Original scientific paper

UDC: 37.01:004.8

Received: March 27, 2025.
Revised: July 07, 2025.
Accepted: July 11, 2025.

10.23947/2334-8496-2025-13-2-481-489

Check for updates

Artificial Intelligence in Art Education: Transforming Visual Arts Training

Ani Zlateva[1*]

[1]Faculty of Education, Trakia University, Sofia, Bulgaria,
e-mail: ani.zlateva@trakia-uni.bg

Abstract: The rising integration of artificial intelligence into the process of creating artwork and its deployment in various professional tasks signifies a notable change in how technology is utilized across different domains. AI is rapidly becoming favoured among students to address various learning challenges. A thoughtful selection of how AI is applied in creative assignments can enhance student creativity and improve outcomes when producing diverse visual content. This article reports on an experiment aimed at generating art products using various AI applications, resulting in image creations based on verbal descriptions. The objective of the educational experiment is to motivate students to create artistic works by utilizing AI, guided by descriptive words, and improving their projects by applying them to different AI software. The research employs visual analysis and comparative analysis to assess the educational artworks produced by students, contrasting those stemming from their imagination with those generated through AI based on their descriptions. Survey Analysis of Using AI in Visual Arts Education. Findings reveal that student satisfaction levels correlate with their creativity; more creative students tend to be less satisfied with the outcomes. There are significant distinctions in the artistic and aesthetic effects of images relating to lines, shapes, and techniques. In conclusion, AI-generated images can greatly enrich the creative process by providing artists with new visual interpretations of their concepts. While AI can effectively produce new images in response to artists' creative briefs, it does not replace human creativity in the artistic process. Instead, the incorporation of AI tools serves as a complementary resource, enhancing the artistic ecosystem in the creative process.

Keywords: *visual art education, artificial Intelligence, AI-generated images.*

Introduction

The integration of artificial intelligence (AI) into professional tasks across various fields signifies a noteworthy technological advancement. In the realm of education, AI is gaining popularity among students for a wide range of tasks. A thoughtful selection of AI tools for creative activities can nurture student creativity and enhance the quality of visually striking content.

Recent studies have underscored the connection between digital technologies, artificial intelligence, and multimodal learning. These findings emphasize the potential of such tools to foster hands-on, collaborative learning environments that are enhanced by computational resources. These settings cultivate real-world problem-solving skills through collaboration, which are often challenging to replicate in traditional, individualized learning approaches (Niemi, H., Pea, R. D., and Lu, Y., 2023; Worsley, M., 2022).

United Nations Educational, Scientific and Cultural Organization, 2021 recognizes AI as a critical resource capable of addressing significant educational challenges, fostering innovation in teaching practices, and accelerating progress toward SDG 4 (Quality Education) (United Nations Educational, Scientific and Cultural Organization, 2021). Other researchers foresee AI's integration into teaching practices and core learning processes, suggesting this could profoundly enhance the quality of education by providing multimodal applications for cognitive and non-cognitive tasks (Haber, N., 2022). Additionally, integrated

*Corresponding author: ani.zlateva@trakia-uni.bg

research is crucial, encouraging computer scientists to design algorithms that support multimodal learning, leveraging machine learning for personalized feedback based on student behaviour and goals (Chen, I. C., Bradford, L., and Schneider, B., 2022; Vivitsou, M., 2022).

Art education holds a vital position within higher education due to its specialized knowledge demands. Traditional teaching methods often face challenges in effectively conveying complex concepts, highlighting the necessity for AI to improve the art instruction process (Kong, F., 2020). The application of generative AI in art has been referred to as "neural media praxis," which questions conventional ideas of artistic intent and reshapes human perceptions regarding creation and interpretation (Choi, DiPaola, and Töyrylä, 2021). Neural art introduces an element of ambiguity, merging algorithmic precision with the subjective interactions between artists and technology, thereby transforming the creative process into a curated exchange. This evolution in art, described as "an art of otherness," signifies a change in the relationship between the artist and the artefact (Choi, DiPaola, and Töyrylä, 2021).

Advocates for integrating digital technologies into art education highlight the enduring relationship between art and technology, emphasizing how each has influenced the other to evolve in new ways. Over recent decades, the conversation within art education has increasingly focused on interdisciplinarity as a strategy to promote innovative teaching methods (Ryoo, A. 2014).

However, the Digital Age has prioritized advancements such as faster processing speeds and increased memory capacities, often at the expense of this symbiotic relationship between the arts.

Another important aspect of applying digital technology in art education is that, within a context where artistic principles enhance new media, it is the responsibility of art educators to incorporate artistic elements into their teaching designs thoughtfully. Relying on information and communication technology (ICT) alone, where these artistic aspects may be overlooked, would mean neglecting effective educational practices. Furthermore, portraying ICT as a universal solution ignores the fact that technology rapidly becomes outdated and is quickly replaced by newer innovations. This fast pace of obsolescence tends to have minimal impact on social and personal transformations, except perhaps to underline and exacerbate the digital divide.

These innovations aim to harness the strengths of AI while integrating human cognitive abilities, promoting a synergistic relationship between humans and computers in educational settings. This approach aligns with Douglas Engelbart's vision of "co-evolving" human-computer intelligent systems, envisioning a future where AI not only complements but also enhances human learning and interaction within educational environments (Bardini, T., 2000).

Recent advancements in AI have led to a variety of educational services, as summarized by the UNESCO Resource Guide on Artificial Intelligence (United Nations, 2021). These include:

- Natural Language Processing (NLP): This involves using AI to interpret and generate texts, which aids in semantic analysis, translations, and personalized learning experiences.
- Speech Recognition: Applies NLP to spoken words, enabling features like AI personal assistants in smartphones and games, intelligent tutoring systems, and conversational bots in learning platforms.
- Image Recognition and Processing: Uses AI for tasks like facial recognition in classroom settings, handwriting and text analysis to detect plagiarism, and image manipulation to recognize deepfakes. It also includes autonomous scoring and grading.
- Autonomous Agents: Employs AI in creating virtual avatars in games, software bots, and smart robots in virtual learning environments.
- Affect Detection: Analyzes sentiments in texts, behaviours, and facial expressions using AI.
- Data Mining Algorithms: Utilized for predictive learning diagnoses, progress forecasting, socio-emotional well-being analysis, financial predictions, and fraud detection.
- Artificial Creativity: Generates new forms of creative outputs, such as photographs, music, artwork, and stories using AI.

Over the past decade, these technologies have significantly transformed education, as highlighted by a multisector expert group convened by Digital Promise (Niemi, H., Pea, R. D., and Lu, Y. 2023). This group envisioned how AI could shape future educational practices.

In a related context, Yao, Yang, Lin, Lee, and Zhu proposed an image-to-text (I2T) framework that generates textual descriptions of visual content. This framework operates by parsing images, converting results into semantic representations, and generating human-readable text reports, utilizing vocabularies

of visual elements and stochastic grammar to define relationships between them (Yao, B. Z., Yang, X., Lin, L., Lee, M. W., and Zhu, S. C., 2010).

The development of new educational methodologies based on digital technologies and AI for multimodal learning is vital in today's educational landscape. AI-based deep learning approaches promise transformative applications across various school subjects (Korhonen, T., Lindqvist, T., Laine, J., and Hakkarainen, K., 2022). However, these methodologies remain fragmented and are often excluded from curricula. A systematic, pedagogically grounded approach is necessary to bridge the gap between rapidly advancing technologies and conservative educational systems. This divide, particularly between digital-native generations and traditional education, emphasizes the urgent need for contemporary methodologies that integrate AI and digital technologies.

While AI offers immense potential to enhance learning experiences, aligning its methodologies with established educational principles, cognitive psychology, and learning theories is critical to achieving effective outcomes. Nonetheless, as Kong (2020) points out, much of the current research focuses narrowly on specific aspects of AI in art education or its implementation stages, often neglecting the need for comprehensive planning. This oversight has limited the depth of research on AI's impact on art instruction and hindered the execution of broader strategies. (Kong, F., 2020)

Materials and Methods

As part of the experimental research, students were invited to explore the application of AI in art education through a series of structured creative tasks. The experiment aimed to assess how AI tools could support and enhance artistic development, idea generation, and technical execution. Participants engaged with AI in multiple ways, including:

- Text Generation: Utilizing AI to create written content based on their prompts, such as artist statements, project descriptions, or art critiques.
- Lesson Planning: Using AI to generate structured art lesson plans, incorporating themes, techniques, and learning objectives.
- Creative Ideation: Leveraging AI for brainstorming and conceptualizing new artistic projects, receiving AI-generated suggestions and inspirations.
- Artwork Enhancement: Applying AI-powered tools to refine and improve their artistic works, experimenting with different styles, compositions, and visual effects.
- Image Synthesis: Generating images from textual descriptions, replicating creative tasks they had previously completed manually during the semester to compare AI-assisted and independent artistic processes.

By integrating AI into their workflow, students were able to evaluate its potential as a creative assistant, analyzing its effectiveness in augmenting artistic expression, efficiency, and innovation.

In this research, we employed several approaches:

- Experimental Studies: We designed pedagogical experiments to test hypotheses, establish causal relationships, and compare groups subjected to different interventions and outcomes.
- Content Analysis: We analyzed educational materials, such as methodologies, curricula, and student work, to identify trends, biases, and patterns within the content.
- Action Research: We addressed specific teaching and learning challenges by collecting data, implementing changes, and reflecting on outcomes to enhance practices.
- Observations: We observed educational settings to gather data on teaching methods, student interactions, learning behaviours, and results.
- Survey on satisfaction with the achieved result: Actively analyzed and systematized the students' reflective feelings and evaluation and self-evaluation of the results obtained from the application of AI in their creative work, comparing the level of satisfaction with their independent creative activity.

Through this multifaceted approach, we aimed to illuminate the transformative role of AI in art education.

Results

The integration of artificial intelligence (AI) into visual arts education presents both opportunities and challenges, as demonstrated by the experimental evaluation of AI-generated content. The study assessed AI's effectiveness in various aspects of creative and pedagogical tasks, revealing its strengths in structured content generation while highlighting certain limitations in artistic originality and expressiveness.

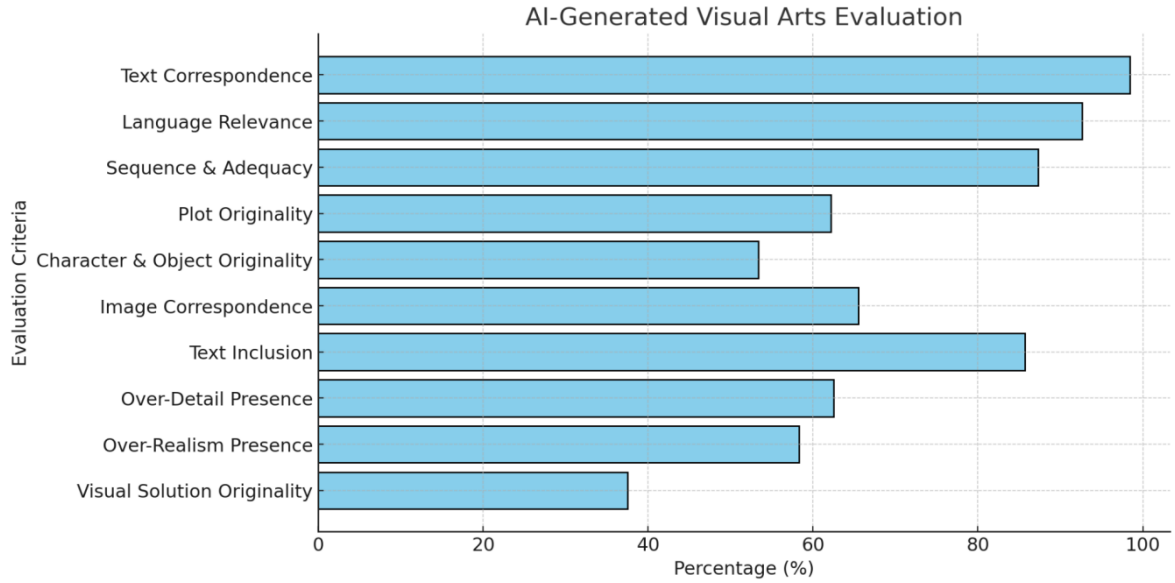

Figure 1. *AI-Generated Visual Arts Evaluation*

The findings indicate that AI performs exceptionally well in tasks that require precision and adherence to given instructions. The highest-rated criterion, correspondence of AI-generated content to the proposed prompt (98.4%), suggests that AI accurately interprets and follows textual descriptions, ensuring alignment between the input and output. Similarly, the relevance of language to the required genre (92.6%) further supports AI's capability to produce text that meets specific stylistic and contextual requirements.

Moreover, AI demonstrates considerable efficiency in structuring educational materials. The sequence and adequacy of tasks (87.3%) highlight AI's ability to organize content logically, making it a valuable tool for lesson planning and instructional design. Additionally, AI effectively incorporates requested textual elements into visual compositions, with 85.7% accuracy in text inclusion within generated images, further underscoring its potential as a multimedia support tool in arts education. (*Figure 1*)

Despite its strengths, AI-generated content presents notable limitations, particularly in fostering artistic creativity and originality. The originality of plots for visual tasks (62.2%) and originality of characters and objects (53.4%) suggest that AI-generated imagery often lacks novelty, relying on pre-existing patterns rather than truly innovative concepts. This is further reinforced by the originality of the visual solution (37.5%), which received the lowest rating, indicating that AI struggles to propose unique artistic interpretations. (*Figure 1*)

Another concern relates to AI's tendency to produce hyper-detailed and overly realistic imagery. The presence of over-detail (62.5%) and over-realism (58.3%) indicate that AI-generated visuals may sometimes appear sterile or excessively polished, potentially limiting artistic abstraction and creative interpretation. This characteristic, while beneficial for technical accuracy, may reduce the expressive potential of AI-assisted artworks. (*Figure 1*)

The survey results reveal a cautious but open attitude toward the integration of artificial intelligence (AI) in visual arts education. While many respondents acknowledge AI's potential benefits, significant concerns remain regarding its impact on creativity, authorship, and artistic quality.

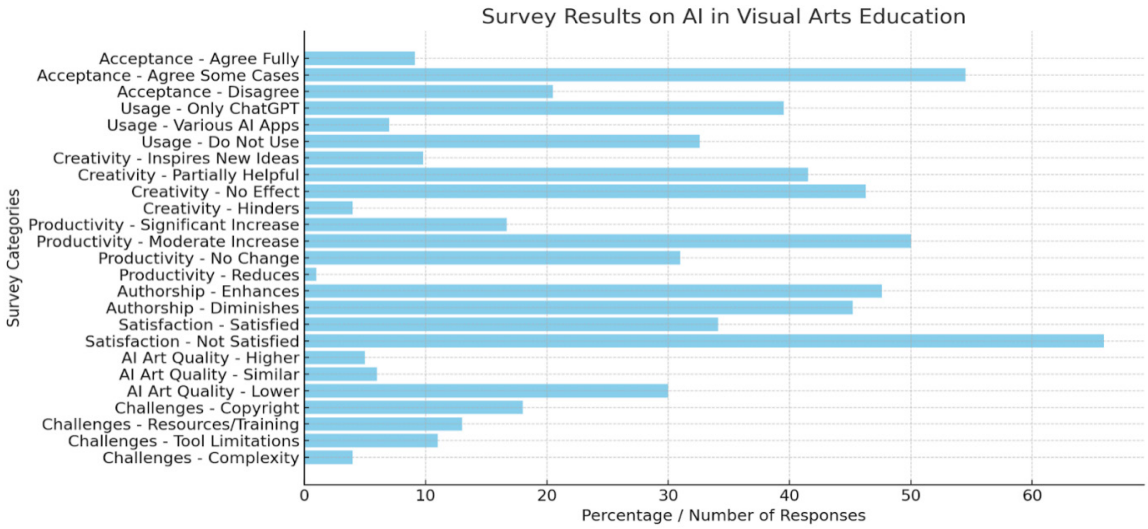

Figure 2. *Survey Results on AI in Visual Arts Education*

Some of the important results of the survey are related with:

- Acceptance and Usage of AI
  - A majority of respondents (54.5%) accept AI's role in visual arts education in select cases, while 9.1% fully support its use. However, 20.5% categorically reject it. Despite widespread awareness of AI's capabilities, its actual usage varies: 39.5% use ChatGPT exclusively, 7% experiment with different AI tools, and 32.6% do not engage with AI at all.
- AI's Role in the Creative Process
  - AI is primarily used for idea generation (14 responses), information assistance (23), and technical execution (6). It also supports tasks such as image animation, retouching, and digital drawing. However, a considerable number (18 respondents) choose not to use AI at all.
- The impact of AI on creativity is divisive:
  - Only 9.8% believe AI inspires them and generates new ideas.
  - 41.5% find AI somewhat helpful but not consistently beneficial.
  - 46.3% report no impact on their creative thinking.
  - 4% believe AI hinders their creativity.
  - AI is recognized for accelerating technical processes and enhancing productivity (66.7% report improvements), yet some fear it diminishes artistic originality and emotional depth.
- Authorship and AI-generated art
  - AI's influence on artistic authorship remains a contentious issue:
  - 47.6% feel AI enhances their sense of authorship.
  - 45.2% believe it diminishes originality, leading to a sense of co-authorship.
  - Some respondents feel AI-generated images lack individuality and artistic intent.
  - In terms of artistic quality, 65.9% express dissatisfaction with AI-generated images, citing issues such as misinterpretation of prompts, sterility, and a lack of uniqueness.
  - Only 5 respondents found AI-generated images superior to their work, while 30 rated them as lower quality.
- Challenges and Ethical Concerns
  - Several challenges hinder AI adoption in visual arts education, including:
  - Ethical concerns, particularly copyright and ownership issues (42%).
  - Lack of training and resources to effectively implement AI tools (36%).
  - Technical limitations and complexity of AI tools (26%).
  - Concerns that AI oversimplifies artistic creation, potentially stifling imagination and problem-solving skills.
  - Some artists fear that AI's accessibility might devalue traditional expertise by enabling anyone to generate art, threatening the role of trained artists. *(Figure 2)*

Discussions

The results of this study highlight the dual role of AI in art education: as a powerful assistive tool that enhances structured learning processes and as a potential constraint on artistic originality. While AI can efficiently generate structured lesson plans, provide visual references, and assist in idea development, its current capabilities suggest that it should not be viewed as a substitute for human creativity.

In the images below we show some examples of students' creations of different educational tasks as logos, posters, and illustrations, and AI-generated images of the same tasks by the prompts of the students.

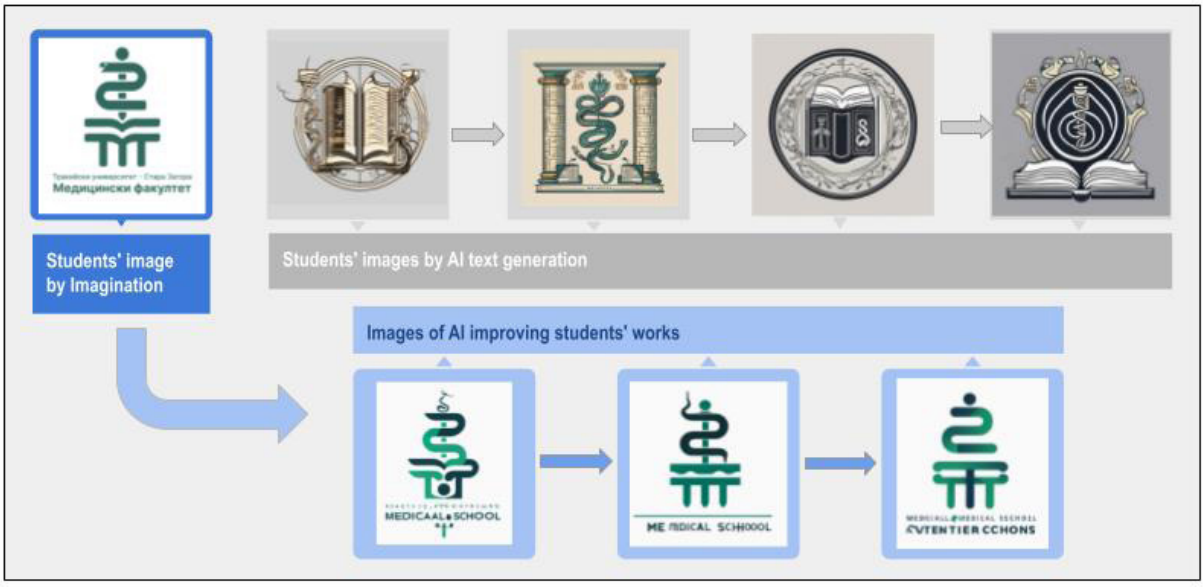

Figure 3. *Logos in 3 ways of creation*

Figure 3 shows the images generated by AI based on verbal descriptions (top row) and those created by AI as an improvement of the presented image (bottom row). In the images generated based on prompts, the excessive ornamentation and excessive detail are impressive, which deprive the proposed logos of their main meaning and purpose. In the logos proposed as variants to improve the ones created by the student, some details can be noted with a clarification of the form, but unfortunately in most cases, the semantic meaning is lost.

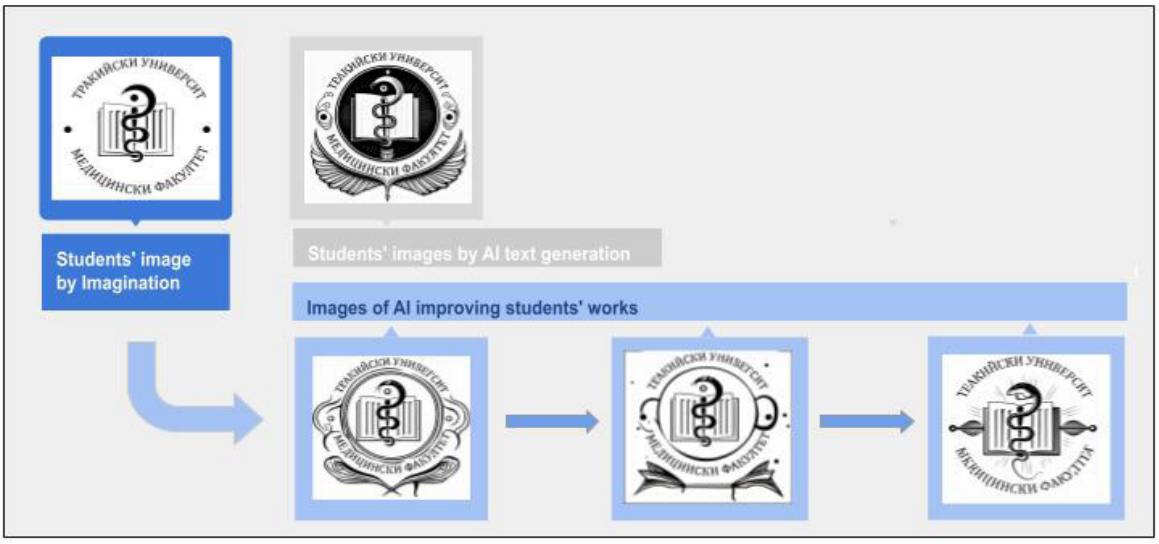

Figure 4. *Logos in 3 ways of creation*

The logos shown in Figure 4 are a demonstration of similar results to those in Figure 3 when working with AI for image generation. Complex ornamentation and unnecessary detailing in the verbally

generated image and in this case, the addition of unnecessary details and perceptually burdensome ornamentation in the images generated based on the image suggested for improvement by AI.

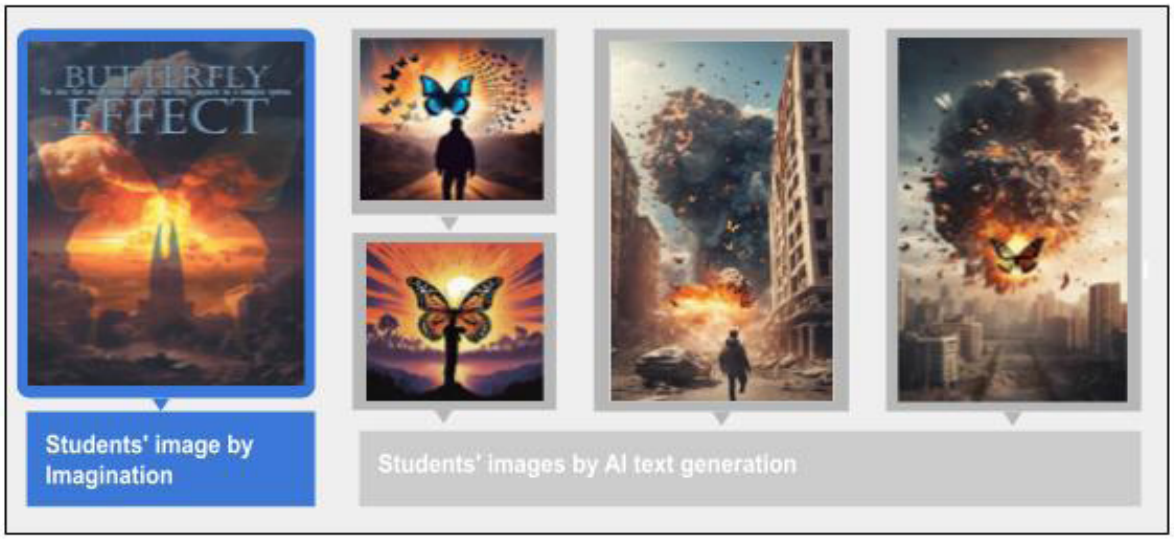

Figure 5. *Posters, created by Students and generated by AI*

Figure 5 displays posters created by a student and generated by AI based on verbal descriptions of the poster concept. The student describes their experience with AI Pixlr and the prompts used as follows: The first prompt was, “A big explosion in the background with a butterfly silhouette in the foreground.” The second prompt was, “A big explosion and a destroyed city in the background, with a butterfly flying in the foreground.”

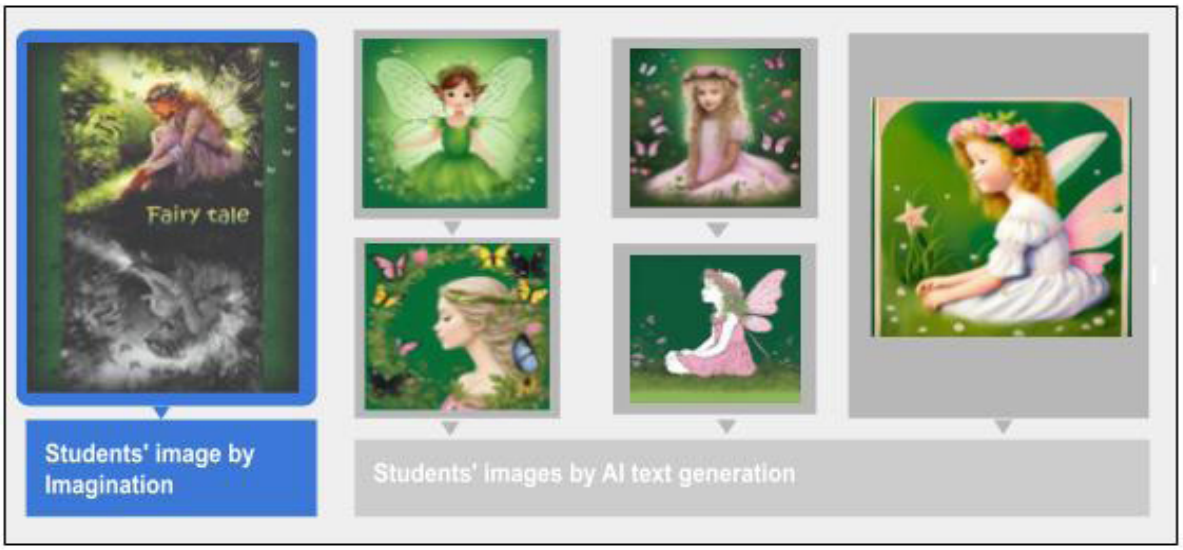

Figure 6. *Posters, created by Students and generated by AI*

Figure 6 illustrates a student’s creation of a poster through imagination, supplemented by their experience with AI FOTOR M2 for generating images based on specific prompts. The first prompt was: “Create a poster featuring a drawn girl dressed as a fairy against a green background. The fairy should be depicted realistically and in profile, looking down while seated on the grass. She should have blonde curly hair, wear a pink dress, sport a wreath on her head, and be barefoot.” The second prompt further elaborated: “Design a poster showcasing a drawn girl dressed as a fairy on a green background, maintaining a realistic style in profile, looking down, and seated on the grass with blonde curly hair, a pink dress, a wreath on her head, and barefoot. Additionally, include a black-and-white version of this image facing down beneath the first one. On the right side of the first image, add white butterflies, and on the left side of the second, include turned-around black butterflies. Between both images, place the caption ‘Fairy tale’ in green and yellow.”

In AI-generated posters, we can observe the schematization of images that leads to illogical stylization and a departure from the original intent of the poster.

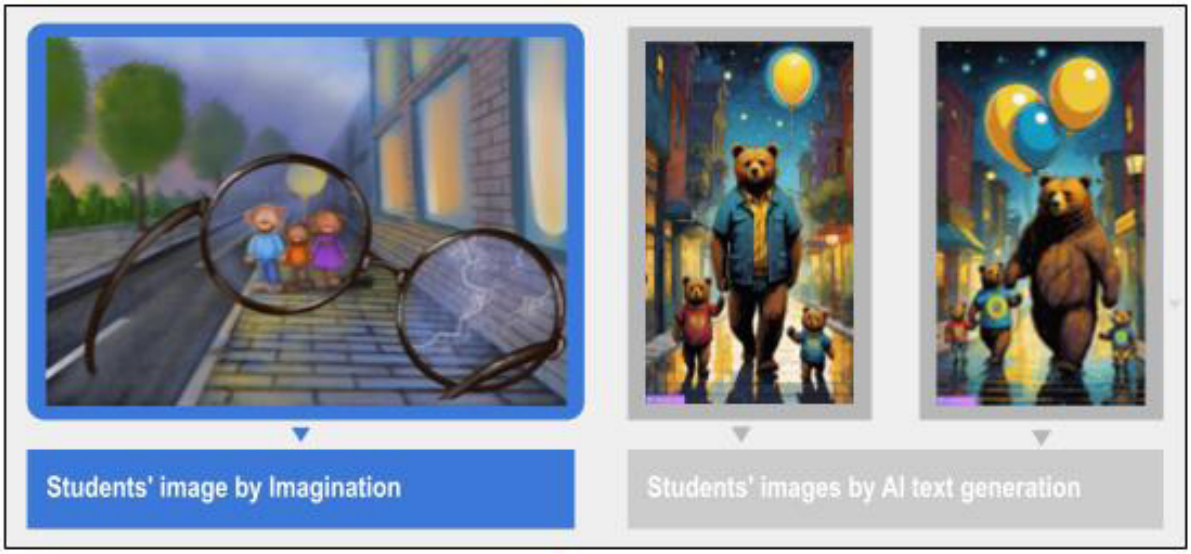

Figure 7. *Students' Illustrations by imagination and Students' images by AI text generation*

Figure 7 clearly illustrates the originality of the visual representation of the idea, which is lost in AI-generated illustrations. Additionally, there are meaning and factual discrepancies in the AI-generated illustrations.

Conclusions

In conclusion, it appears that students pursuing artistic majors exhibit resistance to utilizing AI in the creation of creative products for their academic endeavours. During their process of working and experimenting with various approaches to their creative explorations, many discover numerous opportunities to enhance their initial ideas and develop them further. Throughout their experimentation with AI, they often recognize the significance of precisely crafted verbal descriptions to achieve results that closely align with their visual expectations. However, despite having well-defined parameters for the desired image, the output generated by AI frequently presents substantial discrepancies from the specified conditions and requirements.

The findings of this research indicate a clear correlation between students' levels of creativity and their overall satisfaction with AI-generated images. More creative students tend to express lower satisfaction with these images, suggesting that individuals with higher creativity may have more rigorous standards or expectations that AI-generated images often do not meet. Additionally, the differences in satisfaction may stem from noticeable variations in the artistic and aesthetic qualities of the images, particularly concerning the use of lines, forms, and techniques.

Hyper-realistic photographic images often make AI-generated visuals less visually appealing because they lack the artistry and emotional expression characteristic of works created by real artists. Furthermore, even digital creations by live artists carry emotional depth and expressiveness that AI-generated images typically do not possess. While AI can produce images that meet specific artistic briefs, these outputs often differ subtly from the expectations of more creatively inclined individuals. AI tends to concentrate on highly detailed, hyper-realistic representations, whereas many artists prioritize abstract forms, stylization, or brevity-elements that AI struggles to replicate effectively. Consequently, the artistic impact of AI-generated visuals often falls short of the intuitive, spontaneous, and expressive qualities that human artists can achieve through traditional techniques.

The students expressed satisfaction with the experiment, primarily because it allowed them to quickly generate various visual AI solutions. They could then further develop and adapt these solutions according to their personal creative preferences and ideas.

Therefore, the integration of AI tools into the artistic process should be viewed as an enhancement rather than a replacement. AI enriches the creative landscape by providing new avenues for artistic exploration. However, it is ultimately human vision and creativity that defines the direction and emotional

impact of the artwork. By combining AI capabilities with human ingenuity, artists can expand their creative potential while still preserving the essential and deeply personal aspects of their work.

The results of the experiment and survey can help us find a way to integrate AI in art education and improve methods of application in the teaching process.

Acknowledgements

This study is financed by the European Union-NextGenerationEU, in the frames of the National Recovery and Resilience Plan of the Republic of Bulgaria, first pillar "Innovative Bulgaria", through the Bulgarian Ministry of Education and Science (MES), Project No BG-RRP-2.004-0006-C02 "Development of research and innovation at Trakia University in service of health and sustainable well-being", subproject "Digital technologies and artificial intelligence for multimodal learning – a transgressive educational perspective for pedagogical specialists" No H001-2023.47/23.01.2024.

Conflict of interests

The authors declare no conflict of interest.

References

Bardini, T. (2000). *Bootstrapping*: Douglas Engelbart, coevolution, and the origins of personal computing. Stanford University Press.

Chen, I. C., Bradford, L., & Schneider, B. (2022). Learning Career Knowledge: Can AI Simulation and Machine Learning Improve Career Plans and Educational Expectations? In AI in Learning: Designing the Future, 137-158. Cham: Springer International Publishing. https://dx.doi.org/:0.1007/978-3-031-09687-7_9

Choi, S. K., DiPaola, S., & Töyrylä, H. (2021). Artistic style meets artificial intelligence. Journal of Perceptual Imaging, 4, 1-14.

Haber, N. (2022). Curiosity and Interactive Learning in Artificial Systems. In AI in Learning: Designing the Future, 37-54. Cham: Springer International Publishing. https://dx.doi.org/10.2352/J.Percept.Imaging.2021.4.2.020501

Kong, F. (2020). Application of artificial intelligence in modern art teaching. International Journal of Emerging Technologies in Learning (iJET), 15(13), 238-251. https://dx.doi.org/10.3991/ijet.v15i13.15351

Korhonen, T., Lindqvist, T., Laine, J., & Hakkarainen, K. (2022). Training Hard Skills in Virtual Reality: Developing a Theoretical Framework for AI-Based Immersive Learning. In AI in Learning: Designing the Future, 195-213. Cham: Springer International Publishing. https://doi.org/10.1007/978-3-031-09687-7_12

Niemi, H., Pea, R. D., & Lu, Y. (2023). AI in Learning: Designing the Future, 344. Springer Nature. https://dx.doi.org/10.1007/978-3-031-09687-7_1

Ryoo, A. (2014). Art education and new media: understanding the roles of artists and educators in the age of immediacy (*Doctoral dissertation*, University of British Columbia).

UNESCO (United Nations Educational, Scientific and Cultural Organization). (2021a). AI and education: guidance for policy-makers (2021): Paris. https://unesdoc.unesco.org/ark:/48223/pf0000376709

Vivitsou, M. (2022). Perspectives and Metaphors of Learning: A Commentary on James Lester's Narrative-Centered AI-Based Environments. In AI in Learning: Designing the Future, 125-136. Cham: Springer International Publishing. https://doi.org/10.1007/978-3-031-09687-7_8

Worsley, M. (2022). Artificial Intelligence Innovations for Multimodal Learning, Interfaces, and Analytics. In AI in Learning: Designing the Future, 19-35. Cham: Springer International Publishing. https://doi.org/10.1007/978-3-031-09687-7_2

Yao, B. Z., Yang, X., Lin, L., Lee, M. W., & Zhu, S. C. (2010). I2t: Image parsing to text description. Proceedings of the IEEE, 98(8), 1485-1508.-1. https://doi.org/10.1109/JPROC.2010.2050411