

From Spark to Structure: How ChatGPT Transforms the Way We Form Ideas

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Abstract

The advent of generative AI tools like ChatGPT has revolutionized the ideation process across various domains. By serving as a cognitive partner, ChatGPT enhances creativity, aids in structuring thoughts, and accelerates the transition from abstract concepts to actionable ideas. This mini-review explores the multifaceted role of ChatGPT in idea formation, supported by empirical evidence from recent studies. While acknowledging its limitations, we discuss its transformative impact on individual and collaborative innovation practices.

Keywords: LLM; Innovation; ChatGPT; Idea

1. Introduction

1.1. Reimagining the Birth of Ideas

Artificial Intelligence (AI) is rapidly evolving and advancing, making it one of the most important and cutting-edge technologies of our time. This revolutionary technology is currently transforming business structures and organizing innovative processes across the globe (1).

As a leading branch of computer science, AI focuses on solving complex cognitive challenges and has found widespread applications in various fields. Its unique capabilities, such as machine learning, complex data processing and analysis, pattern recognition, and problem-solving, have made AI an unmatched technology in the digital age (2, 3). Pre-trained generative transformer-based language models (GPTs) are prominent examples of these advancements, evolving into intelligent systems with multifunctional capabilities (4).

ChatGPT, as an AI model based on deep learning, is trained on massive volumes of textual data and is capable of reproducing educational style and content while maintaining coherence with the user's query context. This model leverages three key capabilities: processing large-scale data and recognizing complex patterns, generating accurate predictions for specialized tasks, and facilitating human-like interactions that enable unprecedented levels of natural language understanding and generation. These features represent a fundamental step toward developing responsive and flexible intelligent systems (5, 6).

A study by Filippi indicates that ChatGPT has a dual performance in generating innovative ideas, while it performs well in increasing the number and novelty of ideas, it falls short in producing practical and diverse ones. Interestingly, it has shown the ability to balance designers of varying skill levels. Ultimately, ChatGPT can be considered a valuable supplement to ideation rather than a replacement for human creativity (7).

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Furthermore, ChatGPT was most effective at generating incrementally (versus radically) new ideas. Process evidence suggests that the positive influence of ChatGPT can be attributed to its capability to combine remotely related concepts into a cohesive form, leading to a more articulate presentation of ideas (8).

The results offer actionable strategies for creators and managers in creative industries to promote human-machine interaction and personal values and provide an inclusive and collaborative practical path for enhancing the role of technology in human creativity (9).

This technology offers numerous advantages, including rapid access to information, strategic guidance, and support for innovation processes. Utilizing ChatGPT helps small and medium-sized enterprises manage knowledge more efficiently, enhance customer service quality, and optimize business operations (10).

Given the significance and prominent role of artificial intelligence and the ChatGPT software, this study aims to explore their impact on innovation.

Traditionally, idea generation has been perceived as an inherently human endeavor, relying on intuition, experience, and serendipity. However, the emergence of large language models (LLMs) like ChatGPT has introduced a paradigm shift. These tools can simulate brainstorming sessions, provide diverse perspectives, and assist in refining nascent thoughts. Recent research indicates that ChatGPT can enhance the creativity of generated ideas compared to traditional methods, such as conventional web searches (11).

2. ChatGPT as a Cognitive Partner in Ideation

2.1. Idea Expansion

ChatGPT excels in divergent thinking, offering users a plethora of perspectives on a given topic. In a study assessing its role in generating research ideas for dysphagia, ChatGPT provided a range of novel concepts, demonstrating its utility in expanding the ideation landscape (12).

2.2. Idea Structuring

Beyond generating ideas, ChatGPT aids in organizing and structuring them. For instance, in medical education, students utilized ChatGPT to develop structured intervention plans, enhancing their readiness for clinical fieldwork (13).

2.3. Idea Evaluation and Refinement

ChatGPT can simulate critical evaluation by identifying potential weaknesses or areas for improvement in proposed ideas. In the context of medical informatics education, students reported that ChatGPT assisted in refining their ideas and provided constructive feedback, thereby enhancing the quality of their academic work (14).

3. Applications Across Domains

The versatility of ChatGPT in idea formation is evident across various fields:

- **Healthcare Research:** ChatGPT has been employed to generate innovative research questions in areas like adolescent idiopathic scoliosis, showcasing its potential in medical research ideation (15,16,17).
- **Plastic Surgery:** In aesthetic surgery, ChatGPT was prompted to develop novel patent ideas for rhinoplasty, indicating its applicability in surgical innovation (17).
- **Medical Education:** The integration of ChatGPT into medical curricula has enhanced students' ability to brainstorm and structure ideas effectively (18).

4. Limitations and Considerations

While ChatGPT offers substantial benefits in idea generation, certain limitations warrant attention:

- **Originality Concerns:** Studies have shown that while ChatGPT can produce creative ideas, the best human-generated ideas still surpass those of AI in terms of originality (19).
- **Over-Reliance:** Dependence on AI for ideation may impede the development of individual creative skills (20).

- **Ethical Implications:** The use of AI in generating ideas raises questions about authorship and intellectual property rights.

5. Conclusion

5.1. The New First Draft of Innovation

ChatGPT stands as a transformative tool in the realm of idea formation, acting as a catalyst that propels the journey from initial spark to structured concept. By enhancing creativity, providing structural support, and facilitating critical evaluation, it redefines the ideation process. However, mindful engagement and critical oversight remain essential to harness its full potential responsibly.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

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