



e-ISSN 3041-248X

Philosophy and Governance

<https://www.eu-scientists.com/index.php/fag>



From Analog to Digital: Transformation of Techniques and Technologies in Photography Education

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ARTICLE INFO

ABSTRACT

Research Article

DOI:

[10.70651/3041-248X/2025.11.12](https://doi.org/10.70651/3041-248X/2025.11.12)

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The article examines the transformation of techniques and technologies in photography education during the transition from the analog to the digital paradigm. The study analyzes changes in photographic thinking, pedagogical strategies, and the structure of art education influenced by the development of digital technologies, software tools, and multimedia platforms. Particular attention is paid to the interaction between analog and digital practices within contemporary curricula, the revitalization of film-based techniques as a response to the immateriality of digital culture, and the formation of new competencies among students in the context of a post-photographic environment. The article argues that digitalization not only alters the photographer's technical toolkit but also reshapes the epistemological foundations of photography, the boundaries of authorship, and the pedagogical models used in training future artists. The methodological framework is based on interdisciplinary approaches combining historical and technical analysis of photographic technologies with theoretical concepts developed by classical and contemporary photography scholars. The research employs content analysis, critical interpretation of visual media, comparative pedagogical analysis, and structural-functional methodology. Results. The study identifies the key directions of transformation in photography education under digital conditions: a change in the technological foundation, which shifts pedagogical focus from technical discipline to analytical and multimedia competencies; the development of hybrid educational models integrating film and digital photography, thus balancing analog slowness with digital flexibility; the revitalization of analog practices, which serve both cultural and pedagogical functions by counteracting the "simplifying effect" of digital technologies and fostering material and tactile experience; the integration of networked media platforms and emerging technologies (VR/AR, 3D, algorithmic systems), which expands the boundaries of photographic practice and reshapes professional training. The findings demonstrate that digitalization forms a new visual culture in which photography operates not only as a technique of representation but also as a media, analytical, and creative practice.

KEYWORDS

choice, cognitive aspect, critical approach, decision-making, fear, manager, managerial decision, philosophical thought.



e-ISSN 3041-248X

Філософія та управління

<https://www.eu-scientists.com/index.php/fag>


Від аналогового до цифрового: трансформація технік і технологій у навчанні фотомистецтва

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СТАТТЯ

АНОТАЦІЯ

Дослідницька

DOI:

[10.70651/3041-248X/2025.11.12](https://doi.org/10.70651/3041-248X/2025.11.12)

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Стаття присвячена аналізу трансформації технік і технологій у навчанні фотомистецтва в умовах переходу від аналогової до цифрової парадигми. У роботі розглянуто зміни у фотографічному мисленні, педагогічних стратегіях та структурі мистецької освіти, спричинені розвитком цифрових технологій, програмних засобів і мультимедійних платформ. Значну увагу приділено взаємодії аналогових і цифрових практик у сучасних навчальних програмах, ревіталізації плівкових технік як реакції на нематеріальність цифрової культури, а також формуванню нових компетентностей здобувачів у контексті постфотографічного середовища. У статті обґрунтовується, що цифровізація не лише змінює інструментарій фотографа, але й трансформує епістемологічні основи фотографії, межі авторства та педагогічні моделі підготовки митців. Методологічну основу становлять міждисциплінарні підходи, що поєднують історико-технічний аналіз розвитку фототехнологій, теоретичні концепції класичних і сучасних дослідників фотографії. Використано методи контент-аналізу, критичної інтерпретації візуальних медіа, педагогічної компаративістики та структурно-функціонального аналізу. Результати. У результаті дослідження виявлено ключові напрями трансформації фотографічної освіти в умовах цифрової революції: зміна технологічної основи, що привела до переорієнтації навчального процесу з технічної дисципліни на аналітичні та мультимедійні компетентності; формування гібридних навчальних моделей, які поєднують плівкову та цифрову фотографію, забезпечуючи баланс між аналоговою повільністю та цифровою гнучкістю; ревіталізація аналогових практик, що виконують культурну й педагогічну функцію протидії «спрощенню» цифрових технологій та сприяють розвитку матеріального й тактильного досвіду; інтеграція мережових медіаплатформ і нових медіа (VR/AR, 3D, алгоритмічні системи), що розширює межі фотографічної практики та змінює структуру професійної підготовки. Доведено, що цифровізація формує нову візуальну культуру, у якій фотографія виступає не лише репрезентаційною технікою, а й медіальною, аналітичною та креативною практикою.

КЛЮЧОВІ СЛОВА

фотомистецтво, аналогова фотографія, цифрова фотографія, цифрові медіа, медіапедагогіка, постфотографія, візуальна культура, фотографічна освіта, цифрова трансформація.

1. Introduction

Social policy plays a fundamental role in ensuring social stability and sustainable development of society in the system of public administration. Its main task is to create equal opportunities for access to social services for all segments of the population. The problem of transformation of social policy has become especially relevant in the context of decentralization, since decentralization involves the transfer of powers to the local level. The new conditions have significantly changed the mechanisms of social management and require immediate adaptation. The main task of modern social policy is to develop effective mechanisms and strategies that can ensure the availability of social services and their quality in accordance with the needs of different social groups and regional characteristics. Therefore, ensuring equal access to social services is an integral component of social justice, poverty reduction and strengthening social integration.

Thus, ensuring equal access to social services in modern conditions is a complex process. This process includes improving the legislative framework and financing mechanisms. It is also important to continuously develop the capabilities of local and regional authorities. In addition, it is necessary to introduce new approaches to the organization of social work. One of the key tasks in this area is the development of conceptual models that will take into account the socio-economic specifics of each region. These models should provide social services to all groups of the population. An important task is also to study the relationship between the effectiveness of social policy and the level of economic development through the prism of social expenditures and their impact on the well-being of communities.

Optimization of procedures for the provision of social services, minimization of administrative barriers, increasing transparency and accountability of authorities, development of tools for monitoring and evaluating the effectiveness of the use of budget resources in the social sphere are the main practical tasks of social policy to ensure equal access to services. The growth of social inequality, depopulation of rural areas, urbanization and the war in the East of Ukraine are the main prerequisites for adaptation to new conditions in the context of ensuring an adequate response to the needs of the population and guaranteeing social rights. Scientific and practical research in this area, first of all, should be aimed at identifying the most effective management models capable of ensuring sustainable social development and equal opportunities for access to social services.

2. Literature Review

The classic works of S. Sontag, R. Barth and W. Benjamin laid the theoretical foundations for understanding photography as a socio-cultural phenomenon and defined the key concepts of representation, aura and emotional structure of the image. The studies of W. Mitchell, M. Lister, F. Ritchin and L. Manovich analyze the impact of digital technologies on the radical change of photographic logic, emphasizing the transformation of the image in the conditions of computability, modularity and post-photographic practices. Modern critical reviews by L. Wells, E. Edwards and S. Shore deepen the understanding of the materiality, historicity and structural nature of photography. The latest research on digital culture and education, in particular the works of S. Palladino et al., D. Cordell, E. Van Alphen, F. Kunovski, and S. Kozy highlight the challenges and opportunities of modern photographic pedagogy, focusing on hybrid learning models, creative practices, and the revitalization of analog techniques. The Ukrainian contribution to the topic is represented by the textbook by M. Chikarkova and V. Boruk, which systematizes approaches to digital art in the domestic educational context.

3. Problem Statement

The purpose of the article is to analyze the transformation of techniques and technologies in teaching photographic art under the influence of the transition from analog to digital paradigm, to find out its impact on the content of art education, the nature of photographic thinking and the formation of professional competencies of applicants.

4. Methods and Materials

The methodological basis of the study is a set of interdisciplinary approaches that allow a comprehensive analysis of the transformation of techniques and technologies in teaching photographic art under the influence of the transition from analog to digital paradigm. The work uses a historical and technical method that provides a reconstruction of the evolution of photographic technologies – from chemical and physical processes of film photography to digital sensors, algorithmic processing and multimedia media. This method made it possible to identify the key stages of rethinking the photographic image and changes in hardware and software that influenced the logic of learning.

Structural and functional analysis is used to investigate the changing role of technical, creative and pedagogical components in the educational process, as well as to determine how digitalization transforms the content and functions of art education. The method of comparative pedagogy made it possible to compare modern models of teaching photography combining analog and digital techniques, as well as to assess the effectiveness of hybrid educational approaches in different cultural and institutional contexts.

To analyze modern practices of photographic art, content analysis and critical interpretation of visual media were used, which involved the study of digital and film images, network platforms (Instagram, TikTok, Flickr, Behance), digital museums and interactive installations. This made it possible to determine changes in the structure of visual culture, the characteristic features of digital aesthetics and their pedagogical consequences.

The study also uses the method of theoretical modeling, which made it possible to form a generalized model of modern photographic education that integrates analog practices, digital tools and new media (VR/AR, 3D, generative algorithms). To clarify the cultural and conceptual context, the methodology of visual and media studies was used, based on the works of S. Sontag, R. Barth, W. Benjamin, L. Manovich, M. Lister, L. Wells, E. Van Alphen and others.

5. Results and Discussion

In the context of the theoretical understanding of photography as a cultural and cognitive phenomenon, the classic works of Susan Sontag, Roland Barthes and Walter Benjamin, which laid the foundations for the modern understanding of photographic representation, remain important. For example, Sontag in his work *On Photography* [20] emphasizes that photography forms a specific “morality of the gaze”, since each image is at the same time an act of fixing and interpreting reality. constructing experiences and memories that transform the world into a continuous stream of images. Roland Barthes at *Camera Lucida* [1] expands on this understanding by introducing the concepts of *studium* and *punctum*, which describe the duality of photographic perception: rational, culturally codified and emotional, individually traumatic. Barthes emphasizes that photography always carries “evidence of transience” and at the same time creates a special kind of presence, thereby forming a unique type of interaction between the viewer and the image.

Walter Benjamin’s view of photography as a product of the era of technical reproducibility [2] allows for a deeper understanding of the cultural logic of the transition from analog to digital practices. Benjamin sees photography as a medium that changes the nature of the artistic “aura” – the uniqueness and uniqueness of the work, which at the same time democratizes access to the image. This thesis becomes especially relevant in the digital age, when the image loses its material attachment and is distributed in unlimited circulation. W. J. T. Mitchell *The Reconfigured Eye* [11] continues this line by analyzing the “post-photographic” situation, in which digital technologies destroy traditional ideas about photography as a mechanical imprint of reality. According to Mitchell, the digital image becomes an interface – a visual construct created in the interaction of technology, algorithms and the author’s intention.

The transformation of techniques and technologies in the teaching of photographic art from the analog to the digital era became one of the deepest civilizational shifts in the field of visual culture of the late twentieth and early twenty-first centuries. It is not only a technological change, but also a profound reorientation of the ways of seeing, interpreting and medial interaction in today’s culture. It changed the very logic of artistic thinking, educational interaction and professional training of the future author.

The transition from analog to digital photography has raised new epistemological and cultural questions about the nature of the photographic image, its status and methods of pedagogical mastery.

Michael Lister in his seminal work *The Photographic Image in Digital Culture* [8] emphasizes that digital technologies blur the line between “photographic” and “non-photographic”, as the image ceases to be a mechanical trace of reality and becomes the result of computational Processes. Fred Ritchin in *After Photography* [16] emphasizes that digital photography can no longer be considered a guarantee of authenticity; instead, it becomes a new form of visual communication, where manipulation, layering and interactivity become basic properties of the image. In this context, the transition to digital practices in education means not only a change in technical tools, but also a change in the ways of thinking about the image, its functions and interaction with the viewer.

The theoretical framework for comprehending digital photography is significantly expanded by Lev Manovich, in his work *The Language of New Media* [9] defines a digital image as “modular” and “transformative”, i.e., one that can be infinitely modified without loss of quality. This characteristic fundamentally distinguishes the digital paradigm from the analog one, where the materiality of film and chemical processes set the boundaries for creative experiment. Ernst van Alphen, in his book about the “creative apparatus” [21] continues this approach, arguing that in the digital age, photography functions as a collaboration between humans and equipment, in which the algorithm plays the role of a full-fledged creative agent. Such a view radically changes the idea of authorship, and in the field of education, puts forward new requirements – from practical mastery of the digital environment to a critical understanding of its logic. Liz Wells in *Photography: A Critical Introduction* [20] emphasizes that digital photography creates a new structure of visual culture, where the boundaries between document, art, and communication become movable, which also transforms pedagogical models.

In the cultural and historical dimension, the transition to digital photography means rethinking the materiality of the photographic image. If in the work of Elizabeth Edwards [5] photography appears as a memory medium, closely related to physical objects (albums, prints, archives), then in the digital environment, these material components lose stability and are transferred to the network. That is why modern researchers note the paradoxical return of interest in analog techniques as a reaction to the immateriality of digital culture. Filip Kunovski, in an article on the “analog renaissance” [6], interprets the revitalization of film photography as a form of cultural resistance to digital monotony and as a way to bring tactility, slowness, and corporeality back to artistic practice. At this time, digital photography is evolving towards hybrid forms that combine visual, multimedia and interactive elements, as shown by the analysis of modern photographic education in the works of Diane Cordell [4] and Hoza [7], which prove that digital culture is changing the educational process from hardware skills to the development of analytical, multimodal, and project competencies.

In general, the literature review allows us to identify several stable research areas: historical and technical studies that reconstruct the evolution of photographic technologies from daguerreotype to digital sensors; pedagogical works that analyze changes in curricula and teaching methods; study of the revitalization of analog practices as a reaction to the “speed” and “transparency” of digital culture; works on the role of new digital media in artistic practice and education; as well as methodological cases aimed at integrating modern creative approaches into general education. The combination of these directions allows us to form a holistic idea of the change in the content, goals and competence guidelines of modern photo education.

For decades, analog photography has defined the basic standards of artistic training, forming a set of skills based on the materiality of the image, manual techniques, chemical processes and precise control of exposure parameters [6]. It required high discipline, attentiveness and technical predictability, since the result depended on the ability to work with light, optics, photographic materials and several variables that could not be adjusted after exposure. The final result has traditionally been formed through a sequence of complex and interrelated steps in the photochemical process. In this context, analog learning shaped craftsmanship based on attention to technical details and a deep understanding of the material.

The transition from photographic film to a photosensitive electronic sensor was a radical technological breakthrough that marked a new stage in the development of photographic practice [8; 11]. Digitalization has radically changed the principles of photography: digital cameras and software have made the shooting process more technically accessible and eliminated material restrictions. Instead of a one-time shot, the digital device offered instant viewing, the possibility of repetition, flexible adjustment of parameters and advanced post-production capabilities [8; 13]. This reformatted the pedagogical focus: from a technical discipline to interpretive, analytical, and multimedia competencies.

The change in the technological base also affected the nature of photographic thinking. In the analog paradigm, the creative process was slowed down: before pressing a button, the photographer had to calculate the exposure, assess chiaroscuro, and take into account the properties of the film. Such concentration formed the ability to “see” the image before it appeared on the material. Instead, digital photography, with its ability to experiment endlessly without the risk of final error, has lowered the requirements for prior visual analysis. Therefore, modern photo education should seek a balance between the discipline of analog slowness and the flexibility of digital expressiveness [11; 14]. That is why combined models that combine analog and digital techniques are actively introduced in modern curricula. Analog learning provides a fundamental understanding of light, composition, texture, and frame materiality – universal categories for any technology [6]. Working with film builds confidence in vision, careful framing and the ability to analyze the scene before shooting. At the same time, digital tools allow you to implement complex conceptual projects, carry out post-processing, work with color, and combine photography with other media. Such a synthesis creates a unique pedagogical model of hybrid competence.

Today’s job seekers work in environments where photography is integrated with video, interactive graphics, 3D modeling, VR/AR, and generative algorithms. A vivid example of such practices are digital museums – in particular, the Mori Building Digital Art Museum in Tokyo, where works exist in dynamic interaction with light, space and visitor behavior [15]. Under these conditions, learning requires an understanding not only of technical tools, but also of media technology principles and visual communication. Digitalization has also actualized the problem of image authenticity. If in analog photography “truth” was associated with the physical nature of the chemical process, then in the digital age it depends on the author’s intention, ethics of editing and interpretation [12]. The ability to create images that do not have a real prototype takes photography into the realm of reality modeling, rather than reproducing it. This necessitates the formation of critical analysis and visual literacy competencies in applicants.

The revitalization of analog techniques, noticeable in modern art schools, is not a nostalgic gesture, but a pedagogical response to the “simplifying effect” of digital technologies. The theoretical basis of this approach is substantiated in works on the materiality of the image and the value of tactile experience in the formation of artistic thinking. Analog practice returns to the applicant the experience of working with chemical processes, the physical space of a dark room and visual prediction of the result, which develops visual reflection and slow thinking [3].

Significant changes have also taken place in the role of a teacher. If in the analog tradition he acted as a carrier of technical skills, then in the digital environment he becomes a media educator who works with visual culture, ethics, interpretation and communication [14; 15]. The teacher appears rather as a mentor, curator, and analyst, which creates conditions for the development of creativity and critical thinking.

Modern training also covers online media platforms – Instagram, Flickr, TikTok, Pinterest, Behance – which are becoming new laboratories of visual culture. They allow students to explore trends, build portfolios, work with audiences, and practice real-time visual communication [7]. This integrates photography into broader media processes, where it is important not only to create an image but also to build its communicative context.

In a broader cultural dimension, digitalization has changed the status of photography: it has become an element of visual flows, interactive environments and network communications. This necessitated the inclusion of courses in the psychology of perception, philosophy of technology, visual anthropology, media theory, and digital culture in the curricula [10]. Such a hybrid model forms complex competencies that correspond to the modern visual industry.

Photography pedagogy actively integrates digital platforms, online courses, open educational resources, and interdisciplinary approaches. Changes in learning models suggest that digital tools contribute to the flexibility and adaptability of the curriculum even in resource-constrained contexts [7]. Thus, in modern education, a multi-level model is being formed, in which analog and digital are not opposed, but mutually reinforce each other as components of holistic media artistic competence.

6. Conclusions

The transformation of techniques and technologies in photography teaching from analog to digital paradigm is not only a change in tools, but also a profound change in cultural logic, artistic thinking, and

pedagogical practices. Modern photography education is characterized by hybridity, interdisciplinarity and orientation towards the formation of complex competencies that allow the future photographer to work in a rapidly changing digital culture. As a result, photography appears not only as a technique of representation, but as an intellectual, analytical and creative practice that models reality and forms a new visual culture.

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