CREATIVITY AND ARTIFICIAL INTELLIGENCE: HUMAN PRIORITIES AND TECHNOLOGICAL POSSIBILITIES OF THE ARTIFICIAL INTELLIGENCE

Svitlana Sysoieva, Dr. Sc., Prof.
Full Member (Academician) of NAES of Ukraine
Academician Secretary, Division of Philosophy of Education, General and Preschool Pedagogy, National Academy of Educational Sciences of Ukraine, Kyiv, Ukraine
2099823@gmail.com
https://orcid.org/0000-0003-2499-732X

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Abstract. *The author examines the problems of human creativity in the context of the emergence of modern artificial intelligence technologies. A scientific analysis of the areas of artificial intelligence application in the human creative process is carried out; it is shown that one of the most interesting and at the same time complex aspects of artificial intelligence is its 'creative capabilities' and its impact on the creative development of the individual. It is emphasised that the importance of analysing the artificial intelligence application in human creativity is due not only to the technological achievements of modern science, but also to the ethical, cultural and psychological dynamics that arise in the interaction between man and machine. The study and synthesis of scientific sources on creativity and the abilities of artificial intelligence allows us to conclude that today its application in the human creative process is possible in the following areas: artificial intelligence as a tool for ensuring the creative process, which accelerates the performance of routine tasks, provides quick feedback, and helps in collecting information; artificial intelligence as a method of expanding human creative abilities, i.e., performing tasks requiring divergent and convergent thinking or searching for and solving problems; artificial intelligence as a partner in human creative development, i.e., expanding the boundaries of imagination, fantasy, and problem vision; increasing motivation and interest in solving creative problems; influencing the formation and development of character traits and qualities of the human psyche necessary for productive creativity.*

Keywords: *creativity; creative process; artificial intelligence; generative artificial intelligence; self-expression.*

INTRODUCTION, PROBLEM STATEMENT

Creativity is one of the most mysterious phenomena in the life of every person and society as a whole. Creativity not only ensures the progressive movement of society forward, the development of civilisation. Creativity, which may be even more important from the point of view of the humanity of existence, has a powerful psycho-rehabilitation effect, protects the person -creator from stress, shields him or her from everyday life and fuss, allows to immerse one-

self in oneself, in one's creativity, to draw strength and inspiration for life and creative achievements (Sysoieva, 2006).

Human creative activity, involvement of children and youth in creativity during the war in Ukraine is of exceptional importance precisely because of the psycho-rehabilitation nature of creativity. It is also important to note that the peculiarity of any creative process – the process that results in the creation of something new – is that not only the person–creator influences the result of his or her own creativity, but also the subject of creativity itself contributes to the further creative development of a person, which is of exceptional importance for maintaining a person's mental health, life and professional resource during the war.

It should be emphasised that people able of creativity can easily adapt to any social environment, life and professional situations. The abilities and opportunities for adaptation lie in themselves, in their ability to abstract from secondary aspects, to highlight the main and essential, to see the interesting and promising, to build possible solutions to problems, practical ways of solving them, and to focus on their implementation (Sysoieva, 2006). Creative activity can and should become a powerful creative potential for a person in the modern world, its support and protection, a means of adaptation to changes in his/her life during the war.

Artificial intelligence (AI) is one of the most important technological innovations of the 21st century, which is already changing many aspects of our lives. Over the past decades, this area of technological development has significantly expanded its capabilities to influence various areas of human activity, from healthcare to finance, from industry to art.

The idea that a machine can facilitate the human creative process seems paradoxical, as creativity is often identified with unique human traits such as intuition, emotion, subjectivity, divergent thinking, etc. However, modern AI technologies, such as machine learning algorithms and neural networks, are already capable of creating music, images, literary works, and even conceptual designs that are as good as human work. Classic examples are algorithms that use the styles of great artists or composers to create new works, such as DeepArt, which transforms photos into the styles of famous artists, or OpenAI's MuseNet, which generates music in different styles. These technologies don't just replicate existing patterns, but can create unique combinations, opening up new possibilities for artists and designers.

Thus, one of the most interesting and challenging aspects of the AI problem is its 'creative capabilities' and its impact on human creative development. This issue is not only driven by the technological advances of modern science, but also by the ethical, cultural, and psychological dynamics that arise in the interaction between humans and machines.

The purpose of this paper is to analyse the possibilities and directions of AI application in the human creative process.

LITERATURE REVIEW

Today, AI is receiving considerable attention, including in the context of the problem outlined above. According to Radevych, 'scholars have begun to cite articles about research using AI in various areas of science more often, as shown by an analysis of almost 75 million scientific articles over the past 60 years. The number of such studies began to grow in 2015 with the introduction of the first reliable AI algorithms for processing large data sets, which is often required by scientists' (Radevych, 2024). The researchers analysed scientific articles from the Microsoft Academic Graph database and identified the fields of science that benefit most from the use of AI, including nuclear medicine, biological systems, and engineering. The analysis concluded that further research should focus on implementing AI in a way that would have the most benefits for education, science, and innovation (Radevych, 2024).

In recent years, the attention of scholars has been drawn to such aspects of AI use as: prerequisites for the use of AI (Pogorelenko, 2018), the relationship between AI and open edu-

cation (Mariienko & Kovalenko, 2023), prospects for the development of AI (Zhyvtsova, 2023), the use of AI in scientific research (Panukhnyk, 2023; Kolomiiets & Kushnir, 2024), ethical issues of AI use (Berdo et al., 2023), etc. In Ukraine, the problems of AI in educational discourse are studied by Bykov, Gurevych, Kolomiets, Lytvynova, Osadchyi, Panukhnyk, Spirin, and others (Kremen et al., 2022).

In Ukraine, the problem of the interaction between AI and innovation, which is closely related to the process of creativity, is increasingly attracting the attention of scholars who have begun to study it at the interdisciplinary level, namely at the intersection of technical sciences, philosophy and cultural studies. Yavorsky, a computer scientist, and Kasyanov, a specialist in information theory and technical aspects of digital technologies, were among the first to study the problem of AI on an interdisciplinary level.

The relationship between AI and creativity is considered by such Ukrainian researchers as Antipina (2024), Osadcha (2023), Pantus, Borisov & Borisova (2023), Sabura (2020), Tokareva (2018), Chibalashvili (2021), and others. The impact of AI on human creative development has been studied by foreign scientists, including Grilli & Pedota (2024), Marrone, Cropley & Medeiros (2024), Zhou & Lee (2024), Wingström, Hautala & Lundman (2022).

In the works of scholars, AI is increasingly seen not only as a tool for automation, but also as a partner that can help people achieve significant creative results, providing new opportunities for self-expression and development of creative potential. At the same time, scholars draw attention to the threats of using AI, in particular: loss of human contact, restriction of communication, negative impact on the development of interpersonal communication skills and emotional intelligence, violation of personal space, academic integrity, ethical standards, inequality of access, vulnerability to cyberattacks and hacking, loss of jobs (Kolomiets & Kushnir, 2024).

Regarding the use of AI in the educational process, there are warnings, in particular, regarding the need to train teachers and students in the use of AI in the educational process, as superficial knowledge and unformed skills will not be able to ensure the effective use of AI technologies, the development of ethical standards and innovative approaches to teaching and learning, and the balance in the use of AI technologies and other effective educational technologies.

METHODOLOGY

The methodology of the paper was to study and summarise the capabilities of AI in the projection on the theory of creativity. The analysis of scientific sources on the content of individual's creative capabilities, which reflect the motivation for the creative process, characteristic qualities of an individual, creative skills and mental processes that ensure a person's success in productive creative activity; the stages of the creative process; and the use of AI at the current stage of its technological development allowed to identify the possibilities and main directions of using AI in the human creative process.

MAIN RESULTS

The impact of AI on human creative development is seen primarily in the fact that AI reduces limited rationality, supports decision-making in exploring new problems and creating solutions, and provides new perspectives for understanding existing ones (Grilli & Pedota, 2024). AI cannot fully reproduce human creativity, but it can complement human abilities by automating routine processes and freeing up time for divergent thinking (Marrone, Cropley & Medeiros, 2024). Scholars believe that AI can not only act as a tool for enhancing creativity or a material embodiment in the spectrum of human existence, but can become a full-fledged creator alongside humans. At the same time, most researchers conclude that AI's potential as an independent creator seems much weaker than its potential as an amplifier of human crea-

tivity. Although AI is excellent at convergent thinking, it is also capable of performing divergent thinking tasks. However, unlike humans, who can consciously select and recombine knowledge from infinitely distant domains, AI can be programmed to perform a specific task (Grilli & Pedota, 2024, p. 234–247).

The analysis of scientific sources shows that scholars are trying to analyse the impact of AI on creative activity, human creative development, ethical and legal aspects of this creative interaction. In this discourse, creativity is seen as an integral quality of any human ability that is developed to a universal level, and AI is seen as contributing to the development of thinking, thinking in the process of creativity, since thinking outside of creativity is narrow, reverse thinking. Sabura also considers the impact of AI on creativity from the legal perspective. The researcher writes that in the field of intellectual property law, artificial intelligence is considered by many scholars as a new source of creativity, a source that can produce new results. For a long time, programs were just a tool that helped the author create a work (Sabura, 2020).

A considerable amount of scientific research is emerging in the area of AI use in the work of representatives of various types of creative activity. For example, Antipina points out that AI can transform artistic creativity, allowing artists to focus their attention on generating new ideas, while routine operations can be performed by modern technological models (Antipina, 2024). Such communication with AI allows us to generate new ideas and leave the technical aspects to the machine. Chibalashvili concludes that AI provides artists with new tools for creativity, allowing them to create works that would be impossible without technology. At the same time, music created by AI can imitate structure and style, but true creativity and emotional depth remain human qualities (Chibalashvili, 2021).

Generative artificial intelligence technologies are used by humans not only to perform intellectual tasks, but also creative ones, in particular in the field of design, as K. Osadcha and M. Osadcha point out. Generative AI tools greatly simplify the routine tasks of designers, increasing the efficiency of creating corporate identity elements (Osadcha & Osadcha, 2023). At the same time, the researchers also point out that the logos developed by novice designers were recognised as the most attractive among the 45 logos, and therefore it can be assumed that the analysed generative AI tools have not reached the level of creativity of even beginners (Osadcha & Osadcha, 2023).

In an experiment, generative AI demonstrated a 50% improvement in the productivity of artists, as well as an increase in novelty in their creative products (Zhou, & Lee, 2024). The researchers note that over time, text and image AI increases human creative productivity by 25% and increases the value measured by the likelihood of receiving likes (by 50%). While the peak novelty of content increases over time, the average novelty of content decreases, indicating an expanding but inefficient use of the space of ideas. Artists who use AI to explore newer ideas, regardless of their prior originality, may create works that are more positively rated by their peers (Zhou & Lee, 2024).

At the same time, AI cannot demonstrate significant levels of creativity on its own. The main features of a creative personality, in particular divergent thinking, which ensures the creation of new and effective products, are either beyond the capabilities of AI or require input that only humans can provide (Marrone et al., 2024). We would like to emphasise that humans remain the generator of new ideas and the leader in setting up problems, in the course of which AI and humans can cooperate in justifying (and maybe solving), which allows people to devote more time to more complex tasks. The main areas of AI application are identified (Marrone et al., 2024):

- Information gathering;
- Speeding up routine tasks;

• Providing rapid feedback;
• Supporting human creativity.

Under such conditions, scholars believe that the Concept of Co-Creation, which combines the capabilities of humans and AI, is needed to become the basis for understanding creative processes in the AI age (Wingström, Hautala & Lundman, 2024).

It should be emphasised that, according to most scholars, AI can be used in tasks requiring divergent and convergent thinking or problem-solving. At the same time, the concept of independent AI creativity remains controversial, and the issue of independent AI creativity is transforming to co-creation, i.e., the question of how and when AI can best contribute to the human creative process (Wingström et al., 2024, p. 188), in particular, for scholars, AI should be a 'reliable companion' that works correctly and does not make mistakes, for artists, AI can be a playful companion that creates unexpected and interesting results (Wingström et al., 2024, p. 187). Thus, scholars need AI to produce accurate and reliable results, while artists use AI for exploration and play. Unlike scholars, some artists also consider their work with AI to be co-creation (p. 177). While AI can mimic some of these (creative) skills, it cannot combine creative skills in the way that humans can. Today's AI lacks identity, sentience, the ability to give meaning to the outputs it creates, or to reflect 'human life experience' (p. 182) (Wingström et al., 2024). We would like to draw attention to what we believe to be a valid point about the different perception of AI in the creative process by scholars and artists.

Thus, humans and AI can play different roles and complement each other in the process of co-creation (Wingström et al., 2024, p. 180).

The study and synthesis of scientific sources on the creative development of the individual and the AI capabilities allows us to conclude that today its use in the human creative process is possible in the following areas:

• AI as a tool to support the creative process, speeding up routine tasks, providing quick feedback, and helping to collect information;
• AI as a method of expanding human creativity, i.e., performing tasks that require divergent and convergent thinking or problem-solving;
• AI as a partner in human creative development, i.e., expanding the boundaries of imagination, fantasy, and problem vision; increasing motivation and interest in solving creative problems; influencing the formation and development of character traits and qualities of the human psyche necessary for productive creativity.

Considering AI as a tool for creativity that speeds up routine tasks, provides quick feedback, and helps in collecting information, it is worth noting that artificial intelligence technologies not only help people with technical tasks such as data processing or model building, but also offer new ways to express their creativity. For example, generative models such as GPT-4 or DALL–E can serve as tools for brainstorming, helping users to come up with new conceptual solutions or combine different styles and genres in completely new ways.

As a method of enhancing human creativity in tasks that require divergent and convergent thinking or problem-solving, AI collaborates with humans to develop their creativity by allowing them to experiment without fear of error. AI can quickly generate different versions of ideas or concepts, which humans then analyse, adapt and refine. Such an organisation of scientific research increases the efficiency of the creative process and provides new opportunities for people to express themselves, realise their potential, and develop themselves.

As a partner in human creative development, AI expands the boundaries of imagination, fantasy, and problem vision; increases motivation and interest in solving creative problems; and influences the formation and development of character traits, creative skills, and mental qualities necessary for productive creativity. The main advantage of using AI in the creative process is its ability to expand the boundaries of imagination.

When applying AI in the process of human creativity, we cannot ignore the ethical aspects of using artificial intelligence. One of the main concerns is whether AI will be able to replace humans as creators, and whether the role of intuition and emotions in the creative process will diminish. The question also arises: how will the essence of creativity change if it is completely transferred to algorithms? Will creativity become less 'human' if machines are able to create works that are indistinguishable from the results of, for example, human artistic activity?

The psychological aspects of AI using in the creative process are also important. When using AI in the creative process, people may face new challenges: will they feel helpless or dependent on machines? Many artists and creatives may be afraid of having their work 'replaced' by machines.

At the same time, summarising the work of scholars, it can be argued that AI technologies are unlikely to destroy human creativity, but can transform it by providing new tools for self-expression. AI should not be perceived as a substitute for human creativity, but as a powerful tool that allows opening up new opportunities for its development. AI technologies can help people improve their skills in various fields, from writing to drawing or composing music; they can be used to analyse large amounts of data, allowing creators to find new trends, ideas or styles that were previously inaccessible. An important challenge for AI and creativity is to develop the ability to properly collaborate with AI technologies, understanding their limitations, opportunities, and threats.

CONCLUSIONS

AI technologies open up new opportunities for the creative development of individuals. By helping to automate the technical aspects of the creative process, AI technologies are becoming a method of expanding creative thinking and further developing creative traits. It is important that people use AI not as a substitute for their own activities, but as a partner that can increase the efficiency of creative activity, provide new opportunities for self-expression and improvement. AI should be viewed not only as a technology, but also as a technological component of human cultural and creative development, which contributes to the emergence of new forms of art and means of self-expression.

However, it should be emphasised that AI technologies cannot destroy human creativity, as modern AI lacks identity, feelings, abstract and divergent thinking, the ability to give meaning to the results created or reflect the 'human life experience'. Humans remain the generator of new ideas and the leader in setting up problems that AI and humans can collaborate on, which allows people to spend more time on more complex tasks. The creative potential and abstract thinking of humans are limitless, so AI aims to expand these boundaries rather than replace them, helping each individual find new ways of self-expression, self-realisation and self-development.

Thus, AI modernises the human creative process by providing new tools for self-expression, and therefore AI should not be perceived as a replacement for human creativity, but as a powerful tool that allows opening up new opportunities for its development.

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REFERENCES

Antipina, I. (2024). Shtuchnyi intelekt yak instrument transformatsii kulturolohichnykh idei. *Chasopys Natsionalnoi muzychnoi akademii Ukrainy imeni P.I. Chaikovskoho, 3*, 74–90. https://doi.org/10.31318/2414-052X.3(64).2024.314744

Berdo, R.S., Rasiun, V.L., & Velychko, V.A. (2023). Shtuchnyi intelekt ta yoho vplyv na etychni aspekty naukovykh doslidzhen v ukrainskykh zakladakh osvity. *Akademichni vizii, 22*, 1–10. https://academy-vision.org/index.php/av/article/view/469

Chibalashvili, A. (2021). Shtuchnyi intelekt u mystetskykh praktykakh. *Suchasne mystetstvo, 17*, 41–49. https://doi.org/10.31500/2309-8813.17.2021.248425

Grilli, L., & Pedota, M. (2024). Creativity and artificial intelligence: A multilevel perspective. *Creativity and Innovation Management, 33*(2), 234–247. https://doi.org/10.1111/caim.12580

Kolomiiets, A., & Kushnir, O. (2024). Vykorystannia shtuchnoho intelektu v osvitnii ta naukovii diialnosti: mozhlyvosti ta vyklyky. *Suchasni informatsiini tekhnolohii ta innovatsiini metodyky navchannia v pidhotovtsi fakhivtsiv: metodolohiia, teoriia, dosvid, problemy, 73*, 45–57. https://doi.org/10.31652/2412-1142-2023-70-45-57

Kremen, V.H., Bykov, V.Yu., Liashenko, O.I., Lytvynova, S.H., Luhovyi, V.I., Malovanyi, Yu.I., Pinchuk, O.P., & Topuzov, O.M. (2022). Naukovo-metodychne zabezpechennia tsyfrovizatsii osvity Ukrainy: Stan, problemy, perspektyvy: Naukova dopovid zahalnym zboram NAPN Ukrainy "Naukovo-metodychne zabezpechennia tsyfrovizatsii osvity Ukrainy: stan, problemy, perspektyvy", 18–19 lystopada 2022 r. *Visnyk Natsionalnoi akademii pedahohichnykh nauk Ukrainy, 4*(2), 1–49. https://doi.org/10.37472/v.naes.2022.4223

Marienko, M., & Kovalenko, V. (2023). Shtuchnyi intelekt ta vidkryta nauka v osviti. *Fizyko-matematychna osvita, 38*(1), 48–53. https://doi.org/10.31110/2413-1571-2023-038-1-007

Marrone, R., Cropley, D., & Medeiros, K. (2024). How does narrow AI impact human creativity? *Creativity Research Journal*, 1–11. https://doi.org/10.1080/10400419.2024.2378264

Osadcha, K., & Osadcha, M. (2023). Generative artificial intelligence vs humans in the process of creating corporate identity elements. *Information Technologies and Learning Tools, 98*(6), 212–215. https://doi.org/10.33407/itlt.v98i6.5494

Pantus, N.M., Borysova, S.V., & Borysov, V.V. (2023). Vplyv shtuchnoho intelektu na formuvannia kompetentsii u hrafichnykh dyzaineriv. *Visnyk nauky ta osvity, 9*, 600–609. https://doi.org/10.52058/2786-6165-2023-9(15)-600-609

Panukhnyk, O.V. (2023). Shtuchnyi intelekt v osvitnomu protsesi ta naukovykh doslidzhenniakh zdobuvachiv vyshchoi osvity: vidpovidalni mezhi vmistu ShI. *Halytskyi ekonomichnyi visnyk, 83*(4), 202–211. http://elartu.tntu.edu.ua/handle/lib/42652

Pohorelenko, A.K. (2018). Shtuchnyi intelekt: sutnist, analiz zastosuvannia, perspektyvy rozvytku. *Visnyk KhDU. Seriia Ekonomichni nauky, 32*(1), 22–27. https://ej.journal.kspu.edu/index.php/ej/article/view/405/401

Radevych, I. (2024, zhovten 15). Naukovi statti zi zghadkoiu shtuchnoho intelektu otrymaly bilshe tsytuvan. *Nauka.ua*. https://nauka.ua/news/naukovci-chastishe-cituvali-statti-z-vikoristannyam-shi-u-doslidzhenni

Sabura, S.O. (2020). Tvorchist i shtuchnyi intelekt: problemy spivvidnoshennia. *Yurydychnyi naukovyi elektronnyi zhurnal, 3*(2), 14–17. https://doi.org/10.32782/2524-0374/2020-3-2/3

Sysoieva, S.O. (2006). *Osnovy pedahohichnoi tvorchosti* : pidruchnyk. Milenium.

Tokarieva, V.O. (2018). Shchodo pytannia tvorchosti ta shtuchnoho intelektu. *Prykarpatskyi yurydychnyi visnyk, 1*(22), 55–58.

Wingström, R., Hautala, J., & Lundman, R. (2022). Redefining creativity in the era of AI? Perspectives of computer scientists and new media artists. *Creativity Research Journal, 36*(2), 177–193. https://doi.org/10.1080/10400419.2022.2107850

Zhou, E., & Lee, D. (2024). Generative artificial intelligence, human creativity, and art. *PNAS Nexus, 3*(3), 1–8. https://doi.org/10.1093/pnasnexus/pgae052

Zhyvtsova, L.I. (2023). Shtuchnyi intelekt: sutnist ta perspektyvy rozvytku. *Ukrainskyi zhurnal budivnytstva ta arkhitektury, 3*(015), 66–71. https://doi.org/10.30838/J.BPSACEA.2312.140723.66.956