications), Zhengzhou University (China) (with 5 publication), and University of North Texas (US) remain in top 7. The data composition of our bibliographic categorization is obtained from publications with different foci, which is signified by systematics reviews which means the issue has become so vast and significant that different journals are now publishing studies about them. The notable contributions of prominent journals to this topic will be presented. Annals of Biomedical Engineering (MBE) and The Ceur Workshop Proceedings (CWP), which are all frequently published in Lecture Notes in Computer Science, including subseries Lecture Notes In Artificial Intelligence and Lecture Notes In Bioinformatics, claim a share of 8 publications as well. This information aids scholars in identifying prolific sources and pertinent documents in the field, as

well as potential journals for publishing their research. The diverse subject areas explored also indicate the wide-ranging applications of this technology across various disciplines. ChatGPT is extensively researched and explored in fields such as Computer Science (133), Medicine (95), Social Sciences (79), Engineering (61), Mathematics (23), Decision Sciences (19), Business, Management, and Accounting (16), Neuroscience (13), Arts and Humanities (12), Energy (10), among others. Rather, the fact that this data is acknowledged as a tendency for historians to decide on essential sources and publications gives the scholars an opportunity to explore the field at full. The vast number of topics included in this discipline, from biotechnology to nanotechnology, underscores the inter-disciplinary nature of such this technology. The impact of ChatGPT has been significantly studied and researched in Computer Science (CS-133), Medicine (Med-95), Social Sciences (SS-79), Engineering (Eng-61), Mathematics (Math- 23), Decision Sciences (DS-19), Business, Management, and Accounting (BMA-16), and Neuroscience (NS-13).

Table 2. Most productive and impactful countries.

Countries	Documents	Total citation	Average article citation
United States	115	819	7
China	33	132	4
India	26	177	7
United Kingdom	24	47	2
Italy	21	134	6
Germany	18	33	2
Australia	17	72	4
Japan	12	62	5
France (F) and Spain (S)	11	F 50 and S 10	F 5 and S 1
United Arab Emirates	10	30	3

Whether a certain publication is considered influential can be reliably and unbiasedly determined using the citation count being among the most popular metrics in a field of research (Akın, Stuwitz & Hereth, 2023). It is generally acknowledged by the scientific community that a good nature of paper tends directly proportional to the number of citation it achieved. Consequently, a larger number of citations is usually the hallmark of higher paper quality (Martins, C., da Silva, P., Camilo, M., & Marzetti, M., 2022). Table 3 shows the most cited articles by mentioning their citation count in Scopus database, its year of publication, the name of the journal, the impact factor it belongs to, as well as a brief abstract of it. Having seen light early this year, the study carried out by Gilson et al. 2023, titled "How does ChatGPT play on the United States Medical Licensing Examination? The implication of large language models on

medical education and knowledge assessment", has the greatest citations in the Table as compared to several studies that were published in 2020.

Table 3. Top 10 most cited articles in the Scopus database ordered by total citation number.

Author full names	Title	Year	Source title	Cited by	Document Type
Gilson, Aidan; Safranek, Conrad W.; Huang, Thomas ; Socrates, Vimig; Chi, Ling ; Taylor, Richard Andrew; Chartash, David	How Does ChatGPT Perform on the United States Medical Licensing Examination? The Implications of Large Language Models for Medical Education and Knowledge Assessment	2023	JMIR Medical Education	181	Article
Lund, Brady D. ; Wang, Ting	Chatting about ChatGPT: how may AI and GPT impact academia and libraries?	2023	Library Hi Tech News	115	Review
Rudolph, Jürgen; Tan, Samson; Tan, Shannon	ChatGPT: Bullshit spewer or the end of traditional assessments in higher education?	2023	Journal of Applied Learning and Teaching	109	Article
Salvagno, Michele; Taccone, Fabio Silvio; Gerli, Alberto Giovanni	Can artificial intelligence help for scientific writing?	2023	Critical Care	82	Article
Ray, Partha Pratim	ChatGPT: A comprehensive review on background, applications, key challenges, bias, ethics, limitations and future scope	2023	Internet of Things and Cyber-Physical Systems	59	Review
Lin, Zhaojiang; Xu, Peng; Winata, Genta Indra ; Siddique, Farhad Bin; Liu, Zihan; Shin, Jamin; Fung, Pascale	CAiRE: An end-to-end empathetic chatbot	2020	AAAI 2020 - 34th AAAI Conference on Artificial Intelligence	58	Conference paper
Elkins, Katherine; Chun, Jon	Can GPT-3 Pass a Writer's Turing Test?	2020	Journal of Cultural Analytics	57	Article
Biswas, Som S.	Role of Chat GPT in Public Health	2023	Annals of Biomedical Engineering	52	Letter
Rudolph, Jürgen; Tan, Shannon; Tan, Samson	War of the chatbots: Bard, Bing Chat, ChatGPT, Ernie and beyond. The new AI gold rush and its impact on higher education	2023	Journal of Applied Learning and Teaching	47	Article
Lecler, Augustin; Duron, Loïc; Soyer, Philippe	Revolutionizing radiology with GPT-based models: Current applications, future possibilities and limitations of ChatGPT	2023	Diagnostic and Interventional Imaging	44	Article

Keyword Analysis

First, we managed to refine the sample of records to be analyzed by scrutinizing the contextual information of each of the publications in the study sample we had earlier selected. After that, we moved on to the evaluation of the content of the publications in the much refined sample. So that the goal is met, we carried out a keyword search based on co-occurrence. The research sample was made up from 328 publications, namely the used keywords were keywords in total 2053. A notable fact is that more than half of the words (1,950 of them) appeared in the one only time. To demonstrate the effectiveness of visual representation and understanding of VOS viewer application, we have set a 5-time minimum number of occurrence for each keyword as the threshold for the tool. As result, the removal of nodes that had no more than 5 occurrences was applied in its k-core structure. Co-occurrence analysis, which will be performed by the keywords that were first collected by authors or database, hence, resulted in 115 keywords, all of which met the requirements of being modeled at least 5 times. These keywords are areas of investigation's large exploration; they are the sectors to endeavor in this field. It was the study of the links, pro, and the keywords' clustering which was the most significant. The network of the keyword co-occurrence (Fig. 2) analysis generated significant insights with the keywords being labelled with colored circles and the circle magnitude directly corresponds to how many times the keywords appear in the publications' titles or abstracts. Boundary between the nodes shows the power of the relationship, and the length of the boundary shows the closeness of the connection, where shorter bounds show stronger ties. Every association between keywords can be represented by the link on the map, where the overall link strength determines the number of publications containing both. The bigger the nodes and the thicker the edges mean more frequent pattern and higher overlap of these linguistic features, respectively. Moreover, nodes which are 35 words (key words) contained a link strength that is more than 100. It formed an issue that consists of 5 clusters. Every circle, painted with different colors, shows the subjects typically searched for together within the cluster enabling one to explore the expansive scope of coverage and the correlation between topics contained within the cluster.

Table 4. Most highly co-occurring keywords

Keyword	Occurrences	Total Link Strength
Artificial intelligence	160	1030
Chatgpt	171	976
Human	92	734
Language model	68	494

Humans	54	451
Article	39	360
Large language model	49	351
Large language models	38	315
Natural language processing	42	306
Natural language processing systems	36	264
Gpt-4	35	244

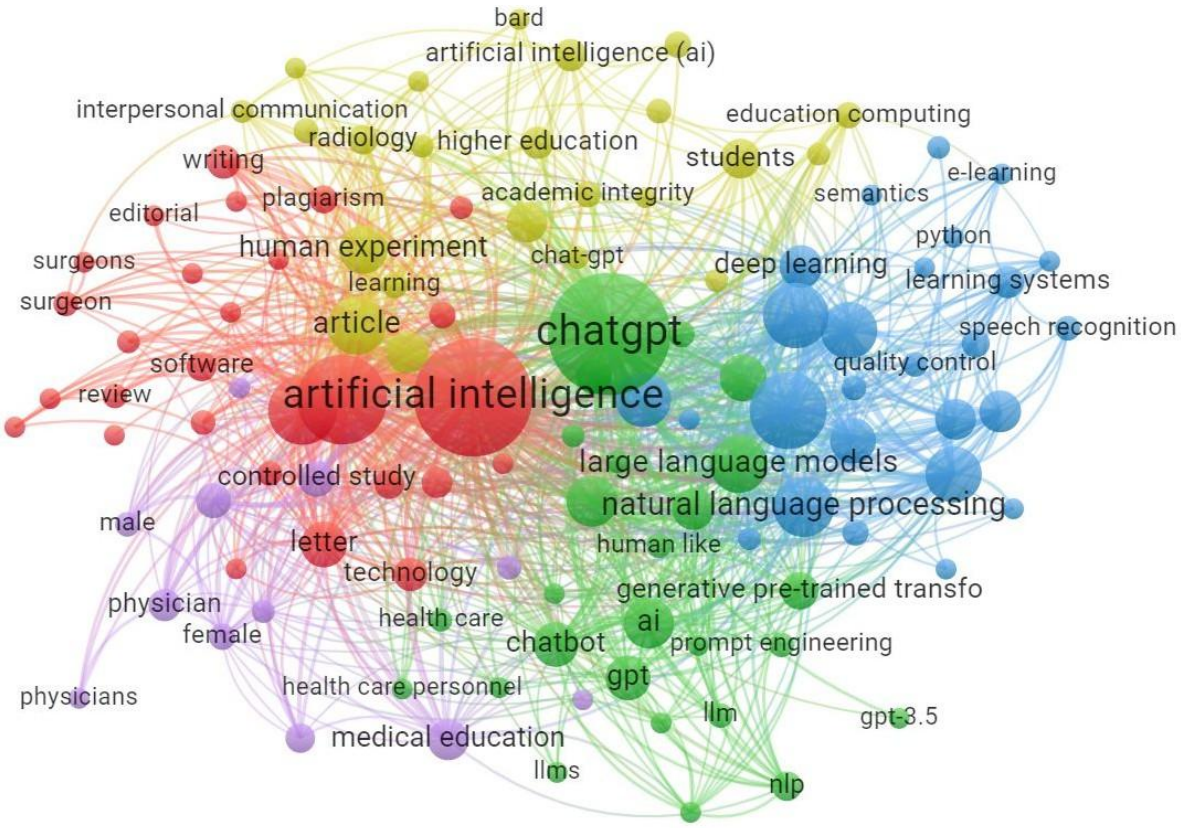

Figure 2. Co-occurrence map of the keywords

An additional step through the keyword analysis was to discover the current keywords that have gained their popularity trend and becoming the hot topics around ChatGPT as one of the new fields of investigation. For this gridiron, we consider overlapping of words over time to track the emergence of these keywords, which is shown in (Fig-3). People think the words on yellow (which are the latest vocabularies for that field of study) and they expect more to be said on the current and upcoming development in the next few years.

Keyword analysis shows that in 2022- ChatGPT, ChatGPT top key word were ' natural language understanding', 'GPT2', and 'transfer learning'. In addition, these keywords such as 'natural language processing system', 'a chatbot',' and 'artificial intelligence' are found to be more generic. Significantly, the search features in this field demonstrate such keywords as 'ChatGPT'as a whole, along with 'academic integrity', 'education', 'higher education', 'medical and surgery', and 'human subjects'. Such expressions are likely to result in a surge of research and areas of interest that may eventually shape the future of ChatGPT. Hence, there is a need for the field of investigation to determine the potential direction of future studies.

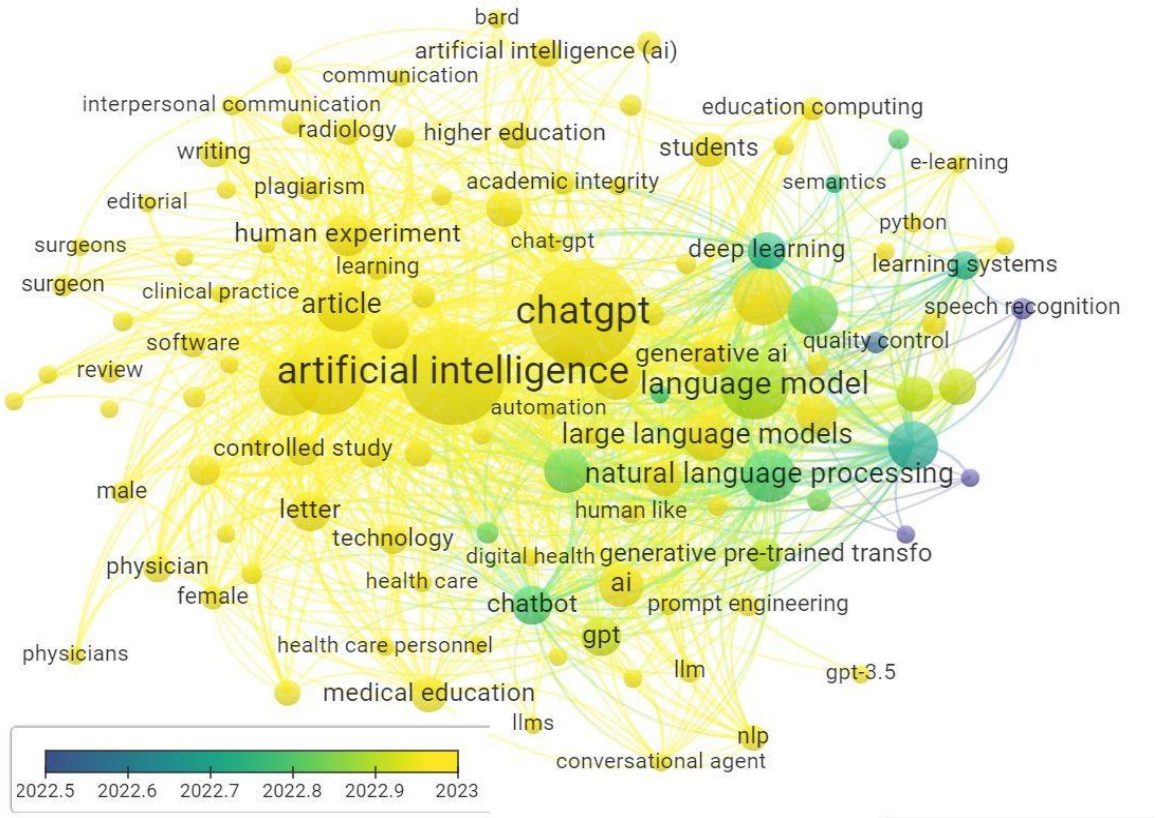

Figure 3. Emerging trends and keywords

Implications, future research, and limitations

The artificial intelligence (AI) is the research area within the computer science that grew in popularity since it has appeared the possibility of changing education completely from its grounds to the new level of the development, making these novelties for both students and teachers. Alongside, the consideration to infuse advancing AI and digital technologies into education becomes more and more problematic from a standpoint of their environmental implications. These technologies retain, go with and throw away during production, use and therefore depletion of natural resources makes waste accumulation thus energy consumption-pollution issues got a high rise (Bevini, 2021). Accordingly, in the process, significantly recognizing, researching, and tackling the challenges beforehand, associated with AI in educational practices is directly vital. Despite this implication, this research omits the issue of potential disadvantages, pointing to a serious drawback. It lies in the fact that such research is needed in the future so that there may be clearer vision of the energy consumption and waste management consequences to AI in education.

Moreover, the AI in education system is occurring through the data-driven character which brings up issues of privacy and data-security. The major prerequisite for such large-scale storage and processing of student data across the server systems needs quite a lot of energy that is put back into the environment in the forthcoming. In order to relieve the push at the ecological side, institutions have to be able to employ the most appropriate data security measures, anonymize student data and, eventually, reduce collectable data for no important goals However, the scope of this study is only quite limited as a departure to deeper research. This work offers both conceptual and practical outcomes though.

To that extent, this study also expands the context of the existing knowledge about the wide utilization of ChatGPT. Through that, the article gives readers insight into all Literature devoted to ChatGPT study including areas where there is still much to be studied, such as the language's influence on academic publications. Whilst The Chat Generate is embraced as a writer for research journals, the lack of research in this area further confirms the need to study this phenomenon from all vantage points including ethics, management, and academic practice.

This study of bibliometric offers an insight for the researchers, pointing towards the productive nations, journals, institutions and among the top cited research papers. In addition, the keyword analysis defines new topics of interest A chatGPT has, leading to some new ideas for a further research. For the further research, we recommend to explore more particular use of ChatGPT in prevailing areas like academic

writing, marketing, creative industries, or customer service and increase our knowledge of the modern technology.

Nevertheless, the research involves the practical possibilities; but a discussion of its limitations should also be included. Owing to the AI development that is ongoing continuously, the bibliometric analysis at one point in time may lead to different findings to even when there is a change in reference of advanced topic like ChatGPT. On the other hand, there will be Systematic Literature Reviews that will be in flux constantly, and we will encounter different voices and perspective which are currently unexplored. Thus, ongoing research projects are of significance to see the latest product of AI technologies relevant to the sphere of AI in education.

Conclusion

The fast pace of technology, especially the AI such as chat GPT, has raised many doubts about its impact on education and on the ability of students to critically reflect. Others maintain a valid point that we are going to be faced with the AI generations that are not quite independent and do not know a life without the clever machinery. However, studies conclude that AI may still provide useful educational resources provided that the instructors are still giving proper emphasis on critical thinking and social development. AI might be considered as an auxiliary component of enriching students' educational concept. Though AI can aid in the performance of things like papers writing and reply to common questions, it can't substitute the most significant thinking skills and analytical competence required for deeper learning. Students should not be users of content but thinkers about knowledge, still having to discuss, debate, and reflect about the world.

This study is a systematic literature review on the existing papers on ChatGPT, a very common large language model used to create conversational machines. The article reports on various study sub-themes and progressing learning trends related to ChatGPT for humanized agent conversations. We found that the first studies have mainly centred around the way in which ChatGPT enhances its performance in terms of the response quality, diversity, and coherence. Keeping that in mind, many fine-tuning methods involving pre-training and the use of domain-specific learning algorithms have been extensively investigated to enhance ChatGPT's capability. Our review confirms that the importance of creation of multifaceted and rather balanced datasets for training the GPT models, and questions of ethics and confidentiality should be considered additionally.

By employing the approach of literature-based bibliometrics, which revealed the main research lines in the ChatGPT literature, we recognized the research streams, themes and guidelines in the field. Moreover,

we were able to successfully identify and single out the primary institutions, entities, and sections including press release and website which developed the evolution of the field. To sum up, a review of the ChatGPT literature conducted in this paper provides a grounded knowledge of the diffusion of ChatGPT-related studies and, more importantly, their applications to conversational AI. We consider that this research underscores the truest industrially leading fields and the hottest points of innovation in this dynamic area, and the theory framework describes how generative AI could benefit or destroy organizational operations.

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