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THE USE OF ARTIFICIAL INTELLIGENCE IN THE CREATION OF VISUAL CONTENT FOR EDUCATIONAL MATERIALS IN VOCATIONAL EDUCATION

Vadym Kushnir

Institute of Vocational Education

of the National Academy of Educational Sciences of Ukraine

Kyiv, Ukraine

The digital transformation of education highlights the need to update approaches to the development of educational materials within the system of vocational education. Contemporary socio-economic conditions and the rapid advancement of technologies necessitate the use of tools capable of ensuring visual clarity, flexibility, and alignment of educational content with the practical requirements of professional training. In this context, the visualization of educational material is regarded as an important means of enhancing learning effectiveness and fostering the professional competencies of learners.

Artificial intelligence technologies, particularly generative systems capable of creating images based on textual descriptions, demonstrate significant potential in the development

of visual educational content. Such technologies expand opportunities for the rapid creation of illustrations, diagrams, models of professional processes, and learning situations, which is especially relevant for vocational education oriented toward the practical training of future specialists (*OpenAI, 2025*).

The use of artificial intelligence for image generation in educational materials contributes to increased visual clarity, adaptability, and variability of educational content, while also creating conditions for the development of project-based and visual thinking among learners. At the same time, the integration of such technologies into the educational process requires a scientifically grounded approach, an understanding of their pedagogical potential, and the identification of appropriate methodological conditions for their use. This determines the relevance of analyzing the capabilities of modern artificial intelligence tools for image generation in the process of developing educational materials for vocational education.

The emergence of image generation technologies is closely linked to the evolution of computer graphics and the development of algorithmic methods for visual data processing, which for a long time were primarily used for editing, correcting, and combining existing images. In the early stages of digital development, software tools – particularly graphic editors such as Adobe Photoshop – performed mainly auxiliary functions by automating individual visual operations, including color adjustment, scaling, effect application, or shape correction. Meanwhile, the direct process of image creation remained entirely dependent on the professional skills and creative decisions of graphic designers.

In educational practice, particularly within the system of vocational education, this level of digital tool development led to the predominant use of pre-prepared visual materials designed for a generalized educational context. Such visual content had limited capacity for rapid updating and adaptation to current requirements and trends in educational material development. As a result, the processes of creating, modifying, and reusing images in educational materials remained inflexible and required significant time and resource investments even for minor changes.

Qualitative changes occurred with the development of generative artificial intelligence models capable of independently creating images based on training datasets and textual prompts. The introduction of neural network approaches, including generative adversarial networks and diffusion models, laid the foundation for modern image generation systems that are now implemented in accessible online platforms (*Goodfellow et al., 2014; Ho et al., 2020*). In the context of vocational education, this enabled a transition from static

illustrations to the dynamic generation of visual educational content aligned with specific didactic objectives.

Key Artificial Intelligence-Based Image Generation Tools

ChatGPT Images (GPT Image / GPT-4o Image Generation) is an image generation tool integrated into the ChatGPT environment and powered by the multimodal GPT-4o model. It allows images to be created and refined during text-based interaction, which makes it convenient for developing educational materials. The tool also enables the combination of textual explanations and visual elements within a single workspace, supporting clearer presentation of learning content (*OpenAI, 2025*).

DALL·E (OpenAI) is a generative system for creating images from textual descriptions that supports different visual styles and basic editing options. It can be used to produce illustrations, visual examples, and simple educational models in vocational education. Its flexibility makes it suitable for adapting visual materials to various educational topics and levels of training (*DALL·E, 2026*).

Midjourney is an image generation platform focused on artistic quality and conceptual visual outcomes. It is mainly used to create creative ideas, visual concepts, and expressive imagery, especially in practice-oriented and creative educational programs. In vocational education, it can support the development of visual thinking and creativity among learners (*Midjourney, 2026*).

Stable Diffusion is an open-source generative model that provides a high level of control over image generation parameters. It is suitable for technical and applied tasks, prototyping, and creating series of instructional illustrations. The possibility of local use makes this model appropriate for educational institutions that require greater control over content and data (*Thampanichwat et al., 2025*).

Adobe Firefly is a generative image tool integrated into Adobe's professional software ecosystem. It allows automatically generated images to be further edited using standard design tools. This makes it useful for creating high-quality visual educational materials, particularly in programs related to design and creative industries (*Adobe, 2025*).

Microsoft MAI-Image-1 is an image generator developed for the Microsoft Copilot ecosystem and Bing Image Creator, designed to produce photorealistic images with controlled lighting and composition. It can be used to visualize educational content that requires realistic representation of objects, equipment, or work situations in vocational education (*Thampanichwat et al., 2025*).

A determining factor in obtaining high-quality generated images is a properly formulated textual prompt, which serves as the primary communication tool between the user and the artificial intelligence system.

The prompt defines the key parameters of image generation, including the set of objects, their characteristics, visualization style, compositional features, and usage context. A clear, structured, and semantically balanced prompt formulation enables the artificial intelligence system to produce visual content that closely aligns with the objectives of professional tasks. For example, a prompt for creating an instructional illustration involving the use of an electric welding machine may be formulated as follows: *“Instructional diagram of using an electric welding machine, showing all work steps, welder wearing protective clothing and mask, clear labels for each step, technical illustration style, light neutral background, crisp outlines.”* For most modern generative systems, the English language is optimal for achieving the highest level of accuracy and detail, particularly for complex or specialized topics. The resulting image can be directly incorporated into educational materials, thereby enhancing their visual clarity and practical value.

At the same time, users must consider that the final generation outcome directly depends on the level of accuracy, specificity, and detail of the textual prompt. Generalized or vague formulations may result in images that do not fully correspond to the intended didactic concept, whereas carefully designed prompts ensure more predictable and controllable results. An additional aspect of integrating generative platforms into the development of educational materials in vocational education is the need to consider the technical and licensing limitations of these services.

Most modern platforms, including Midjourney and professional versions of other image generators, offer limited free access and provide extended functionality only through paid subscriptions. For effective educational material development, this necessitates planning the use of appropriate pricing plans that ensure a sufficient number of generations, as well as the ability to edit and adapt images to specific didactic objectives, thereby improving the clarity and quality of educational content. Consequently, the emergence of specialized courses and professional development programs aimed at building skills in the effective use of generative systems and professional prompt design is becoming increasingly relevant.

Thus, the use of artificial intelligence technologies for image generation in vocational education serves as an effective means of updating approaches to the development of educational materials in accordance with the requirements of digital transformation in education. The application of generative tools significantly enhances the level of visual

clarity, adaptability, and variability of visual educational content, ensuring its alignment with specific didactic objectives and the content of educational programs. The combination of the capabilities of modern image generation platforms with a conscious and methodologically grounded use of prompts creates conditions for the formation of dynamic, flexible, and personalized visual support for the educational process. At the same time, effective integration of such technologies requires the development of educators' digital and methodological competencies, as well as a systematic approach to selecting tools and models for their application. Overall, the use of artificial intelligence for image creation contributes to the formation of a modern digital educational environment and to improving the quality of educational materials in vocational education.

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