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The Ethics of AI Creativity: Emerging Challenges

Ahmed, Iman Osman Mukhtar[1*], Hashim, Aisha Hassan Abdalla[1], Ahmed, Zeinab E.[1, 2], Sophian, Ali[3]

[1]Department of Electrical and Computer Engineering, International Islamic University Malaysia, MALAYSIA
[2]Department of Computer Engineering, University of Gezira, SUDAN
[3]Mechatronics Engineering Department, International Islamic University Malaysia, MALAYSIA

*Corresponding author email: imanosm@gmail.com

Abstract: The utilization of Artificial Intelligence (AI) in educational institutions has the potential to bring about a significant transformation in current educational systems. As more educational establishments incorporate AI tools into their teaching and learning practices, there is a growing adoption of Large Language Model (LLM) technologies, including within the field of education. This adoption is driven by the ever-increasing volume of data and evolving educational requirements. However, despite the advantages offered by these technologies, there remains a consistent lack of clarity surrounding the ethical guidelines, technical standards, and best practices that are vital for their effective implementation. This paper primarily focuses on two key areas of research. Firstly, it seeks to investigate the potential benefits, risks, and outcomes associated with the use of LLM technologies in education. Secondly, it delves into the ethical considerations that should guide the utilization of LLM technologies within this domain. The findings underscore the significance of affording students access to LLM technologies in order to enhance the learning environment, with an emphasis on the necessity of transparent and reliable data collection in research. Moreover, given the considerable potential for the dissemination of misinformation and harmful content through LLM technologies, it is imperative to integrate ethical considerations throughout the field of education. This necessitates educating users and reinforcing measures to control the content in order to mitigate associated risks.

Keywords: *Artificial intelligence (AI), Large Language Models (LLM), Challenges, Ethical*

1. Introduction

Artificial intelligence (AI) has become increasingly significant in all sectors and industries. It has made a profound impact on various fields such as mobile apps, healthcare, and education, and its influence continues to expand as new applications and uses are continually being discovered. In the realm of education, AI has brought about a transformative shift in traditional learning approaches (Creely, 2023). The educational landscape has undergone significant change due to the introduction of generative AI technologies, which are known to have infiltrated the arsenal of the education sector. These advancements in AI technologies have proven beneficial for both students and educational institutions (Vinchon, 2023). According to a report by Markets and Markets, it is estimated that the global market for artificial intelligence in education will have reached a value of USD 3.7 billion by the year 2023. Furthermore, UNESCO predicts that by 2024, the worth of AI in education will have grown to $6 billion.

The revolutionary potential of generative AI technologies, such as ChatGPT, extends to a wide range of scenarios. These technologies have the ability to generate complex writing that is virtually indistinguishable from human-written text (Khalil et al., 2023). Additionally, the utilization of AI algorithms that leverage rich data can create a more personalized learning environment (Tang & Wang, 2018). For example, if a sociology student is struggling with a specific concept, AI can provide them with recommended resources that have been deemed helpful by previous sociology students. In this way, AI can supply the student with summaries, exercises, and exam questions along with their corresponding answers (Stokel-Walker, 2022). By offering students more choices in their learning journey and

empowering them to actively participate in their education, AI has the potential to revolutionize the way education is approached (Holmes et al., 2022).

However, despite the numerous benefits that technology brings, it also raises moral and legal concerns (Jobin et al., 2019). It possesses the ability to exert both positive and negative effects on society and educational institutions. While AI technology undeniably has far-reaching implications for learning and education, students have embraced its latest innovations as tools to assist them with their assignments or even as complete substitutes for the task of writing essays and research papers (Khalil et al., 2023). The attitudes and intentions of students towards utilizing ChatGPT have been the subject of extensive research, with Bonsu and Baffour-Koduah noting the significance of such investigations. Moreover, the Walton Family Foundation (WFF) conducted a nationwide survey to explore the perspectives of both teachers and students on ChatGPT. The survey revealed that 75% of students believe ChatGPT aids them in studying more efficiently, while 87% of students perceive technology as a potential means of overcoming academic setbacks. Additionally, the WFF discovered that 65% of students view ChatGPT as an essential tool for achieving success in college and the future workplace (Bonsu et al., 2023).

2.   Understanding AI-Enhanced Creativity

The concept of "artificial intelligence" (AI) has been elucidated as the ability of computers and other electronic machinery to execute tasks that have traditionally been associated with human intellect, as stated by various sources (Holmes et al., 2022). Within this particular context, the term "artificial intelligence" encompasses a vast array of techniques, ranging from machine learning to computer vision to natural language processing (NLP) to robotics and neural networks. It is worth noting that AI generative technologies, also referred to as Large Language Models (LLMs), which fall under the category of machine learning algorithms, exhibit the capacity to perform a diverse set of natural language processing (NLP) operations, including but not limited to text production and categorization, interactive question answering, and translation, as indicated by multiple studies (Lo, 2023). In fact, LLMs are often regarded as AI assistants due to their ability to undertake numerous tasks typically carried out by human assistants, such as taking notes, reading text, engaging in conversation, and much more. One noteworthy example of an LLM is ChatGPT, which is capable of sifting through massive quantities of data in order to generate work that is reminiscent of human-like output, particularly in the realm of research papers, as corroborated by various sources (Ausat et al., 2023). It is important to highlight that while there exist several LLMs that are utilized within the field of education, ChatGPT stands out as the most prominent and widely recognized among them. In fact, Authors characterizes ChatGPT as a "(Generative Pretrained Transformer) that was developed employing a technique known as Reinforcement Learning from Human Feedback, which facilitated the training of the language model and endowed it with the ability to engage in highly conversational interactions (Thorp, 2023). However, it has been posited that LLMs may lack the inherent intelligence necessary to truly comprehend the meaning or content of the data they process, as their primary function revolves around utilizing advanced machine learning techniques to synthesize factual information in order to create persuasive simulations of knowledge, as suggested by multiple scholarly perspectives (Shah & Bender, 2022).

OpenAI, the renowned AI research firm, made available to the public the initial iteration of ChatGPT, an innovative interface that utilizes natural language processing to engage in textual conversations with users (Peres et al., 2023). This cutting-edge platform, known as ChatGPT, represents the latest manifestation of OpenAI's impressive array of GPT (Generative Pre-trained Transformer) technologies, which are also referred to as Large Language Models (LLMs) (Rahman & Watanobe, 2023). The introduction of ChatGPT has generated a whirlwind of anticipation and enthusiasm within the community (Chen, 2023). Consequently, a plethora of discussions, particularly within the realm of education, have emerged, capturing the attention of individuals from diverse backgrounds who are eager to explore the unique capabilities of this program (Williamson et al., 2023). Following shortly after, Meta, the parent company of Facebook, unveiled Galactica, an extraordinary language model that was meticulously trained on an extensive corpus of scientific articles, websites, books, lecture materials, and encyclopedias. Marketed as a time-saving instrument, Galactica boasts features such as summarizing academic papers, solving mathematical problems, generating articles, and even writing scientific code (Gokul, 2023). However, Meta swiftly removed Galactica from circulation once it became apparent that the model had the potential to produce essays, articles, and research containing erroneous, misleading, or hazardous content. It is important to note that Meta, like other LLMs, faced challenges in comprehending the underlying scientific principles governing its outputs. Nonetheless, the first quarter of 2023 unexpectedly witnessed a groundbreaking revolution as numerous generative AI technologies, capable of being harnessed across commercial, industrial, and educational domains, emerged onto the scene (Gordijn & Have, 2023).

The LLMs that have gained the highest level of popularity among users and researchers alike encompass a notable quartet, namely GPT-4, BERT, T5, and RoBERTa. GPT-4, an acronym for Generative Pretrained Transformer-4, stands as a product of the acclaimed research laboratory OpenAI (Kurian et al., 2023). The second LLM, BERT, short for Bidirectional Encoder Representations from Transformers, and the third one, T5, denoting Text-to-Text Transfer Transformer, both emanate from the innovative minds at Google. Lastly, RoBERTa, an acronym that represents Robustly Optimized BERT Approach, came into existence thanks to the diligent efforts of Facebook AI. It is worth noting that Salesforce Research, a prominent entity in the field, is the driving force behind the creation of CTRL, which stands for Conditional Transformer Language Model.

3. Utilizations of Generative Artificial Intelligence Technologies

The extensive utilization of artificial intelligence (AI) tools on a global scale has brought to light a wide array of applications for this technology. These applications encompass various domains such as lesson preparation and planning, research writing, summarizing research papers, translation, poetry, software development, and many others (King, 2023). A comprehensive study conducted by Dwivedi et al. encompasses contributions from 43 experts spanning multiple disciplines including computer science, education, publishing, information systems, policy, tourism, management, and nursing (Dwivedi et al., 2023). Through their meticulous analysis, it has been determined that sectors such as banking, hospitality, tourism, information technology, management, and marketing are poised to benefit significantly from the implementation of ChatGPT as it has the potential to enhance productivity and improve business efficiency. Nevertheless, the study also takes into consideration the limitations of ChatGPT, potential disruptions to existing practices, as well as concerns regarding privacy and security risks. Furthermore, it acknowledges the potential repercussions stemming from biases, abuse, and the spread of disinformation. However, there exists a divergence of opinions regarding whether ChatGPT should be subject to limitations or legislative measures. From the perspective of educators, large language models (LLMs) can be effectively utilized in situations where effective communication in multiple forms is required. LLMs possess the capability to generate concise and informative summaries that allow individuals to comprehend the content of various sources including academic papers, videos, audio recordings, and conference calls (Reed, 2022). These models are equipped with the ability to interpret natural language and provide sophisticated responses to inquiries. AI-powered programs can also function as virtual teachers, engaging students through personalized one-on-one tutoring sessions that enable them to learn at their own pace (Ausat et al., 2023). Particularly, large language models prove to be immensely beneficial for students with disabilities (Tung, 2023). By providing transcripts of lessons or translations of educational videos, they can contribute to making instructional content more affordable and accessible for individuals with disabilities or those who speak different languages (Teubner et al., 2023). Additionally, these models can develop speech-recognition capabilities to accommodate learners who have hearing impairments (Cope et al., 2023).

Students have the capability to rely on technology due to its facilitation of time-saving advantages resulting from the efficient and precise creation of reports and other written assignments (Shah & Bender, 2022). In addition to this, technology also grants students enhanced accessibility to information, thus contributing to the improvement of their writing proficiency (Rudolph et al., 2023). Within the realm of academic writing, Legal Master's Degrees (LLMs) like ChatGPT provide valuable aid in various research-related tasks. These tasks include composing research articles, synthesizing prior research findings, and generating literature reviews, all of which can be accomplished within a significantly reduced timeframe. Therefore, this technological tool empowers master's and doctorate students to optimize their time and efforts, ultimately resulting in increased efficiency in their academic pursuits (Kasneci et al., 2023). However, it is important to note that ChatGPT may have limitations in its capacity to generate statements that surpass the confines of an existing framework that values quantifiable and fragmented knowledge and abilities. This particular limitation becomes apparent in its tendency to rigidly mimic structured genres, such as standardized academic essays.

4. Emerging Ethical Challenges in AI-driven Creativity

Nonetheless, early users of ChatGPT astounded educators with their ability to produce essays that were extremely difficult to discern as being written by a machine (Khalil et al., 2023). Following the introduction of ChatGPT, the majority of the debate has revolved around ChatGPT's ghostwriting capabilities and the associated issues pertaining to academic integrity, originality, and authorship (Yeo & Tang, 2023). Several lecturers have taken to social media to share examples of the alerts they have received regarding the misuse of ChatGPT. It is worth noting that writings generated by ChatGPT are rarely cited as credible sources. In the event that it is requested, ChatGPT can generate reference lists, however, it is possible that these lists may be fabricated or unrelated to the generated text. Notably, computer scientists have labeled ChatGPT as a "bullshit generator" (Rahman et al., 2023). In January 2023, the American Educational Administration took the decision to block access to ChatGPT on school tools and internet services (Hu, 2023). As the application of LLM (Language Model) technology is one of the most well-known and contentious advancements in the field of education to date, there has been extensive debate regarding the advantages and disadvantages of technological progress, as well as the potential impact on different forms of education (Kasneci et al., 2023). In addition to the cheating debate, several instructors have observed that ChatGPT has demonstrated a deviation from the traditional method of evaluating learner essays and has instead pushed for novel assignments that cannot be effectively created by algorithms (Williamson et al., 2023). However, it is unequivocally apparent that employing AI to produce scientific articles raises significant ethical concerns from multiple perspectives, and the reliability of such work is also subject to scrutiny. The challenge of differentiating between human-authored content and content authored by artificial intelligence has sparked concerns within the academic and educational communities (Crawford et al., 2023). Moreover, the use of AI technologies in academic studies has rekindled discussions regarding the role of more traditional human endeavors (Stokel-Walker, 2022).

As clearly indicated, there exists a contentious debate surrounding the potential need for legal regulation of LLM technologies (Dwivedi et al., 2023). It is evident that there are three primary thematic domains that warrant further research in relation to LLM technologies: a) knowledge, transparency, and ethics; b) the digital transformation of organizations and societies; and c) education, learning, and academic research. Furthermore, it is imperative to delve into the biases inherent in generative algorithms and examine how they correspond to training data sets and processes. Additionally, it is crucial to identify the specific business and societal contexts that are most conducive to the application of generative AI. Moreover, it is essential to ascertain the most optimal combinations of human involvement and generative AI for various tasks, as well as develop methodologies for evaluating the reliability of text generated by generative AI. Lastly, it is imperative to address the ethical and legal challenges associated with the utilization of generative AI in diverse circumstances (Dwivedi et al., 2023).

The present inquiry that arises is as follows: can reviewers and publishers detect text generated by Language Model Models (LLMs)? Determining the answer to this question at present can only be done with a degree of uncertainty. The unprocessed output of ChatGPT, for instance, can be identified with some degree of effort, particularly when the length of the text exceeds a few sentences, especially if the subject matter pertains to scientific research. This is because LLMs construct word patterns based on statistical associations found in the initial training data and the prompts that they are exposed to, which can result in their output appearing insipid and generic or containing simple errors (Rahman & Watanobe, 2023). Furthermore, it is worth noting that LLMs are not yet equipped to provide citations for their work. Additionally, it should be emphasized that the current state of AI text production techniques does not automatically generate accurate citations. According to the perspectives put forth in (Hu, 2023) (Yeo & Tang, 2023), the detection of ChatGPT content necessitates the utilization of counter AI-detectors. The limitations of AI technology encompass not only its reduced precision but also its heightened rates of misclassification, which may consequently lead to the creation of seemingly credible written materials that, in reality, disseminate inaccurate, deceptive, or even hazardous information. Indeed, when ChatGPT was put to practical use, it exhibited issues pertaining to accuracy, bias, logic, and relevance (Hosseini et al., 2023). Moreover, it is important to highlight that ChatGPT lacks the capacity to contextualize language within the broader context of the world. Authors have also asserted that AI systems are unable to handle mathematical concepts effectively. Furthermore, due to its failure to adhere to the formatting conventions typically employed in academic articles, the text generated by ChatGPT often requires extensive editing (Khan et al., 2023). In many instances, satisfactory responses were not immediately attainable, necessitating multiple revisions and adjustments. When it comes to technical studies, it is common for LLM technologies to yield errors and false information due to the scarcity of training data available (Huang et al., 2023). Consequently, LLM technologies lag behind when it comes to addressing criticisms and viewpoints, as they lack the analytical skills that are expected of scientists and the practical expertise that shapes our perspectives. As scientists, our primary concern lies in the fact that these AI language models will not possess the capacity to effectively assimilate new knowledge, generate groundbreaking discoveries, or engage in in-depth analysis, thereby ultimately limiting the scope of academic discourse.

Conversely, Zhai's preliminary investigation revealed that ChatGPT demonstrated the capability to produce well-structured, (partially) appropriate, informative, and methodically robust written work (Zhai, 2022). The validity of the content generated by ChatGPT was examined in (Khalil et al., 2023). Through the utilization of two plagiarism detection programs and the analysis of 50 articles sourced from academic journals, researchers discovered that ChatGPT was able to generate original text that appeared to have been authored by a human being. This finding lends support to Hu's concerns regarding the surreptitious nature of ChatGPT, which poses a threat to the gatekeeping functions traditionally fulfilled by humans (Hu, 2023). Nevertheless, an AI chatbot has been able to craft study abstracts so proficiently that human experts encountered difficulty in discerning them from those produced by actual individuals. This phenomenon also raises concerns about the ease with which spam and other harmful outputs can be generated, which is a matter of concern for society.

5.   Authorship and AI: Large Language Models (LLMs)

Many publications and preprints in the past have made references to the chatbot, specifically ChatGPT, as a co-author in their research endeavors. This phenomenon prompted scholars, researchers, and publishers to eventually establish regulations governing the ethical utilization of Language Models (LLMs). Notably, Nature, Springer Nature, and Science have explicitly declared their refusal to accept manuscripts that list the chatbot as an author (Lee, 2023). Given that artificial intelligence chatbots are not recognized as human authors under current legislation, any content generated automatically by such a bot cannot be regarded as a copyrighted work. Nature and Science have clearly stated the following: "LLMs, such as ChatGPT, do not currently meet our criteria for authorship. It is important to note that authorship carries a certain level of accountability for the work, which cannot be effectively applied to LLMs. Therefore, if an LLM is used, it should be properly documented in the Methods section of the manuscript (or in an appropriate alternative section if a Methods section is not available)" (Watkins, 2023).

To what extent can AI be recognized as the author under existing copyright law? This subject was first raised (Chen, 2023). Many national copyright agencies and courts have expressed strong opposition to this notion. In certain countries like Australia and Korea, the requirement that "a work must be produced by a human in order to be eligible for copyright

protection" has been set as the definitive criterion. In 2022, the US Copyright Office upheld its decision to reject the registration of copyright for a two-dimensional artwork that was purportedly created autonomously by an AI software called Creativity Machine, thereby supporting the concept of human authorship (Rainie et al., 2021). Furthermore, The Nature journal has clarified its position as stated by (Khan et al., 2023): "If AI was employed in a formal research design or methodology, it should be acknowledged either in the acknowledgment section or the methods section of the paper. This acknowledgment should include a description of the content that was edited or generated, as well as details about the specific language model or tool used, including its name, version, extension number, and manufacturer." However, the emergence of bias in the field of AI can be attributed to various factors, including the collection of data, the design of algorithms, and human interpretation. Consequently, LLMs have the potential to magnify and perpetuate social inequities and prejudices, which can significantly impact the outcomes of research studies (Kasneci et al., 2023). Conversely, incorporating diverse perspectives in scientific investigations serves to mitigate bias. Hence, it is of utmost importance to carefully consider and control the openness of AI models and the training data they rely on, as certain AI models may necessitate more stringent modifications or limitations on specific technologies. Consequently, the use of AI in specialized research domains may give rise to errors, copyright complications, issues of accountability, instances of plagiarism, and the involvement of non-human authors (Shah & Bender, 2022).

In terms of scientific writing, particularly in the context of experimental inquiry, it is worth noting that there exist certain limitations pertaining to language models (LLMs) such as Chat GPT. While it is indeed true that LLMs have the capability to generate prose that closely resembles human writing, it is crucial to acknowledge that they are not without their own set of drawbacks when it comes to scientific writing (Crawford et al., 2023). One notable limitation is the lack of domain-specific knowledge possessed by LLMs. Although they are trained on a diverse array of materials, it is possible that they may not possess the same level of expertise on a given scientific subject as a human specialist (Rahman et al., 2023). Additionally, LLMs may have a limited capacity to adhere to a particular writing style or format that is characteristic of scientific discourse. While they may be able to generate text in various styles, it is unlikely that their output will perfectly mirror the specific style and format typically associated with scientific writing. Furthermore, LLMs may struggle to fully comprehend scientific terminology, which could result in a limited understanding of the nuanced jargon commonly used in scientific circles. Consequently, they may not possess the same level of grasp on scientific concepts and terminology as human experts. Moreover, LLMs have a restricted ability to critically evaluate the reliability and utility of sources. While they are capable of generating text based on a given source, they lack the capacity to assess the credibility and usefulness of that source in the context of a scientific investigation (Williamson et al., 2023). Lastly, LLMs may encounter difficulties in comprehending the intricacies and complexities surrounding ethical concerns. Although they are able to generate text on ethical matters, they are unable to fully grasp the multifaceted nature of these topics in the same way that a human expert would (Gillotte, 2019).

Algorithms possess the capability to efficiently generate academic publications that are structured in a coherent manner. Consequently, there is a valid concern that this efficiency may unintentionally facilitate the production of fraudulent research papers, thus posing significant challenges for educators and reviewers when it comes to identifying instances of such misconduct. This issue has the potential to exacerbate within the publishing domain (Rahman et al., 2023). As a means of rectifying systematic biases, the implementation of authorship tracking has been proposed as a potential solution (Pavlik, 2023). However, it is important to take into account the perspective put forth by (Hutson, 2022), which highlights a notable issue within the realm of human involvement in the development of artificial intelligence by the year 2030. Specifically, it is anticipated that the primary focus of artificial intelligence development will be centered around profit maximization and the enforcement of societal control. Furthermore, (Hutson, 2022) emphasizes the inherent challenges associated with achieving a consensus on ethical matters, underscoring the complexity of this particular aspect.

6. Ethical Recommendations

When considering the impact that artificial intelligence (AI) will have on various scientific disciplines, there are individuals who argue that educators should embrace the future of science with an open mind. These proponents suggest that instead of solely focusing on understanding the mathematical foundations of statistical models, scholars should prioritize acquiring the necessary skills to effectively utilize statistical formulas. Similarly, it is proposed that scientists should not feel ashamed by their lack of familiarity with AI algorithms; rather, they should strive to comprehend how to effectively employ AI resources (Hutson, 2022). In an effort to demystify AI technologies, certain educators have put forth the idea of incorporating the use, critique, and evaluation of such technologies as part of classroom learning exercises (Pavlik, 2023). Conversely, others have advocated for the inclusion of these activities in order to foster students' critical digital literacy and provide instruction on the ethical employment of language model (LLM) tools. Consequently, it has been suggested that technology firms responsible for creating these tools have a moral obligation to promote their socially advantageous uses, while discouraging or preventing potentially negative uses, such as employing a text generator to cheat on a test (Rainie et al., 2021). Taking these perspectives into account, it is advisable for students to utilize ChatGPT as a means to enhance their writing skills, rather than relying on it as a complete replacement for their own writing efforts. Furthermore, it is of utmost importance to appropriately acknowledge the information generated by AI technologies and

provide proper attribution for all sources utilized during the writing and research process. Both educators and researchers bear the responsibility of safeguarding the validity of studies when it comes to addressing ethical issues. This necessitates a need for responsibility and ownership, as well as a comprehensive review of the content produced by AI. Additionally, guidelines should be established to instruct authors on how to effectively incorporate LLM tools like ChatGPT in their writing (Lee, 2023). In order to promote ethical behavior, the scholarly publishing sector must develop workable solutions, regulations, and standards. Educators play a crucial role in encouraging students to independently produce essays or projects before seeking feedback from AI software. By engaging in this type of formative evaluation, students can learn how to more effectively utilize LLMs. The evaluation process assesses the extent to which students actively participate in each step of the activity, including the feedback procedure. Moreover, it evaluates the degree to which students successfully integrate feedback into the original content.

7.   Conclusion

Generative AI, a form of artificial intelligence that creates new content, is having a profound impact on the field of education, and yet its potential is just beginning to be realized. By incorporating AI tools into educational settings, researchers are able to overcome creative obstacles without needing to fully understand the intricacies of these tools. This allows for the development of more advanced learning environments, which in turn foster students' creativity and shape their future prospects. However, despite these positive outcomes, there are lingering concerns to be addressed. The use of AI-generated writing raises ethical dilemmas and introduces doubts about the accuracy of the information being presented. This, in turn, has the potential to impact critical thinking skills, problem-solving abilities, and social aptitude. In order to ensure the advancement of scientific knowledge, it is crucial to uphold transparency and trust when using opaque AI software. As scientists continue to explore the use of AI chatbots in education, publishers must acknowledge their legitimate applications while also establishing clear guidelines to prevent any potential misuse. Striking a balance between the benefits and challenges associated with integrating AI into education is of utmost importance in order to ensure its continual evolution and success.

Acknowledgement

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