

11. THE INTEGRATION OF DIGITAL TECHNOLOGIES IN STUDENTS' TRAINING IN THE FIELD OF BOOK GRAPHICS

Aliona Timuța²³⁷

Abstract: *In the context of digitalization and modernization of production processes in the field of book publishing and printing, the issue of training graphic design students in accordance with the requirements and conditions of their future professional activity arises. Acquiring competencies in the field of computer graphics and digital technologies is an essential condition for the professional implementation of graphics. In this article, the author attempted to analyze digital technologies from the point of view of pedagogical experience in using computer graphics to create book illustrations, awareness of the relevance and necessity of the knowledge gained.*

Key words: *information technologies, book graphics, illustration, digital graphics, graphic design*

1. Introduction

In the era of digitalization, computer technologies are increasingly integrating in all areas of human activity. Today, for successful professional fulfillment in the field of book graphics, it is no longer sufficient to have only traditional illustration skills, such as watercolor, engraving, ink and pen, or pencil techniques. There is a growing need to have a good command of digital technologies, that enable the creation and processing of images, as well as the organization of text and book layouts. According to Martin and Ertzberger, digital technologies not only support the learning process but also demand its rethinking²³⁸ and adaptation to the new requirements. This implies the need to revise the forms and content of education: digital tools and technologies should be integrated into the learning process to prepare students for a changing world where successful professional activity requires not only a creative approach but also a confident proficiency in digital tools.

For the purposes of our research, we define *digital technologies* as those based on the use of digital data, allowing the creation, processing, transmission, and storage of information in digital form. Technologies that cover the creation, processing, and output of the images with the help of computer technology — such as 2D and 3D images, animation, and visualization — are defined as *computer graphics*²³⁹. With its artistic and expressive potential, computer graphics, through various graphic programs and tools, computer graphics allows creating illustrations, editing photos, and designing layouts, thereby establishing it as an essential component of modern technology and art. Learning computer graphics implies the visualization of digital data in a visual graphic form, such as through image creation or editing²⁴⁰.

²³⁷ Candidate Doctoral, "Ion Creangă" State Pedagogical University, Chișinău, Republic of Moldavia, Lecturer, Academy of Music, Theater and Fine Arts, Chișinău, Republic of Moldavia, e-mail: aliona.timuta@gmail.com, ID ORCID <https://orcid.org/0009-0003-0464-6095>

²³⁸ Martin, F., & Ertzberger, J. (2013). *Here and Now: A Study of the Impact of Technology on Student Learning*. Journal of Educational Technology

²³⁹ Zabavnikova, T. Yu., (2005), *Aesthetic Education of Students by Means of Computer Graphics*. PhD dissertation abstract. Tambov, 28 p.

²⁴⁰ Zaripov, O.K., (2020), *Pedagogical conditions for teaching computer graphics to students in a higher educational institution* / O. K. Zaripov // Collection of conferences of the National Research Center Sociosphere. no. 8, p. 29–34

Computer technology is a combination of methods, processes, and tools based on the use of computers and software for the creation, processing, storage, transmission, and display of information. In book graphics, computer technology significantly optimizes the creative process and, thanks to its technical and technological capabilities, greatly expands graphic tools and possibilities for realizing artistic ideas. It contributes to the expression of creativity and the development of skills for effectively combining traditional graphic techniques with the artistic and expressive tools of computer graphics in book illustration field. There are several main types of computer graphics:

Raster Graphics: Based on pixels or dots that form an image; the quality of the image depends on the number of dots — resolution; it is used for photos, digital painting, and complex images with a high level of details.

Vector Graphics: Created using mathematical formulas that describe lines, curves, and shapes; it does not depend on resolution, meaning images can be scaled without losing quality; commonly used for illustrations, applied graphics, and fonts.

Fractal Graphics: Based on mathematical calculations and algorithms that create self-repeating patterns (fractals); used to create complex structures and natural-like forms²⁴¹. Each of this type of graphics has its own features and finds applications in various areas of digital art, design, and data visualization. The main tools for working in computer graphics are a graphic tablet and graphic editors²⁴².

A graphic tablet is a device that allows you to draw using a stylus directly on the screen or on a special surface, with the drawing displayed on the computer monitor. The most popular models include professional lines from Wacom, Huion, and XP-Pen, Apple. These devices vary in their specifications: resolution, pressure sensitivity of stylus and pen tilt support, response time, and one of the most important specification — the size. Tablets may come with or without a screen. Screenless tablets require some accustomation, as the drawing process takes place on a specific surface while the image is projected on the monitor. Some well-known models include Wacom Intuos Pro, Huion H610 Pro, and XP-Pen Deco. Tablets with a screen, such as Wacom Cintiq 22, Huion Kamvas Pro, XP-Pen Artist Pro, Pablo Coast, and iPad Pro, besides their main options, also offer additional features that significantly ease and speed up the workflow process. These advantages include quick-access buttons, styluses with various nibs for creating textures, and compatibility with various software. The experience of working on these tablets closely resembles traditional drawing, which is an important factor in mastering the experience itself.

A graphic editor is software of creating and editing digital images. Software developers offer a wide range of graphic editors of creating, processing, and editing digital images. Among the most popular applications is the Adobe Inc. set, which includes editors such as *Adobe Photoshop*, *Adobe Illustrator*, and *Adobe InDesign*, Corel corporation's development — *CorelDraw*, and *Procreate* by Savage Interactive Pty Ltd.

- *Adobe Photoshop* is one of the most popular and powerful graphic editing programs,

²⁴¹ Ermohina, E.V., (2018), *Computer graphics. Basic concepts. Classification, color modes and file formats. Lectures*. PhD Orion LLC. Tambov, p. 36

²⁴² Kravchenya, E. M., (2002), *Fundamentals of Informatics, Computer Graphics and Pedagogical Software*. Minsk, 130 p.

well known among professional artists and designers for working with raster images. It offers a wide range of tools for drawing and editing images. It includes layers, filters, masks, and effects, enabling the creation of complex compositions. It also contains tools for working with 3D graphics and animation²⁴³.

- *Adobe Illustrator* is an editor, designed for creation of vector graphics, which is based on mathematical formulas, allowing images to be scaled without losing the quality. It is widely used in creating illustrations and graphic design, where high image quality is essential. It creates images using lines, curves, and geometric shapes. It provides artists with a variety of tools for freehand drawing with brushes and working with color, including palettes, gradients, and effects²⁴⁴. An alternative vector graphics editor to *Adobe Illustrator* is *CorelDraw*, which also specializes in creating and editing vector graphics.

- *Adobe InDesign* is an editor for professional layout, focused on working with text and images. It enables the creation of layouts for books and any printed materials²⁴⁵.

- *Procreate* is a raster graphic editor for drawing on the iPad, equipped with a vast selection of brushes and features; supports a layer system. It allows the creation of sketches, various types of illustrations and also animation²⁴⁶.

2. Computer Technologies — a Tool for Creating Book Illustration

Illustration (from Latin *illustratio* — lighting, visual representation) is a type of book graphics and its foundation. Illustration is not independent in its narrative; it exists in unity with the text and is intended to enhance the perception of images and literary content. As an important element of an artistic publication, the illustration represents a specific narrative composition, structured within the overall architecture of the book. By applying the most suitable artistic expressive to its concept (format, compositional center, rhythm, balance, contrast, light and shadow, color, dynamics and statics, symmetry and asymmetry), the artist strives to find an original compositional solution. Imagery, expressiveness, and originality of composition are fundamental in a computer illustration.

To design a printed publication, a comprehensive approach is used, and computer technologies facilitate both the work process and communication between the author, editor, artist, and technical editor. In the case of an artistic design of a publication, the boundary between the technical and artistic aspects is virtually erased, and computer technologies serve merely as tools for the artist, even if equipped with various additional capabilities.

Computer graphics possess a number of unique opportunities to create artistic images compared to traditional graphic techniques — these include ease of image manipulation, changing its shape, silhouette, partial replacement of elements, and editing tonal and color solutions. Graphic editors allow the creation of complex multilayer compositions while maintaining the ability to edit individual layers and to restore and return to earlier versions of the composition. Such changes are hard to imagine when creating illustrations using traditional techniques.

At the Graphic Design specialty at the Academy of Music, Theater, and Fine Arts

²⁴³Graphics editor Adobe Photoshop review <https://www.adobe.com/products/photoshop.html>, download 23.10.2024

²⁴⁴ Ibidem

²⁴⁵ Ibidem

²⁴⁶ Graphics editor Procreate review <https://procreate.com/procreate>, download 25.10.2024

of the Republic of Moldova, students are offered courses such as “Creative Explorations in Book Graphics” and “Computer Graphics,” where they learn the tools and means of computer graphics and create a series of illustrations in vector and raster graphics. During the learning process within these courses, students have the opportunity to delve into the study of computer applications. Practical assignments help creating illustrations in various techniques and realizing the relevance and necessity of the gained knowledge, by forming conditions to activate creative and cognitive activities and to develop intrinsic motivation for learning.

Vector Illustration. One of the practical assignments involves developing graphic series of illustrations using a black-and-white graphic technique. To achieve the objectives, students are encouraged to complete the assignment using vector graphics in Adobe Illustrator or CorelDraw, with the help of a tablet. It is worth noting that the challenge of this assignment lies not only in creating artistic form solely through lines but also in finding an expressive way to convey imagery and literary content. After being limited in terms of tonal and color organization and modeling, many students face difficulties in structuring the graphic form. Initially, almost all students feel the need for additional options, such as fills or color. This issue can be easily resolved by suggesting that student’s replace solid fills with the play of lines (see fig. 1).



Figure 1. Vector illustration by Roshka Olga

Project coordinator: university lecturer Timutsa Aliona

An approach based on inversion — white lines on a black background — is another method of working on such a project (see fig. 2).

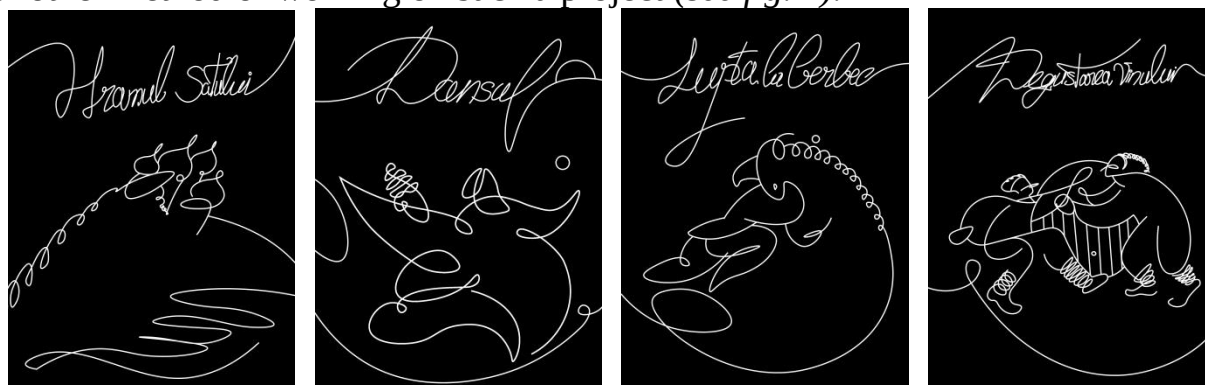


Figure 2. Vector illustration by Timofeev Denis

Project coordinator: university lecturer Timutsa Aliona

What distinguishes the creation of illustrations in this technique from traditional drawing or engraving? The answer is simple — the flexibility of vector graphics and the speed of its transformation without loss of quality or artistic expressiveness. In the context of the educational process and the catastrophic lack of time, it is a significant factor. Furthermore, the use of digital brushes with texture,

“uneven” or jagged line edges, as well as pressure and tilt angle control of an instrument on a graphic tablet, allow more expression and energy to be infused into the digital work. The artist's technique plays an important role, because even in a digital environment, the dynamics of hand movement and approach to the work impact the final result, helping to achieve greater realism and uniqueness. Thus, using a masterful control of the tools and understanding the traditional artistic techniques, one can achieve a special expressiveness and intensity in an artistic image.

Raster Illustration. Another practical assignment involves developing a series of illustrations in full-color raster graphics. To achieve the objectives, students are encouraged to complete the assignment using Adobe Photoshop, with the help of a graphic tablet. This assignment allows to combine the technical capabilities of computer graphics, applying filters, effects, and the expressiveness of freehand drawing (see fig. 3).



Figure 3. Raster illustration by Timofeev Denis
Project coordinator: university lecturer Timutsa Aliona

Adobe Photoshop provides artists with a powerful set of tools to create expressive and detailed illustrations. With a variety of brushes, filters, and plugins, artists can imitate various traditional techniques. Photoshop's capabilities are further enhanced by plugins that add specialized functions and effects. The multilayered work in Photoshop allows artists to control every element of the image, which is especially useful for complex illustrations. The use of layers simplifies the editing process and enables the creation of the depth and textural effects by combining elements at different levels. Additionally, the layers facilitate the management of light and shadow and allow quick adjustments to the color, saturation, and transparency of separate parts of the illustration. All these features create favorable conditions to find the most expressive forms of color solutions. Students lose their fear of ruining their work since almost all graphic editors support the ability to restore an earlier version of the file or to undo several actions.

It is worth noting that despite all the visible advantages of computer graphics, illustrations created in traditional graphic techniques remain in demand. When creating illustrations using traditional techniques, the artist invests his unique style into the work, creating liveliness and expressiveness that are difficult to replicate with the help of digital tools. The textures of the paper, unique brush strokes, and various materials (such as charcoal, watercolor, and pastel) all these add depth and uniqueness to the image. This approach allows the artist to convey not only the visual representation but also the emotional state, mood, tempo, and rhythm, as well as the energy of the creative process itself. While digital graphics provide precision

and control, manual work remains a special form of self-expression, valued for its unique visual and emotional qualities.

Nowadays, many graphic editors strive to reproduce traditional artistic tools. For instance, *Adobe Photoshop*, *Adobe Illustrator*, and *Procreate* feature brushes that mimic watercolor and oil painting, as well as pens, pastel chalks, charcoal pencils, and much more. Despite their numerous advantages, the illustrations created by using traditional graphic techniques lose some qualities during digital processing. In this context, computer graphics become a valuable complement, enriching the arsenal of visual tools and allowing for a more expressive interpretation of literary texts (see Fig. 4).

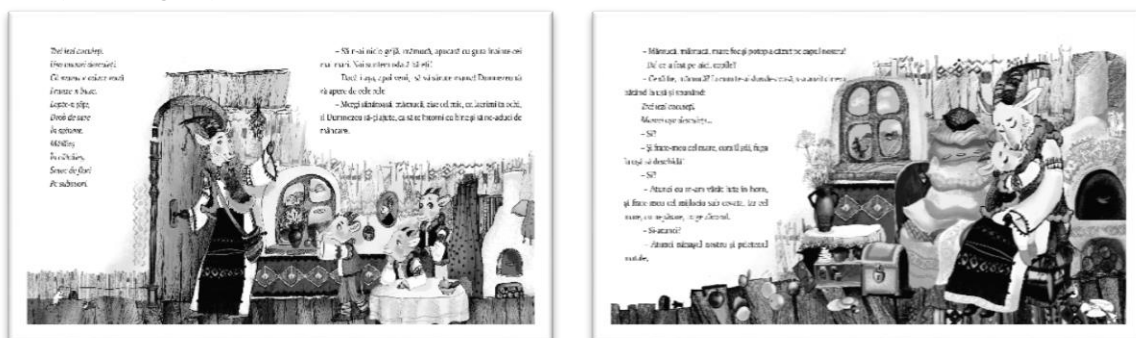


Figure 4. Illustration in mixed technique by Kristina Kachurovskaya,
Project coordinator: university lecturer Timutsa Aliona

To ensure that learning computer graphics is effective, it is essential to continuously update educational programs in accordance with the latest advancements in computer technology and graphic design. New tools and software are regularly emerging, and their use opens up new opportunities for creativity and professional growth. Adapting the content of education allows students to not only master relevant technologies but also to remain competitive in the job market, which is a key aspect in preparing modern graphic artists.

3. Conclusions

Based on the arguments and points presented, it can be concluded that mastering the means and tools of computer graphics plays a significant role in the professional training of graphic students in the field of book graphics. This enables the development of not only technical skills and a deeper understanding of working principles in graphic editors but also the development of creative thinking when adapting traditional artistic approaches and forms to the digital realm. Additionally, completing practical assignments helps to solidify the acquired knowledge, to expand the visual vocabulary, and also to form the required level of professional mastery.

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