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A Study on the Influence of CHATGPT Usage on Human Cognitive Thinking and Creativity

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ABSTRACT

Chat GPT is a cutting-edge ai technology that leverages the power of the gpt language model to facilitate natural language interactions and generate human-like text responses. This innovative tool has garnered significant attention for its ability to effectively address single-turn tasks, such as answering questions and completing ai prompts. While chat gpt excels in providing accurate and coherent responses, it is important to acknowledge both its strengths and limitations in the realm of human cognition and creativity. It is essential to recognize that while chat gpt excels in certain aspects of language processing, it may fall short in others. For instance, the technology may struggle with grasping nuanced contextual cues or providing emotionally intelligent responses in certain scenarios. Additionally, the reliance on instant answers and the potential for reduced independent thinking when interacting with chat gpt raise important considerations about the impact of ai on human cognition and decision-making processes. Chat gpt represents a significant advancement in ai technology and has the potential to enhance productivity and efficiency in various domains, it is crucial to approach its utilization with a balanced perspective. By acknowledging both the capabilities and limitations of chat gpt, we can harness its power effectively while also preserving the importance of human creativity, critical thinking, and emotional intelligence in our interactions with ai systems.

Keywords: A.I. Powerbots, Human Creativity, Chatgpt, Cognitive Thinking, Learning Skills.

INTRODUCTION

As the use of Artificial Intelligence (AI) has become increasingly prevalent across diverse sectors, its effects on human cognitive ability have been particularly pronounced. These models, which include Generative Pretrained Transformers (GPT) and other Large Language Models (LLMs), hold the potential to transform the educational landscape through the enhancement of pedagogical and learning processes, offering a range of benefits that include the improvement of reading and writing skills, the facilitation of personalised learning experiences, and the promotion of multilingual communication. Among these models, OpenAI's ChatGPT has distinguished itself due to its advanced capabilities and widespread use. ChatGPT, which uses machine learning techniques to produce responses that are often read as uncannily human, operates by predicting the next word in a sentence, taking into account contextual cues provided by the preceding words. It is trained on a wide range of Internet texts, and can be further customized by fine-tuning it with datasets specifically tailored to various tasks. This technology has a wealth of applications, from drafting emails to coding and holds great promise as an educational tool. However, as with any powerful technology, it is essential to consider its effects on human cognition, particularly with regard to the impact it may have on learning and memory capabilities. Creativity has historically been considered a human characteristic, but generative AI technology has shown that AI can match or even surpass humans in creative tasks. This technology is being integrated into various fields to aid in the creative process of generating new and useful ideas. GAI chatbots like alpa.ai, Copy.ai, ChatGPT, Studio.ai, and YouChat.GAI are valuable tools in the creative process.

LITERATURE REVIEW

- Samir A. El-Seoud Shehab, Eldeen Ayman, Omar H. Karam, (2023) in their paper titled, "The Impact of ChatGPT on Student Learning/performing.'' have emphasized the need for responsible implementation, faculty training, and ongoing evaluation to maximize the benefits of ChatGPT while upholding ethical practices in education.
- Mhlanga, (2023) in their paper titled, "The Value of Open AI and Chat GPT for the Current Learning

Environments and The Potential Future.'' have mentioned cutting-edge artificial intelligence technologies like Chat GPT have the potential to transform the educational landscape. These technologies can improve learning outcomes, increase student engagement, and automate administrative tasks.

- Castillo, (2023) in their paper titled, "Effect of Chat GPT on the digitized learning process of university students." emphasized that ChatGPT significantly impacts the digitalized learning process as many students prefer to use ChatGPT to handle tasks. Institutions should come up with ways of dealing with students' growing use of AI bots.
- Dwivedi, Y. K, et al. (2023). So what if ChatGPT wrote it? Multidisciplinary perspectives on opportunities, challenges and implications of generative conversational AI for research, practice and policy. International Journal of Information Management, 71, 102642. The article discusses the implications of generative conversational AI, specifically ChatGPT, on research, practice, and policy. The question is raised on whether ChatGPT should target a superhuman, know-it-all system or focus on specific knowledge. Specialization is valued by both humans and corporations, but training databases may lack specialized personal experiences.
- Long Bai, Xiangfei Liu, Jiacan SuEzra and Omit, (2022) in their paper titled, "ChatGPT: The cognitive effects on learning and memory." concluded that for educators, there is a need for a well-rounded educational strategy that combines traditional instruction with artificial intelligence. By automating routine tasks, ChatGPT can allow users to conserve mental energy, thereby facilitating higher-order cognitive functions such as creativity and problem-solving.
- Rudolph, Tan, & Tan (2023) in their paper titled, "ChatGPT: Bullshit spewer or the end of traditional assessments in higher education?" reveal that ChatGPT is emerging as a technology capable of changing our social interactions radically. They suggest to conduct training for faculty on AI tools such as ChatGPT; provide training on academic integrity for students; practice the use of AI language tools (like ChatGPT) to solve real-world problems (Zhai, 2022),become digitally literate by mastering AI tools (Zhai, 2022) and thereby increase employability.
- Feng Zhu, Wenbo Zou (2023) in their paper titled, "The Role of Generative AI in Human Creative Processes: Experimental Evidence." studied that unlike human-human collaboration that increased output creativity, "human-AI teams" on average performed similar to human individuals in our novel creative tasks. Willingness to pay (WTP) for access to ChatGPT relative to working alone in a future creative task on average equal to 1.44 Yuan out of their 10-Yuan budget. Experiencing human-human collaboration and human-AI collaboration both decreased this WTP. Finally, when having access to ChatGPT, individuals find the creative process more satisfactory and reported higher levels of self-efficacy.
- Inuusah Mahama, David Baidoo-Anu, Peter Eshun, Benjamin Ayimbire, Veronic Esinam in their paper titled, "ChatGPT in Academic Writing: A Threat to Human Creativity and Academic Integrity? An Exploratory Study." studied that fears are borne out of the fact that students are required to submit academic assignments, and the possibility that they see ChatGPT as the best way to execute these assignments is high.
- Brovko, A. (2024) in his paper titled, "The impact of Chat GPT on cognitive functions of university students." In this regard, as E. van Dis, J. Bollen, R. Van Rooij, V. Zuidema and K. Bockting and M. Halaweh note in their works, in cases where ChatGPT is not able to find and provide certain information, including scientific data, he begins to invent them, providing non-existent definitions of concepts, classifications, models or references to literature.

RESEARCH GAP

Every research has shortcomings that can be filled in by future research. Following are the limitations of the research-

- ➢ There aren't many publications on the subject of chatgpt's influence on human behavior because there is still a lot of research to be done.
- ➢ A survey could only be completed by 202 respondents due to time constraints. In order to make the study stronger, more responders would be needed.
- ➢ Sample demography consists majority of only Undergraduate students.

OBJECTIVES

- To explore the influence of chat GPT on the critical thinking abilities of students, considering the potential reliance on the model For generating responses.

- To evaluate the extent to which students' independence in decision-Making And information-Seeking is affected by their use of Chat GPT
- To identify the potential benefits and drawbacks of Chat GPT in relation to the creativity skills of undergraduate Students.
- To examine the extent to which undergraduate students utilize Chat GPT for communication purposes in their academic and professional contexts.

RESEARCH METHODOLOGY

This study utilizes both primary and secondary data to explore the various aspects of ChatGPT and its impact on student users' creative and cognitive thinking processes. Through a survey conducted via Google Forms using Convenient Sampling, 202 responses were gathered from undergraduate students. The research aims to understand how ChatGPT is utilized and its effects on users' thinking patterns by combining survey data with insights from existing literature on artificial intelligence. The study focuses on Convenience Sampling for its accessibility and simplicity, allowing for a diverse range of perspectives. Ultimately, the goal is to provide a detailed analysis of how ChatGPT influences users' cognitive processes and creativity. For this research the sample design is

Sample size - 202 respondents

- Target population – Undergraduate Students
- Type of sampling – Convenience Sampling
- Type of research - Descriptive Research

RESEARCH PROBLEM

1. How does the use of chat gpt affect the critical thinking and creativity skills of it's users?
2. Is there a trade off between efficiency and creativity when using Chat GPT?
3. What are the benefits of integrating A.I. into the education system and what are the best practices for doing so?

Below mentioned are the detailed deductions and analysis of the data collected.

DATA ANALYSIS AND FINDINGS

1. Age Group and Profession

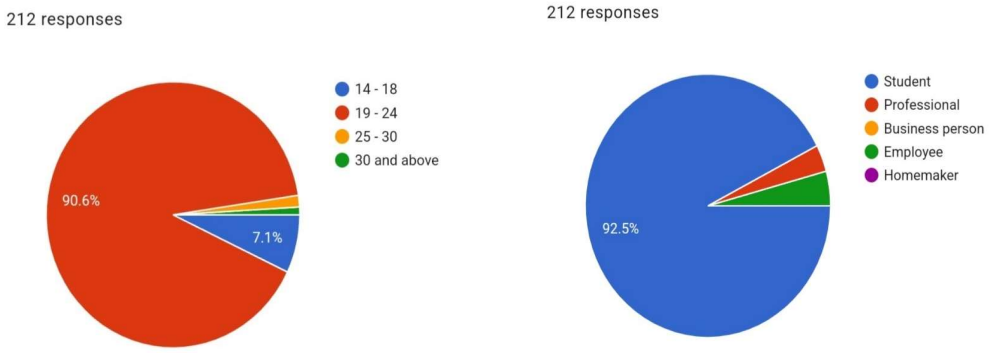


Figure 1.

Interpretation

The majority of respondents, 90.6%, were in the 19-24 age group. 7.1% of respondents were in the 14-18 age group, while 1.4% were aged 25-30, and 0.9% were 30 years old and above. The survey participants primarily consisted of students, accounting for 92.5% of the sample, while professionals, employees, business persons, and homemakers made up the remaining 0.5%. The research questions were segregated into five sections which mainly focused on Information Verification and usage, Independent Thinking, Situations of Reliance, Critical thinking and Creativity skills, Privacy Concerns and Future of A.I. Powered Bots.

INFORMATION VERIFICATION AND USAGE OF CHATGPT

2. How frequently do you use chatGPT?

3. Do you cross check the information you receive from ChatGPT with other sources?

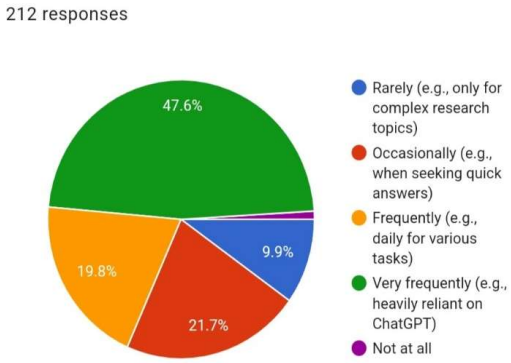


Figure 2.

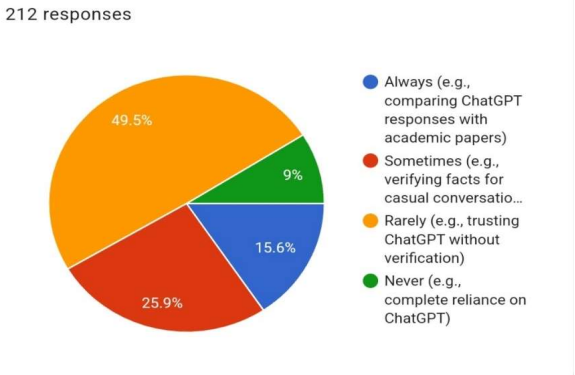


Figure 3.

Interpretation

Figure 2. shows that most users (47.6%) use chat gpt very frequently, meaning they are heavily reliant on it. 19.8% use it frequently, 21.7% use it occasionally and 9.9% use it only for complex research topics.

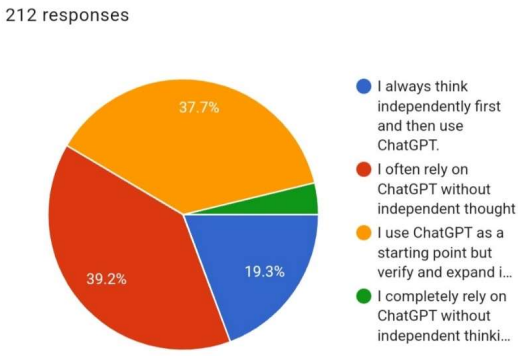
Figure 3. elaborates regarding Information verification: Half of the users (49.5%) rarely verify the information they receive from chat gpt, indicating a high level of trust. 25.9% sometimes verify facts for casual conversations, 15.y% always compare chat gpt responses with academic papers and 9% never cross-check the information.

INDEPENDENT THINKING VS. RELIANCE ON CHATGPT

4. To what extent do you rely on ChatGPT for completing assignments or tasks?

5. Before using ChatGPT, do you try to think independently and come up with your own solutions?

6. In what situations do you rely solely on ChatGPT without independent thought?



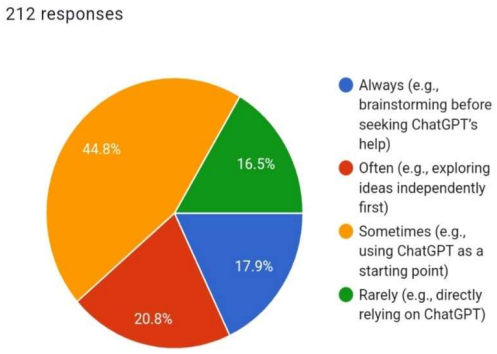


Figure 4.

Figure 5.

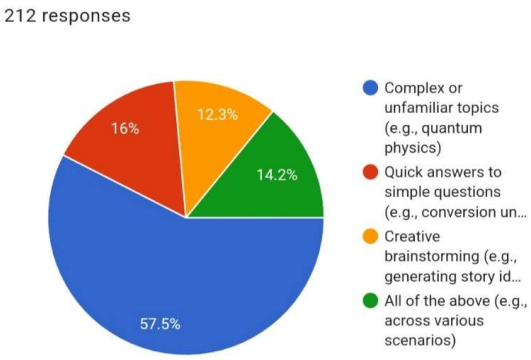


Figure 6.

Interpretation

Figure 4. explains Independent thinking: 39.2% of the users often rely on chat gpt without independent thought. while 37.7% use chat gpt as a starting point but verify and expand independently. 19.3% always think independently first and then use chat gpt. 3.8% completely rely on ChatGPT without independent thinking.

Figure 5. emphasizes that around 44.8% respondents use chat gpt as a starting point, 20.8% like to explore ideas independently first, 17.9% always brainstorm first then use chat gpt, and 16.5% rarely brainstorm and directly rely on chat gpt.

Figure 6. illustrates Situations of reliance: The majority of the users (57.5%) among the respondents rely on chat gpt to solve complex or unfamiliar topics, such as quantum physics. 16% rely on chat gpt for quick answers to simple questions, such as conversion units. 12.3% rely on chat gpt for creative brainstorming, such as generating story ideas. 13.8% respondents rely on chat gpt for all of the above situations.

CREATIVITY SKILLS AND CHATGPT

7. Have you noticed any impact on your creativity skills since using ChatGPT? (On a scale of 1 to 5, 1- Yes, Significantly, 5- No, Not at all)

8. Which of the following skills have you developed or enhanced by using ChatGPT? (Select all that apply)

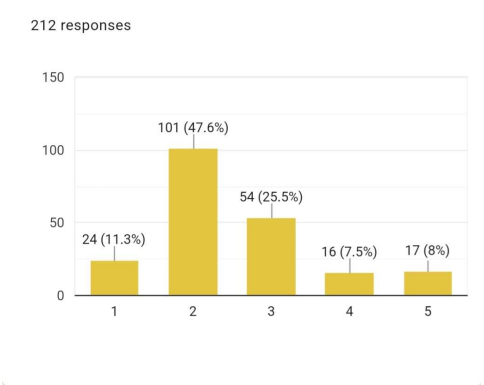


Figure 7.

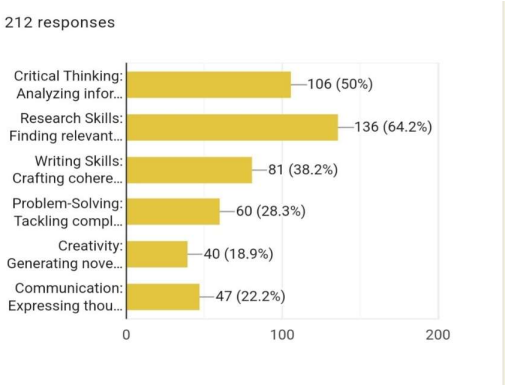


Figure 8.

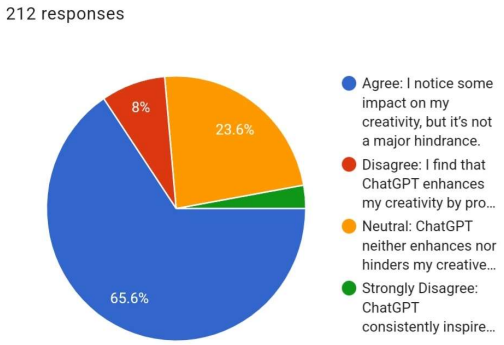
Interpretation

Figure 7. depicts that among the 202 respondents surveyed, about 47.6% reported a significant positive impact on their creativity skills from using ChatGPT, while approximately 7.5% indicated that ChatGPT had no effect on their creativity.

Figure 8. describes Creativity skills: The skills that have been developed or enhanced by using chat gpt are: critical thinking (50%), research skills (64.2%), writing skills (38.2%), problem-solving (28.3%), creativity (18.9%) and communication (22.2%).

9. Do you find that using ChatGPT affects your ability to think creatively or come with original ideas?

10. Have you ever collaborated with ChatGPT on a creative project? If so, how did it influence the outcome? 11. Can ChatGPT effectively understand and respond to emotional cues in your messages?



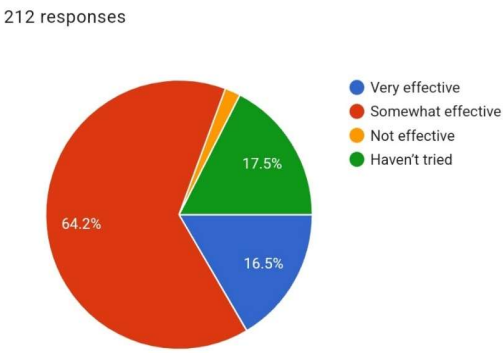


Figure 9.

Figure 10.

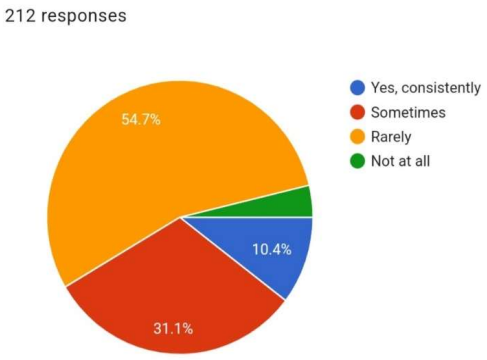


Figure 11.

Interpretation

Figure 9. emphasizes Creativity skills: 65.6% of the users think that ChatGPT has impacted their creativity skills significantly, while 8% users think it enhances creativity by providing fresh perspectives. 23.6% of the users stand neutral. Around 2.8% respondents think that ChatGPT enhances their creative thinking.

Figure 10. denotes Creativity outcomes: 64.2% of the users have collaborated with chat gpt on a creative project and had a somewhat effective outcome. 17.5% haven't tried using chat gpt for a project. 16.7% find chat gpt very effective for creative projects whereas 1.9% don't find ChatGPT effective for creative outcomes.

Figure 11. shows Emotional cues: 55.2% of the users think that chat gpt rarely responds to emotional cues in their messages. 30.5% of the users feel chat gpt sometimes responds to emotional cues in their messages. Only 10.5% of the users believe chat gpt responds to emotional cues in their messages.

PRIVACY CONCERNS OF AI POWERED BOTS

12. How comfortable are you with sharing personal data with AI-powered bots for personalized learning experiences?

13. How important is it for you to have control over the data you provide to Chat GPT, including the ability to delete it? (On a scale of 1 to 5, 1- Very important and 5- Not important at all)

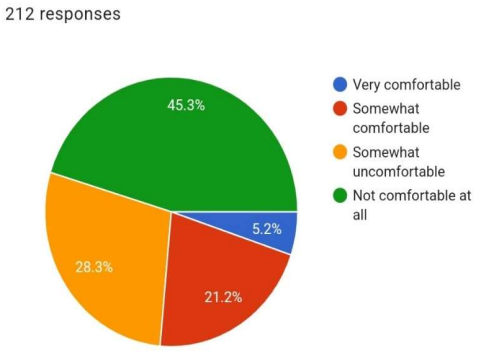


Figure 12.

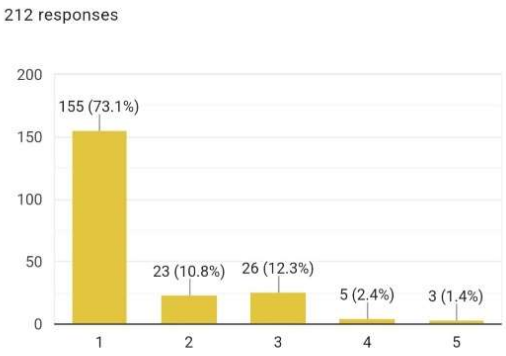


Figure 13.

Interpretation

Figure 12. addresses privacy concerns: 45.3% of the users are not comfortable with sharing personal data with Al-powered bots for personalised learning experiences. 28.3% are only somewhat uncomfortable with sharing personal data with Al-powered bots for personalised learning experiences. 21.2% are only somewhat comfortable and 5% users are not comfortable at all with sharing personal data with AI powered bots for personalised learning experiences.

Figure 13. shows around 155 respondents think it is important to have control over the data you provide to ChatGPT including the ability to delete it.

FUTURE OF A.I. CHATBOTS

14. Which features or improvements would you like to see in AI-powered chatbots for educational purposes?

15. How do you envision the future of AI-powered chatbots in education?

16. In what ways have AI-powered chatbots been helpful in your learning journey? (Select all that

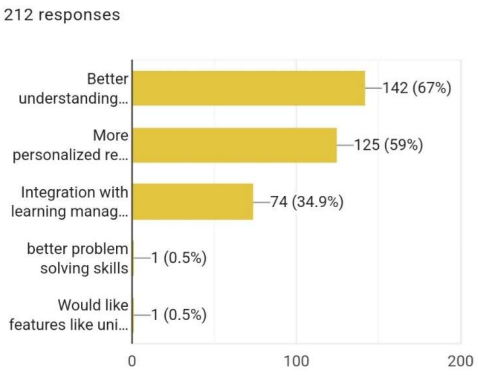


Figure 14.

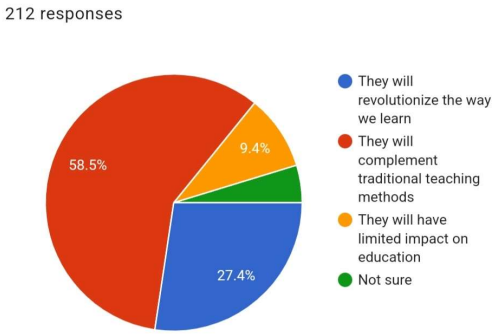


Figure 15.

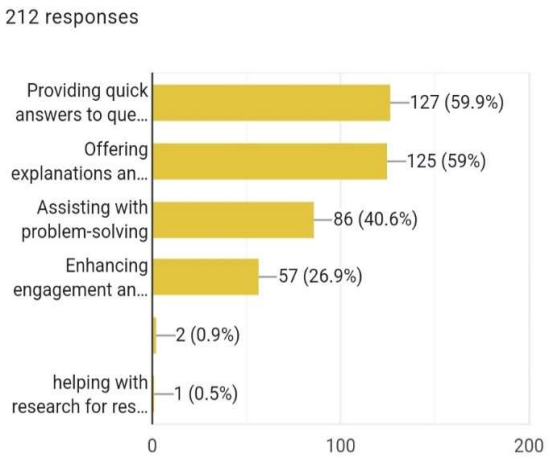


Figure 16.

Interpretation

Figure 14. tells us that looking ahead to the future of AI chatbots for educational purposes, respondents have expressed various desires for features and improvements. Specifically, 67% believe that chatbots can aid in better understanding complex questions, while 59% appreciate the provision of personalized responses. Additionally, 34.9% see the potential benefits of integrating chatbots with learning management systems, and a small percentage of around 0.5% acknowledge the role of chatbots in enhancing problem-solving skills.

Figure 15. emphasizes that when considering the future of AI Powered Bots, the majority of respondents, approximately 58.5%, believe that these bots will enhance traditional teaching methods. About 27.4% anticipate that AI-powered bots will bring about a revolution in the way we learn. A smaller percentage, 9.4%, feel that their impact on education will be limited. Lastly, 4.7% of respondents are uncertain about the future role of AI-powered bots.

Figure 16. denotes that approximately 59.9% of respondents believe that Chat GPT is beneficial for providing prompt answers to questions, while 59% appreciate its ability to offer explanations and examples. Additionally,

40.6% find it helpful in assisting with problem-solving, and 26.9% feel that it enhances engagement and interactivity. Lastly, 1.4% of respondents have other perspectives on the impact of Chat GPT.

FINDINGS

Reduced Independent Thinking: The popularity of Chat GPT has decreased independent thinking among users, as they now depend heavily on the AI tool for quick answers. This reliance on AI may limit human cognitive abilities and hinder originality and creativity, as users often skip critical thinking. Additionally, users tend to accept the first AI-generated response without verifying information, increasing the risk of misinformation.

Creativity Trade-off: While chat GPT provides efficient answers, it may hinder originality.However, this convenience comes at the expense of personal creativity, as users tend to bypass critical thinking and verification processes when relying solely on Chat GPT. The shift towards immediate AI-generated responses has replaced traditional brainstorming and problem-solving methods, leading to a tendency to settle for the first answer provided.

Positive Outcomes: Collaborating with chat GPT yields positive results in creative projects. While some argue that Chat GPT streamlines processes and delivers superior outcomes, concerns persist regarding its impact on creativity. Users acknowledge a slight reduction in their creative output when collaborating with Chat GPT, but they perceive positive outcomes in creative projects. Despite Chat GPT's ability to respond to emotional cues in prompts, the impending development of Artificial General Intelligence (AGI) may further diminish this human advantage.

Privacy concerns: Privacy concerns arise as users express discomfort in sharing personal data with AI systems. However, findings suggest that individuals are willing to provide substantial amounts of data to Chat GPT in exchange for desired outcomes. The accuracy of Chat GPT's responses is directly linked to the quality and quantity of data provided by users, highlighting the trade-off between privacy and accuracy in utilizing the AI tool.

Prioritizing education, particularly in AI literacy, is crucial for adapting to these changes. Paying attention to both non-verbal and verbal cues, actively listening, and being present in conversations are essential skills. While tools like ChatGPT can be beneficial for specific learning tasks, they should be used as aids rather than replacements for critical thinking and problem-solving. Undergraduate students should view AI as a tool for learning and practice, supplementing their development of employability skills through a mix of human interaction, real-world experiences, and self-reflection. Striking a balance between leveraging AI and nurturing our creative abilities is key to fostering innovation. As we look to the future, it's clear that ChatGPT is just the beginning of disruptive technological advancements. Technologies like Explainable AI (XAI), Deep Reinforcement Learning (DRL), and Transfer Learning are on the horizon, signaling further advancements in the field. It's essential to approach these developments with a professional mindset, embracing the opportunities they bring while continuing to cultivate our unique human capabilities.

CONCLUSION

The integration of AI systems like ChatGPT into workflows can enhance productivity and streamline processes, but users need to actively engage their cognitive faculties and exercise critical thinking skills when interacting with the tool. Education on the responsible and ethical use of ChatGPT is crucial. Concerns about the impact of AI on education have emerged, with some fearing that excessive reliance on AI may hinder critical thinking skills in learners. However, research indicates that AI can be valuable in the classroom when combined with a focus on critical thinking and interpersonal connections. By collaborating with ChatGPT as a partner rather than relying on it as a puppet, users can effectively utilize AI in their work environments. It is important to remember that AI technologies are designed to assist humans, not replace them. By maintaining control over the use of artificial intelligence, users can harness its benefits without allowing it to dominate decision-making processes.While AI-powered chatbots like ChatGPT offer promising opportunities to enhance learning experiences, they also pose challenges related to privacy, security, and compatibility with different learning styles. Users must approach the use of chatbots for learning responsibly and critically. Understanding the impact of AI on cognition and creativity is essential for making informed decisions and fostering innovation in the evolving landscape of AI. By maintaining a balanced approach to utilizing AI tools like ChatGPT, users can maximize their benefits while preserving their autonomy and creativity in the learning process.

SCOPE FOR FURTHER RESEARCH

Further research on the influence of ChatGPT usage on human cognitive thinking and creativity could explore the following areas:

1. **Long-term effects:** Investigate how prolonged use of ChatGPT impacts cognitive thinking and creativity

over an extended period of time.

2. **Comparative studies:** Compare the cognitive performance and creativity of individuals who regularly use ChatGPT with those who do not, to identify any differences or patterns.
3. **User demographics:** Analyze how factors such as age, education level, and profession may influence the impact of ChatGPT on cognitive thinking and creativity.
4. **User feedback:** Gather qualitative data through surveys or interviews to understand users' perceptions of how ChatGPT usage affects their cognitive processes and creative abilities.
5. **Task-specific analysis:** Explore how ChatGPT usage influences cognitive thinking and creativity in specific tasks or scenarios, such as problem-solving, brainstorming, or storytelling.

REFERENCES

Form link: https://forms.gle/ZCzsbopn3FwH22qN6 The Influence of ChatGPT usage on Human Cognitive Thinking and Creativity

ChatGPT: Vision and Challenges. Retrieved 2024, from https://arxiv.org/ftp/arxiv/papers/2305/2305.15323.pdf (2023).

Mhlanga, The The Value of Open AI and Chat GPT for the Current Learning Environments and The Potential Future Uses, 2023/05/10

(Castillo, 2023/05/16) Effect of Chat GPT on the digitized learning process of university students

(Crust, 2023) ChatGPT Employability Study Skills and Curriculum Development

The User Experience of ChatGPT: Findings from a Questionnaire Study of Early Users, https://doi.org/10.1145/3571884.3597144

Dwivedi, Y. K, et al. (2023). So what if ChatGPT wrote it? Multidisciplinary perspectives on opportunities, challenges and implications of generative conversational AI for research, practice and policy. International Journal of Information Management, 71, 102642.

Jia, N., Luo, X., Fang, Z., & Liao, C. 2023. When and How Artificial Intelligence Augments Employee Creativity. Academy of Management Journal, amj.2022.0426.

Zhu, Feng and Zou, Wenbo, The Role of Generative AI in Human Creative Processes: Experimental Evidence (December 26, 2023). Available at SSRN: https://ssrn.com/abstract=4676053 or http://dx.doi.org/10.2139/ssrn.4676053

Mahama, I., Baidoo-Anu, D. , Eshun, P. , Ayimbire, B. and Eggley, V.E. 2023. ChatGPT in Academic Writing: A Threat to Human Creativity and Academic Integrity? An Exploratory Study. Indonesian Journal of Innovation and Applied Sciences (IJIAS). 3, 3 (Oct. 2023), 228-239. DOI:https://doi.org/10.47540/ijias.v3i3.1005.

Bowers, A. J. (2023). Unpacking the caveats of ChatGPT in education: Addressing bias, representation, authorship, and plagiarism. https://doi.org/10.7916/6q72-hm22

Jennifer Haase, Paul H.P. Hanel (2023) “Artificial muses: Generative artificial intelligence chatbots have risen to human-level creativity.” https://doi.org/10.1016/j.yjoc.2023.100066

Orrù G, Piarulli A, Conversano C and Gemignani A (2023) Human-like problem-solving abilities in large language models using ChatGPT. Front. Artif. Intell. 6:1199350. doi: 10.3389/frai.2023.1199350

Brovko, A. (2024). The impact of Chat GPT on cognitive functions of university students. Scientific Collection «InterConf», (188), 64–68. Retrieved from https://archive.interconf.center/index.php/conference-proceeding/article/view/5380