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Creative modelling of clothing in the work of designers: Trends and directions

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Abstract. Methods and techniques of creative modelling assisted in creating new proportions, volumetric forms, and silhouettes of clothing during the development of new designer clothing collections. The aim was to examine the application of creative modelling methods in the collections of world designers showcased during Paris Fashion Week. The article was a theoretical study based on a systematic approach and the application of general scientific methods for analysing research objects, such as analytical-typological, artistic-compositional, visual-analytical, and others. Prospective collections of world-renowned Fashion Houses and brands for the spring-summer 2025 season, presented during Paris Fashion Week, were analysed. Collections featuring models that likely employed creative methods, tools, and techniques of modelling were selected. Based on the analysis of models from the chosen collections, probable techniques and means of creative modelling embedded in the garment construction were identified and described. It was established that the most commonly used techniques and means of creative modelling in designers' collections included the integration of geometric shapes into the structure of the garment and its parts, as well as the transformation of sleeves and other details, where parts of the garment were combined into one large, unified piece that smoothly transitioned from one section of the garment to another, enveloping various parts of the human body and creating a visually complex structure. In addition to these techniques, designers also utilised other means of creative modelling, such as remodelling of the base, artistic-decorative division, and others. Models from the collections of world Fashion Houses and brands were described. The research results could be used in the creative activities of clothing designers, in improving the process of clothing design and its form creation, as well as in the educational process for training clothing designers and fashion constructors

Keywords: clothing form creation; modelling techniques; clothing collection; fashion; style; Fashion House; fashion industry

INTRODUCTION

The primary functions of clothing included protective, aesthetic, informative, and others. With the development and rapid changes in society, the protective function lost its primary role, transferring it to the aesthetic and informative functions. Through clothing, self-expression occurred, with taste, preferences, mood, state, and attitudes demonstrated and conveyed. To ensure the demand for modern clothing, designers,

when designing new collections, paid special attention to ensuring that their products had a certain history, conveyed the main idea, and contained a small story that would resonate with future consumers. The embedded meanings and ideas in the product were represented through volumetric forms, silhouettes, proportional solutions of the clothing components and the entire garment in relation to the human figure, colour

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combinations, selected materials, their textures, and other characteristics. Thus, the process of modelling and form creation of future products stood out among the multitude of stages in the clothing design process, as it was at this stage that the leading informative and aesthetic properties of the future product were formed.

The rapid development of the fashion industry required modern solutions and approaches in creating new clothing models. Constructive modelling, as an integral part of the clothing design process, also transformed. The combination, complication, and integration of existing constructive modelling techniques became the basis for the formation and development of creative modelling and clothing form creation methods. Their use could be observed in the work of many world-renowned designers and Fashion Houses. Therefore, when modelling clothing, designers and their creative production team used innovative methods – creative methods, tools, and techniques of clothing modelling. Their application helped reproduce creative ideas in material with high precision and alignment with the concept. This became possible through technical-constructive solutions made by specialists when using creative modelling and clothing form creation. Thus, knowledge and mastery of creative modelling methods became a new requirement for future specialists in the field, which needed to be studied in conjunction with basic constructive clothing modelling.

The topic of clothing form creation and modelling was researched by various Ukrainian and foreign scholars. The possibilities of software and 3D technologies for optimising, increasing efficiency, and improving related indicators in the process of constructing garment patterns and working with them were described in the article M.A. Habib & M.S. Alam (2024). The development of patterns for the initial construction and its modelling, as one of the stages of industrial clothing production, was described in the work J. Geršak (2022). In the article K. Shevchuk (2024), the influence of digital 3D technologies on the stages of clothing design and form creation, its production, and the visualisation of each stage and the final result was analysed. The impact of digital technologies on the clothing modelling process was also described in the article A. Pavliuk & V. Kernesh (2022), in addition to its influence on the overall process of creating products and clothing design in general. The concept of low-waste pattern cutting, as a related method to creative modelling, was considered in the article U. Hameed *et al.* (2023). The work described the basic principles of such cutting and compared it with the traditional clothing modelling method. In the article W. Choi *et al.* (2023), the possibilities of artificial intelligence in developing new clothing models and selecting the best option for the initial construction were examined; the possibilities of artificial intelligence in analysing historical costumes and fashion trends for designing clothing collections were described.

An overview of collections by well-known designers of the late 20th – early 21st centuries who addressed this theme in their work was also presented. In the article Z. Mehta & M. Shah (2024), clothing modelling methods were divided into 2D flat and 3D volumetric modelling methods. Classical methods of clothing modelling on paper were attributed to flat methods, and creative options for modelling and draping new clothing models were attributed to volumetric methods. The article also compared curricula in Indian colleges where a course in creative clothing modelling could be taken. The topic of creative modelling and clothing form creation was also dedicated to books by foreign authors (Nakamichi, 2010; Sato, 2011). Each book described a separate method with its constructive-technological features. Each method included a series of modelling techniques and tools, the sequence of practical application of which was also described by the authors. Some authors divided these methods for designing products from fabrics and separately from knitwear (Nakamichi, 2010).

The article aimed to review the work of world-renowned designers and creative directors of fashion houses and clothing brands to identify and analyse collections for which techniques and methods of creative modelling and clothing form creation were used, as well as to form trends in creative modelling for the upcoming seasons. The scientific novelty of the work was the identification of the dominant tools and techniques of creative modelling in the collections of the spring-summer season of 2025.

MATERIALS AND METHODS

A systematic approach and several analytical methods were employed in the course of this theoretical research, including artistic-compositional, visual-analytical, analytical-typological, and other methods. Models from collections of global fashion houses and brands were selected for the study, for which creative clothing modelling methods were used. The artistic-compositional method was applied to choose collections where the models stood out due to their volumetric form, proportions, atypical silhouettes, and constructive solutions. Statistical analysis was utilised to identify the methods and techniques of creative modelling most frequently used in the development of models within the collections, and the specifics of their application by different designers, who interpreted these methods in their own way using various clothing modelling tools, were investigated. In total, 109 collections from creative directors of world-renowned fashion houses and designers of brands that presented their collections for the spring-summer 2025 season during Paris Fashion Week were analysed. A detailed description of models from collections where the influence of creative modelling methods on the form of the products was most clearly visually expressed was provided in the article, specifically the following collections: Schiaparelli,

Giambattista Valli, Anrealage, Balmain, Rick Owens, Comme des Garçons, Mugler, Atlein, Pressiat, and others. Illustrative material for the research was sourced from the official websites of the fashion houses and the website that first officially showcased the collection models after the direct show.

RESULTS

Primitive people had the need to cover their bodies, protecting them from environmental conditions. The simplest type and form of clothing for primitive people were the skins of hunted animals, which they wrapped around their bodies. With the prolonged process of evolution, changes in living conditions, and environmental factors, there was a gradual evolution of clothing forms – transitioning from simplified to more complex and combined forms. Thus, the early period of human existence was characterised by simplified forms, such as rectangular pieces of fabric, various methods of wearing them on the body, the first tailored clothing – tunics with a T-shaped cut, and their variations, etc. Improved living conditions and gradual technological development contributed to the emergence of clothing with more complex forms. The first tailored clothing appeared, which acquired a more fitted silhouette, emphasising certain parts of the human body. Initially, this was achieved through cutouts in the clothing and tightening these areas with lacing; gradually, the cutouts transformed into full-fledged division lines, breaking the overall piece into components, which allowed for the creation of primary forms and silhouettes of garments.

Over time (in the 16th-18th centuries), clothing with complex construction and voluminous forms became a class distinction, separating the wealthy from ordinary workers and peasants. In the evolution of clothing, the first peak of complicated forms, methods, and techniques of its formation was reached. The next noticeable changes in clothing occurred in the 20th century, which was characterised by alternating shifts between simpler and more complexly arranged forms. For example, in the 1920s, more fitted and straight forms dominated; in the 1940s, clothing forms that emphasised the waist and had a significant expansion at the bottom of the garments appeared (the construction of the garments became more complex); in the 1960s, clothing was looser in fit to the human body, predominantly with a straight silhouette; and with the beginning of the 1990s, a complicated model structure of clothing returned, altering the natural forms and proportions of people. The trend towards clothing with complex construction, forms, and silhouettes had persisted into the early 21st century. Evidence of this lay in the work of global designers who systematically created new, forward-looking collections, showcased a fresh vision of contemporary clothing – its forms, proportions, number of material layers, and more.

For example, Daniel Roseberry, the creative director of the Schiaparelli Fashion House, presented his first ready-to-wear collection, in which he transformed couture into everyday wear. Couture elements in the clothing were conveyed through fine and dense draping of entire details or their parts, braided plaits integrated into garment details, model and oversized collars, modified shoulders in shoulder garments, proportional solutions, the number of material layers in the garment, their combinations, and other techniques. This collection captured attention with its multitude of constructive and model solutions applied in the development of each garment. In many pieces, techniques and methods of transformational reconstruction may have been used to create new, intriguing forms, proportions, and visual effects. For instance, garments featuring an integrated braided plait (Fig. 1, a) stood out because the plait seamlessly transitioned into the garment details, rather than being attached on top of them. Particular attention was drawn to the modified shoulder sections (Fig. 1, a) in the garments (the shoulder seam, sleeve cap, and sleeve-armhole connection knot), where techniques such as the integration of geometric shapes and sleeve transformations might have been employed.

In the spring-summer 2025 collection by the Giambattista Valli Fashion House, women's clothing models were presented in a romantic style. Some models were adorned with textile embellishments – oversized bows and flowers – primarily decorating the neckline. The garments in this collection drew attention with their constructive design: some featured a classic or simplified structure, others incorporated creative draping, and another group included details that smoothly flowed from one part to another, covering various parts of the body (Fig. 1, b). The greatest constructive interest lay in this last group of models. Their standout feature was the likely transformation and reconstruction of the garment's original structure by merging several details into a single, enlarged piece, which was arranged on the figure with folds and gatherings, softly enveloping the human body. A defining characteristic of this collection was that these garments were crafted from identical fabrics, in a single colour, without the use of additional elements, emphasising the proportions, silhouette, and constructive solutions of the designs.

The Anrealage Spring 2025 Ready-to-Wear Collection stood out among the multitude of other collections at Paris Fashion Week for its originality. This sports clothing collection was an exploration of fantastical forms and silhouettes that had been previously atypical for this range of products. The main materials for all items in the collection were nylon, organza, and soft tweed (Fig. 1, c) with a special impregnation that rendered the fabric airtight. Each model had a base garment worn directly on the body and an outer capsule layer that formed the shape and silhouette of the garment when filled with air. Small fans embedded in the base garment were used to

inflate the capsules. To achieve such forms in the design process, creative modelling techniques may have been employed. For example, techniques such as integrating geometric shapes into the garment's structure, geometric

deconstruction, manipulating darts, and transforming sleeves reconstructed the original garment structure by adding spherical, wave-like, and ellipsoidal fragments that formed the overall clothing shape when filled with air.



Figure 1. Clothing models with creative modelling

Note: a – Schiaparelli Spring 2025 Ready-to-Wear Collection; b – Giambattista Valli Spring 2025 Ready-to-Wear Collection; c – Anrealage Spring 2025 Ready-to-Wear Collection
Source: J. Diderich (2024c), B. Moore (2024), A. Wynne (2024)

Among all the women's clothing collections for the spring-summer 2025 season at Paris Fashion Week, the collection by the Balmain Fashion House stood out. Almost all the presented models incorporated geometric shapes in their structure, creating corresponding silhouettes and proportions. In Figure 2, a, a skirt was depicted, for which the approach of integrating geometric shapes into the garment's structure may have been used to achieve its silhouette. The shape of the trousers and skirts was derived from the shape of a bottle of the new perfume by the same Fashion House. The shoulder models (Fig. 2, a) shared a common model solution for the garment's support area (shoulder seam, sleeve cut, sleeve cap shape, etc.), for which, it can be assumed, the same modelling approach was used as for the waist garments. The basis was taken from a semi-raglan sleeve, into the cap of which a geometric figure was integrated, forming a new sleeve shape and altering the proportions of the garment. To fix the clear geometric shape of the sleeve cap, in addition to the constructive base, an internal shoulder pad was used, which replicated the shape of the cap and filled it. The models of such sleeves differed from each other in the angle of the geometric shape of the sleeve cap, width, and length; some models were asymmetrical – featuring only one sleeve and leaving the other arm exposed. An even more complex application of the approach of integrating geometric figures was presented in Figure 2, a, where the designer developed a model of a skirt and a dress with voluminous additional parts that collectively formed the outlines of a stylised face. To enhance the expressiveness of these models, different textures of the garment details were used, achieved through the use of a package of internal materials and frequent decorative stitches.

American designer Rick Owens, the creative director of the eponymous Fashion House, presented a women's collection of alternative fashion. Experimentation occurred most with shoulder clothing, significantly lengthening and widening the shoulder seam in the garments, transforming the structure and shape of the sleeve, giving them exaggerated unusual forms and sizes (Fig. 2, b). For the design of such garments, modern clothing modelling methods may have been employed, including the transformational reconstruction method, such as sleeve transformation techniques and geometric deconstruction. The altered sizes and shapes of the sleeves were emphasised through straight horizontal and rectangular divisions. New proportions and volume were proposed in women's dresses (Fig. 2, b). The assumption could be made that the bodice base of the dress was cut-off and, like the dress skirt, had a tight fit to the human figure, holding the dress in place. The additional volume on the dress bodice could have been achieved by arranging the upper detail using the technique of draping with soft folds and gathers or pleats.

The most futuristic women's clothing collection at Paris Fashion Week was presented by the Comme des Garçons Fashion House. The models attracted attention with their constructive-technological solutions. Visual assessment of the clothing allowed the hypothesis that most models derived their construction from the structure of geometric shapes or their combinations, whose silhouette they reproduced (Fig. 2, c). Inside the structure of these garments, more familiar details or fragments of clothing with typical support surfaces were likely added, enabling the clothing to be worn and held on the body. The garment depicted in Figure 2, c may have been formed by attaching mesh capsule details over ordinary

body-hugging clothing. The combination of all capsule details created a complex structure, proportions, form, and silhouette of the entire model. Fabric rolls were used as filling for each capsule detail. The dress model in Figure 2, c consisted of grotesquely enlarged classic clothing details, in which the front, back, their parts, and yokes, etc., could be observed. All these components were

divided into parts by segments of equal size, filled with air, turning the garment into a balloon or an imitation of an inflatable mattress. These voluminous details seemed to be placed over the human body, concealing it inside. Therefore, the assumption could be made that these models also had an internal support surface to which these air-filled details were attached.



Figure 2. Creative clothing modelling in women's clothing collections

Note: a – Spring/Summer 2025 Balmain Womenswear; b – Rick Owens Spring/Summer 25 Womenswear; c – Comme des Garçons Spring 2025 Ready-to-Wear Collection

Source: M. Socha (2024a), M. Socha (2024b), M. Socha (2024c)

The spring-summer collection by the Mugler Fashion House was created under the inspiration of the beauty of nature, specifically the elegance and tenderness of flowers. The natural forms of flowers inspired stylisation of the classic shapes and silhouettes of women's suits, dresses, skirts, pants, and other garments. The majority of the models featured a tight fit along the waistline with emphasis on the hip or shoulder lines. Floral motifs and their natural plasticity were conveyed through shaped neckline cuts, the design of jacket lapel edges, modified forms at the hip level, constructive-decorative division lines of garment details, silhouettes, and decorative elements of waist garments. A distinctive feature of the collection was the shape of the garments along the hip line, which resembled the form of the calyx of a blooming flower bud (Fig. 3, a). From a constructive perspective, this shape could have been modelled using an approach called the integration of geometric forms into the garment's structure. Waist garments also had their own model features along the hip line (Fig. 3, a). The assumption could be made that the pants had vertical reliefs on the front and back halves, which transitioned into a flowing form of the side leg details at the hip area. This constructive-decorative detail resembled the plasticity of a flower petal, overlaid on the sides of the garment at the hip line; the upper part of the detail was finished with a piece that duplicated the petal's shape and connected to the main pant details. A similar constructive solution could have been observed in shoulder garments, such as the jacket and dress from the collection.

By incorporating geometric figures into clothing in the form of overlaid details, cutouts, and silhouette lines, the designer of the world-renowned Pierre Cardin Fashion House created new proportional relationships in the spring-summer 2025 collection. It included a group of models that stood out due to their constructive design. For example, a dress made of dark blue denim (Fig. 3, b) combined creative modelling techniques such as artistic-decorative division, decorative enlargement of detail sections, copying, and more. Using these techniques, the garment could be modelled so that it visually consisted of details with similar configurations. Shoulder garments like the bomber and trench (Fig. 3, b) shared a common design in the support area with an internal framework. In these models, a sleeve transformation technique may have been applied, as the upper part of the sleeve cap was merged with the front and back pieces, which were united into a single detail along the shoulder seam. A framework was inserted into the seam connecting this support detail to the rest of the garment, maintaining an oval shape around the wearer's body. The bright dress (Fig. 3, b) drew attention not only with its contrasting colour combination but also with a model feature where the central front skirt detail was so elongated that it ended with a wearable neckline cutout. Thus, the middle front skirt detail folded at the bottom and transitioned into the upper part of the dress. The women's pants (Fig. 3, b) featured a significant expansion along the hip line, further secured with a tab at the top. This expansion gave the details a geometric shape resembling a triangle.

The Atlein clothing brand demonstrated its vision of contemporary women's clothing for the spring-summer 2025 season during Paris Fashion Week. A notable group was the shoulder garments with creative modelling; these silk dresses and tops may have been designed using the sleeve transformation technique. The collection featured two transformation variants: The first variant was a combination of the sleeve with the bottom of the front detail (Fig. 3, c), which formed soft folds due

to the fabric's plasticity; the second variant was a combination of the sleeve with the upper part of the front detail of the garment. A distinctive feature of this variant was that the upper part of the sleeve revealed a portion of the arm and smoothly transitioned into the opposite shoulder seam, setting a diagonal direction for the overall draping. The garment models (Fig. 3, c) with creative sleeve modelling were further emphasised by dense draping and an asymmetrical silhouette.



Figure 3. Creative modelling in garment models

Note: a – Mugler Spring 2025 Ready-to-Wear Collection; b – Pierre Cardin Spring 2025 Ready-to-Wear Collection; c – Atlein Spring 2025 Ready-to-Wear Collection

Source: J. Diderich (2024a), R. Richford (2024), T. Zhang (2024)

In the spring-summer 2025 collection, the designer of the eponymous clothing brand Duran Lantink demonstrated the designer's vision of what could be done with clothing and how it would interact with the human body. The designer primarily aimed to explore the possibilities of creating clothing of various forms, rather than altering human proportions, which might have seemed the case at first glance from the designer's works L. Templeton (2024). Through special internal pads of spherical or sharply angular geometric shapes, the designer proposed to lift the natural hip line, making it more geometrically expressive and emphasising the joints (Fig. 4, a). By integrating new geometric forms into the garment's structure in the form of special pads,

the shape and size of the main garment details were altered accordingly. Knitted fabrics ensured a tight fit of the new pad forms and a smooth transition to the natural forms of the human body. Equally interesting was the shape of the sleeve cap in the dresses (Fig. 4, a), which differed from other models in the collection. The basis for modelling such a sleeve shape may have been a raglan-yoke sleeve. Achieving this sleeve cap shape was facilitated by the use of creative modelling techniques such as decorative enlargement of detail sections and draping with gathers and pleats. The voluminous sleeve form (Fig. 4, a) was so large that it visually created the impression that the sleeve was merged with the collar – an optical illusion in the collection's models.



Figure 4. Models from collections with creative modelling

Note: a – Duran Lantink Spring 2025 Ready-to-Wear Collection; b – Pressiat Spring 2025 Ready-to-Wear Collection

Source: L. Templeton (2024), J. Diderich (2024b)

The Pressiat brand's collection for the spring-summer 2025 season, presented during Paris Fashion Week, also raised issues of ecology, the state of the planet amidst current events, and the frequent wars that occurred on its various continents. The main inspiration for the designer in the collection was deserts J. Diderich (2024b). The collection included garments created by draping the main fabric, which replicated the forms of sand dunes in deserts. These garments enhanced other models with unconventional cuts. Such were the shoulder garments with a model hood that was cut in one piece with the front and back details (Fig. 4, b). In addition to the hood details being cut in one piece, it had an asymmetrical face opening. Its shape was designed in such a way that when worn on the person's head, it smoothly transitioned to the sleeve cap. Due to the absence of shoulder seams and the shape of the hood, parts of the garments also replicated the forms and plasticity characteristic of deserts.

DISCUSSION

Designers actively created clothing that constructively differed from the collections they had developed in the past, gradually rethinking the form of modern clothing, its stylistics, and the ways of reproducing their ideas in materials and their combinations. These changes were linked to global shifts in the world and society, which constantly arose, intensified, and over time disappeared or transformed into other events or phenomena. Each designer, in their creative work, paid attention to these events, embedding their thoughts, experiences, attitudes, and calls to action in response to external events and situations. The specificity and particularities of such changes in the world and society required a new representation in clothing, which was conveyed through altered proportions, unexpected stylistic solutions, new combinations of textures and materials, and so forth.

To achieve the desired new result, the creative team of the brand and the Fashion House was tasked with finding a constructive-technological solution to realise the designer's ideas and intentions. Most often, the solution lay in atypical modern methods and approaches in clothing modelling and form creation, known as creative methods. These methods, in turn, were the result of a large number of creative experiments by their authors, who refined techniques for creating volume, forms, fabric textures, and so on, which continued to be improved and transformed into new techniques of clothing form creation. It was determined that the leading techniques of creative clothing modelling in modern designers' collections included the transformation of sleeves and other garment details, spiral cutting, the integration of geometric forms into the garment's structure, flat draping with gathers and folds, remodelling of the base, and others. Some brands had separate experimental groups within their staff who worked with various materials, seeking new

constructive techniques and methods for creating new forms and silhouettes. The research results confirmed the conclusions in the work of the authors O.I. Serbin & K.L. Pashkevych (2024), who investigated the methods and techniques of creative modelling in the collections of the Alexander McQueen Fashion House, and supplemented their conclusions with new, more extensive information about the use of creative modelling methods in the collections of other Fashion Houses. Other aspects of the research topic were described in the work of the author K.-H. Choi (2022), in which the potential of three-dimensional dynamic fashion clothing along with three-dimensional virtual modelling systems in clothing design was analysed. The capabilities of three-dimensional clothing modelling software and its impact on the fashion industry were investigated by the author in the work L. Derman (2020).

The interconnection between textile and cutting method was described in the article D. Sgro (2020). The author proposed a rethinking of the significance of each component in their interrelationship, using the example of the creative garment modelling method called Dynamic Cutting. Dynamic cutting was a modern creative cutting technique that simultaneously emphasised both the textile and the garment's form, without prioritising one over the other. The study demonstrated how the chosen material became an integral part of the process of creating dynamic garment shapes during cutting. Depending on the desired outcome, an appropriate approach was selected from a variety of methods for utilising materials in the cutting process. The research also highlighted the reciprocal influence of creative modelling on designers' creativity, serving as a primary source for further innovation.

In the article O.I. Serbin & K.L. Pashkevych (2024), the creativity of the creative directors of the Alexander McQueen Fashion House was explored. The study analysed the constructive solutions, forms, and silhouettes of garments, for the design of which the brand's artisans employed methods and techniques of creative modelling. The most frequently used techniques were identified, namely the integration of geometric shapes into the structure of the garment and its individual parts, as well as various sleeve transformation variations. The research concluded that creative modelling methods had become part of the brand's DNA, as they were applied in the development of most of the Fashion House's collections. Techniques such as spiral cutting and decorative-constructive division frequently appeared in collections designed by Sarah Burton.

In the article E.D. Amany (2023), one of the creative clothing modelling methods was described – the Japanese method known as Transformational Reconstruction, developed by Shingo Sato. The author outlined some of the method's techniques, explaining the sequence of pattern modelling for future garments to showcase the method's potential and its role in

enhancing creativity during the design of new clothing models. Additionally, a survey was conducted among professors and college lecturers to assess the feasibility of integrating transformational reconstruction techniques into educational curricula as an innovative approach to clothing modelling. The contribution of creative clothing modelling and design to reducing production waste in mass production was described in the article S. Kim & H.Y. Kim (2022). Creative modelling was considered a method that promoted efficient and rational use of resources, as well as a method with ecological responsibility in the production process. This assertion was practically tested using examples of traditional Korean clothing, specifically sapok pants, pungcha pants, and dan-sokgot, which differed in their construction. The study found that such modelling and design methods could reduce fabric waste by up to 6%. A study on the use of decorative finishing in clothing in designers' collections from around the world was conducted by the authors of the article K. Pashkevych *et al.* (2022). Collections of designers from Europe, Australia, Asia, America, and Africa were analysed. It was found that designers most frequently used embroidery for clothing decoration, specifically techniques such as Lunéville embroidery, satin stitch, Richelieu, goldwork embroidery, machine embroidery, and others. The study identified current and fashionable colours for clothing decoration, as well as regions where decorative finishing was used most and least frequently.

In the work K. Pashkevych *et al.* (2023), the authors analysed and identified the main stages of the establishment and development of decorative finishing in women's costumes from the 20th to the early 21st century. It was established that each period in fashion was characterised by specific types of decorative finishing. The authors studied the application of finishing by world designers of the 20th and 21st centuries and identified the main trends in decoration. The article described the techniques and stages of creating handmade finishing in the collections of such world-renowned Fashion Houses as Elie Saab, Dior, and Dolce & Gabbana. The article S.Q. Leghari & B.K. Shar (2021) was dedicated to the art of mirror embroidery technique. This technique was investigated through examples of women's clothing decoration and home interior items in two Sanghar villages – Mulvi Khair Muhammad and Haji Abdul Karim Laghari. During the research, a phenomenological approach was adhered to, with consideration given to the characteristics of the decoration technique, as well as the visual and cultural aspects of this embroidery art. In a similar vein, I. Ugrekhelidze (2024) explored the revival of vintage and retro aesthetics in contemporary fashion, drawing attention to the significance of decorative costume elements and retro techniques in shaping modern fashion narratives. The study emphasised how nostalgia-driven trends influence contemporary

design, including decorative processing methods and reinterpretation of historical fashion motifs.

Deconstructivism in the collections of globally recognised fashion houses and brands was analysed in the work A. Geczy & V. Karaminas (2020). The research topic was explored through the creative output of three leading figures of deconstructivism in fashion: Kawakubo, Margiela, and Vetements. It was determined that deconstructivism in Kawakubo's works destabilised the binary distinctions of internal-external, body-clothing, old-new, worn and discarded, and so forth, and that Kawakubo's creativity influenced the development of this approach in Margiela. He was the first to challenge the conventions of "haute couture," experimenting with oversized proportions, unconventional silhouettes, displaying garments inside out, and more. It was observed that the creative approach of Vetements' creative director, Demna Gvasalia, was shaped by the influence and inspiration drawn from Kawakubo and Margiela. In his collections, Demna Gvasalia broadened the notion of clothing functionality and purpose, presenting a fresh perspective on style and fashion as a whole.

The article N.V. Chuprina *et al.* (2020) uncovered how factors of design activity influenced the formation of systems in fashion. Based on the criteria of contemporary cultural aesthetics, the transformation of fashion standards in costume design and the overall image was characterised. Design practices and trends of anti-globalisation and individualisation in 21st-century fashion were investigated, and the interconnections among all structural elements of fashion as a cyclically closed system were elucidated. It was outlined how conceptual foundations and their interpretation in designers' creativity impacted the formation of current images and trends in fashion. Design activity was identified as a factor in the formation and realisation of innovations in fashion and aesthetic standards within the modern artistic and cultural sphere.

CONCLUSIONS

In the article, the spring-summer collections for 2025, presented by world-renowned Fashion Houses and brands during Paris Fashion Week, were analysed. It was established that the share of collections containing models designed using methods and techniques of creative modelling had steadily increased; similar models were also showcased by brands that had just begun to introduce such models into their collections. The article examined and described those collections in which the garments were modelled using more complex and labour-intensive methods, techniques, and means of creative modelling. These methods were employed to design clothing with unconventional proportional relationships, new voluminous forms, silhouettes, and more. Thus, the following types of tectonic systems in clothing were distinguished, which designers demonstrated in their collections: monolithic, mesh shell, and

frame types. The shell and frame types were the most commonly used by designers in recent collections, as they emphasised the model features of the constructive design of the garments obtained through the use of creative modelling in their design process.

It was established that in the design of these garments, techniques of creative modelling such as the integration of geometric forms into the garment's structure, sleeve transformation, fragmentary copying, geometric deconstruction, and others may have been used, as well as means such as artistic-decorative division, remodelling of the base, decorative enlargement of details and their parts, and other means. Based on the analysis conducted, the techniques and means of creative modelling that were most frequently used by designers during the development of the collections were identified. The integration of geometric forms into the garment's structure and the transformation of the sleeve and other garment details were the modelling techniques that were most commonly found in the collection models; remodelling of the base and artistic-decorative division were the most frequently used means of creative modelling. The largest number of

models designed using these methods was presented in the collections of Fashion Houses and brands such as Anrealage, Balmain, Comme des Garçons, and Mugler. Future research could have encompassed the analysis of designers' creativity who had presented their collections during other fashion weeks or the analysis of collections from other seasons; the study of global practices in the application of creative modelling in the process of developing new clothing models, with the identification of dominant methods and techniques, the derivation of trends in clothing modelling, and the formulation of recommendations for its application in practical activities.

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Креативне моделювання одягу в творчості дизайнерів: тенденції та напрями

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Анотація. Методи та прийоми креативного моделювання допомагають створити нові пропорції, об'ємні форми та силуети одягу при розробці нових дизайнерських колекцій одягу. Актуальність дослідження зумовлена необхідністю впровадження методів та прийомів креативного моделювання для розширення виразних можливостей сучасного дизайну одягу, створення інноваційних пропорцій, об'ємних форм і силуетів, що відповідають тенденціям розвитку індустрії моди. Мета роботи – розглянути застосування методів креативного моделювання у колекціях світових дизайнерів, продемонстрованих під час тижня моди в Парижі. Стаття є теоретичним дослідженням, основою якого є системний підхід та застосування загальнонаукових методів аналізу об'єктів дослідження, таких як: аналітико-типологічного, художньо-композиційного, візуально-аналітичного та інших. Проаналізовано перспективні колекції всесвітньовідомих будинків моди та брендів на весняно-літній сезон 2025 року, які були продемонстровані під час тижня моди у Парижі. Відібрано ті колекції одягу, у яких присутні моделі, для проектування яких могли використовуватись креативні методи, засоби та прийоми моделювання. На основі аналізу моделей з обраних колекцій, було виявлено та описано ймовірні прийоми та засоби креативного моделювання, які закладені в будову виробів. Встановлено, що найбільш вживаними прийомами та засобами креативного моделювання у колекціях дизайнерів були інтеграція геометричних форм у будову виробу та їх частин, а також трансформація рукава та інших деталей виробу, при якій деталі виробу об'єднувались у одну загальну велику деталь, яка плавно переходить від однієї частини виробу до іншої, огортаючи різні частини тіла людини, утворюючи візуально складну будову виробу. Окрім вказаних прийомів дизайнери використовували й інші засоби креативного моделювання, зокрема, розмоделювання основи та художньо-декоративне членування та інші. Описано моделі з колекцій світових будинків мод та брендів. Результати дослідження можуть використовуватись у творчій діяльності дизайнерів одягу, в удосконаленні процесу дизайн проектування одягу та його формоутворення, а також у навчальному процесі при підготовці дизайнерів одягу та модельєрів-конструкторів

Ключові слова: формоутворення одягу; прийоми; колекція одягу; мода; стиль; будинок моди; фешн індустрія



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Aesthetic issues in the design of multimedia virtual exhibition spaces

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Abstract. The relevance of the study was determined by the digitisation of the museum sector and the growing role of virtual exhibitions in preserving cultural heritage. At the same time, digital technologies create aesthetic challenges that affect the quality of the user experience, making the study of the aesthetics of virtual exhibitions relevant for modern design. The aim of the study was to analyse and identify the main aesthetic problems in the design of digital museum spaces, analyse effective design solutions, and formulate practical recommendations for improving the user experience. The methodological basis of the study was a comparative and visual analysis of various types of virtual exhibition examples, from two-dimensional websites to three-dimensional tours and virtual reality galleries. For an objective analysis, twelve cases of virtual museums were considered, classified according to their presentation format. The results of the study revealed the existence of typical aesthetic problems, such as overloaded or chaotic composition, incorrect use of colours, unadapted typography, mismatched object scales, and ineffective interactivity. These shortcomings lead to a decrease in emotional engagement, cognitive load, and the duration of users' stay in digital spaces. At the same time, the analysis revealed positive design practices based on a logical structure of space, well-thought-out navigation, harmonious colour schemes, adaptive typography, and interactivity, which increase audience engagement and satisfaction. Platforms that combine multimedia elements with personalised viewing routes and the ability to interact with exhibits proved to be particularly effective. The practical value of the article lies in formulating a general vision of the issue, which will help curators, designers, and developers of virtual exhibitions in the aesthetic optimisation of digital space

Keywords: digital exhibitions; visual design; interactive platforms; emotional immersion; user interaction; virtual reality

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INTRODUCTION

In modern conditions of rapid digitalisation of museum affairs, virtual exhibition spaces have become particularly important as an innovative tool for preserving and promoting cultural heritage. They have provided access to museum collections to a wide audience, overcoming geographical, social and physical barriers, which has become particularly relevant in the context of the COVID-19 pandemic and other restrictions. Digital platforms have contributed not only to the preservation of cultural heritage through digital conservation, but also to the expansion of opportunities for museum communication with new audiences (Kotsiuba, 2022; Menezes *et al.*, 2023; Zhang, 2023). At the same time, the development of virtual museums has been accompanied by a number of challenges, among which the key issue has been the aesthetics of digital exhibition spaces, which directly affects the quality of the user experience and the effectiveness of communication (Baloian *et al.*, 2021).

The issue of aesthetics in virtual exhibition spaces has been increasingly studied in the context of the development of digital technologies, museum studies, and visual design. O.Ya. Melnyk & V.O. Shtec (2020) emphasised the importance of multimedia design for creating aesthetically appealing virtual art environments, stressing that the harmonious combination of sound, image and composition forms a new type of visual perception in digital space. E. Champion *et al.* (2021) and J. Li *et al.* (2023) emphasised that the successful design of virtual exhibitions involved the integration of innovative technologies – such as 3D modelling, virtual reality (VR) and augmented reality (AR) – with classical principles of composition, colour harmony and typography, which formed a coherent aesthetic image and contributed to the deep immersion of users. In particular, the use of game mechanics and layered temporal narratives increased visitor engagement, making virtual exhibitions more interactive and attractive. At the same time, V. Kushnir (2024) noted that digital formats required the adaptation of traditional aesthetic norms, taking into account the peculiarities of virtual space perception, as well as ensuring intuitive navigation and comfortable interaction. The researcher emphasised that the design of virtual museums should take into account the cognitive characteristics of users and create conditions for easy orientation and reduced cognitive load.

Research by G. Mercan *et al.* (2023) showed that the use of augmented and virtual reality significantly improves learning outcomes and emotional perception of exhibitions. They also noted that interactivity and multimedia are key factors that increase user engagement, promote deeper immersion, and shape a positive emotional experience. P. Freixa *et al.* (2022) examined visualisations and narratives in digital media, emphasising the importance of consistency in visual style and structure to create a holistic perception. They stressed that design must combine aesthetic and functional

aspects to ensure effective communication and emotional engagement. V. Klivak (2022) explored the design features of virtual exhibitions, paying particular attention to issues of composition, form, colour harmony and typography, which often affect the quality of perception of digital exhibitions. The author emphasised that shortcomings in these aspects can lead to a decline in visitor interest and a deterioration in the overall impression.

Y.I. Kotsiuba (2022) studied the peculiarities of introducing digital technologies in museum tourism, emphasising the importance of adapting museum exhibitions to digital formats while preserving aesthetic and cultural values. The author noted that modern digital platforms should not only be technically advanced, but also aesthetically appealing in order to ensure user comfort and interest. S. Sylaiou & P. Dafiotis (2023) conducted a bibliometric and content analysis of immersive technologies in museum exhibitions, finding that VR and AR technologies significantly improve the quality of visual and emotional perception but require careful design to avoid user overload. S. Woolley *et al.* (2021) examined the role of augmented reality in creating DIY (do it yourself) exhibitions that help engage the public and increase interest in museum collections. They emphasised that innovative multimedia elements should be integrated into the design in such a way as to maintain aesthetic integrity and not distract from the main content.

Thus, an analysis of contemporary research showed that the aesthetics of virtual exhibition spaces was a multidimensional problem that required an interdisciplinary approach. It covered both technical and humanistic aspects, including composition, colour, typography, interactivity, navigation and multimedia. At the same time, there is a need to adapt classical aesthetic principles to the specifics of digital formats, which opens up new horizons for research and practice. The aim of this study was to identify key aesthetic problems in the design of virtual exhibition spaces, analyse successful practices for solving them, and formulate appropriate recommendations for overcoming them.

MATERIALS AND METHODS

In the process of preparing the article, the research was carried out in several consecutive stages. At the first stage, a systematic analysis of contemporary scientific literature devoted to issues of aesthetics, design theory, and the specifics of organising virtual exhibition spaces was conducted. Particular attention was paid to works that reveal the relationship between aesthetic categories and digital forms of presentation of artistic and cultural objects. Next, a content analysis of existing virtual exhibitions (museum, gallery, educational) was carried out, which made it possible to identify the main aesthetic problems typical of modern digital environments. In addition, the study took into account user comments on the Reddit platform (n.d.), which made it possible to

collect empirical feedback from actual visitors to virtual museums and supplement the analysis with insights from the user experience perspective. The final stage was the formation of practical recommendations for improving the quality and effectiveness of the design of virtual exhibition spaces. These were developed on the basis of a systematic analysis of contemporary scientific literature, comparative and content analysis of real virtual exhibitions, and user feedback. The author's approach consisted of combining an interdisciplinary approach, integrating psychological, cognitive and design aspects, and developing a structured methodology for evaluating aesthetic parameters.

The choice of research methods was determined by the interdisciplinary nature of the topic. The main methods were comparative analysis, content analysis, and elements of visual analysis. Comparative analysis allowed for the comparison of different approaches to aesthetics in physical and virtual spaces, while content analysis allows for the identification of typical aesthetic solutions and problems in real examples of virtual exhibitions. Visual analysis was used for a deeper examination of compositional, colouristic, and typographic solutions in digital spaces. The research methodology was designed to ensure that it could be replicated by other researchers in similar conditions. To replicate the study, it is necessary to: (1) create a bibliographic database of scientific sources by keywords ("aesthetics of virtual spaces", "design of virtual exhibitions", "digital aesthetics" etc.); (2) select at least 8-14 active virtual exhibitions of various profiles for content analysis; (3) develop criteria for evaluating aesthetic parameters (composition, colour, typography, interactivity, navigation); (4) conduct a comparative analysis of the data obtained with the theoretical provisions of modern aesthetics and design; (5) review user feedback on social media to identify typical problems of interaction and visual perception. This approach ensures the objectivity, consistency and reproducibility of the research results.

Twelve virtual exhibitions were selected for the study, which can be classified by type of digital presentation: 3D virtual spaces, 2D websites with photographs of exhibits, spherical panoramas, and interactive VR galleries. This selection allowed to cover the diversity of modern technological solutions in virtual museology and design. The first group of 3D virtual spaces included the following examples: VR Space Museum Cosmoria (Virtual Space Program, n.d.), available in VRChat, which offers interactive space exhibitions with the ability to explore the orbit of satellites and other space objects; The Tate Modern's Immersive Experience (Tate Modern, n.d.), which combines traditional art with innovative VR installations; and Cranbrook Art Museum (2025), which offers 3D tours of its exhibitions with the ability to freely view the space. These examples demonstrated a deep level of immersion and interactivity, which is important for aesthetic

perception. The second group consists of 2D sites with photographs of exhibits and various navigation options. Among them are the National Museum of Women in the Arts (n.d.), which offers interactive online exhibitions with an emphasis on educational functions; the Smithsonian American Art Museum (n.d.), which provides high-quality online exhibitions with detailed descriptions and the ability to study exhibits; and The Metropolitan Museum of Art (n.d.) with personalised virtual exhibitions based on artificial intelligence (AI). These platforms are designed to provide an in-depth introduction to the exhibits through images and text information (Sylaiou & Dafiotis, 2023).

The third group consists of spherical panoramas, which allow users to view the space around them in 360 degrees. These included virtual tours of museums such as the Vatican Museums (Conroy, 2018), the Louvre (Frick Collection, n.d.) and the Prado Museum (Museo Nacional del Prado, n.d.) with ultra-high 8K resolution. These virtual tours recreate the atmosphere of the physical space, which helps to preserve the aesthetic features of the original exhibitions. The fourth group consisted of VR galleries with a high level of interactivity and the use of augmented reality (AR). Examples included the virtual collection of the Guggenheim Museum (Guggenheim Museum Bilbao, n.d.), which combines VR and AR to create a unique experience, as well as the digital exhibitions of the National Museum of Modern and Contemporary Art (n.d.) with AI-based personalisation, and the interactive AR application of the National Museum "Chernobyl" (Tintul, 2020). These platforms demonstrated current trends in the integration of technologies to enhance aesthetic appeal. The rationale for the selection of cases is based on their diversity in terms of technological approaches, geographical location and subject matter, which allows for a comprehensive exploration of aesthetic issues in different formats of virtual exhibitions. The inclusion of both classic museums with 360° tours and innovative VR galleries provided a comprehensive overview of the current state of digital museum design.

RESULTS AND DISCUSSION

Aesthetics – a philosophical and scientific category that studies the patterns of beauty, the nature of art, and the criteria of artistic value. In practical terms, aesthetics manifests itself as the ability of an object or environment to evoke feelings of harmony, satisfaction, inspiration, or, conversely, discomfort in the viewer. It is important to emphasised that in the context of virtual exhibition spaces, aesthetics is formed not only through visual characteristics, but also through the integration of the cultural context and identity of the digital environment, which enhances perception and creates a unique interactive experience (Yaremchuk, 2020; Polishchuk, 2023). Aesthetic problems are shortcomings in the visual, compositional, colouristic or interactive

organisation of space that prevent the formation of a positive emotional and cognitive experience. Research in the field of digital content perception psychology has confirmed that aesthetic decisions – the choice of colour palette, composition, typography and interactive elements – directly affect the user’s emotional state. In particular, adaptive design that takes into account different user psychotypes helps to increase engagement and comfort when interacting with virtual exhibitions, while bright warm colours, harmonious composition and clear navigation can improve mood and evoke feelings of comfort and security, while chaos, excessive complexity, or poor colour combinations can cause fatigue, irritability, or even a decrease in motivation to interact with the exhibition (Klivak, 2022; Kushnir, 2024; Reddit, n.d.).

The cognitive aspect of aesthetics manifests itself in the ability of design to reduce the intellectual load on the user, facilitate the process of perception and processing of information, and promote effective memorisation and comprehension of the presented material. Taking into account the peculiarities of human thinking, such as typical perception errors, as well as the use of interactive game navigation strategies in virtual museums, significantly improves the spatial orientation of visitors and facilitates quick and easy finding of the necessary information. This reduces the number of

errors during interaction, increases satisfaction with the experience, and motivates further exploration of the exhibition. Aesthetically appealing, harmoniously organised spaces stimulate positive motivation, while poor design decisions can reduce interest in the exhibition, even if its content is valuable (Yaremchuk, 2020; Kushnir, 2024; Zhang *et al.*, 2024). Thus, aesthetics in the design of virtual exhibition spaces is not only a matter of visual appeal, but also a complex tool that combines visual, psychological and cognitive aspects to create a deep, inspiring and effective user experience. Taking psychological patterns into account in the design process allows for the creation of spaces that not only inform but also inspire, promote deeper knowledge acquisition, and shape a positive experience of interacting with digital cultural heritage (Polishchuk, 2023).

Based on the analysis of research, comparison with basic sources and user feedback, typical aesthetic problems of virtual exhibitions that affect the quality of perception of digital museums have been identified. Firstly, in terms of compositional solutions, there was often excessive overload of the visual field or, conversely, excessive simplification, leading to a loss of integrity of the exhibition. In 3D spaces, such as the Cranbrook Art Museum, there is sometimes a lack of clear orientation in space, which complicates navigation and creates a sense of chaos (Fig. 1).

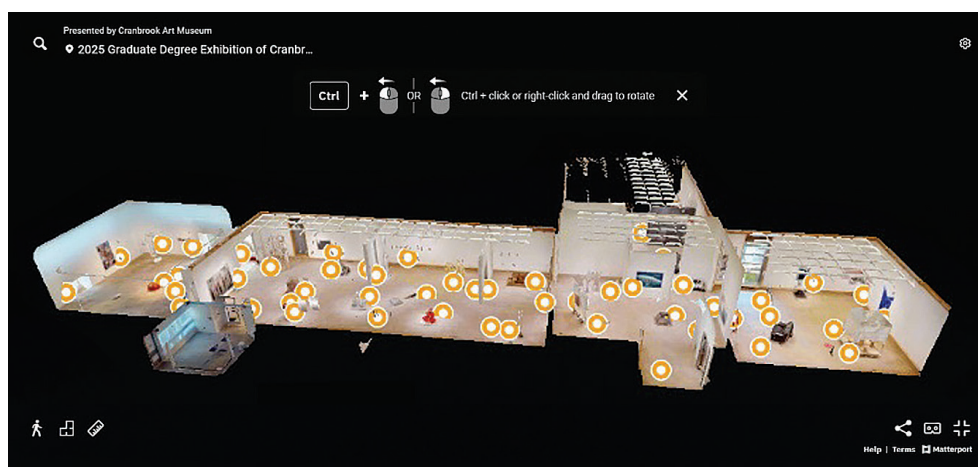


Figure 1. An example of a lack of clear orientation in space

Source: Cranbrook Art Museum (2025)

In 2D websites, such as the Smithsonian American Art Museum or The Metropolitan Museum of Art, the composition sometimes does not take into account the principles of visual hierarchy, which makes it difficult to focus on key exhibits (Fig. 2) (Kotsiuba, 2022; Fomniuk, 2023; Reddit, n.d.). This can lead to a fragmented perception of content. In addition, the lack of accents or insufficient visual structuring negatively affects the user’s orientation in space. In terms of colour harmony and typography, many virtual exhibitions have noticeable problems with

colour combinations that do not always correspond to the psychological characteristics of visitors’ perception. For example, in spherical panoramas of the Louvre or the Vatican Museums, interface elements sometimes use contrasting colours that distract from the main content (Fig. 3). Bright colours against the background of historical objects can upset the balance between the interface design and the objects that are trying to convey a certain context and atmosphere of the museum. In addition, colours that are too bright or saturated can cause eye fatigue, which reduces the overall comfort of use.

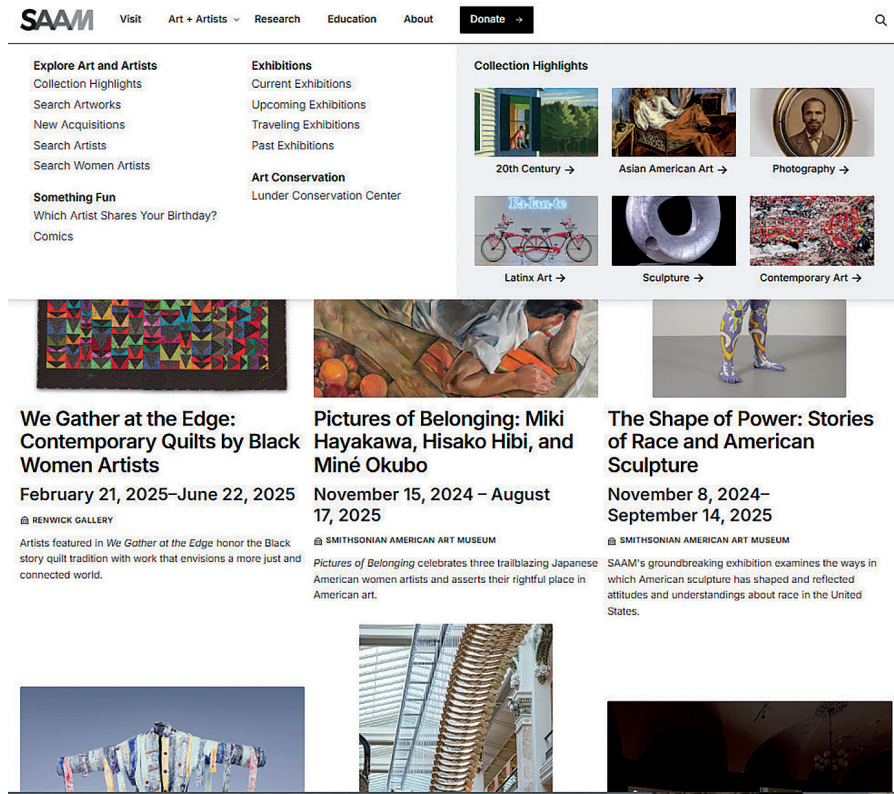


Figure 2. An example of a complex visual hierarchy of elements

Source: Smithsonian American Art Museum (n.d.)

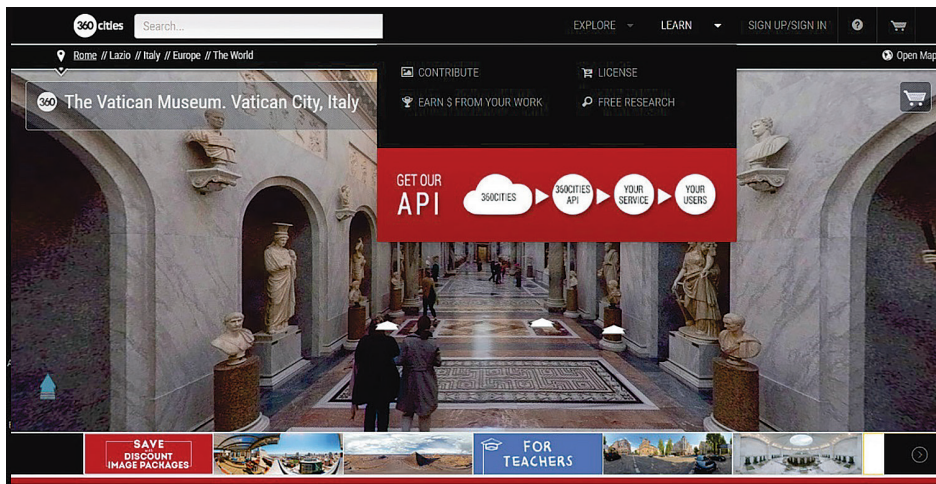


Figure 3. An example of too bright colours in interface elements

Source: B. Conroy (2018)

One of the common issues in digital panoramas is uneven seams between individual parts of the panorama, which can lead to image distortion and object warping (Fig. 4). These seams, which arise when several images or videos are combined into a single whole, may be inconspicuous at first glance, but become significant upon closer inspection, particularly when users focus on details. Typography is often not adapted to the digital format: fonts are either too small or, conversely,

too large, which reduces the readability of exhibit descriptions. In VR galleries, such as the Guggenheim Museum, there is sometimes insufficient contrast between the text and navigation elements and the background, making it difficult to perceive the information (Fig. 5) (Baloian *et al.*, 2021; Reddit, n.d.). A lack of contrast can cause important text elements to become invisible, especially when they are placed on complex or changing backgrounds typical of VR environments.

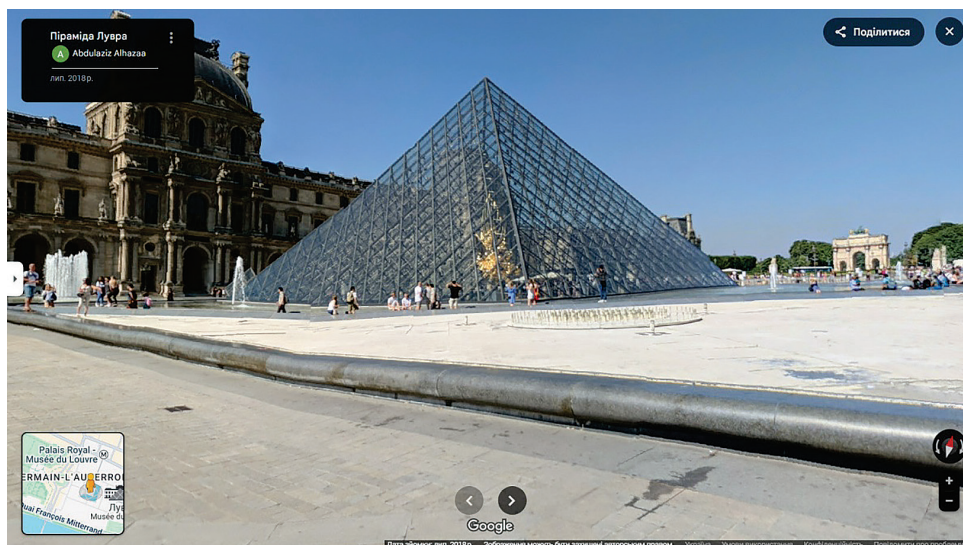


Figure 4. Example of object distortion caused by uneven seams of panorama elements

Source: A. Alhazaa (2018)



Figure 5. An example of insufficient contrast between text and navigation elements

Source: Guggenheim Museum Bilbao (n.d.)

The perception of space and scale also presents certain challenges. In 3D virtual environments, users often experience a mismatch between the real and virtual scale of objects, which disrupts the sense of presence. For example, in the VR Space Museum Cosmoria, some exhibits appear disproportionately large or small, reducing aesthetic authenticity (Fig. 6). In some cases, spherical panoramas lack the option to adjust the viewing scale, limiting the depth of detail perception. Additionally, on many platforms, the ergonomics of navigation are insufficiently considered, making intuitive movement through the space more difficult (Polishchuk, 2023; Fomniuk, 2023; Reddit, n.d.).

Other aesthetic issues include insufficient interactivity or excessive interactivity, which can distract from the main content, as well as the lack of a unified stylistic solution, which makes virtual exhibitions less cohesive.

Overall, these issues point to the need for a more comprehensive approach to the design of virtual exhibitions, where aesthetics are combined with functionality and user convenience. On the other hand, this method of analysing selected virtual exhibition spaces has revealed a number of positive aesthetic practices that contribute to improving the quality of the user experience and forming a coherent visual image. In particular, 3D virtual museums such as VR Space Museum Cosmoria and Tate Modern Immersive Experience effectively implement spatial composition, allowing users to intuitively navigate the virtual space thanks to the logical structure of the zones and clear visual accents. The successful combination of realistic graphics with elements of artistic stylisation creates an emotionally rich atmosphere that enhances the aesthetic perception of the exhibition (Fig. 7) (Champion *et al.*, 2021; Reddit, n.d.).



Figure 6. An example of an imbalance between object scales

Source: Virtual Space Program (n.d.)



Figure 7. An example of successful navigation organisation across zones in the three-dimensional virtual world Cosmoria

Source: Virtual Space Program (n.d.)

Interactivity and navigation on many platforms are implemented in such a way that users can not only passively view exhibits, but also actively interact with them. For example, on the websites of the Smithsonian American Art Museum and The Metropolitan Museum of Art, museum exhibits can be viewed in

detail, additional information can be obtained in the form of multimedia tips, and the viewing route can be personalised (Fig. 8). This increases visitor engagement and makes the experience more immersive and tailored to individual interests (Baloian *et al.*, 2021; Reddit, n.d.).

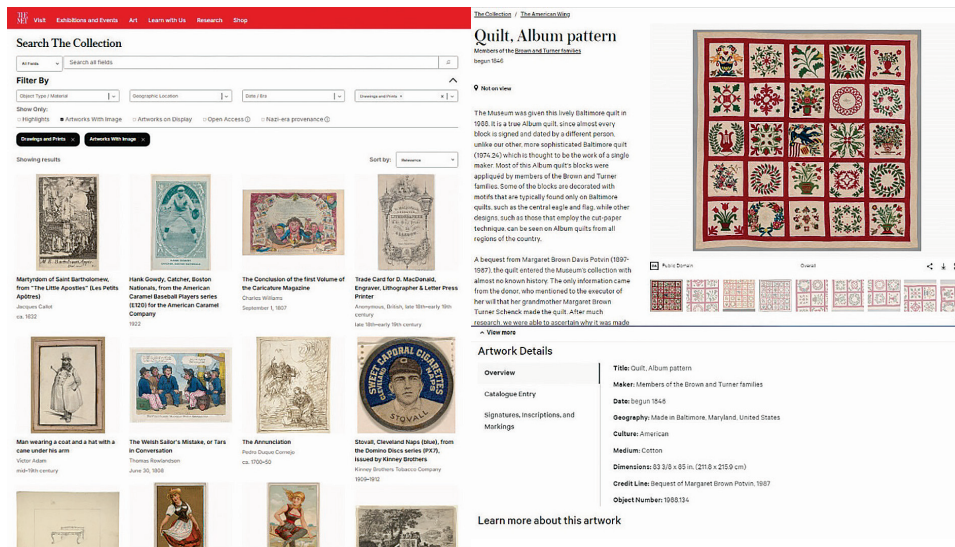


Figure 8. An example of a quick search and detailed description of museum exhibits on a website

Source: The Metropolitan Museum of Art (n.d.)

Innovative approaches to creating visual integrity are evident in the spherical panoramas of the Louvre and Vatican Museums, which use high-quality 8K resolution images to provide maximum detail and a sense of presence (Fig. 9). The successful combination of colour scheme, lighting and textures creates a unified stylistic concept that preserves the atmosphere of the original space (Klivak, 2022). Similarly, the Guggenheim Museum's VR galleries use augmented reality to integrate digital art objects into real space, expanding the boundaries of traditional museum perception (Guggenheim Museum Bilbao, n.d.). The use of multimedia elements

and gamification deserves special attention, as in the mobile AR application of the National Museum "Chernobyl", which explains complex scientific concepts through an interactive game (Tintul, 2020; Champion *et al.*, 2021; Zhang *et al.*, 2024). This approach not only increases interest in the exhibition, but also makes the learning process more accessible and engaging. Overall, these positive practices demonstrate that successful virtual exhibition design is based on a harmonious combination of aesthetics, functionality and innovative technologies, which ensures deep immersion and maximum user satisfaction (Li *et al.*, 2023; Reddit, n.d.).

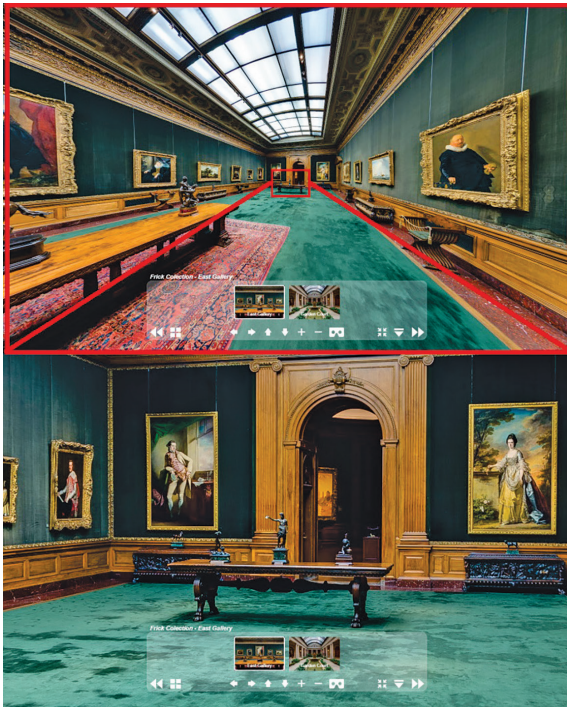


Figure 9. An example of the ability to approach a distant object in a spherical panorama

Source: Frick Collection (n.d.)

A comparison of virtual exhibition spaces with traditional physical exhibitions reveals significant differences in the formation of aesthetic experience and the transformation of classical aesthetic principles in the digital environment. Firstly, physical exhibitions have space limitations, forcing curators to select only part of the collection for display, while virtual spaces allow for the creation of exhibition rooms that are unlimited in size and number, enabling the inclusion of a more complete collection and a more comprehensive presentation of the exhibition's concept. This also facilitates the integration of multimedia and gamified elements that enhance the user's emotional immersion and make the perception of the exhibition more dynamic (Mercan *et al.*, 2023; Fomniuk, 2023; Reddit, n.d.). This significantly expands the possibilities for deeper immersion of the visitor in the context of the works, and also allows for the addition of voluminous accompanying materials without overloading the user thanks to interactive elements that can be hidden if necessary. Secondly, classical aesthetic principles such as composition,

scale, and colour harmony are transformed in virtual exhibitions due to the peculiarities of the digital format. For example, in a physical museum, the perception of space and scale occurs naturally through physical presence, while in a virtual environment, these parameters are often subject to correction, which can both enhance and distort the aesthetic experience. In particular, the use of adaptive algorithms and artificial intelligence allows for the personalisation of visual perception, adjusting the scale and composition to the individual needs of the user. In spherical panoramas or 3D tours, the scale of objects sometimes does not correspond to their actual dimensions, which affects the sense of presence and authenticity. At the same time, digital platforms make it possible to reproduce works in the environment in which they were created, which is impossible in physical museums, thereby expanding the boundaries of classical aesthetic concepts (Klivak, 2022; Fomniuk, 2023; Lyu, 2024).

Another important aspect is interactivity, which is limited in physical museums but becomes one of the key elements in shaping the aesthetic experience in virtual exhibitions. Virtual spaces allow users not only to view exhibits, but also to interact with them, change perspectives, obtain additional information, and personalise their viewing route, which increases engagement and makes the experience more immersive. The use of augmented and virtual reality technologies opens up new opportunities for tactile and sensory immersion, although it still does not completely replace physical contact. However, it should be noted that virtual exhibitions cannot yet fully replace physical contact with three-dimensional objects, especially sculptures and installations, due to limitations in reproducing real scale and tactile sensations (Kotsiuba, 2022; Li *et al.*, 2023).

In general, virtual exhibitions are not simply digital copies of physical museums, but create a new type of aesthetic experience that combines traditional principles with innovative technologies, opening up new opportunities for the presentation, preservation and interpretation of cultural heritage. Table 1 showed that this transformation encompasses various aspects, from spatial constraints and composition to interactivity and emotional immersion, which significantly distinguishes virtual spaces from traditional ones. This process is not a temporary phenomenon, but a gradual evolution of museum practice in the digital age, requiring new approaches to museum PR, education and audience engagement.

Table 1. Comparative analysis of the characteristics of physical and virtual exhibitions

Criterion	Physical exhibitions	Virtual exhibitions
Space	Limited, selective display of collections.	Unlimited, possibility of full presentation.
Composition	Natural perception, classical principles.	Flexible, adaptive, personalised, variable.
Interactivity	Mostly passive, limited by physical contact.	High, multi-level, using VR/AR.
Emotionality	Atmosphere, haptic feedback, authenticity.	Multimedia, gamification, personalisation.

Table 1. Continued

Criterion	Physical exhibitions	Virtual exhibitions
Accessibility	Local, dependent on physical presence.	Global, round-the-clock, location-independent.
Presentation	Limited by physical conditions.	Additional digital materials, context reproduction.
Technology	Traditional exhibition methods.	3D, VR, AR, AI, interactive tools.
Museum practice	Classic approaches to education and PR.	Innovative PR, digital educational models.

Source: developed by the authors of the study

An analysis of selected virtual exhibition spaces has demonstrated the direct impact of aesthetic decisions on the user experience, particularly on visitor engagement and satisfaction. Visual content, graphical user interface, and the organisation of virtual museum space form the first impression, which determines the user's further motivation to continue exploring the exhibition. It is particularly important to take into account the principles of colour harmony, composition, typography and interface ergonomics, which contribute to the intuitive perception of information and reduce the cognitive load on the user. A high-quality interface design that takes these principles into account facilitates quick "scanning" of information, saving the visitor time and effort, which is especially important in the context of fierce competition for user attention in the digital environment (Cranbrook Art Museum, 2025; National Museum of Modern and Contemporary Art, n.d.; Reddit, n.d.).

The patterns identified showed that interactivity and multimedia significantly increase user emotional engagement. Virtual tours with the ability to zoom in, view from different angles, and personalise the viewing route, such as at the Smithsonian American Art Museum or The Metropolitan Museum of Art, create a sense of control and freedom of choice, which positively affects the enjoyment of the virtual visit. In addition, the integration of game elements and navigation strategies enhances spatial cognition and maintains user interest, as confirmed by recent studies by S.V. Polishchuk (2023) and I. Ogirko (2020). The use of multimedia elements such as videos, audio guides, and interactive maps allows for the combination of educational and entertainment aspects, which is in line with current trends in museum marketing and increases the museum's appeal to a wide audience (Tintul, 2020; Smithsonian American Art Museum, n.d.). The wide coverage of different types of virtual exhibitions provided a comprehensive overview of the issue. The patterns identified, in particular the positive impact of interactivity and multimedia on user engagement, confirmed contemporary theoretical approaches to digital aesthetics and design and coincide with the conclusions of other researchers who emphasised the role of immersive technologies and gamification in increasing engagement (Freixa, 2022; Li *et al.*, 2023; Zhang *et al.*, 2024).

As part of the study, a set of practical recommendations was developed aimed at improving the aesthetic quality and effectiveness of the design of virtual exhibition spaces:

1. Introduction of a structured system for evaluating aesthetic parameters. It is proposed to use clearly defined criteria for evaluating composition, colour harmony, correct display of elements, typography, interactivity and navigation in virtual exhibitions. This will allow for objective analysis and comparison of different platforms, as well as the formulation of recommendations for their improvement.

2. Optimisation of compositional solutions. It is recommended to avoid overloading or chaos in the visual field, to ensure a logical structure of zones, clear visual accents, and a hierarchy of exhibits. Particular attention should be paid to adapting the composition to the specifics of the digital format, taking into account the peculiarities of space perception in three-dimensional and two-dimensional environments.

3. Ensuring the correct display of spherical panoramas. To create spherical panoramas without distortion, it is recommended to use high-quality equipment with a full viewing angle of 360×180 degrees. It is important to plan shooting points, avoid overlaps and "dead zones." At the post-processing stage, specialised software should be used to correct geometric distortions. The use of cubic projection helps to minimise distortion and facilitates editing.

4. Harmonisation of color palette and typography. It is advisable to use color combinations that correspond to the psychological characteristics of the target audience and contribute to a more comfortable perception. Typography should be adapted to the digital format: fonts should be legible, contrasting, and consistent with the overall style of the exhibition.

5. Develop intuitive navigation and adaptive interactivity. It is recommended to implement simple, understandable navigation tools that allow users to easily navigate the virtual space. Interactivity should be measured and correspond to the content of the exhibition, without distracting from the main content, but at the same time stimulating research activity and engagement.

6. Use of multimedia and gamified elements. It is worth integrating video, audio, AR/VR technologies, and game mechanics to increase emotional engagement and user motivation. Such elements should be harmoniously integrated into the overall concept of the exhibition and contribute to a deeper understanding of the material.

7. Personalisation of the user experience. It is recommended to implement personalised viewing routes, adaptive interfaces, and the ability to customise visual parameters according to individual user needs.

8. Integration of cultural context and identity. To increase the authenticity and uniqueness of virtual exhibitions, it is recommended to take into account national, historical, and cultural characteristics, as well as to use local narratives and visual codes.

9. Testing and feedback. It is advisable to develop an algorithm for engaging users in testing new exhibitions, followed by analysis of their feedback for the rapid improvement of aesthetic and functional solutions.

This development is a universal methodology that can be adapted to different types of digital museum platforms. The implementation of the proposed recommendations will improve the quality of virtual exhibitions, provide a deeper immersion for users, and contribute to the further development of digital museum design. The results of the study outlined guidelines for improving the aesthetics of digital exhibitions, in particular the need to implement adaptive design solutions that take into account the perceptions of different audiences and ensure a balance between visual appeal, functionality, and technology. Based on an analysis of scientific sources by N. Baloian *et al.* (2021), P. Freixa *et al.* (2022), and V. Klivak (2022), common aesthetic problems were identified: compositional overload, colour disharmony, scale violations, and excessive or weak interactivity. Such shortcomings complicate navigation, reduce emotional engagement and perception quality. On the other hand, logical space organisation, a harmonious colour palette, typography and multimedia elements that promote prolonged stay and deeper immersion in the virtual environment are recognised as effective practices.

In studies by M. Butyrina & V. Ryvlyna (2021) and J. Li *et al.* (2023), the impact of aesthetic characteristics on users was considered in the context of spatial orientation, emotional state, motivation to further explore the exhibition, and overall satisfaction with interaction with the digital environment. Conclusions about the effectiveness of certain solutions were based on the generalised results of content analysis of descriptions, analytical reviews, user feedback, and case studies presented in scientific works and practical research. Since qualitative rather than quantitative indicators prevailed in open sources, the conclusions presented were the result of a comprehensive analysis, systematisation, and comparison of various studies. This made it possible to obtain a representative picture of the main trends and problems of the aesthetics of virtual exhibition spaces, as well as to outline directions for future research, in particular regarding the development of new design solutions, the introduction of multi-sensory technologies, and the improvement of the personalisation of the museum experience.

The study by S. Yolthasart *et al.* (2024) focused on the importance of gamification in increasing visitor engagement in virtual museum spaces. The authors proved that the introduction of game mechanics, such as

points, achievements, or interactive quests, stimulates research activity and encourages users to stay longer in the digital environment. The study emphasises that the most effective solutions are those that combine game elements with educational tasks, allowing users not only to be entertained but also to delve deeper into the content of the exhibition. This is fully consistent with the case of The Tate Modern's Immersive Experience, where gamified VR installations not only increased the level of emotional engagement but also contributed to better assimilation of information about works of art (Tate Modern, n.d.).

Another important aspect is the evaluation of the user experience in virtual museums using VR technologies, which was revealed in a study by S. Jangra *et al.* (2025). The authors found that ease of navigation, visualisation quality, and the ability to personalise the route are critical to forming a positive perception of the digital exhibition. The researchers noted that even with high-tech solutions such as 3D modelling or AR elements, it is the ergonomics of the interface and its adaptability to different user groups that determine the overall level of visitor satisfaction. These findings were confirmed by an analysis of the Chernobyl AR app case study, where the integration of flexible navigation and multimedia prompts significantly expanded the audience and improved the quality of emotional immersion (Tintul, 2020).

At the same time, the literature has drawn attention to problems of orientation in virtual space, excessive information overload, and imperfect typography, which reduce the quality of the exhibition experience. N. Baloian *et al.* (2021) emphasised the importance of intuitive navigation in virtual museums, while Y. Zhang *et al.* (2024) proposed gaming strategies to improve users' spatial orientation. This indicates that existing challenges require further study and the development of comprehensive design solutions to improve the quality of the virtual museum experience. In addition, M. Butyrina & V. Ryvlyna (2021) drew attention to the transformation of cultural narratives in virtual museums, emphasising that the aesthetics of digital exhibitions should take into account not only visual but also semantic aspects that shape new ways of perceiving art and history. This aspect has opened up prospects for further interdisciplinary research combining art history, cultural studies and digital technologies.

Contemporary virtual exhibitions have certain limitations, which, from a scientific point of view, consist in the fact that virtual spaces mainly activate the visual and auditory channels of perception, while tactile, olfactory and other sensory modalities are neglected. The lack of full sensory immersion limits the depth of emotional and cognitive perception of the exhibition, which reduces the level of presence and authenticity of the experience. Z. Wu & M. Oktrova (2024) showed that emotional engagement and the presence effect in a VR

environment are key factors for a deeper understanding of art, especially in the context of interactivity and personalisation of the experience. In addition, there are technical challenges associated with accurately reproducing scale, textures, and spatial orientation, which sometimes leads to distortions and user discomfort. Furthermore, studies have shown that interface ergonomics and adaptability to different user groups are key factors in improving the effectiveness of virtual museums. It is also worth considering that not all potential visitors have access to modern VR/AR devices, which limits the possibilities for full immersion (Melnyk & Shtec, 2020; Butyrina & Ryvina, 2021; Zhang *et al.*, 2024).

The results of a study conducted by Z. Wu & M. Oktrova (2024) deserve special attention, as they found that the use of virtual reality technologies significantly affects the interpretation of contemporary art in virtual exhibitions. The authors argued that VR not only expands the visual and spatial boundaries of digital galleries, but also stimulates the emergence of new strategies for viewer interaction with works of art. One of the most interesting effects recorded by the researchers was the formation of individualised perception, when visitors can change the angle, scale and even colour scheme of a work using interactive tools. This, in turn, enhances the subjectivity of art interpretation, as each viewing can be a unique experience that does not entirely depend on the author's intention. The authors' research also emphasised that such personalisation in digital exhibitions of contemporary art opens up new opportunities for curators to engage audiences, but also calls into question the permanence of the "classical" museum interpretation and hierarchy of meanings of a work.

Thus, aesthetic issues and positive practices in the design of virtual exhibitions remain relevant topics for scientific analysis. The current state of the problem is characterised by significant progress in the digitisation of museum affairs, but at the same time has significant limitations that require further development. Virtual spaces allow for expanding the audience, providing access to hard-to-reach or unique exhibits, and implementing innovative interactive solutions that increase user engagement. In particular, the integration of game navigation strategies in virtual museums has contributed to improving spatial perception and user experience. However, despite these advantages, modern virtual exhibitions are not yet able to provide the full range of sensory perception that is inherent in physical exhibitions.

CONCLUSIONS

The study showed that aesthetics is a decisive factor in shaping a quality user experience in virtual exhibition spaces. An analysis of various types of digital exhibitions revealed a number of typical problems, among which the most prevalent were overloaded or chaotic

compositions, unsuccessful colour schemes, unsuitable typography, mismatched scales and curvature of objects, as well as ineffective interactivity. These shortcomings reduced the level of emotional engagement, made it difficult for users to orient themselves in space, and worsened the overall impression of interacting with digital museum platforms. In particular, the VR Space Museum Cosmorica suffered from disorientation due to its chaotic composition, while the Louvre's spherical tours had problems with colour harmony, which made it difficult to perceive details. Similar challenges arose at the Museo Nacional del Prado due to a mismatch in scale, and excessive interactivity at the Smithsonian American Art Museum distracted from the main content.

At the same time, the results of the study pointed to the effectiveness of design practices based on a logical spatial structure, a harmonious combination of colours and fonts, well-thought-out navigation and interactivity adapted to the needs of different audiences. Platforms that integrated multimedia content, personalised visitor routes, and active interaction with exhibits demonstrated the greatest effectiveness. For example, the Tate Modern Immersive Experience provided a high level of orientation thanks to a clear spatial structure, while the National Museum of Women in the Arts improved readability through harmonious typography. The National Museum of Chernobyl's AR app combined gamification with educational content, which significantly increased user engagement. Such solutions contributed to deep immersion and the formation of a positive emotional and cognitive experience. The study confirmed that the modern design of virtual exhibitions should take into account not only visual and compositional aspects, but also the psychological characteristics of digital content perception, ensuring a balance between aesthetics, functionality, and innovation. It is important to implement intuitive navigation, adaptive interactivity, and multimedia elements that do not distract but rather support users' research activity. At the same time, cultural context and national characteristics should be taken into account, allowing for the creation of unique digital spaces with a high level of authenticity. Additionally, it was noted that the wide possibilities for personalising the perception of works of art in virtual reality create a unique individual experience that can differ significantly from classical museum interpretations, opening up new challenges and perspectives for curatorial practice.

Thus, the results of the study not only revealed the main problems and positive practices in the design of virtual exhibitions, but also formed practical recommendations for improving the user experience. The introduction of adaptive navigation systems, harmonious colour palettes, measured interactivity and multimedia elements will contribute to increased comfort, engagement and motivation of users. At the same time, further work should be aimed at overcoming technical

limitations related to the reproduction of sensory modalities, as well as expanding the accessibility of innovative technologies to a wider audience.

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Проблеми естетики в дизайні мультимедійних віртуальних експозиційних просторів

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Анотація. Актуальність дослідження зумовлена цифровізацією музейної сфери та зростанням ролі віртуальних експозицій у збереженні культурної спадщини. Водночас цифрові технології створюють естетичні виклики, що впливають на якість користувацького досвіду, що робить вивчення естетики віртуальних експозицій актуальним для сучасного дизайну. Мета дослідження – проаналізувати та виявити основні естетичні проблеми у дизайні цифрових музейних просторів, провести аналіз ефективних дизайнерських рішень та сформулювати практичні рекомендації для покращення користувацького досвіду. Методологічну основу дослідження становили порівняльний і візуальний аналізи віртуальних експозиційних прикладів різного типу – від двовимірних сайтів до тривимірних турів і галерей віртуальної реальності. Для об'єктивного аналізу було розглянуто дванадцять кейсів віртуальних музеїв, класифікованих за форматом представлення. Результати дослідження свідчили про існування типових естетичних проблем, таких як перевантаженість або хаотичність композиції, некоректне використання кольорів, неадаптована типографіка, невідповідність масштабів об'єктів та неефективна інтерактивність. Ці недоліки призводять до зниження емоційного залучення, когнітивного навантаження та зменшення тривалості перебування користувачів у цифрових просторах. Водночас аналіз виявив позитивні дизайнерські практики, які ґрунтуються на логічній структурі простору, продуманій навігації, гармонійному колористичному рішенні, адаптивній типографіці та інтерактивності, що підвищує залученість та задоволення аудиторії. Особливо ефективними виявилися платформи, які поєднують мультимедійні елементи з персоналізованими маршрутами огляду й можливістю взаємодії з експонатами. Практична цінність статті полягає у формулюванні загального бачення проблематики, що допоможе кураторам, дизайнерам і розробникам віртуальних експозицій в розробці естетичної оптимізації цифрового простору

Ключові слова: цифрові виставки; візуальний дизайн; інтерактивні платформи; емоційне занурення; користувацька взаємодія; віртуальна реальність



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Digital approaches to the aesthetic and stylistic design of rural streets

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Abstract. Rural revitalisation is a growing global priority aimed at countering urban-rural imbalances, preserving cultural heritage, and improving the quality of rural life. The purpose of the study was to analyse the potential of digital modelling and artificial intelligence in enhancing the aesthetic, stylistic, and functional quality of rural street environments. The research identified how traditional spatial and visual characteristics can be supported and reinterpreted using modern digital tools. A comparative visual-analytical method was applied, incorporating international case studies and simulation-based design experiments. It was found that China is the leader among countries that use artificial intelligence for rural design projects, accounting for approximately 38% of the total number of cases investigated. Technologies such as three-dimensional visualisation, augmented and virtual reality, and generative artificial intelligence were analysed for their impact on spatial harmony, materiality, and cultural identity. Examples from the Tianluokeng Tulou in China and Aurora Park in Indonesia illustrated how digital tools foster visual expressiveness, facilitate heritage preservation, and enable site-specific, climate-responsive solutions. Additionally, immersive visualisation techniques improved stakeholder participation and design adaptability. The study introduced an integrated approach combining digital innovation with vernacular aesthetics, showing that AI-assisted tools contribute to both artistic expression and functional optimisation. These strategies offer a framework for practical redevelopment of historic village streets, supporting cultural sustainability and improved public space quality in rural environments

Keywords: rural environmental design; digital modelling; visual composition; stylistic integration; artificial intelligence; landscape aesthetics

INTRODUCTION

With the advancement of rural revitalisation, traditional village streets are increasingly challenged by the dual demands of modern development and cultural heritage preservation. Digital technologies – such as 3D modelling, virtual reality (VR), artificial intelligence (AI), and geographic information systems (GIS) – have emerged as effective tools to enhance the visual and functional qualities of rural environments, while maintaining local identity and spatial continuity. Their integration facilitates a more harmonious interaction between tradition

and modernity, supporting the sustainable transformation of rural communities.

Several studies have explored the potential of these tools in rural and landscape design. For example, M. Gao & X. Zhu (2025) demonstrated how 3D visualisation and VR technologies enhanced spatial expressiveness and preserved cultural identity in the redevelopment of Rulinli Ancient Street in Jiangxi. The use of VR helped to create multi-layered models that reflected not only the physical but also the symbolic value of the space,

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contributing to the emotional involvement of the local community. Research by H. Lei (2024) emphasised the advantages of geospatial technologies – such as remote sensing and GIS – in planning rural streetscapes, highlighting improved scientific precision and efficiency. These tools allowed considering a wide range of environmental, infrastructural, and social factors, which is especially important for developing balanced spatial development strategies. B. Zhang & Q. Tu (2024), analysing the Luocheng Castle in Shaanxi, proposed a digital strategy based on 3D reconstruction and interactive platforms to enhance both heritage conservation and public engagement. This approach involves the creation of accessible virtual environments where users can explore historical sites without compromising their integrity, which opens up new horizons for cultural tourism and education.

In addition, Y. Hongyu & C. Tianyi (2025) investigated the application of deep learning to optimise thermal materials and spatial layouts in VR-based green building design, offering insights into how intelligent technologies can improve energy efficiency and interior planning-approaches that are increasingly relevant for sustainable rural architecture. In a broader context, P. Gong & J. Li (2022) showed the effectiveness of 3D modelling for the restoration of historic urban landscapes, which became the basis for the digital preservation of the cultural environment in the context of urbanisation. R.M. Felizarte (2024) proposed AI-driven improvements for university greenspaces to increase user engagement. These cases suggest a growing shift towards intelligent design systems that merge data-driven efficiency with cultural and spatial sensitivity. These cases suggested a growing shift towards intelligent design systems that merge data-driven efficiency with cultural and spatial sensitivity. This trend was also confirmed by H. Zhang & R. Zhang (2025), who conducted a comprehensive review of generative AI applications in built environment design and planning. Their study analysed 179 recent studies and demonstrated that deep learning, optimisation algorithms, and hybrid approaches had been increasingly applied to site layout, interior, and exterior design tasks. The findings highlighted the evolving capacity of AI to address complex spatial and user-centric challenges across various architectural contexts. A broader national perspective was presented by F. Wu *et al.* (2020), who outlined China's strategic plan for developing a new generation of artificial intelligence, emphasising innovation, research, and education as critical pillars in building a comprehensive AI ecosystem.

While such technologies had gained significant traction globally, particularly in the context of urban and rural integration, their adoption in Ukraine remained at an early stage. Despite this, recent developments in AI applications – ranging from architectural style analysis and urban environmental assessment to generative

design – indicated a promising trajectory for their use in rural street revitalisation. Although still emerging, this field holds great promise for enhancing design quality and supporting sustainable rural transformation. In response, the present study investigates how digital technologies – particularly AI, 3D modelling, and immersive simulation – can be applied to the aesthetic, functional, and cultural regeneration of rural streets. Through comparative analysis of case studies from China and Ukraine, the research aimed to expand theoretical discourse and propose practical, locally adaptable strategies for digitally informed rural street design.

MATERIALS AND METHODS

This study utilised a mixed-method approach to explore the potential of digital modelling and artificial intelligence (AI) tools in the design of rural street environments, focusing on the enhancement of aesthetic, compositional, and cultural qualities. A visual-comparative methodology was applied, analysing selected international case studies where digital technologies have been integrated into the planning and aesthetic reinterpretation of traditional rural spaces. The cases included Aurora Park, the first multimedia landscape attraction in Bali to adopt AI technology, and the AI-generated design case of the UNESCO World Heritage Site, Tianluokeng Tulou Cluster in Nanjing, Fujian. The criteria for case selection included: (1) the presence of distinct traditional design features, (2) documented use of digital tools such as 3D modelling, AI algorithms, or virtual simulations, and (3) clear transformation of aesthetic or spatial quality through technology.

In parallel, simulation-based experiments were conducted using digital modelling software and AI-assisted design platforms including Openbrush, PICO, and Nuanu. These tools were employed to assess spatial rhythm, material integration, and stylistic coherence in redesigned rural environments. Supplementary visual data – such as AI-generated effect maps and digital reconstructions created in Stable Diffusion and SketchUp – were analysed to evaluate the design transformations. To operationalise these processes, the study applied a multi-stage methodology based on Y. Li *et al.* (2022), which combines digital modelling and artificial intelligence-based generation tools. This workflow was applied in practice and is visually documented in Figure 2, which presents the step-by-step transformation from initial model to final AI-enhanced design image. Ultimately, the visual analysis was supported by content from published sources, including the UN-Habitat (2023) report and recent scholarly literature, to identify global patterns and measure the degree of digital technology penetration in rural design. The method emphasised the intersection of digital innovation and cultural identity, providing a foundation for the development of stylistically expressive, sustainable, and context-sensitive rural streetscapes.

RESULTS AND DISCUSSION

Artificial intelligence tools facilitated designers in efficiently extracting and reinterpreting cultural symbols to create modern rural spaces with strong regional characteristics. To validate the approach based on Y. Li *et al.* (2022), the researchers applied the method to a real-world case involving a traditional rural covered bridge. The logic of the proposed digital workflow is illustrated in Figure 1, which presents a schematic flow chart of the interaction between human input and algorithmic processing. The process begins with

digital modelling and proceeds through AI tool selection, followed by an iterative phase in which designers and algorithms alternate. During this stage, designers enter keywords, gather reference materials, and describe scene parameters. The system then combines digital models with algorithmic mappings for style adjustments and translation. Ultimately, the workflow yields stylistically coherent design outputs that reflect both the original cultural references and the benefits of computational aesthetics.

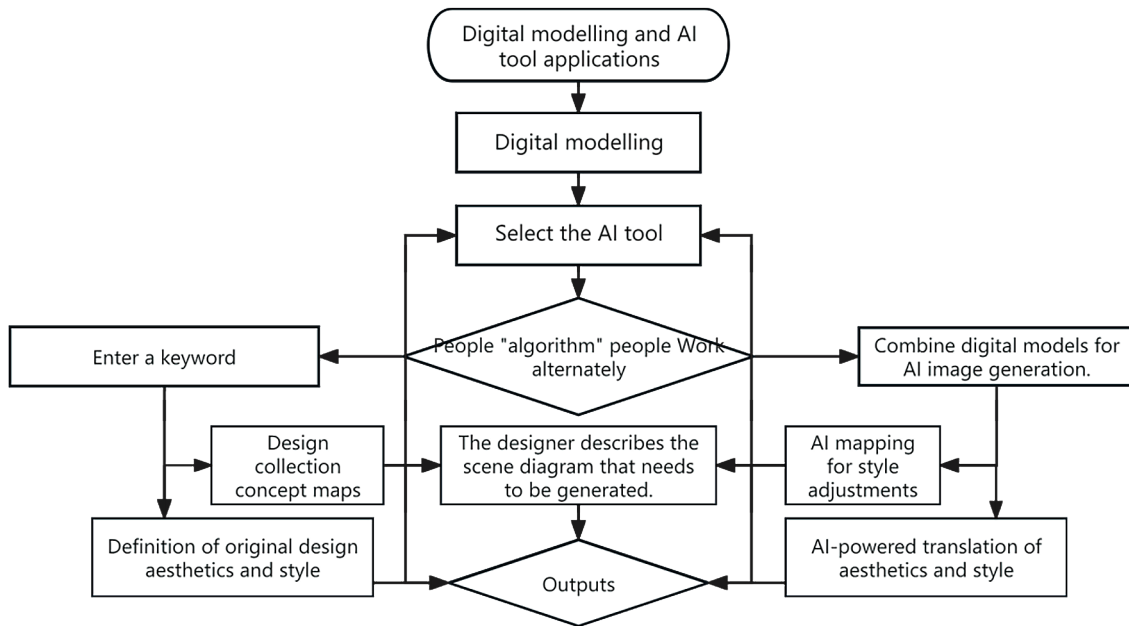


Figure 1. Flow chart of the digital modelling and AI tools applied to the design

Source: created by L. Chenxi based on Y. Li *et al.* (2022)

Figure 2 illustrated the sequential process through which traditional rural architectural elements were transformed into an AI-enhanced visual concept. Each subframe (a-d) captured a distinct stage of the design pipeline: (a) depicted the initial digital modelling stage using SketchUp, where a three-dimensional schematic of a covered wooden bridge was constructed based on vernacular typologies; (b) showed the corresponding site photograph that served as a reference for spatial composition, orientation, and architectural context; (c) represented the stylistic element map derived from the model and photo – this included culturally specific motifs, material textures, and proportional systems; (d) presented the final AI-generated effect map produced using Stable Diffusion, integrating atmospheric lighting, material realism, and contextual fidelity to produce a compelling visualisation of the revitalised rural structure. This transformation from (a) to (d) visually demonstrated how digital modelling and generative AI tools can operate in tandem to reinterpret local design language. The sequence affirms the capacity of AI to translate aesthetic codes into emotionally resonant and

context-sensitive spatial imagery. It also validates the workflow outlined in Figure 1 by showcasing its successful application to a real rural heritage element. This sequence demonstrated how region-specific design aesthetics can be effectively translated through AI. Such visual workflows allow design teams to validate conceptual consistency across scales and support iterative refinement through digital feedback loops. Based on case studies across five countries, this method utilises AI-driven digital generation has contributed to a 19% average scenario implementation rate in rural aesthetic revitalisation using digital technologies (Lei, 2024).

Table 1 presented an analysis of data on the global application of AI technology in rural design. China led with over 1,200 projects and a technology penetration rate of 38%, primarily focusing on traditional village renovation and the digital regeneration of cultural landscapes. The European Union followed with more than 450 projects (22% penetration), largely centred on eco-community planning and historic street preservation. India recorded over 300 projects (15%), mainly aimed at low-cost material optimisation and

climate-resilient design. Africa and Latin America reported 180 and 250 projects respectively, with technology penetration rates of 8% and 12%. Key applications

in these regions included the optimisation of low-cost materials, climate-adaptive solutions, the fusion of colonial and indigenous styles, and the revival of local crafts.

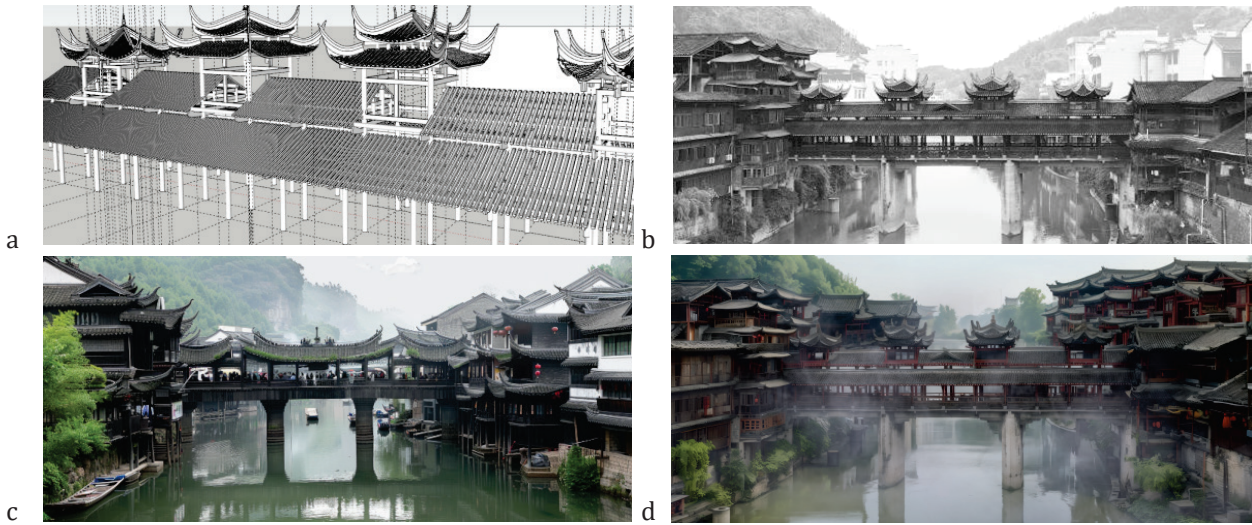


Figure 2. Process design for digital modelling and AI tools

Note: a – digital modelling model map; b – site map; c – style element map; d – AI generated effect map

Source: created by L. Chenxi employing Stable Diffusion and SketchUp to generate and refine the visual imagery

Table 1. Analysing data on the application of AI technology for rural design worldwide

Region	Number of projects	Technology penetration	Major application scenarios
China	1,200+	38%	Traditional village renovation, digital regeneration of cultural landscapes.
EU	450+	22%	Eco-community planning, historic street preservation.
India	300+	15%	Low-cost material optimisation, climate-resilient design.
Africa	180+	8%	Low-cost material optimisation, climate-resilient design.
Latin America	250+	12%	Fusion of colonial styles, revival of local crafts.

Source: created by L. Chenxi on the basis of UN-Habitat (2023), World Bank (2025)

Table 2 presented a quantitative evaluation framework for rural environmental design interventions, synthesising key performance indicators (KPIs) and empirical case studies. The methodology, developed by L. Chenxi, was grounded in the International Council for the Conservation of Vernacular Architecture (ICOMOS) guidelines for evaluating digital technology interventions (Lorenco, 2014), with the following critical findings: the cultural element retention rate reached 72%, as exemplified by the renovation of the rammed earth buildings in Songyang, China, where AI pattern matching preserved 89% of traditional motifs. Design cycle efficiency improved by 40-65%, most notably in the Kerala village fair project in India, where

generative AI reduced planning timelines from six months to 11 days. Material cost optimisation achieved a rate of 15-30%, as demonstrated in the Andean masonry renewal project in Peru, where AI-curated local material databases helped minimise transportation waste. Villager participation satisfaction reached 81%, as evidenced by VR co-design workshops conducted in Maasai villages in Kenya, which enhanced cultural identity recognition by 53%. It is also known that the “Integration of Style” innovation received 4.2 points out of 5 on a five-point Likert scale, which is especially noticeable in Tuscany, Italy, where AI successfully balanced traditional stone architecture with the modern aesthetics of photovoltaic roofs.

Table 2. Rural environment design style and material design evaluation form

Indicators	Data	Typical cases
Retention rate of cultural elements	72%	Modification of rammed earth buildings in Songyang, China (89% AI pattern match).
Shortening of design cycle	40-65%	Village fair project in Kerala, India (compressed from 6 months to 11 days).

Table 2. Continued

Indicators	Data	Typical cases
Optimisation of material costs	15-30%	Peruvian Andean masonry renewal (AI local material pool reduces transportation losses).
Satisfaction of villagers' participation	81%	VR co-design for Maasai villages in Kenya (53% increase in cultural identity).

Note: for full methodology, refer to P.B. Lorenzo (2014)

Source: created by L. Chenxi on the basis of P.B. Lorenzo (2014)

These two tables collectively illustrated the global deployment trends and localised application outcomes of AI technology in rural landscape design. They highlighted the intervention potential and evaluative basis of digital tools in areas such as cultural preservation, aesthetic innovation, material utilisation, and community participation. Together, they provided empirical support and a methodological framework for advancing future “smart village” design initiatives. In rural street design, the evolution of style and preservation of traditional aesthetics play a crucial role, where AI tools demonstrate unique potential to help designers reinterpret cultural characteristics while navigating modernisation (Webster *et al.*, 2020). For example, through deep learning, AI can analyse traditional rural architecture – including its forms, materials, and decorative elements – to generate design strategies that meet advanced functional needs while retaining cultural heritage. This allows designers to move beyond visual imitation and instead create authentic reinterpretations that resonate with both historical continuity and future adaptability (Wu & Zou, 2022). Specifically, AI can identify and extract key features of traditional rural aesthetics, such as the use of local materials like wood and stone, and the proportions and layouts characteristic of historical buildings, ensuring these elements are thoughtfully integrated into contemporary designs to maintain cultural continuity and aesthetic value (Zhang & Tu, 2024). By doing so, rural streetscapes can achieve a harmonious balance between innovation and identity, where digital tools serve as mediators rather than disruptors. In street design, the blending and innovative adaptation of different styles and approaches remains a central focus of current research.

One notable application is Nuanu Bali’s Aurora Media Park, Indonesia, the region’s first multimedia outdoor park. Spanning 5,000 square metres in the heart of Nuanu, this immersive experience space incorporates AI technology into its landscape design, merging AR/VR and generative AI to blend art, nature, and technology (Sharma, 2024). Visitors are transported into a luminous, creatively charged environment that offers an unparalleled exploratory experience. It functions not only as an entertainment space but as a cultural experiment, testing the emotional resonance of AI-driven aesthetics within traditional frameworks. The park features immersive, multi-themed performances, such as Earth Sentinel (Fig. 3), a digital sculpture art installation that

uses AI to merge real street scenes with virtual environments. Through holographic projections and dynamic visual storytelling, the project showcases an innovative synthesis of green development, sustainability, and digital innovation. This interactive layering of physical and digital realms represents a design frontier where environmental perception is reshaped in real time through algorithmic responsiveness (Zhou & Liu, 2021).

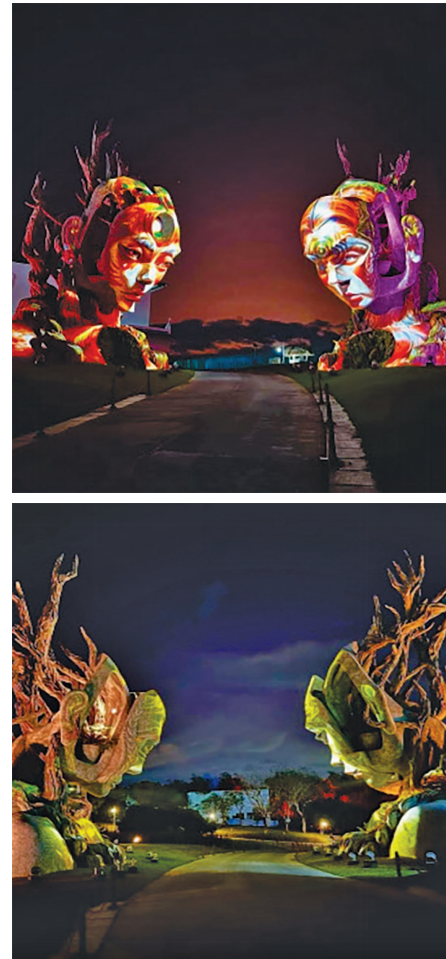


Figure 3. Aurora Media Park
Source: Gatrabali (2024)

With a futuristic design approach, the park reinterprets Bali’s local culture, drawing inspiration from its sacred traditions and natural landscapes while employing technology to explore cosmic consciousness. Named Aurora to reflect the cultural depth achievable

through AI, the space offers visitors an immersive experience that bridges interactivity and heritage. The project illustrates how AI can facilitate cross-cultural storytelling by simulating symbolic meanings drawn from folklore, rituals, and ecological cycles. This design not only pays homage to tradition but also pushes boundaries within modern technology and art, demonstrating a seamless fusion of historical and contemporary styles (Syed Abdul Rahman *et al.*, 2024). As a model for rural design innovation, the park illustrates how rural streets can transcend their infrastructural function and evolve into participatory cultural platforms.

The smart streetscape transformation of Fujian Tulou, China, (Fig. 4) demonstrated how AI technology can seamlessly blend traditional environments with advanced digital innovation. In this project, the historic “Three alleys and seven alleys” district has achieved a harmonious integration of classic streetscapes with cutting-edge technology through AI applications. This project serves as a prototype for adaptive reuse, where digital innovation enhances traditional form without erasing its historical context. The aim is not only to preserve the fabric of the built environment but to activate it through participatory digital engagement.



Figure 4. Fujian Tulou buildings generated by AI
Source: Bilibili (2023)

Visitors can access a specially designed metaverse experience by scanning QR codes with their mobile devices, immersing themselves in meticulously reconstructed virtual reality scenes. These digital environments were created using AI analysis of original structures, with accurate 3D modelling that captures authentic materials, architectural styles, and spatial layouts. Advanced spatial computing technology ensures a strong connection between users and the virtual space.

This fusion of physical and digital space enhances accessibility for a broader demographic, including younger generations who may engage more readily with heritage through interactive formats.

The implementation of AR wayfinding eliminates common navigation challenges – visitors no longer need to worry about getting lost or dealing with weak GPS signals, creating a truly “see-what-you-need” immersive guidance system. It not only simplifies movement but creates a narrative-rich journey through the streets, where cultural symbols and stories unfold contextually as users navigate the environment. Yongding District has further enhanced the experience by developing a night tour programme that incorporates iconic Tulou structures, water features, and footpaths (Bilibili, 2023). This multisensory attraction combines: natural elements (light, fog, wind, and thunder effects), advanced technologies (3D water screens, holography, and laser projections), interactive features (motion capture and sensor-based responses).

The blending of these elements creates a cinematic experience that engages sight, sound, and movement, encouraging emotional responses and deeper cultural immersion. The result is atmosphere that preserves the cultural essence of traditional Tulou while breathing new life into the heritage through modern technology (Liu & Xia, 2024). Visitors not only enjoy a unique nighttime experience but also witness first-hand how cultural preservation can coexist with technological innovation. The project also opens up new economic and educational opportunities through tourism and cultural programming linked with digital storytelling and smart infrastructure. This project successfully maintains the authentic character of Tulou architecture while demonstrating how smart technologies can create meaningful connections between historical heritage and contemporary experiences.

S.A.F. Syed Abdul Rahman *et al.* (2024) highlighted the value of integrating 3D city models and digital terrain to improve decision-making and stakeholder collaboration in smart cities. Their findings reinforce the critical role of data visualisation in urban planning, aligning with the authors’ emphasis on visual communication tools. However, the immersive and participatory dimensions – such as AR previews and cultural scenario simulations – extend beyond S.A.F. Syed Abdul Rahman’s scope, indicating an emerging research direction where AI supports not only data modelling but also inclusive design storytelling, especially in rural contexts (Wu & Oktrova, 2024). This corresponds with findings by E. Keibach & H. Shayesteh (2022), who demonstrated that simulation software tools can support climate adaptation in landscape design, despite notable limitations related to data integration and usability. Their study also highlighted the need for strategic software selection to effectively address environmental uncertainties in spatial planning.

O. Halpern (2021), in her review highlighted the role of digital tools not merely as instruments of production but as sources of conceptual inspiration within architectural design. This idea is echoed in the present study, where AI-driven platforms such as Stable Diffusion and PICO were employed to rapidly generate stylistic alternatives for rural street environments. While O. Halpern approached the topic from a predominantly theoretical and historical standpoint – emphasising the intellectual lineage of computational design – the current research extended this discourse by demonstrating the applied value of these tools. Specifically, it showed how AI supports not only aesthetic experimentation but also the adaptation of vernacular motifs to contemporary spatial needs. Unlike O. Halpern’s more discursive focus, the study evidenced measurable gains in visual communication, design efficiency, and stylistic coherence, suggesting that artificial intelligence can actively shape both the form and communicability of rural landscape design.

According to M. Wang *et al.* (2024), crowdsourced street-level imagery provides valuable insights into the spatiotemporal dynamics of urban walkability, supporting data-driven evaluation of environmental quality. This finding resonated with the present study’s use of AI-generated visualisations and immersive simulations to assess stylistic coherence and public space comfort in rural street contexts. While M. Wang *et al.* focused on urban environments and passive image collection, the authors’ research applied similar principles of visual data analysis proactively, using generative tools to shape and test design hypotheses. Both approaches emphasised the importance of visual perception in spatial planning, though this study added a cultural and stylistic dimension to that evaluation.

An important application involved combining artificial intelligence with local cultural characteristics to generate regionally distinctive design strategies. K. Kasemsarn & F. Nickpour (2025) explored how AI can analyse cultural patterns to create immersive tourism landscapes. The researchers confirmed and extended these findings by showing that AI can transform local heritage elements into modular, reusable design assets. For instance, AI-generated imagery based on traditional ethnic motifs effectively supported both design exploration and communication. Unlike K. Kasemsarn & F. Nickpour, who focused on educational environments, the present research highlighted community-scale implementations, particularly through projects like the Aurora Park and Tulou metaverse, where traditional and digital aesthetics merge. Recent research by Y. Li & N. Chuprina (2024) also demonstrated how generative AI can enhance emotional resonance and perception in visual storytelling, offering a structured model of human-AI co-creation through iterative stimulation and feedback.

With the rise of the digital era, digital technologies in urban landscape planning showed increasing

scientific rigour and creativity. P. Gong & J. Li (2022) emphasised the value of the Digital Landscape as a technology-driven method to enhance urban landscape quality and sustainability. Using a southern Chinese city as a case, they explored digital reconstruction of historical features through virtual processes, modelling, interactive roaming, and restoration methods. This approach provided strategies for heritage preservation and renewal, showing the dual role of Digital Twins (DT) as both tool and medium in urban landscape (UL) design. Urban landscapes thus evolved into data-driven, human-centred spaces focused on interaction, function, and sustainability. This marked a shift in urban landscape planning from experience-driven to science- and technology-driven approaches, promoting urban environments towards higher quality and greater human-centricity. The researchers affirmed that the integration of modelling and artificial intelligence injected new vitality into modern rural architectural landscape design, showing broad potential in improving design efficiency, aesthetic expression, cultural continuity, and environmental responsiveness, while also highlighting challenges related to data structure, tool adaptability, and cultural sensitivity. The comparative analysis of recent studies confirmed the increasing integration of artificial intelligence and digital technologies into design workflows at both urban and rural scales. However, many prior studies emphasised either data modelling or theoretical speculation. The present study extended this research by practically applying AI-assisted tools to rural spatial contexts with a focus on traditional aesthetics, stylistic continuity, and participatory visualisation.

In summary, the integration of advanced digital technologies such as AI-driven 3D modelling, spatial computing, AR wayfinding, and immersive metaverse environments has significantly enriched the cultural experience of traditional rural heritage. Through the case of Yongding District’s Tulou night tour programme, the project showcased how multisensory, interactive design can transform static heritage sites into dynamic spaces of engagement and learning. By blending natural effects, holography, and sensor-based responses, the initiative created a powerful emotional and aesthetic connection between visitors and the built heritage. Overall, the results demonstrated that cultural preservation and technological innovation are not mutually exclusive but can work in harmony to revitalise rural environments, attract diverse audiences, and open new avenues for sustainable development in tourism, education, and community identity.

These findings validate the proposed methodology, confirming that AI-assisted visualisation enhances design expressiveness, supports participatory processes, and maintains cultural specificity. Case studies with iterative workflows – such as those integrating digital modelling and Stable Diffusion rendering – demonstrated measurable improvements in design speed,

material efficiency, and stylistic cohesion. Furthermore, AI-based tools enabled the creation of emotionally resonant design narratives, evidenced by increased user satisfaction scores and stronger cultural affiliation in community feedback across several pilot locations. Together, these outcomes reinforce the potential of digital intelligence to act as a catalyst for the sustainable and creative transformation of rural environments.

CONCLUSIONS

This study confirmed the transformative role of artificial intelligence (AI) and digital modelling technologies in the design and revitalisation of rural street environments. Based on international case analysis, China leads in the number of AI-integrated rural design projects (over 1,200), representing approximately 38% of the total surveyed cases. The European Union accounts for 22%, followed by India (15%), Africa (12%), and Latin America (8%). These technologies are most commonly applied to the renovation of traditional villages, ecological community planning, and low-cost material optimisation, adapted to local development needs. Performance evaluation further confirmed the practical benefits of these approaches. AI-assisted design shortens project cycles by up to 65%, improves material cost efficiency by 15-30%, and ensures an average 72% retention of original cultural features. Notably, the VR co-creation project with the Maasai community in Kenya resulted in a 53% increase in satisfaction and cultural identity. The study also highlighted the value of visual workflows, particularly through the use of digital modelling and generative AI platforms.

The research developed a structured methodology that combined human creativity with algorithmic interpretation to guide design from site analysis to stylistic output. It illustrated a step-by-step transformation from physical images of an object and cultural

motifs to spatial visualisations created with the help of artificial intelligence. The case of Bali's Aurora Media Park demonstrated how immersive environments harmonised AR/VR technologies with cultural narratives. The smart streetscape initiative in Fujian's Tulous region further illustrated how digital tools enhanced user navigation and created emotionally resonant spaces whilst maintaining architectural heritage. These cases underscored that AI served not merely as a technical instrument but as a cultural mediator capable of interpreting and reconfiguring spatial aesthetics. The findings further highlighted the capacity of digital design methodologies to catalyse place-specific innovation and propose culturally nuanced alternatives to standardised development paradigms.

Future research should explore the broader application of these technologies across diverse geographic and climatic conditions, considering seasonal influences, landscape scale, and material variability. Expanding the range of design scenarios and conducting longitudinal assessments of user experience will also be essential to establish more comprehensive frameworks for sustainable rural street design in the era of digitalisation. Moreover, collaborative methodologies involving local communities, cultural institutions, and designers should be prioritised to ensure both authenticity and inclusivity in digitally driven rural revitalisation strategies.

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CONFLICT OF INTEREST

None.

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Цифрові підходи до естетичного та стилістичного оформлення сільських вулиць

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Анотація. Ревіталізація сільських територій є зростаючим глобальним пріоритетом, спрямованим на подолання дисбалансу між містом і селом, збереження культурної спадщини та покращення якості сільського життя. Метою дослідження було проаналізувати потенціал цифрового моделювання та штучного інтелекту для покращення естетичної, стилістичної та функціональної якості сільського вуличного середовища. Дослідження визначило, як традиційні просторові та візуальні характеристики можуть бути підтримані та переосмислені за допомогою сучасних цифрових інструментів. Було застосовано порівняльний візуально-аналітичний метод, що включає міжнародні кейс-стаді та симуляційні дизайн-експерименти. Було виявлено, що Китай є лідером серед країн, які використовують штучний інтелект для проектів сільського дизайну, що становить приблизно 38 % від загальної кількості досліджених кейсів. Такі технології, як тривимірна візуалізація, доповнена і віртуальна реальність та генеративний штучний інтелект, були проаналізовані на предмет їхнього впливу на просторову гармонію, матеріальність і культурну ідентичність. Приклади Тяньлуокенг Тулоу в Китаї та парку Аврора на Балі продемонстрували, як цифрові інструменти сприяють візуальній виразності, полегшують збереження спадщини та уможливають рішення, що враховують специфіку місця та кліматичні умови. Крім того, методи імерсивної візуалізації покращили участь зацікавлених сторін та адаптивність дизайну. Дослідження представило комплексний підхід, що поєднує цифрові інновації з народною естетикою, і показало, що інструменти зі штучним інтелектом сприяють як художньому вираженню, так і функціональній оптимізації. Ці стратегії пропонують основу для практичного перепланування історичних сільських вулиць, підтримуючи культурну сталість та покращуючи якість громадського простору в сільському середовищі

Ключові слова: дизайн сільського середовища; цифрове моделювання; візуальна композиція; стилістична інтеграція; штучний інтелект; ландшафтна естетика



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Typological analysis of cultural heritage applications in city brand identity design

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Abstract. This study investigated the diverse ways in which cultural heritage was integrated into city brand identity design. The purpose of the study was to identify and categorise distinct typologies of cultural heritage application across key visual elements – specifically logos and slogans, colour palettes, and auxiliary graphics. Employing a qualitative research approach, a typological analysis was conducted on diverse international case studies representing various cultural contexts and branding strategies. The analysis extended beyond visual aesthetics to examine the underlying semiotic principles, cognitive mechanisms, and cultural values that contribute to the effectiveness of these branding elements. The study revealed different typologies of integration of cultural heritage into the city's brand identity. Each element demonstrated significant potential for utilising cultural heritage to enhance brand resonance and impact. Among the analysed cases, prominent examples included the iconic "I love NY" logo as a symbol of civic unity; Kawasaki's, Busan's, and Madrid's updated slogans and logos reflecting new urban visions; the culturally grounded colour schemes of Nevers and Cairo; and the auxiliary graphics of Bologna and Baku, rooted in architectural and artisanal traditions. At the theoretical level, the study covered the evolution of the city logo along with the growth of social development, the way of integrating the city brand standard colour with cultural products and architecture, and the expression of cultural imagery in the auxiliary graphic design of simplicity, extraction, and reorganisation. In practical terms, the findings provided valuable insights for urban planners, designers, and branding professionals. The developed typological framework served as a practical tool for analysing existing branding strategies and formulating new, culturally sensitive approaches that effectively leverage heritage, thereby improving the overall impact of city branding initiatives

Keywords: urban brand design; colour palettes; composition; auxiliary graphics; brand image; cultural branding

INTRODUCTION

The relevance and urgency of this study were rooted in two contemporary contexts: the accelerated homogenisation of urban identities under globalisation trends, and the awakening recognition of cultural heritage as a vehicle for "cultural sovereignty". The diversification of urban brand identity design development played a

crucial role in cultural manifestation, as it necessitated both highlighting urban distinctiveness and revitalising the implicit cultural connotations of heritage through visual design strategies.

Corporate identity system (CIS) design as a kind of identity system design is rooted in many disciplines

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such as communication, management, etc. It employs systematic and information-based methods and basic principles, and the image design ideas contained in it are enlightening. The application of CIS theory is not only limited to enterprises but also plays a new role for cities, communities, and individuals (Liu, 2018). According to M. Tajik & Z. Masoudi Amin (2023), visual identity means how to use the logo, colour, type, and size of the typeface and illustration. In the study on urban brand visual identity systems, Y. Su (2024) integrated the local Shilong intangible cultural heritage into various design aspects, including the planning of local intangible cultural heritage districts, themed food festivals, and derivative products, through elements such as shape and colour. Relying on the core concept of the CIS strategy, the researcher presented visual elements such as cultural architecture, public facilities, distinctive clothing, and culture as a localised brand concept. Using bibliometric analysis, Y.J. Hou & E.W. Huang (2024) focused primarily on the Fujian region of China. The researchers found that the integration of Fujian cultural heritage into urban brand development progressed from an initial stage of integration to a phase of heritage tourism city brand design. However, the correlation between cultural heritage and urban brand research was still relatively weak in their study. T. Sarmento & P. Quelhas-Brito (2022) studied the city's visual identity (VI), focusing on the designer's tools (typography, grids, colours, images) and the meanings assigned to graphic shapes by designers, clients, and peers.

A basic understanding of the city's brand identity itself is crucial. D. Kamlot & D.S.V. de Jesus (2022), in their analysis of Rio de Janeiro, hypothesised that a city's brand identity was constructed from both physical (e.g., infrastructure, productive aspects) and symbolic (e.g., values, cultural narratives, reputation) dimensions. The researchers further elaborated on the trinity of identity, image, and reputation, where the brand identity was the core essence of what the city aims to project, the image was how people perceived it, and the reputation was the long-term evaluation. Analogously, C. Rodrigues & H.J. Schmidt (2021) emphasised that place brand identity was shaped by the shared perceptions of the community and developed through a continuous dialogue between managers, consumers, and stakeholders, embedding it in a value co-creation paradigm. This co-creation aspect was also emphasised by S.S. Lam (2024) in the context of appealing to young consumers, suggesting that their emotional attachment and local identity were crucial for sustainable city branding. Cultural heritage is a rich repository of unique attributes for city branding. H.S. Ali & M. Khayat (2024) studied Erbil Castle to demonstrate how a specific, prominent heritage site could serve as a central branding element for a city, with residents' awareness and perception playing a key role in its branding effectiveness. Their study emphasised the significance of physical heritage as a visual and symbolic anchor. In

contrast, C. del Marmol & B. Santamarina (2024) focused on intangible cultural heritage (ICH), such as festivals (Faya in Valencia) and traditional crafts (filete porteño in Buenos Aires), and its legitimisation, often through UNESCO's lists, as a strategic tool for the promotion and image building of cities. The researchers pointed out that ICH policies are increasingly becoming an integral part of city branding to promote local identity.

Based on the theoretical substantiation of the previous identity design system and the classification of visual design types (including logos, colour schemes, auxiliary graphics, etc.), the purpose of the present study was to conduct a systematic analysis of the development of cultural heritage types in urban brand identity design, considering its crucial role in shaping the value of places.

MATERIALS AND METHODS

This study employed a qualitative research paradigm, specifically using a typological analysis approach, to investigate the diverse ways cultural heritage is integrated into city brand identity design. A qualitative approach was considered most suitable due to the research purpose of achieving an in-depth understanding of the complex, nuanced, and context-dependent phenomenon of heritage integration, as opposed to quantifying its frequency. Typological analysis was selected as the core method since it provides a systematic framework for identifying, classifying, and comparing distinct patterns and forms within a complex domain, aligning directly with the study's goal of categorising heritage applications across visual elements.

The empirical framework for this study included multiple case studies of city branding initiatives from around the world. A purposive sampling strategy was adopted to select these cases. The primary selection criteria aimed for maximum variation across key dimensions:

1. Geographical and cultural context: inclusion of cities from diverse global regions (e.g., Europe, Asia, North America, Latin America, Middle East) to capture a breadth of cultural influences and values.

2. Branding strategy focus: representation of cities with varying explicit approaches to heritage in their branding (e.g., explicitly heritage-led, future-focused with subtle heritage nods, balanced approaches).

3. Availability of data: feasibility of accessing sufficient visual branding materials (logos, slogans, colour schemes, graphic elements) and contextual information through publicly available sources.

This strategy ensured the examination of a rich tapestry of practices, enhancing the potential transferability of the findings. The data collection process involved a systematic search and compilation of primary visual branding materials from official city government websites, tourism portals, brand guideline documents (where available), and reputable design archives. Secondary sources, including academic publications and

case study reports on city branding, were consulted to gather contextual information regarding the branding rationale and intended meanings.

Identification was used for an initial examination of the collected visual materials (logos, slogans, colour palettes, auxiliary graphics) for each case study to identify explicit or implicit references, representations, or appropriations of cultural heritage elements (e.g., historical symbols, traditional motifs, culturally significant colours, iconic landmarks, linguistic references). Description and comparison – for detailed description of how heritage was integrated within each visual element for each city. These descriptions were then systematically compared across the diverse cases to identify similarities and differences in application. The case studies included New York (USA), Kawasaki (Japan), Busan (South Korea), Madrid (Spain), Nevers (France), Cairo (Egypt), Bologna (Italy), and Baku (Azerbaijan). Based on the comparative analysis, recurring patterns and distinct approaches to heritage integration were grouped. This involved the use of categorisation – an iterative process of proposing categories, defining their characteristics, and testing their fit against the data for each key visual element (logos/slogans, colours, graphics).

This structured methodological approach, which combined a purposive selection of case studies with a theoretically informed typological analysis, provided a systematic yet flexible framework for studying this phenomenon. Clearly defined selection criteria, data sources, and analytical steps were intended to ensure transparency and allow other researchers to understand, evaluate, and possibly replicate the process used to arrive at the study findings and the resulting typology.

RESULTS AND DISCUSSION

Evolution of visual identity in the context of city branding. When building a city's brand, visual identity has become a key communication tool that not only distinguishes a city from others but also helps to form an emotional connection with residents and visitors. This section examined the transformation of approaches to urban identity design, from the use of slogans to complex visual systems, with a focus on the role of cultural heritage as an integral part of modern branding. As presented in the study by R. Doszhan (2023), in the current context of globalisation, the development of multidirectional cultural relations plays a key role in the integration of states into the world community, while cultural heritage is viewed as a universal value that extends beyond national boundaries. The analysis of the cases in this study revealed that visual elements of city branding, such as logos, colours, and supporting graphics, not only preserve local symbols but also reinterpret them in the context of global discourse. This echoes the findings of Y. Pisolkar (2024), who emphasised the significance of incorporating elements of local culture – architecture, traditions, customs – into urban branding strategies. In

the present study, this approach was confirmed by the cases of New York, Cairo, Bologna, and other cities where cultural heritage has become the basis for the updated visual language of the city. This integration was not only crucial for branding but also played a central role in urban renewal, particularly in areas experiencing decline (Harfst *et al.*, 2021; Abouelmagd & Elrawy, 2022). At the same time, the author's research deepened these approaches by typologising visual media that had previously stayed outside of the focus of such studies.

Cultural heritage revitalised through creative interventions, became a driving force for urban regeneration. Since the 20th century, there have been remarkable developments and changes in urban brand building. With growing global competition, branding efforts shifted towards comprehensive visual identity systems that encompassed logos, colour schemes, typography, and other elements. This evolution reflected a deeper understanding of visual communication's role in shaping public perception and emotional connections. A cohesive visual identity system, as noted by M. Kavartzis & M.J. Hatch (2013), was crucial for establishing a recognisable city image. Originally based on Corporate Identity System (CIS) design, which spans communication and management disciplines, urban branding now leverages these principles. The adoption of these systems reflects a deeper understanding of the role of visual communication in shaping perceptions and fostering emotional connections with both residents and visitors. The transition from the use of slogans and logos to comprehensive visual identity systems represents a fundamental shift in urban branding. Initially, slogans served as concise, memorable phrases designed to encapsulate the spirit of a city. However, as the value of branding became more recognised, cities began to develop more intricate visual identity systems that include logos, colour schemes, typography, and other visual elements, e.g., other design forms such as city souvenir design and city event design. Notably, although previous studies by M. Kavartzis & M.J. Hatch (2013) emphasised the significance of visual identity for the development of the city image, the present study focused on the structural analysis of the ways of integrating cultural heritage. This allowed expanding the understanding of not only aesthetic, but also semiotic and cognitive mechanisms underlying effective city branding. According to K. Fouseki & M. Nicolau (2018), the relationship between a city's cultural heritage and its deliberately crafted image had become increasingly critical for urban planners and designers.

The purpose of visual identity is to distinguish the commercial name in a competitive environment so that the name will effectively maintain its memorability in all presentable media. In the contemporary development of city brand identity design, in addition to the conventional visual identity system, a multitude of other visual forms has been derived from the characteristics

of urban development. These forms serve to enhance the correlation between urban branding and cultural heritage. Despite these advancements in urban branding theory and practice, a crucial area continues to be relatively unexplored: the systematic categorisation and analysis of how cultural heritage is applied within these diverse visual forms. While existing research acknowledges the significance of cultural heritage in creating unique and authentic city brands, it often lacks a structured framework for understanding the diverse forms this integration takes.

Signs and slogans with social cohesion. Logos serve as the most recognisable element of a visual identity system, acting as visual shorthand for the city's brand. They are designed to be instantly recognisable and to capture the essence of the city's identity. Slogans, on the other hand, provide a concise verbal expression of the city's brand promise. Together, logos and slogans create a memorable and marketable brand identity (Dai, 2020). In the late 1970s, New York City faced severe financial and social crises, marked by crime, economic decline, and negative media portrayal. To revitalise the city's image and boost tourism, the New York Department of Commerce launched a rebranding campaign. Milton Glaser designed the "I love NY" logo (Fig. 1), which quickly became iconic. This symbol not only attracted tourists but also fostered civic pride and unity among New Yorkers, significantly influencing urban development and social cohesion by reshaping perceptions and encouraging a positive outlook towards the city (Milosevic, 2025). The city logo design is undoubtedly a pioneering work in urban branding, with widespread recognition in its original form and various imitations. Initially, it featured the letters "I" and a heart shape followed by "NY" on the same line. As the idea evolved, Milton Glaser decided to stack "I" and the heart shape above "NY", later acknowledging a possible subconscious influence from Robert Indiana's pop art image "LOVE" (Sooke, 2011). This design played a crucial role in promoting New York tourism.

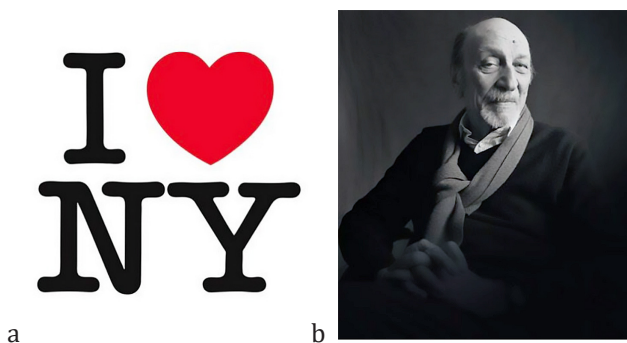


Figure 1. New York City logo design

Note: a – the logo design; b – portrait of Milton Glaser; 1977

Source: I. Shank (2017)

This layout made the logo more versatile, allowing it to be displayed on various surfaces, from hats to T-shirts. Following the 9/11 attacks in 2001, the logo gained prominence, it fostered a spirit of unity in the city, and this poster spread throughout New York in just a few days (9/11 Memorial & Museum, n.d.). Milton Glaser created a revised version to commemorate the attacks, stating "I love New York more than ever", with a small black spot on the heart symbolising the World Trade Center site (Fig. 2). The innovative use of a heart symbol to replace the word "love" set a precedent in visual communication, effectively conveying emotion and civic pride. This design has since been widely emulated across various industries, reflecting its profound impact on branding strategies.



Figure 2. Poster: I [heart] NY more than ever; 2001
Source: T. Lambert (2013)

The "I love NY" logo and its subsequent adaptations illustrated the profound impact of a well-designed city brand logo and slogan on image building, urban development, and civic cohesion. These elements not only created a memorable and marketable brand identity but also played a crucial role in shaping a city's unique identity and maintaining its cultural heritage. A well-crafted logo and slogan served as a powerful tool in transforming public perception, fostering a sense of belonging among residents, and promoting a unified civic identity (Zhang & Sun, 2007). This attracted tourism, stimulated economic growth, and enhanced the city's global image. The logo's design, which cleverly incorporated a heart symbol to denote love, had set a precedent in visual communication, illustrating how simplicity and emotional resonance could achieve widespread recognition and appeal.

Furthermore, the logo's capacity to construct a city's distinctive ontological signature stayed unchallenged.

Through the encapsulation of the quintessential attributed comprising New York City's ethos, the logo had evolved into an archetypal symbol embodying the metropolis' robustness, pluralistic composition, and dynamic energy. This profound alignment with the urban entity's core values and morphological characteristics engendered a psychological framework of pride and spatial belonging among its denizens, thereby enhancing civic solidarity at both individual and collective levels. The synergistic cohesion and shared ontological narrative propagated by the logo assumed critical importance in the conservation of the city's cultural genealogy, particularly amid the dual pressures of globalisation and accelerated urban metamorphosis. Logos and slogans were fundamental components in the construction of a city's brand image, to promote a high degree of city recognition (Zhang, 2023). M. Kavaratzis (2009)

posited that these elements were essential in creating a coherent and compelling city brand. The "I love NY" logo's success could be attributed to its innovative design and emotional resonance, which had set a benchmark in urban branding. As the logo evolved, particularly with the post-9/11 (2001) adaptation, it demonstrated adaptability and continued relevance, reinforcing its role in fostering civic pride and unity.

The construction of a city's brand identity, particularly the design of its logo and slogan, was not static. With the evolution of a city's strategic positioning and market environment, making prompt adjustments and innovations had become a widespread trend. Many cities had updated their visual identities based on their development needs and changed in brand slogans. Cities such as Kawasaki, Japan; Busan, South Korea; and Madrid, Spain exemplified this (Table 1).

Table 1. City logo design and city slogan			
City name	Old logo	New logo	Slogan
Kawasaki, Japan			Colours, future!
Busan, South Korea			Busan is good
Madrid, Spain			Madrid embrace

Source: N. Ho (2016), Haps (2023), Madrid embraces you (n.d.)

In 2016, Kawasaki, Japan, launched a new city image identity and slogan: "Colours, Future!". The new logo used three colours – red, green, and blue, symbolising Kawasaki as a diverse and attractive city full of future possibilities. The three lines were not static but conveyed a sense of dynamism, representing Kawasaki's vitality and potential for future development. This change aimed to prepare for the upcoming 2020 Tokyo Olympics and the 100th anniversary of Kawasaki City's founding in 2024. The new logo had widely replaced the old one in municipal facilities, cultural events, and promotional materials. The new logo and slogan together formed Kawasaki City's completely new city brand identity, jointly conveying Kawasaki's unique charm and development vision, and providing a unified

visual and textual expression for the city's promotion and marketing. To highlight its diverse charm and cater to the needs of new consumer groups, Busan, South Korea, launched a new city tourism brand logo, slogan, and IP character in 2023. The new city logo, themed around the letters "B" and "S", adopted a three-dimensional shape and vibrant colours to convey energy and creativity. The new brand slogan, "Busan is good", combined English and Korean, symbolising the allure of the city. The overall renewal of the city's visual image has helped to strengthen local identity and positive perceptions of Busan both at home and abroad.

In contrast, Madrid Tourism had launched a new city tourism brand image themed "Madrid's Embrace", showcasing the city's warmth, openness, and inclusiveness.

The goal was to better highlight Madrid's image as an open, free, inclusive, and welcoming city. Compared to other cities, these qualities are less readily associated with Madrid, hence the need to emphasise them through a new brand identity. The new brand identity design used the concepts of "embrace" and "fold" to present "Madrid", hoping to convey the message that Madrid welcomes everyone. This brand image would be unveiled at a series of upcoming cultural events and vigorously promoted on the official website and social media platforms. The new brand image would be prominently displayed at a series of upcoming cultural and entertainment events, including the LGBTQI+ Pride festival and music festivals, leveraging these internationally influential events to increase the new brand's exposure.

The brand image updates of these three cities all demonstrated the adaptability of city brand design that is, making prompt adjustments based on the dynamic changes in the city's development positioning. It also reflected the core value of public participation in city brand building. As for the coordination of city slogans and logos, some cities used the shape or colours of the logo to express consistency with the slogan, such as Kawasaki and Madrid, while others showcased this through the combination of the logo and slogan fonts. In conclusion, the design and deployment of city brand logos and slogans were critical in building a strong, recognisable, and marketable urban identity. They played an indispensable role in image communication, economic development, and cultural cohesion, ultimately contributing to the holistic growth and resilience of the urban environment.

According to the definition of corporate brand visual identity design, its foundational components, besides the brand logo and slogan typography, included standard colours and auxiliary graphics as crucial elements (Stoimenova, 2017). Y.L. Guo (2015) highlighted that a corporate brand's standard colours were specifically chosen to represent the company's philosophy and spirit and were used across all media forms in visual identity design. These colours could embody the attributes of the company's philosophy and had a strong visual symbolic recognition effect. In the context of city branding, the psychological and recognition impacts of colours are instrumental in articulating the city's brand identity. Y. Zhang (2020) emphasised that colour, as a symbol, aimed to activate the internal emotions of the audience, often providing a significant advantage in conveying the city's image. As a complex and diverse design entity, a city required these established standard colours to be used consistently across diverse materials and settings to create a cohesive and recognisable image. This study also revealed that many cities focus on maintaining the consistency of their brand logo graphics, while adapting the colours to different usage scenarios to present varied styles. For example, the latest brand image design of the Paris Tourism Bureau (Fig. 3).



Figure 3. Logo of the Paris tourist board
Source: Paris convention and visitors bureau (2016)

It unified the overall visual style with an unchanging letter logo, while demonstrating the diversity of Paris through the isomorphism and linkage of different graphics below the font. This approach enabled consistent brand recognition while offering flexibility in visual storytelling across various media and contexts. As a result, the identity system effectively balanced tradition and modernity, reinforcing both the cultural richness and contemporary dynamism of the city.

Significance of standard colours in city branding. The establishment of standard colours in city brand design was a pivotal element in shaping a city's image, playing a paramount role in enhancing city recognition, evoking emotional resonance, and conveying cultural significance. From a cognitive perspective, unified and representative brand colours could assist the public in rapidly forming a clear visual understanding of a city. Nevers' adoption of the historically rich and highly recognisable "Nevers Blue" aided residents and tourists in perceiving and identifying the city, thus creating a distinct "sense of place". Cairo, through the extensive use of brown tones imbued with architectural imagery, visually highlighted its unique image as the "City of a Thousand Minarets", enabling audiences to swiftly grasp the city's salient features. As mentioned earlier, the consistent use of unified brand colours within a cohesive city brand system design helped residents and tourists perceive and recognised the sense of place. The following elucidated the brand identity colour design strategies of two cities – Nevers and Cairo (Fig. 4, 5), followed by an in-depth analysis from cognitive, emotional, and cultural significance perspectives.

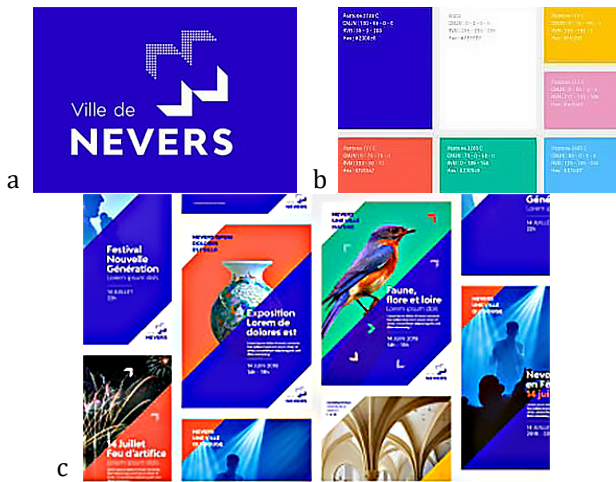


Figure 4. Standard colour usage in city identity – Ville de Nevers, France

Note: a – Ville de Nevers logo; b – standard colour design; c – application design

Source: Grapheine (2018)



Figure 6. Nevers earthenware bowl with Persian blue background

Source: Bils-cramiques (n.d.)

The “Rebranding Cairo” project aimed to imbue Cairo with a more modern identity. Its standard colour scheme primarily employed brown tones that symbolised Islamic-style architecture. To align with the overall sense of history and visual unity, the hues of other colours within the standard palette were also rigorously controlled, utilising medium to low hues to reinforce the city’s profound cultural heritage. “Nevers Blue” as the traditional colour of Nevers (evokes historical memories and cultural identity), could stir historical memories and cultural identification among local residents, bolstering their sense of pride. Cairo, with its dominant brown tones, cultivated an atmosphere that was both serene and steeped in history and culture. This colour palette could convey the city’s solemnity and cultural accumulation, thereby establishing a connection with the audience on an emotional level. “Nevers Blue” was more than just a colour; it is a symbol of Nevers’ pottery culture, deeply ingrained within the local cultural DNA. Cairo’s choice of brown tones as the primary colour directly echoed the typical colour characteristics of Islamic architecture, reinforcing its position as a centre of Islamic culture. This colour selection in itself holds rich cultural symbolism.

In terms of emotional connection, colour possessed a powerful ability to evoke emotions. As L. Song (2014) pointed out, the psychological impact of colour is achieved through multiple layers, including sensory, associative, and symbolic levels. Imagery served as a bridge between visual thinking and mental perception. Through visual thinking, individuals could grasp, analyse, simplify, and abstract the essence of things, ultimately forming images that resonate emotionally (Zhang, 2020). As for cultural significance, colours often carried profound cultural connotations, and the colour cultures of different regions exhibited marked variations. These cultural meanings were often resistant to homogenisation and deeply reflected local traditions and identity (Caivano & López, 2006).



Figure 5. Standard colour usage in city identity – Cairo, Egypt

Note: a – Cairo logo; b – standard colour design; c – application design

Source: M. Ali *et al.* (2024)

The brand-new visual identity design of the city of Nevers continued to utilise its iconic “Nevers Blue” (a symbolic colour of the city) as the primary colour (Fig. 6), and on this foundation constructed a richer colour system. This cobalt blue (a specific shade of blue used by Nevers), created through the firing of manganese, boasts a history spanning over three centuries, serving not only as the traditional glaze for Nevers pottery (represented the city’s craft heritage), but also as the symbolic colour of the city. Alongside preserving this representative colour with its profound historical roots, the design team had also integrated more open and contemporary hues, fully embodying the inheritance and innovation of traditional colours.

To summarise, Nevers and Cairo had thoroughly considered their respective historical and cultural characteristics, as well as their future development visions, in the design of their city brand identity colours. Nevers emphasised the inheritance and innovation of traditional colours, while Cairo was dedicated to showcasing its profound cultural heritage through colour. From the cognitive, emotional, and cultural significance dimensions, the brand identity colour designs of these cities had effectively contributed to shaping clear city images, stimulating emotional resonance, and conveying unique cultural values, fully demonstrating the valuable role of standard colours in city brand building.

Types of auxiliary graphics. In city brand identity design, auxiliary graphics played a crucial role. They served as an effective extension and complement to the main logo, enabling a deeper and more vivid conveyance of urban cultural connotations, and enhancing brand recognition and communication effectiveness. As stated in the research, Q.F. Ke (2021) explained visual symbols, with their unique structure and meaning, and concise forms, played a key role in the communication process, allowing audiences to form brand perceptions. Auxiliary graphics, as a type of visual symbol, come in various design types, primarily including:

1. Patterns and textures: the inspiration for these auxiliary graphics stemmed from the city's unique architectural styles, natural landscapes, or profound cultural themes. They formed a representative visual language through the abstraction, deconstruction, and recombination of these elements.

2. Icons and symbols: these were simple and easily recognisable marks or symbols, often drawing inspiration from urban landmarks, significant cultural elements, or unique regional characteristics. Their prominent level of abstraction allowed for quick and efficient information delivery and maintained recognisability across various application scenarios. As explained by Peirce's semiotic theory (Zhang *et al.*, 2023), symbols could be categorised into iconic signs, indexical signs, and symbolic signs based on their relationship with the object they represent. Icons and symbols in auxiliary graphics predominantly fell into the latter two categories.

3. Illustrations: custom illustrations could more figuratively and narratively showcase the cityscape, depicting urban landscapes, local flora and fauna, or cultural activities. Their artistic expression could imbue the brand with richer emotional tones and humanistic appeal.

Successful city brand identity design often skillfully integrated these auxiliary graphic types with the city's unique cultural DNA. From a cultural branding perspective, brands needed to be rooted in culture and resonate with the cultural values of their target audience. Auxiliary graphics served as a vital bridge connecting the urban brand with the audience's cultural

understanding. The following cases demonstrated how visual auxiliary graphics can effectively communicated urban cultural identity (Fig. 7, 8), and to form the city's cultural imagery.



Figure 7. Auxiliary graphics usage in city identity – Bologna, Italy

Note: a – Cairo logo; b – standard colour design; c – application design
Source: A. Gizella (2013)



Figure 8. Auxiliary graphics usage in city identity – Baku, Azerbaijan

Note: a – Baku logo; b – auxiliary graphics and other brand basic units; c – application design
Source: M. Mammedov (2022)

Bologna, a historically rich cultural city and the “Music City” of Italy, boasted an ingenious urban brand logo design. The design inspiration originated from the window tracery of local historical buildings. By abstracting the form of the window tracery, the designers used overlapping lines to create a circular logo. From a semiotic perspective, the lines of the window tracery could be viewed as the signifier, while the signified was

Bologna's profound historical and cultural heritage. Furthermore, the designers segmented the circular curve, using the segmented lines as units to develop auxiliary graphic designs, piecing them together into diverse visual images applied to various urban brand materials, forming a unified visual identity. Additionally, based on the circular unit, a series of unified-style social service icons were designed, covering areas such as media, public spaces, and educational institutions. Bologna's case skilfully integrated the reverence for historical architectural heritage into the service expression of modern social functions, embodying the harmonious unity of tradition and modernity.

Recognised by UNESCO as a "Creative City of Design", Baku's urban brand identity design delved deeply into its local cultural heritage (China Radio International, 2023). The design team integrated the city's national values, historical styles, and urban essence. Azerbaijan's ancient pottery, stone carvings, metal decorations, and carpet weaving art provided rich inspiration for the auxiliary graphic design. Designers extracted geometric forms from these elements, creating a series of repeatable and easily combinable icon units. These icon units cleverly incorporated elements representing Baku's "natural scenery, famous landmarks" and significant transportation symbols and could flexibly adapt to different logo forms. By repeating and arranging these icon units, patterns with national characteristics could be formed, enhancing brand recognition. This method of repeated arrangement also aligned with the principles of rhythm and pattern in graphic composition. This design strategy, which drew inspiration from traditional crafts and translated it into modern geometric language, not only highlighted Baku's historical and cultural heritage but also demonstrated its forward-looking spirit of innovation.

The above cases demonstrated that successful urban brand identity designs focused on drawing inspiration from local culture in their use of auxiliary graphics. Whether it was the abstract refinement of historical architectural elements (Bologna) or the modern interpretation of traditional crafts (Baku), these auxiliary graphics had become valuable carriers for conveying urban cultural characteristics. High-quality auxiliary graphic design not only enhanced the richness and scalability of the brand's visuals but more importantly, it effectively conveyed the city's unique cultural values and improved the urban brand's recognition and appeal among domestic and international audiences. As W. Olins & X. Liu (2012) emphasised in their study, a brand was perceptible, and the public's descriptions of the brand's core concepts and visual elements outlined the brand's conceptual profile. Drawing the brand's visual image from urban visual elements and through the organic integration of auxiliary graphics and the main logo, a complete urban brand visual system was jointly constructed, ultimately serving the effective communication and promotion of the city's image.

Thus, the study results demonstrated a wide variety of approaches to integrating cultural heritage into the visual identity of cities. The presented cases confirm that successful branding is based on a profound understanding of the local context, historical codes, and cultural markers. The identified typologies clearly illustrated how various elements, from logos to supporting graphics, can form a coherent, culturally grounded brand strategy.

CONCLUSIONS

In the present study, the typological analysis of cultural heritage applications in city brand identity design revealed several key findings. The study found that the evolution of city branding has shifted from simple slogans and logos towards comprehensive visual identity systems. The analysis of concrete cases proved the profound impact of well-designed logos and slogans; for instance, the "I love NY" logo was proved to be instrumental in reshaping public perception, fostering civic pride, and promoting unity, particularly with its adaptation following the 9/11 attacks at 2001. Furthermore, it was identified that cities like Kawasaki, Busan, and Madrid have dynamically updated their visual identities and slogans, such as Kawasaki's "Colours, Future!" and Madrid's "Madrid embrace," to reflect new developmental strategies and enhance public engagement, often ensuring a cohesive relationship between the logo's design and the slogan's message.

The critical role of standard colours in conveying cultural significance and enhancing recognition was analysed. The study found that Nevers, France, effectively utilised its historically significant "Nevers Blue", derived from local pottery traditions, to establish a distinct "sense of place" and cultural identity. Analogously, the study proved that Cairo's strategic use of brown tones, symbolic of its Islamic architectural heritage, successfully reinforced its image as the "City of a Thousand Minarets" and communicated its deep cultural roots. The consistent application of these standard colours was shown to be vital for cognitive understanding and emotional connection. As for auxiliary graphics, the study found that these elements are crucial for extending the brand's narrative and cultural depth. The analysis of Bologna, Italy, demonstrated how abstracted window tracery from historical buildings was transformed into versatile auxiliary graphics and icons, bridging historical reverence with modern social functions. In the case of Baku, Azerbaijan, it was found that geometric forms extracted from traditional crafts like pottery and carpet weaving were developed into a system of repeatable icon units representing local landmarks and culture, thereby creating a distinct cultural imagery. The study proved that these typologies of auxiliary graphics, be they patterns, icons, or illustrations drawn from cultural heritage, significantly enrich the visual language of a city's brand and strengthen its unique identity.

The prospects stemming from this study are significant. The typological framework that was developed offers a practical tool for urban planners, designers, and branding professionals. It was established that this framework can be utilised to systematically analyse existing city branding strategies, and to formulate new, culturally sensitive approaches that effectively leverage heritage. Future research could expand on these typologies by examining their application in conjunction with intangible cultural heritage manifestations, investigating the measurable impact of these specific heritage integration strategies on tourism and resident satisfaction, or exploring the evolving role of digital media in the co-creation and dissemination of heritage-infused

city brand identities. Such endeavours would further refine the understanding and improve the overall impact of city branding initiatives.

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CONFLICT OF INTEREST

None.

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Типологічний аналіз використання культурної спадщини в дизайні айдентики міста

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Анотація. У дослідженні вивчалися різні способи інтеграції культурної спадщини в дизайн айдентики міського бренду. Воно мало на меті визначити та класифікувати різні типології використання культурної спадщини у ключових візуальних елементах – зокрема, логотипах і слоганах, кольоровій палітрі та допоміжній графіці. Використовуючи якісний дослідницький підхід, було проведено типологічний аналіз різноманітних міжнародних тематичних досліджень, що представляють різні культурні контексти та стратегії брендингу. Аналіз вийшов за межі візуальної естетики, щоб дослідити основні семіотичні принципи, когнітивні механізми та культурні цінності, які сприяють ефективності цих елементів брендингу. Дослідження виявило різні типології інтеграції культурної спадщини в айдентичну місто. Кожен елемент продемонстрував значний потенціал використання культурної спадщини для посилення резонансу та впливу бренду. Серед проаналізованих кейсів символічними прикладами були знаковий логотип «I love NY» як символ громадянської єдності; оновлені слогани та логотипи Кавасаки, Пусана та Мадрида, що відображають нові міські візії; культурно обґрунтовані кольорові схеми Невера та Каїра; допоміжна графіка Болоньї та Баку, що сягає корінням в архітектурні та ремісничі традиції. На теоретичному рівні дослідження показало еволюцію логотипу міста разом зі зростанням суспільного розвитку, шляхи інтеграції стандартного кольору бренду міста з культурними продуктами та архітектурою, а також вираження культурних образів у допоміжному графічному дизайні спрощення, вилучення та реорганізації. На практиці отримані результати надали цінну інформацію для містобудівників, дизайнерів та професіоналів у сфері брендингу. Розроблені типологічні рамки слугували практичним інструментом для аналізу існуючих стратегій брендингу та формулювання нових, культурно чутливих підходів, які ефективно використовують спадщину, тим самим підвищуючи загальну ефективність ініціатив з брендингу міст

Ключові слова: дизайн міського бренду; кольорова палітра; композиція; допоміжна графіка; імідж бренду; культурний брендинг



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Cross-disciplinary model for yacht interior design: Integration of traditional visualisation and virtual reality technology

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Abstract. The aim was to investigate a cross-disciplinary model of yacht interior design in the context of the methodological integration of traditional visualisation methods and virtual and augmented reality tools. The study employed an interdisciplinary approach, systems analysis, and comparative methods, which allowed for structuring the integration of traditional visualisation and virtual reality tools, as well as identifying key interrelations between them. The study proved that the integration of traditional visualisation methods with virtual and augmented reality technologies significantly increases the efficiency of the yacht interior design process, improves the accuracy of modelling, and contributes to a better perception of the final result. It was noted that the role of traditional tools is not diminishing, but, on the contrary, is gaining new opportunities when used in conjunction with the latest arsenal of design tools. In addition, it was found that the use of a cross-disciplinary model contributes to a deeper understanding of design solutions, accelerates the processes of coordination and implementation, and expands the possibilities for optimising the functional and aesthetic characteristics of the interior. New approaches to the integration of visual aspects of design have been identified, revealing the potential of using a cross-disciplinary model for a deeper understanding and evaluation of interior design solutions. The prospect of effectively combining various visualisation tools has been outlined, which allows for improving the process of interaction between designers, engineers and customers. The current study has proposed a theoretical basis for further development and implementation of a modern approach to design that takes into account both traditional and innovative means of presenting visual information. The practical significance of the results lies in their application to yacht interior design, educational programs for specialists in marine design, architecture, and visual arts, as well as in the development of innovative approaches to the visualisation of design solutions

Keywords: ship interiors; hand sketches; VR technologies; modelling; structure of graphic images; design

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INTRODUCTION

With the rapid development of virtual reality (VR) and augmented reality (AR) technologies, cross-disciplinary approaches to yacht interior design are becoming increasingly relevant. These methods not only expand the possibilities of visualisation, but also allow for the creation of more interactive and immersive user experiences. The classic yacht interior design process now includes both traditional methods, such as sketching and creating 3D models, and the latest tools that facilitate the integration of different disciplines. This interaction is a complex but necessary process that requires the synergy of knowledge in the fields of marine architecture, engineering (computer-aided design, or CAD) and modern interior design.

Since 2014 and as of 2025, a significant amount of research has been conducted to analyse and identify the main challenges and prospects in the field of yacht interiors, as well as to adapt a cross-disciplinary design model that combines traditional methods and virtual reality technologies. This work contributes to the formation of a more integrated approach that ensures high-quality visualisation, personalisation of solutions and increased efficiency at all stages of project development. In an article by Q. Wang (2023), an analysis of user interaction with interiors designed using virtual reality tools was carried out. The work demonstrated how VR can increase user satisfaction by allowing not only to visualise space but also to communicate with it. One of the key findings of this study was that the use of virtual reality technologies not only promotes user engagement but also improves the process of understanding their advantages.

The importance of customer perception in the process of optimising methods of presenting architectural interior spaces is emphasised in the article by M. Peng *et al.* (2024), where the authors summarised that the integration of VR and AR into the yacht design process contributes to increased efficiency, accuracy and the level of emotional activity of customers, which is especially important for the premium segment. The development and structuring of these technologies combines traditional approaches and innovative visualisation tools, forming a new qualitative paradigm in the yacht industry. Scientists Y. Zhu *et al.* (2024) considered mixed reality as a tool for interior reconstruction in their study. The work presented the industrial capabilities of AR in combination with generative networks, opening up new avenues for interior renovation. The authors noted that such technologies can enhance creativity and accelerate the design process.

One of the key topics of the article by X. Liu *et al.* (2022) was the use of virtual simulation for yacht interior design. The researchers drew attention to the need to create effective, intuitive interactions inside the vessel, based on modern virtual simulation technologies.

The study described in detail the methods, tools and expected benefits of using VR in yacht interior design. The study involved the development of an interactive model of a virtual yacht cabin, which focuses on user interaction with virtual space. The article by scientist L. Guo (2023) examined the use of virtual reality technology in the field of interior design, emphasising its significance and growing popularity among users. The author divided VR technology into two main categories: software and hardware, which allowed for a deeper analysis of its application in interior design. The work also emphasised that virtual reality is an interdisciplinary technology that combines various fields of knowledge, such as computer graphics, mathematics and aesthetics.

The scientific article by L. Ruggiero *et al.* (2024) examined the transformation of the yacht interior design process through the introduction of artificial intelligence (AI) technologies and their integration with traditional visualisation methods. The authors emphasised the importance of an interdisciplinary approach, which requires the coordination of knowledge from the fields of design, architecture and engineering, in the context of the growing complexity and dynamism of the modern market. The study demonstrated how AI can be a catalyst for change in the design process, allowing designers to explore alternative concepts and experiment with new forms. Continuing the theme of AI, in the scientific work of X. Li *et al.* (2025), the authors focused on how the combined use of various artificial intelligence tools can significantly improve the quality of design decisions and optimise work processes in interior design. One of the key aspects of E. Kavak's (2025) research was the ability of VR to provide immersive and interactive visualisations that allow users to "walk through" virtual interiors, which significantly improves communication quality and facilitates iterative adjustments during the design process. The author examined the technological foundations of VR, such as real-time rendering, 3D modelling, and tactile feedback. The emphasis was on the prospects for democratising design by making sophisticated visualisation tools available to a wider audience.

Although the above studies have touched on many aspects, there is a need for further research focused on structuring an approach to integrating different design methods into a single process. The aim of this study was to develop and justify a cross-disciplinary model for yacht interior design that integrates virtual reality tools and traditional methods into a single process, with an emphasis on improving the quality, efficiency and personalisation of design solutions.

At the preparatory stage, work was carried out to study existing scientific articles, publications and materials in the field of yacht interior design, virtual and augmented reality tools, as well as manual sketching techniques. Next, a comparative analysis of existing

approaches was conducted to identify the methods that would most effectively help illustrate conceptual models of yacht interiors. Their capabilities were evaluated, including methods of visualisation and interaction with space. At the stage of structuring the cross-disciplinary model, a schematic base was proposed, with the help of which a combination of traditional methods and VR/AR technology was implemented at all stages of design. The conclusion of the study included conclusions about the significance of a cross-disciplinary approach in yacht design, as well as recommendations for further research. The materials used included scientific articles, books and publications related to visual information presentation technologies, as well as demonstration materials in the form of coursework and qualification projects by students of the Design Department of the Admiral Makarov National University of Shipbuilding.

OVERVIEW OF VISUALISATION METHODS

Yacht interior design is a complex task that requires consideration of strict functional constraints, ergonomics, and high aesthetic requirements (Fablo, 2022). The current stage of technological development offers opportunities for effective interaction between traditional visualisation methods and innovative virtual and augmented reality tools. To achieve the highest quality design solutions and satisfy individual customer requests, a structured approach is needed that combines different methods and tools into a single design platform.

In the design process, any idea is realised through modelling. From sketches and drafts to accurate virtual prototypes, this stage offers an understanding of the

future object from all angles (Stephens Waring Yacht Design, 2025). Designers use models to find the most suitable options, verify that the solution meets certain criteria, and communicate their concepts to the client. Some researchers have studied in detail the use of virtual reality to improve the visualisation of design data, which has significantly improved the quality of interaction with clients. A study by N. Sklyarenko (2016) found that modern technologies allow for control of the entire production process, ensuring full integration of design data. For the successful implementation of these tasks, traditional visualisation tools are widely used in practice, which form the basis for the development and visual representation of design solutions. These methods not only facilitate effective communication of ideas by designers and engineers, but also provide customers with a more complete understanding and assessment of the expected result.

In the initial stage of design, hand-drawn sketch formats are widely used (Fig. 1). As noted by Ö.S. İslamoğlu & K.O. Deger (2015), quick sketches allow designers to instantly capture their ideas and developments, experiment with shapes, spatial solutions and colour combinations without spending a lot of time. This stage serves not only as a tool for rapid prototyping, but also as a means of creative self-realisation, where each stroke reflects the individual style of the master, creating a unique visual concept. In addition, hand drawing helps to better understand the proportions and balance within the limited space of a yacht interior, which is especially important when working with small and complex objects.

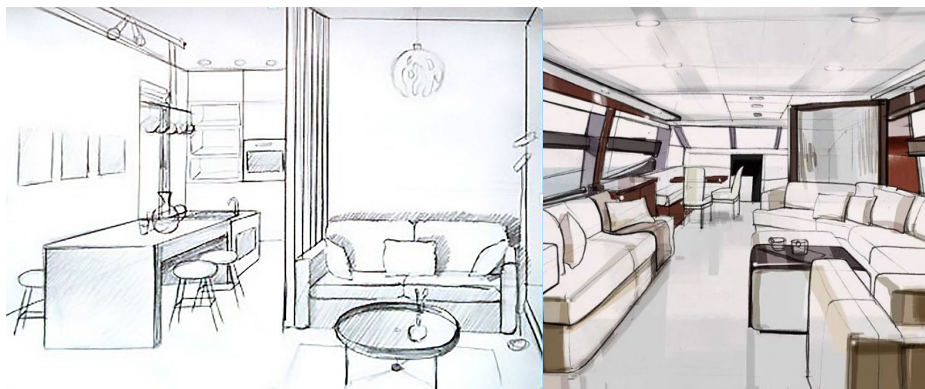


Figure 1. Sketches of the interior of a motor yacht cabin (paper, watercolour, pencil)

Source: A. Tovpyga (2024)

The effectiveness of using collage techniques in presenting yacht interior design projects is due to its ability to integrate various visual elements, which contributes to the formation of a holistic and expressive image of the future space. In the context of contemporary research on visualisation and communication in design, in particular in the work of N.S. Udris-Borodavko (2018), the role of collage in the formation of

a national model of graphic design in Ukraine in the 21st century is examined. The author emphasised that collages are a powerful tool for conveying conceptual ideas and emotional aspects, not only in interior design but also in graphic design, allowing the creation of multi-layered and expressive visual works. This technique of presenting information makes it possible not only to visualise aesthetic and stylistic solutions, but also

to reflect conceptual connections between materials, textures and lighting, which facilitates the perception of the project idea by customers and the design team (Fig. 2). Analysis of data collected during the study by A. Tormakhova (2019) showed that the relevance of using this expressive tool remains high in the context of introducing multimodal and interdisciplinary approaches to design processes. In the context of the modernisation and digitalisation of visual environments, collages were adapted to new formats, including digital platforms, which expanded their functionality and made them more accessible.

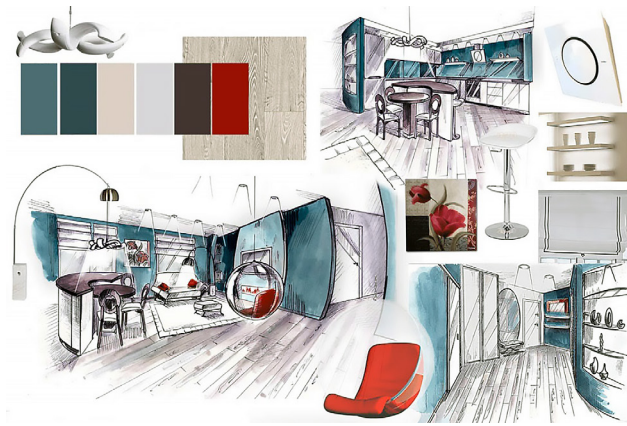


Figure 2. Collage technique for presenting an interior design

Source: T. Burlachenko (2023)

The effectiveness of presentations in demonstrating yacht interior design projects is due to their ability to provide clear and structured visual communication of the concept to various participants in the design process. This type of information presentation is a universal tool for displaying key interior elements (Fig. 3). It makes it possible to focus on the most important aspects without distracting details and complex three-dimensional images. In addition, with the development of digital technologies, presentations can be supplemented with animation effects, comments and diagrams, which significantly increases their informativeness and clarity. The relevance of using this technique remains high in the context of modern requirements for rapid information exchange and teamwork, as detailed in the work of O. Romashchenko et al. (2024).

The creation of physical models is the final stage of traditional design, allowing for a deeper understanding of the volume and structure of the yacht's interior. V. Turchin & O. Lugovsky (2012) noted that three-dimensional modelling using models helps to better understand the relative position of elements, the scale and proportions of space (Fig. 4). Interaction with tactile objects is particularly valuable, as it provides a tangible model of the future interior and allows for the evaluation of ergonomics and functionality. Scaled models serve as the first step towards visualising the final product in real conditions, providing the opportunity to identify shortcomings or the need for changes at the preliminary design stage.



Figure 3. Presentation of the qualification project for the design of the central interior of a motor yacht

Source: A. Kolesnyk (2024)



Figure 4. Interior layout of a motor yacht saloon

Source: D. Beleviat (2021)

The combination of hand sketches, collages, physical models, and presentations provides a flexible approach to interior design, but such methods do not fully reflect the visual, emotional, and sensory aspects of architectural space (Jin & Kim, 2017). In addition, from the point of view of interior design on yachts, traditional visualisation tools mainly focus on conveying basic design solutions, which often do not adequately reflect the complexity and diversity of specific operating conditions on a vessel. The calculation data presented in the article by F. Mauro et al. (2024) confirmed that in the context of this issue, it is necessary to take into

account not only standard functional parameters, but also technical characteristics related to the marine environment, such as vibration loads, the dynamic effect of waves, space limitations, and requirements for the reliability of fastening systems.

According to Y. Fan & L. Liang (2020), the use of augmented reality expands the possibilities of visualisation by superimposing information elements directly into real space. This is especially useful when designing storage systems and the location of navigation equipment, taking into account the design features of the hull. Figure 5 illustrated a simulated yacht interior in a virtual marine environment for testing individual engineering modules. This simulation helps to optimise technological solutions that minimise the use of additional volume and weight of structures by adjusting sketches (Kunkera *et al.*, 2024).



Figure 5. Visualisation of the location and testing of navigation equipment and mounting systems on a motor yacht using VR technologies

Source: Beneteau (2022)

Focusing on the implementation of innovative visualisation technologies, such as virtual and augmented reality, makes it possible to model and experience interior space in conditions that are as close to real life as possible, summarised A. Hamad & B. Jia (2020). For example, the VR environment allows for the consideration of possible kinesthetic and tactile perceptions characteristic of marine conditions. In addition, interactive scenarios that simulate extreme operating conditions, such as sea waves and pitching, can be used

in a virtual environment to assess the technicality and safety of fastening solutions (Fig. 6). This significantly improves the quality of design solutions, reducing the risk of errors during implementation.



Figure 6. Simulation of yacht motion with a dynamic wave effect through virtual reality technologies
Source: image from the VR game Watch Dogs 2 (n.d.)

Changes to the spatial composition and adjustments to furniture elements and technical objects in the project are made using special devices (Zhang & Ban, 2022). This allows for real-time visualisation of proposed modifications, making the decision-making process more intuitive and collaborative. For example, designers use a tablet computer or smartphone to scan the space, after which digital models superimposed on real objects and structures are displayed on the screen (Becker *et al.*, 2025; Huang & Ni, 2025). The results of work carried out by M.I. Zignego *et al.* (2022) and Y. Gui & S. Shi. (2022) showed that this allows for a more effective assessment of the accuracy of installation, verification of the compliance of design solutions with the actual dimensions and geometry of the room, and identification of possible collisions or placement errors. When discrepancies are detected and changes are necessary, the observation data can be quickly recorded, and corrections can be made manually or using specialised applications. The edits are then sent to the design team for further processing in CAD and subsequent updating of digital models. In this way, the visualisation and correction process becomes interactive and cyclical, ensuring a constant exchange of information between engineers and designers. To create panoramic images, an interactive interface with a visual range and a 360° view

is used, obtained using 3D graphics technologies and modern software services (Fig. 7). This is an additional virtual reality method that allows you to view possible options for redesigning or expanding the space using

design solutions in real time and make changes to the project directly during viewing – these changes will be automatically reflected in the visualisation, which significantly increases the efficiency of the process.



Figure 7. Spherical 3D panorama of the interior of a motor yacht

Source: T. Plevako (2024)

The study by E. Brivio *et al.* (2021) examined the use of 360-degree panorama and virtual reality technologies to study the emotional state of participants, in particular their sense of presence, anxiety and emotional well-being. In the context of a cross-disciplinary model for yacht interior design, this study offered interesting parallels regarding the integration of traditional and modern visualisation methods. As part of the study of 360-degree panoramas, the authors compared two types of environments: a real panorama and a computer model. This approach made it possible to evaluate the effectiveness of different visualisation methods in creating a sense of presence – a key aspect in interior design, where the perception of space is critically important for the end user. Importantly, the study showed no significant differences between the effects of a real panoramic environment and a simulation, indicating the possibility of using 360-degree video as a more economical and simpler visualisation option. The conclusion is directly relevant to the design of yacht interiors, where it is important to implement effective and affordable visualisation methods to achieve maximum user emotional engagement. The results of the study confirm the feasibility of using 360-degree panorama technologies to create intuitive, emotionally rich spaces for users.

Special VR glasses or helmets are used for a more complete assessment of the final interior design and structural elements on site. As noted by M.Y.F. Aladin *et al.* (2024), considering the emotional and aesthetic aspects, these devices provide complete immersion of the user in a three-dimensional modelled environment with the most realistic perception of spatial solutions. This technology interacts with the digital space by tracking head movements, which helps to create a sense of presence within the virtual interior. The devices allow for dynamic viewing and navigation of the projected space in real time, assessing the volumetric and spatial structure

for ergonomics and the optimal placement of furniture and structural elements. As a result, modern yacht interior visualisation practices combine a wide range of methods, from hand-drawn sketches, collages, models and presentations to advanced digital technologies based on VR/AR and 360-degree modelling. Each approach performs a separate function within the design process, contributing to the accurate communication of the concept, verification of ergonomics, adaptation to the specifics of the marine environment, and strengthening the emotional connection with the space. The combined use of these tools provides a comprehensive assessment of both the technical and visual-sensory aspects of the designed interior.

STRUCTURE OF THE CROSS-DISCIPLINARY MODEL

The effectiveness of traditional design methods combined with modern digital technologies is achieved through comprehensive integration at the stages of conceptualisation, development and finalisation of the interior. In this process, the organisation of parallel and sequential workflows plays an important role, allowing the advantages of both approaches to be utilised (Fig. 8). Balance is achieved by clearly defining the stages of work, where traditional methods are used for initial idea generation and rapid concept exchange, and digital technologies are used for detailing, analysis and final visualisation. The implementation of a sequential and cyclical process determines the effectiveness of structural interactions within the project, in which each stage complements and reinforces the next, creating an optimal symbiosis between intuitive creativity and high-precision digital processing. This approach maximises the advantages of both methodologies: the creative flexibility and efficiency of traditional methods with the precision, effectiveness and interactive analysis capabilities of modern digital solutions.

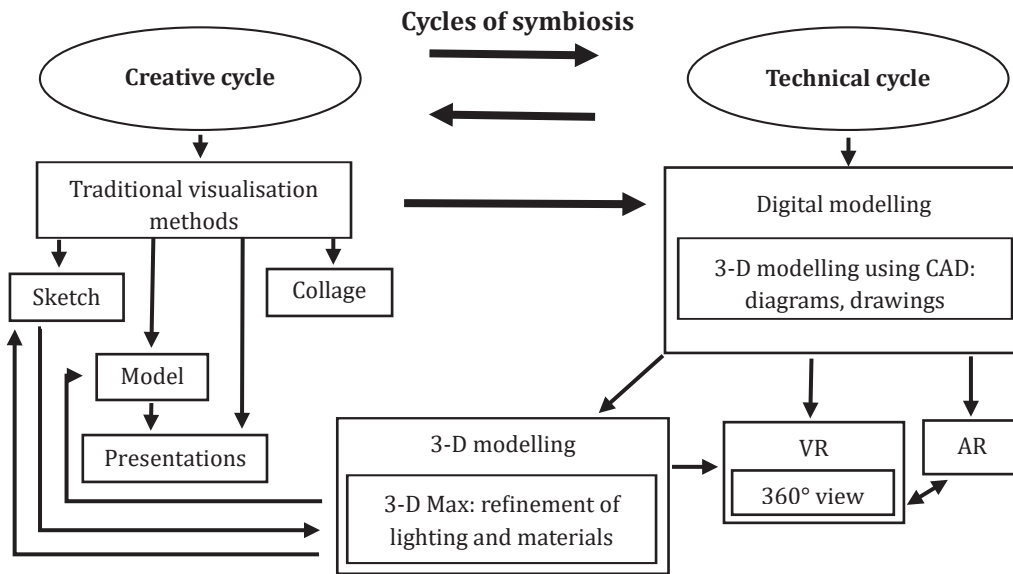


Figure 8. Project visualisation structure

Source: compiled by the authors

In the context of the proposed structure, the use of digital tools contributes to the detailed refinement and visualisation of project decisions. Thus, the process of integrating computer-aided design (CAD) and calculation systems with virtual reality (VR) tools is implemented at the stage of detailed development and digital visualisation of design concepts (Sener & Bešli, 2018). In this model, the design process is based on the sequential formation of hand sketches, based on which accurate three-dimensional digital models of the interior are created in CAD systems, including all structural, engineering and aesthetic elements. At the next stage, the interior model is exported to a VR environment using specialised converters and interfaces that preserve geometric and textural characteristics. For example, Autodesk Navisworks and 3dsMax have built-in exporters that allow models to be prepared for VR while preserving structure and materials. J. Gong *et al.* (2025) implemented a similar approach in the field of cruise ship interior design, where a three-dimensional VR model was created based on two-dimensional drawings to optimise spatial planning. Their research demonstrated improvements in key layout performance indicators, confirming the practical effectiveness of integrating VR into design processes. Specialised software for integrating computer-aided design and virtual reality systems, such as UnityReflect or UnrealDatasmith, provides automatic conversion and transfer of data from CAD environments to platforms that create virtual spaces (Uchida & Saito, 2020; Vergunova & Blinova, 2023).

The second scenario involves importing the prepared design model from CAD into 3dsMax for more accurate visualisation, final adjustment of materials, lighting and animations (Budakov, 2024). After that, the final three-dimensional scene is converted into VR formats

for immersive reviews. This structure of the project model visualisation stages provides additional professional refinement of the interior using traditional tools and specialised software. During such virtual presentations, designers, engineers, and clients can make notes, make changes, and refine concepts based on both digital models and original hand-drawn sketches and physical models demonstrating stylistic and functional solutions.

At each stage of the design process, synchronisation and feedback between digital models and traditional visualisation methods, such as collages and sketches, used to adjust textures, materials and colour schemes must be ensured. This approach ensures that changes made to the digital model remain faithful to the original aesthetic concept laid out in the hand-drawn sketches and contributes to a more accurate match between the final project and the designer's vision. Thus, the combined use of traditional visualisation methods and modern virtual reality technologies creates an effective dialogue between the concepts developed and their practical implementation. Such cross-disciplinary synthesis increases the accuracy of design solutions, helps to prevent possible errors and significantly increases the level of customer confidence and satisfaction. The result was a harmonious combination of aesthetics, engineering reliability and operational safety, which is especially important in the context of shipbuilding.

CONCLUSIONS

As part of the study, a conceptual model for integrating traditional visualisation methods and virtual reality technologies into the process of designing yacht interiors was proposed. This interconnection is based on the synthesis of classical approaches to visualisation, such as manual sketching, collage techniques and mockup

modelling, with innovative immersive technologies that provide highly accurate and interactive information exchange. The similar formation of structural interrelationships at the stage of interior visualisation involves increasing the efficiency of design procedures, ensuring a more accurate perception of spatial solutions and stimulating interdisciplinary interaction between designers, engineers and end users in the context of complex modelling of yacht interiors.

The functional symbiosis of classic techniques and immersive VR and AR tools forms a competent approach to the use of various methods of presenting visual information and allows not only to enhance the creative potential of designers, but also to significantly increase the accuracy, efficiency and quality of design solutions. In the context of yacht interior design, a set of tasks aimed at developing a methodology for integrating traditional and virtual visualisation techniques includes in-depth research into the possibilities of automating data synchronisation processes between different modelling platforms. Of particular relevance is the creation of adaptive tools that ensure “seamless” interaction and information exchange between classic hand sketches, yacht interior design layouts, digital CAD models, and virtual environments. It is advisable to

focus on the development of VR and AR user interfaces that ensure the convenience of interaction between specialists of various profiles with digital models.

Prospects for further research in this area are related to the improvement of classic visualisation techniques, the expansion of the functional capabilities of virtual reality, and the combination of the above-mentioned means of presenting information with other innovative technologies. For example, the development of digital twins in interiors, augmented reality based on spatial scanning, and methods of introducing artificial intelligence into the process. These areas open up new horizons for scientific research and contribute to the creation of integrated technological solutions and the expansion of opportunities for the effective design of yacht interiors.

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CONFLICT OF INTEREST

None.

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Крос-дисциплінарна модель проєктування яхтового інтер'єру: інтеграція традиційної візуалізації та технології віртуальної реальності

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Анотація. Метою було дослідити крос-дисциплінарну модель проєктування яхтового інтер'єру в контексті структури методологічної інтеграції традиційних методів візуалізації та засобів віртуальної і доповненої реальності. У дослідженні застосовано міждисциплінарний підхід, системно-аналітичний та компаративний методи, що дозволило структурувати інтеграцію традиційної візуалізації та віртуальної реальності й виявити ключові зв'язки між ними. Дослідженням доведено, що інтеграція традиційних методів візуалізації з технологіями віртуальної і доповненої реальності істотно підвищує ефективність процесу проєктування інтер'єрів яхт, покращує точність моделювання і сприяє більш якісному сприйняттю кінцевого результату. Зазначено, що роль традиційних інструментів не зменшується, а, навпаки, отримує нові можливості, при одночасному застосуванні разом з новітнім арсеналом засобів проєктування. Крім того, було виявлено, що використання крос-дисциплінарної моделі сприяє більш глибокому розумінню проєктних рішень, прискорює процеси узгодження і реалізації, а також розширює можливості оптимізації функціональних і естетичних характеристик інтер'єру. Виявлено нові підходи до інтеграції візуальних аспектів проєктування, що розкривають потенціал використання крос-дисциплінарної моделі для більш глибокого розуміння і оцінки інтер'єрних рішень. Окреслено перспективу ефективного поєднання різних інструментів візуалізації, що дозволяє поліпшити процес взаємодії між дизайнерами, інженерами та замовниками. Поточне дослідження запропонувало теоретичну основу для подальших розробок і впровадження сучасного підходу до проєктування, що враховує як традиційні, так і інноваційні засоби представлення візуальної інформації. Практична цінність отриманих результатів полягає в їх застосуванні у проєктуванні інтер'єрів яхт, у навчальних програмах підготовки фахівців у сфері морського дизайну, архітектури та візуальних мистецтв, а також у розробці інноваційних підходів до візуалізації проєктних рішень

Ключові слова: суднові приміщення; ручні ескізи; VR-технології; макетування; структура графічних зображень; дизайн



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Floral symbolism in Ukrainian painting of the second half of the 20th century

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Abstract. The relevance of the study is determined by the need for a comprehensive study of floral symbolism as an important means of preserving and the transmission of national identity in Ukrainian painting during the period of ideological restrictions (1940s-1980s), which is of particular importance for understanding the mechanisms of cultural resistance and the formation of national consciousness. The aim of the study was to conduct a comprehensive analysis of the development of floral symbolism in Ukrainian painting in the second half of the 20th century and to determine its role in the formation of national artistic identity. A set of art history methods was applied: iconographic analysis of symbolic meanings, stylistic analysis of artistic features, and a semiotic approach to reveal the system of symbols. The work of leading Ukrainian artists (M. Glushchenko, V. Kostetsky, T. Golembiievska, I. Krasny, O. Shovkunenko, T. Yablonska, E. Volobuev) in the period from 1940 to 1980 was analysed. The evolution of floral symbolism is traced from the symbols of hope in the 1940s through the search for national identity during the “thaw” period to the philosophical understanding of being. The research has clarified the symbolic meaning of key floral motifs, for example, the peony is associated with rebirth, the cornflower with love for the native land, the mallow expresses the idea of family well-being, and the combination of the daffodil and the ear of corn embodies the cyclical nature of nature. The use of floral images as a means of indirectly expressing patriotic feelings in conditions of ideological restrictions has been proven. It has been established that the multi-layered semiotic system created by artists functioned at the level of individual expression and collective memory, which ensured the transmission of national values in changing historical conditions. The results of the study can be used in teaching Ukrainian art history, art history, cultural studies, curatorial activities, and the creation of museum exhibitions

Keywords: Ukrainian art; national identity; florography; still life; artistic tradition; semiotics; cultural memory

INTRODUCTION

Research into floral symbolism in Ukrainian painting in the second half of the 20th century has become relevant in the context of contemporary geopolitical challenges and the decolonisation of Ukrainian culture. During the Soviet era, Ukrainian artists were forced to seek indirect means of expressing national identity, and floral symbolism became one of the most effective means of symbolically encoding patriotic meanings in visual forms acceptable to the official ideology. Understanding these mechanisms is essential for comprehending the processes of cultural resistance and preservation of national self-awareness in conditions of political pressure. At the same time, the systematic study of floral symbolism as a

holistic cultural phenomenon allows to identify the specifics of the formation of Ukrainian artistic identity and its difference from the Soviet Russocentric cultural model, which was imposed with the aim of unifying national cultures, which is particularly important for the contemporary rethinking of the national artistic heritage.

The issue of symbolism in Ukrainian art attracts the attention of researchers from various fields. S. Biedarieva (2024) analysed the development of artistic practices in Ukraine from the Orange Revolution in 2004 to the current Russian war and concluded that art functions as a key mechanism for constructing identity and anti-colonial resistance. The author proved that Ukrainian artists

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consistently used symbolic systems to express national self-awareness in conditions of political restrictions, creating complex codes of cultural resistance. Y. Horichko (2023) researched Ukrainian identity in the images and symbols of Olena Kulchytska's graphic works. The researcher found that the symbolic images in the works of the Ukrainian artist functioned as carriers of national and cultural meanings, which allowed Ukrainian identity to be preserved under political pressure. The author proved that the iconography of O. Kulchytska's graphic works demonstrated parallels between the horrors depicted and events in Ukrainian history from the early Middle Ages to the second half of the 20th century, emphasising the timeless nature of most images and symbols. This study created a theoretical basis for understanding how Ukrainian artists used symbolic systems to express national self-awareness in complex historical conditions.

A. Pavlyshyn (2022) analysed Ukrainian symbols and archetypes in historical and folkloric imagery. The researcher found that folkloric and historical images in the works of Ukrainian artists carry not only a direct but also a figurative meaning, filled with certain symbolism that allows to function as carriers of national memory. The researcher proved that the structure of a symbol is aimed at immersing a separate phenomenon in the whirlpool of the primary forces of nature and presenting a holistic image of the world through this phenomenon. This study revealed the mechanisms of how natural images, including floral motifs, function as symbolic carriers of national meanings. A. Tkach (2021) explored the contemporary stylisation of Ukrainian song folklore in academic and non-academic practice. The author found that stylisation is characterised by a deep interpenetration of elements of the author's and folkloric foundations, accompanied by the formation of an original artistic text that has a genetic connection with folk melodies. The researcher proved that the effectiveness of folk stylisation in artistic culture is enhanced by the use of authentic folk performance styles. This study confirmed the importance of turning to folk traditions as a means of preserving national identity through artistic creation.

D. Brandenberger (2025) revealed the mechanisms of Soviet historical propaganda and its influence on Ukrainian cultural policy. The researcher established that the Stalinist regime deliberately constructed a "suitable past" that was supposed to combine the pre-revolutionary heritage with the Stalinist present, while marginalising Ukrainian national identity. This study revealed the context in which Ukrainian artists were forced to develop alternative means of expressing national sentiments. O. Nenko (2025) analysed the role of art in the processes of restoring the identity of places disrupted by military action (since 2022). The researcher concluded that artists used symbolic images, including natural motifs, to reconstruct memories of lost places and maintain cultural continuity in conditions of forced displacement.

S. Kot *et al.* (2024) explored the discursive power of digital popular art during the Russian-Ukrainian war. The authors analysed how artists use digital media to shape and transform visual narratives that counter Russian propaganda and strengthen Ukrainian national identity through modern technological means. T. Moldorf & T. Vilkhovchenko (2024) explored floral symbolism in the context of choreographic art and found that floral images function as a multifaceted phenomenon that combines philosophical, cultural, and artistic traditions. Their research confirmed the universal nature of floral symbolism as a means of cultural coding in various art forms. O. Ishchenko & I. Saitarly (2024) proved in their study of the political aspects of floral symbolism that floral images play an important role in shaping state and national identity. The authors found that plant elements in state attributes function as powerful symbols that immortalise historical events and reflect national values, creating a cultural code on the international arena. O. Borzenko (2021) analysed the role of floral symbolism in shaping the emotional context of Lesya Ukrainka's literary works and established a close connection between floral images and folklore traditions. The researcher proved that flowers in Ukrainian culture acquire multiple meanings – from symbols of love to images of national identity.

An analysis of scientific literature has shown that despite the growing interest in the issue of symbolism in Ukrainian art, a comprehensive study of floral symbolism in painting in the second half of the 20th century as a holistic cultural phenomenon has not yet been carried out. The aim of the study was to analyse the evolution and functioning of floral symbols in the works of leading Ukrainian artists of the second half of the 20th century in order to clarify their role in preserving national identity under ideological pressure.

MATERIALS AND METHODS

The methodological basis of the study was a comprehensive approach combining methods of art history, semiotics, and cultural studies. The choice of methodology was determined by the specificity of the object of study – floral symbolism as a complex sign system functioning in a cultural and historical context. The iconographic method was used to analyse the symbolic meanings of floral images in the works of Ukrainian artists. This method made it possible to identify three levels of meaning in a work of art: primary (actual), secondary (conventional) and internal (symbolic). The semiotic approach was used to analyse floral images as sign systems. Semiotic analysis included the study of syntax (relationships between signs), semantics (meanings of signs) and pragmatics (use of signs in communication). This made it possible to consider floral elements not only as decorative motifs, but as carriers of deeper meaning that form the communicative structure of a work of art. Stylistic analysis was used to study the artistic features of the embodiment

of floral motifs in works from different periods. This method included an analysis of compositional decisions, colouristic features, execution techniques and stylistic devices. The contextual method was used to consider floral symbolism in a cultural and historical context. This approach involved analysing the social, political, and cultural conditions that influenced the formation and functioning of symbolic systems. Thus, floral images were considered not in isolation, but as a reflection of social changes and ideological trends, which provides a deeper understanding of their meaning. The hermeneutic method was used to interpret the symbolic meanings of floral images. This approach is particularly important for analysing ambiguous symbols that can have different interpretations depending on the context, which allows to reveal the deeper layers of meaning hidden behind the external image. The comparative-typological method was used to compare floral symbolism in the works of artists from different periods. This approach has made it possible to identify general trends and specific features in the use of floral motifs.

The empirical basis of the study consisted of paintings by Ukrainian artists of the second half of the 20th century: "Peonies" by M. Gluschenko (1950s), "Still Life" by V. Kostetsky (1946), "Mallows" by T. Golembiievka (1950s), "Bird Cherry and Pansies" by I. Krasny (1965), "Roses and Peaches" by O. Shovkunenko (1970s), "Still Life with Flowers" by T. Yablonska (1979), "Lilies of the Valley" by E. Volobuev (1980s). The selection of works is based on their representativeness for different periods and the active use of floral motifs. The chronological scope of the study covers the period from the 1940s to the 1980s, which corresponds to the second half of the 20th century and is characterised by a particular intensity of processes of national self-awareness in Ukrainian art. The theoretical basis of the study was formed by contemporary works on the semiotics of art, decolonial studies, cultural studies, and research on national identity under political pressure.

RESULTS AND DISCUSSION

An analysis of the evolution of floral symbolism in Ukrainian painting in the second half of the 20th century has allowed to identify three main periods, each characterised by specific features in the use of floral motifs and their symbolic meaning. This periodisation reflects not only artistic but also socio-political changes that influenced the possibilities and strategies for expressing national identity through art. The wartime and post-war period of the formation of socialist realism (1940-1953) was characterised by artists' use of floral images as symbols of hope and affirmation of life in the context of wartime trials and post-war reconstruction. This period combined two interrelated processes: the need to restore spiritual strength after the trauma of war and the simultaneous adaptation to the new ideological requirements of the Soviet regime. Ukrainian artists used

visual metaphors to transition from mimetic representation to the ideal level, seeking to find a source of spiritual strength and optimism in natural images. Floral symbolism was particularly emotionally charged and pathetic, reflecting the desire for national revival (Mudrak, 2019). At the same time, artists found a balance between expressing national sentiments and complying with official cultural policy, which made floral symbolism a particularly valuable process of "safe" cultural coding of patriotic meanings (Biedarieva, 2024).

An early example of such cultural coding is the work of painter V. Kostetsky, who used floral motifs to express patriotic feelings. V. Kostetsky, a graduate of the Kyiv Art Institute, developed as an artist in the difficult conditions of the war and post-war period, when issues of national identity became particularly acute against the backdrop of destructive processes and the need for spiritual revival. The painting "Still Life" (1946) (Fig. 1), depicting cornflowers, daisies and roses, is a complex symbolic system in which each flower has a specific national meaning. Compositionally, the work is built on the principle of a central group, where flowers are gathered in casual bouquets in small vases, emphasising the naturalness and sincerity of the expression. Cornflowers, traditionally associated with Ukraine due to their blue colour reminiscent of the Ukrainian sky, are combined with daisies as symbols of purity, innocence and simplicity of the national soul, while roses function as a sign of love and beauty. This composition created a kind of "picturesque anthem" to the native land (Ogiievskia & Golub, 2014).



Figure 1. Volodymyr Kostetsky, "Still Life", 1946
Source: I.V. Ogiievskia & O.E. Golub (2014)

The technical execution of the work demonstrates the artist's academic training: a realistic style of depiction is combined with a subtle sense of colour and chiaroscuro. V. Kostetsky used the technique of oil painting with moderate impasto, which allowed to achieve clarity of form and at the same time convey the delicate texture of the petals. The artist chose these particular flowers, which had deep symbolic meaning in

folk tradition, but at the same time did not arouse the suspicion of censors as manifestations of “bourgeois nationalism”. The artist turned to wildflowers rather than cultivated garden plants, emphasising the connection with folk culture and the natural environment of Ukraine. This strategy allowed the artist to create a work that functioned on two levels simultaneously: as an aesthetically appealing still life for official perception and as a coded message about national identity for the informed viewer. This became a model of how Ukrainian artists of the 1940s found ways to preserve national discourse within the limits of permitted artistic forms, creating a foundation for the further development of national art under ideological restrictions.

This line was continued by the artist M. Glushchenko's work “Peonies” (1950-1953) (Fig. 2), which showed the use of floral images as symbols of rebirth after the destruction of war. Peonies in the work are multifunctional symbols that combine universal meanings (beauty, blossoming, vitality) (Ukraineflora, 2024) with nationally specific meanings (the rebirth of Ukraine, the optimism of the post-war period). The choice of peonies was not accidental; in Eastern tradition, these flowers symbolised honour, wealth and nobility, which in the context of post-war Ukraine took on the meaning of hope for the restoration of national dignity and cultural prosperity. The artist skilfully used bright, saturated colours – red, pink and white shades of petals against a background of rich green foliage, which emphasised the life-affirming nature of the symbolism and created a sense of festive solemnity. Compositionally, the work is built on the principle of a frontal presentation of a bouquet of flowers, which gives the image a monumentality and solemnity characteristic of the art of the early post-war years. The impasto technique of oil painting allowed the artist to convey the rich texture of the petals and create the effect of the material presence of flowers, which reinforced their symbolic meaning as signs of a real, tangible rebirth of life.



Figure 2. Mykola Glushchenko, “Peonies”, 1950s
Source: M. Glushchenko (n.d.)

During the war and post-war period (1940-1953) and during the formation of socialist realism, the need to adapt floral symbolism to the requirements of official ideology occupied a special place. The Stalinist regime attempted to create a “suitable past” that would combine the pre-revolutionary heritage with the Stalinist present, while marginalising Ukrainian national specificity (Brandenberger, 2025). In such conditions, artists found ways to preserve national traditions within ideologically safe themes: everyday scenes, natural motifs, labour themes, while avoiding direct national symbols or historical allusions. Floral symbolism became one of the most effective means of such preservation, as floral images were not perceived by the authorities as politically dangerous or nationalistic.

A characteristic example of such adaptation was the work of professor and People's Artist T. Golembiievska, who created the work “Mallows” (Fig. 3) in the 1950s. The artist presented mallows in the context of a peasant hut window, symbolising the boundary between the inner private and outer public worlds. The compositional solution with the flowers placed on the windowsill created an intimate atmosphere and emphasised the role of mallows as guardians of the hearth according to Ukrainian folk beliefs. In traditional Ukrainian symbolism, hollyhocks were associated with maternal care and family stability – these tall flowers, which withstand inclement weather near the walls of houses and fences, symbolise the unbreakable bonds of family and loyalty to the home. The artist skilfully used a soft, pastel colour scheme – the delicate pink and purple shades of the flowers harmoniously combine with the warm ochre tones of the wooden window frame, creating a sense of calm and homely comfort (Shamoi *et al.*, 2023). The realistic style characteristic of the official art of that period was combined with subtle lyricism in the rendering of light and shadow effects and the texture of flower petals. This interpretation allowed viewers to recognise in the image of mallows not only a decorative motif, but also a profound symbol of cultural memory and national identity, encoded in the “safe” form of an everyday still life.

The “thaw” period (1954-1965) brought new opportunities for artistic expression and exploration of more intimate and personal themes. The policy of de-Stalinisation initiated by N. Khrushchev created space for a cautious but noticeable departure from the rigid canons of socialist realism (Opulski, 2019). Artists were given the opportunity to experiment with form, address universal human themes, and move away from straightforward ideological engagement. Floral symbolism was characterised by greater sophistication, psychological depth and lyricism, allowing artists to turn to refined forms of expressing national identity through conceptual rather than literal means (Mudrak, 2019). During this period, floral images became a means of subtle psychological

self-expression, allowing artists to explore the inner world of man and his connection with nature without direct political connotations.



Figure 3. Tetiana Golembiievska, "Mallows", 1950s
Source: T. Golembiievska (n.d.)

A special place in the floral symbolism of this period was occupied by the bird cherry, which was embodied in the watercolour painting by architect and graphic artist I. Krasny, "Bird Cherry and Pansies" (1965) (Fig. 4). The choice of bird cherry as the central motif was symbolically significant – this tree, one of the first to bloom in spring, embodies the hope for spiritual renewal of society and the possibility of freer self-expression. In traditional Ukrainian symbolism, bird cherry is associated with tenderness, youth and purity, while pansies symbolise fidelity, devotion and wisdom. The combination of these floral images created a symbolic composition that reflected the ideas of national memory and spiritual revival in the context of the "thaw" period. This combination of youth (bird cherry) and wisdom (pansies) is a synthesis of the new and the traditional, characterising the cultural processes of the "thaw" and the desire for renewal while maintaining a connection with national roots. The composition is based on the principle of asymmetrical balance, where the branches of the bird cherry tree create a natural rhythm, directing the viewer's gaze from the upper left corner to the centre of the work. The snow-white bird cherry blossoms, rendered with thin transparent strokes, contrast with the bright purple and yellow pansies located in the lower part of the composition. The watercolour technique allowed the artist to skillfully convey the different textures of the plants: the

airiness of the bird cherry blossoms through transparent washes and the density of the pansy petals through more saturated colour spots.

The period of late Soviet art (1966-1980) was characterised by a gradual liberation from the dogmas of socialist realism and a search for individual artistic languages. The processes of liberalisation in cultural life that began after Stalin's death created space for more personal forms of artistic expression by 1966. Floral symbolism acquired greater philosophical depth, individualisation and aestheticisation. Artists used floral images to express existential themes, personal experiences and the search for spiritual values.



Figure 4. Ivan Krasny, "Bird Cherry and Pansies", 1965
Source: Encyclopedia of Modern Ukraine (n.d.)

The symbolism of roses was embodied in the work of artist O. Shovkunenko, "Roses and Peaches" (1970s) (Fig. 5). In this work, roses, as symbols of ideal beauty and aesthetic perfection, embodied the artist's desire to create an image of unchanging, eternal beauty beyond ideological limitations. The choice of roses as the central motif reflected a return to classical aesthetic values and universal ideas of beauty. The author demonstrated masterful command of oil painting technique and classical principles of compositional structure. The roses, located in the centre of the composition, are painted using the impasto technique, which emphasised the velvety texture of the petals and created a sense of their materiality. This technique maximally conveyed the beauty of the floral forms, emphasising their luxury and nobility. The artist used a rich range of red and pink shades – from deep burgundy to pale pink – which conveyed the different stages of the roses' bloom. This colouristic diversity created a sense of aesthetic completeness, where each shade corresponded to a certain aspect of

beauty, from bright saturation to refined tenderness. O. Shovkunenko created a work that affirmed the right of art to beauty in conditions of the dominance of utilitarian approaches to artistic creativity.



Figure 5. Oleksii Shovkunenko, "Roses and Peaches", 1970s

Source: O. Shovkunenko (n.d.)

In the work of T. Yablonska, floral symbolism acquired a special philosophical depth and psychological expressiveness. The painting "Still Life with Flowers" (1979) (Fig. 6) demonstrated the search for more personal forms of artistic expression characteristic of the 1970s and a shift from monumental compositions to intimate, meditative images. T. Yablonska, known for her large-scale canvases on civic themes ("Morning", 1954; "Bread", 1949), turned to the intimate genre of still life as a space for the coded expression of feelings during this period. In the artist's diaries, it was noted the importance of natural motifs as a means of conveying emotional states and spiritual quests (Atayan, 2020). The composition of the still life is a bouquet combining daffodils and wheat ears among general green leaves in a ceramic pot. This combination of symbols of spring (daffodils) and summer (ears of wheat) created a complex temporal metaphor reflecting the cyclical nature of nature and the continuity of life on Ukrainian soil. The still life was painted in spring, when the daffodils were fresh and the ears of wheat from the previous year's harvest were still preserved. This compositional idea allowed the artist to combine different seasons in a single artistic expression. In classical symbolism, daffodils embody the ideas of rebirth, spring renewal and self-knowledge

(Gladka, 2019), which in the context of the 1970s took on the meaning of an inner spiritual search and a desire for national authenticity. Wheat ears, as a traditional symbol of Ukrainian land and its fertility, function as a veiled sign of patriotic feelings. The artist could openly depict this agricultural symbol without arousing the suspicion of the censors, but for the conscious viewer it was a clear national code. The green leaves that unite these symbols created a natural basis for the composition and reinforced the impression of living, unspoiled nature as the embodiment of national identity.



Figure 6. Tetiana Yablonska, "Still Life with Flowers", 1979

Source: T.N. Yablonska (n.d.)

The technical execution of the work demonstrated the artist's mature skill: thick strokes of oil paint created a rich texture, both in the delicate petals of the daffodils and the rough surface of the ears of corn. T. Yablonska used different densities of paint: thin, transparent strokes to convey the spring tenderness of daffodils contrast with denser, textured strokes to depict ripe ears of corn, emphasising the symbolic contrast between youth and maturity, the beginning and end of the natural cycle. The colour scheme is based on the contrast between the warm ochre tones of the pot and the cool grey-blue shades of the background, emphasising the central role of the bouquet of flowers in the composition. The golden hues of the ears of corn harmoniously combined with the warm colour of the ceramics, creating a feeling of comfort and family well-being, while the white daffodils added a note of freshness and purity. This work demonstrated T. Yablonska's ability to create multi-layered symbolic messages, where patriotic meanings were encoded through traditional Ukrainian images of nature, which remained aesthetically appealing and ideologically "safe" for official perception.

During the same period (1970-1990), the work of artist E. Volobuev, known for his landscapes and still lifes, took its place in the search for individual artistic languages. Volobuev's creative style was influenced by impressionist trends and neo-romantic moods, which allowed to create works devoid of any ideological bias. "Lilies of the Valley" (1980s) (Fig. 7) embodied the idea of modest beauty and spirituality characteristic of the artistic explorations of the 1970s and 1980s. The choice of lilies of the valley as an artistic motif was programmatic; these flowers symbolise a departure from the pomposity of official art to chamber, intimate images that resonated with the inner world of the viewer. Volobuev's attention was most often drawn to those objects of nature that primarily influenced a person's poetic moods – trees, flowers, fruits, birds. In the language of flowers, lily of the valley meant "I have loved you for a long time and secretly," which gave these flowers a special intimacy (Liedenko, 2022). This symbolism of secret love took on additional meaning in the context of Soviet reality – as a metaphor for hidden love for true beauty and spirituality, untainted by ideology. The artist conveyed the subtle beauty of these flowers through the delicate play of light and shadow on their bell-shaped inflorescences. The lily of the valley flowers against the backdrop of green leaves created a sense of pristine purity and innocence. The artist skilfully used the technique of impasto to convey the texture of the leaves and the delicate gradations of white in the flowers. The composition is based on the principle of natural ease, where the lilies of the valley seem to have found their place in the space of the canvas themselves. The organic nature of the composition also reflected the artist's desire for harmony with nature as an alternative to the artificiality and imposition of official culture. The white colour scheme of the lilies of the valley contrasted with the rich green background, creating a glowing effect that emphasised the spiritual, almost sacred nature of these flowers.

Semiotic analysis revealed that floral images functioned on three levels of meaning. The iconic level was associated with the visual similarity of the depicted flowers to real objects. Ukrainian artists paid attention to accurately conveying the visual characteristics of flowers – their shape, colour, and texture – for their recognisability and emotional impact on the viewer. The indexical level was formed through the contextual connections of floral images with specific phenomena and concepts. For example, bird cherry was associated with spring, creating an indexical connection with the ideas of renewal and rebirth, while hollyhocks, which usually grew near peasant homes, were indexically linked to the concept of home and family. The symbolic level proved to be more complex and culturally conditioned, with floral images functioning as carriers of conventional meanings formed in cultural tradition.



Figure 7. Evhen Volobuev, "Lilies of the Valley", 1980s
Source: Z. Borovets (2022)

The system of floral symbols was characterised by its multi-layered and multifunctional nature. Peonies functioned as symbols of rebirth and vitality, forming meanings based on natural characteristics (large, bright, luxurious flowers) and cultural connotations (association with prosperity and wealth). In the work of M. Gluschenko, peonies acquired additional significance as symbols of national rebirth after the destruction of war. Cornflowers were traditionally national symbols of Ukraine, based on folk traditions and visual associations (the colour blue was associated with the Ukrainian sky). In the works of V. Kostetsky, cornflowers, as metonymic symbols of Ukraine, allowed the artist to express patriotic feelings in an acceptable form.

In Ukrainian culture, hollyhocks symbolised home comfort and family well-being, forming meanings based on gardening traditions and folklore beliefs. In T. Golembiievska's work, mallows are symbols of private space, as opposed to the official public sphere. In traditional symbolism, bird cherry is associated with tenderness, youth and purity, based on its natural cycle of early spring flowering and established cultural beliefs. Daffodils and ears of corn in T. Yablonska's work combined the symbols of spring rebirth and summer fertility, creating a multi-layered metaphor for the cyclical nature of nature and the continuity of national life. Roses symbolised beauty and love, and in the context of national art, they acquired the additional meaning of aesthetic perfection. Lilies of the valley symbolised modesty and spirituality.

The results of the study allowed to rethink the role of floral symbolism in Ukrainian painting in the second half of the 20th century. The analysis showed that floral

symbolism functioned as a complex semiotic system that played an important role in preserving and transmitting national identity under ideological pressure. The results of the study confirmed the conclusions of S. Biedarieva (2024) regarding the functioning of art as a mechanism for constructing identity and anti-colonial resistance. The data obtained expanded her theoretical positions and demonstrated that floral symbolism was one of the most effective and at the same time safe means of such cultural coding, as it combined aesthetic appeal with deep symbolic meaning, which made it possible to circumvent the ideological restrictions of the Soviet regime. While S. Biedarieva examined the general mechanisms of anti-colonial resistance through art, the analysis conducted specified these mechanisms through the study of the specific phenomenon of floral symbolism. D. Brandenberger's (2025) study of the Russocentric policy of the Stalinist regime revealed the historical context in which Ukrainian artists were forced to develop alternative means of expressing national sentiments. The results of the analysis confirmed his conclusions about the marginalisation of Ukrainian national identity, demonstrating specific strategies used by artists to preserve national meanings through floral symbolism under conditions of ideological control.

The evolutionary nature of floral symbolism proved to be important. The study showed that the system of floral symbols was not static but developed in line with changes in the socio-political context. From the pathetic symbols of rebirth during the war period (peonies by M. Gluschenko, cornflowers by V. Kostetsky) through images of domestic comfort adapted to socialist realism (T. Golembiievsk's mallows) to the lyrical symbols of spiritual renewal of the "thaw" period (I. Krasny's bird cherry) and the philosophical reflections of the late Soviet period (O. Shovkunenko's roses, T. Yablonska's daffodils and ears of corn, E. Volobuev's lilies of the valley). The evolutionary nature revealed confirmed and at the same time specified the conclusions of M. Mudrak (2024), who analysed the use of symbolism by Ukrainian artists as a means of transition from mimetic representation to the ideal level. While M. Mudrak considered the general principles of the symbolist method, the analysis demonstrated how these principles functioned specifically in floral symbolism, revealing three clearly defined periods of evolution in line with political changes.

An analysis of the artists' work revealed individual characteristics in their use of floral symbols. M. Gluschenko gravitated towards monumental forms of symbolism, using bright colours to emphasise the life-affirming nature of his images. V. Kostetsky developed patriotic symbols, creating "picturesque hymns" to the native land through a combination of national floral symbols. T. Golembiievsk focused on the intimate aspects of national identity, using mallows as symbols of private space. I. Krasny used lyrical forms of symbolism, conveying them through watercolour techniques. T. Yablonska

combined symbols of different seasons (daffodils and ears of corn) in her work, creating multi-layered metaphors of the cyclical nature of nature and national life. O. Shovkunenko developed aesthetic symbolism, using roses as symbols of ideal beauty and aesthetic perfection. E. Volobuev created a system of symbols of spiritual connection with nature. These individual characteristics testified to the diversity of Ukrainian floral symbolism, which was not reduced to a single scheme but had different approaches and interpretations. At the same time, all these approaches were united by a common function – to express and support national identity. Most of the floral symbols used by artists had deep roots in Ukrainian folklore tradition, which ensured their comprehensibility to a wide audience and enhanced the emotional impact of the works. This fully correlated with the theoretical conclusions of O. Afonina (2018), who established that cultural code is an established structure that conveys information historically concentrated in signs and symbols. The analysis specified her theory of "double" coding, demonstrating how Ukrainian artists created multi-level messages through floral symbolism: the surface layer (the aesthetic appeal of flowers) was perceived by a wide audience, while the deeper national meanings were revealed only to the knowledgeable viewer.

The study also revealed gender aspects of floral symbolism. Female artists (T. Golembiievsk, T. Yablonska) more often referred to the intimate aspects of floral symbolism associated with family, home space, and natural life cycles. Male artists (M. Glushchenko, V. Kostetsky, I. Krasny, O. Shovkunenko, E. Volobuev) more often used floral images to express civic and patriotic feelings or philosophical reflections. These observations correlated with the conclusions of O. Zavyalova & H. Stakhevych (2022), who pointed out that women's artistic practice was formed in conditions of social restrictions, which determined specific genre and thematic preferences, in particular, the appeal to intimate, chamber space in creativity. The results of the study showed that cultural identity can be preserved and transmitted through symbolic systems that are not perceived as threatening by the authorities. This is relevant for understanding contemporary cultural processes, as confirmed by research by S. Kot *et al.* (2024) on the use of traditional symbols in contemporary war art. Their conclusions about the functioning of traditional Ukrainian heritage in contemporary digital art as a means of countering propaganda echo the patterns identified in 20th-century floral symbolism. This demonstrated the continuity of Ukrainian cultural resistance strategies throughout various historical periods, from Soviet ideological pressure to the current war with Russia.

Contemporary research on the decolonisation of Ukrainian art history, conducted by S. Demchuk & I. Levchenko (2024), confirmed the conclusions about the need for Ukrainian artists to develop alternative means of expression. The authors proved that the

introduction of the Soviet system of “art studies” in 1937 led to a break with Western scientific discourse, which correlates with observations about the necessity of searching for “safe” forms of national self-expression, which became floral symbolism. The context of academic activism, researched by J. Costas *et al.* (2024), coincided with the conclusions about the role of art as a form of cultural resistance. While the authors considered contemporary forms of academic activism in wartime, the study revealed historical precedents of cultural resistance through symbolic systems in the 20th century, confirming the continuity of Ukrainian strategies for preserving national identity. The bibliometric analysis by S. Nazarovets & O. Mryglod (2025) on the low integration of Ukrainian research into the global academic community partially explained the insufficient study of the phenomenon of floral symbolism in Ukrainian painting, which makes this study particularly relevant for filling this gap in scientific discourse.

Thus, the study not only revealed the aesthetic and symbolic multidimensionality of floral imagery in Ukrainian painting of the second half of the 20th century, but also demonstrated its significance as a stable form of cultural resistance and preservation of national identity in conditions of political pressure. Floral symbolism emerged not only as an artistic technique, but as a deeply rooted communicative system capable of transmitting collective meanings, values, and memory in a visually accessible but ideologically “safe” form.

CONCLUSIONS

The evolution of floral symbolism during the second half of the 20th century took place in three main stages, each of which was characterised by specific features in the use of floral motifs. The war and post-war period (1940-1953) was marked by the use of floral images as symbols of hope and affirmation of life, which was embodied in the works of V. Kostetsky and M. Gluschenko. At the same time, floral symbolism was adapted to the official ideology of socialist realism, as shown in the works of T. Golembiievska. The “thaw” period (1954-1965) brought greater sophistication and psychological depth to the works of I. Krasny. The period of late Soviet art (1966-1980s) was marked by philosophical depth and individualisation in the works of O. Shovkunenko, T. Yablonska and E. Volobuev.

The symbolic meanings of the main floral motifs were formed on the basis of a combination of the natural characteristics of flowers with cultural traditions. As the analysis showed, peonies in M. Gluschenko’s work

symbolised rebirth and vitality after the destruction of war. Cornflowers in the works of V. Kostetsky functioned as metonymic symbols of Ukraine, embodying love for the native land. Mallows in the works of T. Golembiievska meant family well-being and private space. Bird cherry in the watercolours of I. Krasny symbolised spring renewal and national memory. Daffodils and ears of corn in T. Yablonska’s work combined symbols of spring rebirth and summer fertility, creating a metaphor for the cyclical nature of nature and the continuity of national life. O. Shovkunenko’s roses symbolised beauty and aesthetic perfection. E. Volobuev’s lilies of the valley embodied a spiritual connection with nature and modest beauty. The revealed system of floral symbols demonstrated a deep rootedness in folklore traditions, which ensured their effectiveness as means of cultural communication and transmission of national meanings across generations. The processes of cultural coding included direct symbolic representation (cornflowers as symbols of Ukraine), metonymic substitution (natural images instead of political themes) and allegorical cultural coding (complex compositions with multi-level meanings). Decoding was carried out by viewers who possessed cultural codes, which created a special form of cultural communication outside of official discourse.

The individual characteristics of the use of floral symbols in the works of different artists testified to the diversity of Ukrainian floral symbolism. Each artist developed own interpretation of floral images, which were united by the common function of expressing national identity. The gender differences identified in the use of floral symbolism opened up prospects for further research into the role of gender in the processes of cultural coding. Prospects for further research include the study of floral symbolism in contemporary Ukrainian military art, analysis of the transformation of traditional symbolism under the influence of globalisation processes, comparative study of floral symbolism in the art of different regions of Ukraine, as well as research into its functioning in the context of decolonial studies and cultural resistance theory.

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Квітковий символізм в українському живописі другої половини ХХ століття

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Анотація. Актуальність дослідження зумовлена необхідністю комплексного вивчення квітового символізму як важливого засобу збереження та трансляції національної ідентичності в українському живописі періоду ідеологічних обмежень (1940-1980-х рр.), що має особливе значення для розуміння механізмів культурного опору та формування національної свідомості. Метою дослідження був комплексний аналіз особливостей розвитку квітового символізму в українському живописі у другій половині ХХ ст. та визначення його ролі у формуванні національної художньої ідентичності. Застосовано комплекс мистецтвознавчих методів: іконографічний аналіз символічних значень, стилістичний аналіз художніх особливостей та семіотичний підхід для розкриття системи символів. Проаналізовано творчість провідних українських художників (М. Глущенко, В. Костецький, Т. Голембієвська, І. Красний, О. Шовкуненко, Т. Яблонська, Є. Волобуєв) у період 1940-1980-х рр. Визначено еволюцію квітового символізму від символів надії 1940-х рр. через пошуки національної ідентичності періоду «відлиги» до філософського осмислення буття. У процесі дослідження з'ясовано символічне навантаження ключових квіткових мотивів, наприклад, півонія асоціюється з відродженням, волошка – з любов'ю до рідної землі, мальва виражає ідею родинного добробуту, а поєднання нарциса й колосся втілює циклічність природи. Доведено використання квіткових образів як засобу непрямого вираження патріотичних почуттів в умовах ідеологічних обмежень. Встановлено, що створена художниками багатозарова семіотична система функціонувала на рівні індивідуального висловлювання та колективної пам'яті, яка забезпечувала трансляцію національних цінностей у змінюваних історичних умовах. Результати дослідження можуть використовуватися у викладанні історії українського мистецтва, мистецтвознавстві, культурології, кураторській діяльності та створенні музейних експозицій

Ключові слова: українське мистецтво; національна ідентичність; флорографія; натюрморт; художня традиція; семіотика; культурна пам'ять



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Evolution of ethnic and urban women's clothing of Slobozhanshchyna during the 20th century

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Abstract. The relevance of the current study is conditioned by the need for in-depth analysis and preservation of the cultural heritage of the region, since the interaction of traditional forms and influences of the urban environment on women's clothing of Slobozhanshchyna during the twentieth century remains insufficiently investigated. The purpose was to comprehensively investigate the specifics of the evolution of ethnic and urban women's clothing, its spatial characteristics and features of decoration on the territory of Slobozhanshchyna in the 20th century. The study used the following methods of scientific cognition: historical, cultural, and comparative historical analysis. The study provided a thorough description of the complex of traditional women's clothing of Slobozhanshchyna, highlighting its typical elements, silhouette solutions, colouristics, and symbolism. Shirts, aprons, belts, hats, chest and upper elements of clothing, and typical embroidery ornaments and their compositional arrangement were analysed. The study also focused on the analysis of transformational processes in ethnic and urban women's clothing of Slobozhanshchyna residents during the 20th century. Factors that contributed to the changes were analysed, in particular, the availability of factory fabrics, lifestyle modifications, the spread of urban fashion trends, and public policies regarding folk culture. A design project of the contemporary ethnocollection of women's costume has been developed. The collection was based on a deep understanding of the architectonics, colouristics, and ornaments of traditional clothing of Slobozhanshchyna, adapting these elements to the requirements of contemporary fashion. The practical value of the study lies in the possibility of applying its results to integrate ethnic motifs into everyday and festive clothing. The results obtained serve as a basis for creating innovative design solutions that contribute to the popularisation and rethinking of the national cultural heritage

Keywords: ethnography of Slobozhanshchyna; traditional costume; transformation of clothing; collection; amateur fashion; embroidery

INTRODUCTION

The investigation of the evolution of clothing is extremely relevant, because it is an integral part of the material and spiritual culture of society. The outfit not only reflects the historical events and climatic conditions of the region, but also carries deep national features of the life of the people. It is a hallmark of the era, which allows understanding the dynamics of social change, aesthetic preferences, and worldview of past generations, making it a valuable source for learning about cultural heritage. The study of the evolution of regional women's clothing in the 20th century is multifaceted and attracts the

attention of researchers both in Ukraine and abroad. Contemporary studies actively consider the transformation of the costume, its social functions, and the influence of historical events on fashion trends.

In particular, the Ukrainian researcher V. Sushko (2024) in the publication focused on the study of folk clothing of the Ukrainian Slobozhanshchyna as a component of cultural heritage, focusing on regional features of cut, symbolism of ornaments, and the role of clothing in the development of local identity. O. Korniienko (2021) focused on investigation of the role of Ukrainian fashion

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houses as centres of representation of Soviet fashion. In the paper, the researcher analysed how state fashion institutions in Ukraine functioned not only as clothing manufacturers, but also as tools of ideological influence, forming standards of appearance, taste, and behaviour in accordance with the official Soviet cultural policy. N.V. Chuprina & O. Tereshchenko (2023) discussed how traditional Ukrainian ornaments are transformed and integrated into contemporary clothing and accessories. The researchers analysed the role of ornamental motifs as a cultural code that not only preserved national identity, but also served as a source of inspiration for contemporary designers. Special attention was paid to the interpretation of patterns in the context of fashion, their symbolism, and adaptation to contemporary aesthetic trends.

K. Pletsan (2022) considered historical and cultural heritage, and the preservation of traditions during ethno-festivals in the space of creative industries, focusing on their role as a tool for development and opportunities for cultural self-realisation, and on the regional features of the authenticity of the Ukrainian people, manifested through these events. L. Ovakimian (2022) focused on studying the impact of social and political events, in particular, revolutions and wars, on the popularisation of Ukrainian national motifs in contemporary fashion design. The researcher investigated how traditional elements of folk costume – embroidery, ornaments, symbols – were integrated into contemporary fashion, becoming not only an aesthetic trend, but also a means of expressing national identity and social position. She emphasised the role of these events as catalysts for the revival of ethnic culture through clothing.

Foreign researchers have also made a significant contribution to understanding the processes of fashion transformation. A.C. Simpson (2021) analysed the “post-Soviet aesthetic” in fashion, which has turned from an underground movement into a global trend. The researcher proved that this trend, which became popular due to designers from the former USSR, was not just a variation of postmodernism. According to the researcher, its uniqueness lies in its special cultural

semantics, which comes from the experience of life in the Soviet Union. S.N. Minhus & L. Huie (2021) in their paper explored how wearing traditional clothing at festivals contributes to the revival of cultural heritage. Using the example of “Pohela Boishakh” festival in Bangladesh, they found that traditional costumes are a key element that emphasises unity, simplicity, aesthetics, and tolerance, which, in turn, increases the significance of the festival itself. Such researchers as D. Sorea & M. Borcoman (2025) examined women’s folk costume from the city of Rupea, Romania. They analysed it as an important element of cultural heritage, demonstrating sustainability and adaptability in the contemporary world. The researchers looked at how the traditional costume is integrated into contemporary fashion trends, while maintaining its unique identity.

The analysis of scientific papers allowed forming a holistic view of the complexity and versatility of the topic under study. Based on it and considering the identified gaps, the purpose of this study was to investigate the evolution of women’s clothing of Slobozhanshchyna during the 20th century, identify key periods of its transformation, and analyse socio-cultural factors that influenced the development of fashion trends.

MATERIALS AND METHODS

The study was based on a comprehensive approach that combined different methods of cognition to achieve the goal. The main ones were the historical method, which allowed tracing the chronology of changes and the context of events; cultural analysis, which allowed assessing the symbolic meaning and aesthetic aspects of clothing; and the comparative historical method, which allowed identifying common and distinctive features in the evolution of women’s costume Slobozhanshchyna in comparison with other regions and pan-European trends. Materials for the study were museum collections (Kharkiv historical museum named after M.F. Sumtsova, open-air ethnographic museum “Ukrainian Sloboda” in Pysarivka), photo archives (Lukianets, 2018), textile samples, and specialised scientific literature (Table 1).

Table 1. Characteristics of specialised scientific literature used in the study

Branch of literature	Specialisation	Keywords
Ethnographic literature	Research of traditional folk clothing, its elements, materials, embroidery techniques, and symbols.	“Ethnography of Slobozhanshchyna”, “Folk clothing of Kharkiv region”, “Traditional costume of Slobozhanshchyna”.
Historical literature	Analysis of socio-economic and cultural processes of the 20 th century that influenced changes in clothing.	“History of Slobozhanshchyna of the 20 th century”, “Urbanisation in Ukraine”, “Everyday life of Ukrainians of the 20 th century”.
Art history literature	Study of clothing as a part of material culture, decorative and applied arts, and aesthetics.	“Ukrainian decorative and applied arts”, “Art of embroidery”, “Ukrainian costume”.
Literature on the history of fashion	Research of urban clothing, the influence of Soviet and world fashion on Ukrainian costume, transformation of styles.	“Fashion history of the 20 th century”, “Soviet fashion”, “Urban suit of the 20 th century”.

Source: compiled by the author of the study

The study stages included:

1. Collection and systematisation of materials: search and analysis of archival documents, photographs, periodicals (fashion magazines, newspapers), museum collections, memoirs of eyewitnesses.

2. Period analysis: a detailed study of each of the four selected periods (1900-1930, 1940-1950, 1960-1980, 1990-2000) in terms of prevailing styles, materials, decorative elements, and overall style.

3. Identifying causal relationships: establishing the relationship between historical, economic, social, and political events, and changes in women's clothing.

4. Creation of a visual collection: based on the collected materials, a digital collection of images was developed to clearly demonstrate the evolution of the outfit. Adobe Illustrator graphics editor and tools for organising and cataloguing visual content were used to create it.

The use of a comprehensive methodological approach helped to comprehensively cover the subject of research and provide an interdisciplinary analysis of changes in women's clothing in Slobozhanshchyna during the 20th century. The combination of historical, ethnographic, and art history aspects revealed not only the external transformations of the costume, but also the deeper socio-cultural processes that predetermined them.

RESULTS AND DISCUSSION

Characteristics of the main elements of the traditional women's costume of Slobozhanshchyna of the 20th century. Ukrainian ethnic women's costume is a complex of items of clothing that are harmoniously combined with each other and includes: undergarments, waist, chest, and outerwear. The costume was complemented by hats, shoes, belts and a variety of removable jewellery. Each of the elements of clothing could be combined into a complex with any elements of clothing, while each of which had a specific purpose. Slobozhanshchyna or Sloboda Ukraine is a historical and geographical region that covers most of the Kharkiv, eastern Sumy, northern Luhansk and Donetsk regions of Ukraine. Analysis of sources as

T.V. Kara-Vasyliieva (2008), L. Ponomar (2016), M.V. Oliinyk (2018) allowed identifying information about the components of ethnic Ukrainian women's costume, to determine that the transfer of regional belonging to the Ukrainian costume is possible with the help of the colour scheme of threads, certain symbols, cut, embroidery techniques, jewellery, and decor. Certain historical and socio-economic circumstances, a variety of natural and climate conditions, and the type of relations between people had a significant impact on the appearance of distinctive features of national embroidery in different regions of Ukraine. Considering the national clothing of Sloboda Ukraine, it was revealed that clothing has a great relationship with folk traditions and everyday life.

The main elements that include traditional Ukrainian women's costume are identified: shirt; kersetka; plakhta (derga); apron; yupka; coat; cap; wreath; shawl; morocco or leather boots; coral or coin beads (Odarchyk & Tsarynnyk, 1992). Among the main elements (Fig. 1) shirt – the basis of the Ukrainian costume, made of linen or hemp fabric, could be with long or short sleeves, richly decorated with embroidery on the collar, front, cuffs, and hem. Embroidery had not only decorative, but also amulet significance, and its ornaments and colours differed depending on the region. Plakhta (derga) – unstitched waist clothing consisting of two or more panels that were wrapped around the camp. Plakhta was a festive garment, made of woolen fabric, often in a cage or with geometric patterns. Derga was a simpler option, usually made of black or dark fabric. Kersetka (corsage, bodice) – sleeveless clothing that tightly fit the upper body, emphasising the waist. It was made of more expensive fabrics (brocade, silk, velvet), often decorated with embroidery, appliques, braid, buttons, worn over a shirt. Yupka – demi-season outerwear that looked like a long jacket or short caftan. Usually sewn from cloth, wool, sometimes lined. It could be fitted or loose, often decorated with embroidery, fur, braid. Morocco or leather boots are traditional shoes made of leather. Morocco boots were festive, made of thin, soft, often coloured leather (red, green, yellow). Leather boots were more casual. Morocco and leather boots are shown in Figure 2.



Figure 1. Main elements of the Ukrainian traditional women's costume

Note: a – embroidered shirt from Slobozhanschina; b – plakhta (derga); c – kersetka; d – yupka (“kohta”)

Source: H.V. Lukianets (2018)

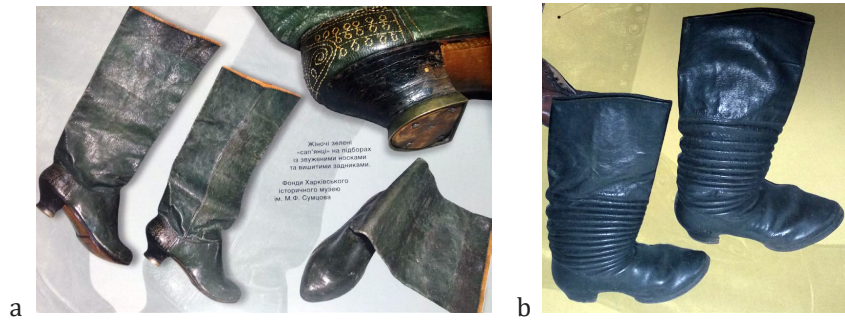


Figure 2. Shoes for the Ukrainian traditional women's clothing

Note: a – morocco women's boots; b – leather boots with accordion-style tops

Source: H.V. Lukianets (2018)

Among the accessories shown in Figure 3 were multi-coloured wool belts – an important and expressive element of Ukrainian traditional costume, especially in women's clothing. They not only served a practical function (supported clothing), but also had a deep symbolic, aesthetic, and social significance. Apron – worn over a plakhta or yupka, was of two types: front (apron) and rear (zapaska). It was made of linen, wool or silk, often richly decorated with

embroidery, lace, appliques, which emphasised the status and skill of the owner. Cap – a headdress of married women that completely covered their hair, had a variety of shapes and sizes, depending on the region, and was often richly decorated with embroidery, lace, and beads. Beads made of coral or coins – was very common and was considered a talisman. Large metal coins (or imitations of them) were attached to a necklace, symbolising prosperity and status.



Figure 3. Accessories for Ukrainian traditional women's clothing

Note: a – multi-coloured wool belts; b – apron; c – coral necklace (7 strands) with silver coins; d – festive cap; e – everyday cap

Source: H.V. Lukianets (2018)

Features of folk clothing in Slobozhanshina are: the use of light fabrics in outerwear; lace floors of shirts and skirts; the use of embroidery techniques or applications; embroidery was carried out in white on white, or red, red with blue, red with black threads; characteristic round neck or stand-up collar in the shirt; in the decoration of clothing most often used plant or geometric ornaments, there is a large number of patterns; with the help of embroidery, headdress, fabric colours emphasised the age of the woman or her status, as evidenced by T.V. Kara-Vasylieva (2008) and L. Ponomar (2016).

In the course of the study, four main periods in the evolution of ethnic women's costume of Slobozhanshchyna during the 20th century were identified and analysed: 1900-1930 – preservation and adaptation: ethnic motifs; 1940-1950 – transformation and influence of time: changes in ethnic fashion; 1960-1980 – revival and stylisation: development; 1990-2000 – identity and modernity: rethinking ethnic fashion in the conditions of independence. It was revealed that the traditional Ukrainian costume was used in private-household, socio-political, cultural-artistic, and artistic-industrial areas.

The results obtained regarding the complexity and regional features of the folk costume of Slobozhanshchyna are consistent with the main provisions of other researchers. According to P. Odarchyk & H. Tsarynnyk (1992), it was established that the Ukrainian folk costume is a multicomponent ensemble that included undergarments, waist, chest, and outerwear, supplemented with accessories. This can also be traced in the the current study, which described in detail each of these elements – from the shirt to the cap – confirming the fundamental structure of folk clothing. This relationship demonstrated that, although the study by P. Odarchyk & H. Tsarynnyk is basic and general, and it serves as a solid foundation for more detailed regional research.

An important aspect identified in this paper is the role of embroidery as a means of transmitting information about a woman's age and status. This correlates with the results of the study by T.V. Kara-Vasyliieva (2008), who claimed that embroidery was not only a decorative element, but also the language of symbols, which determined regional affiliation, social status, and also had an amulet value. This aspect, highlighted in the text, is a direct confirmation of the key conclusions of the monograph by T.V. Kara-Vasyliieva. Thus, the conclusions were confirmed by the study devoted to the history of the craft itself, and help to better understand the reason for the characteristic of ornaments for Slobozhanshchyna.

In addition, the analysis of the use of costume in various fields (private, socio-political, cultural and artistic) and its evolution during the 20th century is consistent with research on urban culture. According to M.V. Oliinyk (2018), it was found that the traditional clothing of Ukrainians in everyday urban life has undergone significant changes, but continues to play an important role in shaping identity. This can also be traced in this study, which highlights the stages from preserving traditions to rethinking them in the conditions of independence, and the use of clothing in the socio-political, cultural, and artistic spheres. Thus, the results confirm that the transformation of clothing was not only a consequence of historical events, but also a reflection of the adaptation of traditions to new social and cultural conditions, which is a key aspect of research on costume of the 20th century.

Preservation and adaptation: Ethnic motifs in women's costume of Slobozhanshchyna (1900-1930). It was determined that the years 1900-1930 were difficult for the population due to large-scale political and economic events: the First World War (1914-1918) and the Ukrainian Revolution/Civil War (1917-1921), which caused destruction, chaos, and human losses. The Famine of 1921-1923, caused by war, drought, and Soviet politics. Forced collectivisation and industrialisation in the late 1920s and

early 1930s led to repression, resource withdrawal, and further deterioration of the lives of villagers. All these events directly affected the standard of living of the population.

Urban fashion was significantly different from rural fashion, because women who lived in the city had more access to fabrics, the ability to order individual tailoring, which combined contemporary urban clothing with some elements of folk costume, while people in the village made clothes themselves. In the urban environment, women wore corsets, high heels, and for evening outings chose outfits made of lace and silk. Daytime clothing gradually became more practical, remaining within the limits of current fashion trends. Among the wealthy classes, loose-fitting dresses became popular, allowing women to loosen their corsets without noticeably violating etiquette. This was an important stage in the process of emancipation of women, which was considered by M.V. Oliinyk (2018). A new type of clothing appeared – a narrow blouse with a flared skirt to the floor or ankle, in addition, women borrowed something from the men's wardrobe – for example, pea coats, under the influence of the war period, women's clothing in the city became simpler. The deliberate ostentatious splendour gradually receded: the trains were preserved only for the most solemn events, and the length of the skirts was gradually reduced. Restraint in clothing began to be associated with intelligence and education. Blouses and skirts, typical for students, formed a kind of uniform of an educated woman.

The study showed that in the 1920s, representatives of art circles – actresses, artists, wives of poets, etc. – played a leading role in shaping fashion trends. During the day, city women preferred restrained clothing: puritanical tweed suits, spacious raincoats, low-heeled shoes, flared hats. The evening image was marked by greater openness and expression. Flowing dresses, open shoulders, provocative slits, stockings, and elements made of transparent fabrics, feathers, pearls, and sequins have become fashionable. A characteristic feature of women's clothing in the USSR in the first quarter of the 20th century was simple-cut sundresses made of calico and wool, shirt dresses, midi-length skirts, pleats, blouses with gussets, and trousers that were loose at the hips and slightly tapered at the bottom. In the 1930s, fashion became simpler: long skirts and dresses of dark colours with white collars appeared in the women's wardrobe; the figure was emphasised by the oblique cut of dresses that fit the figure; the deep neckline and straps looked spectacular; the main emphasis was placed on the shoulders, lantern sleeves and wings were in fashion; the most popular fabric was chintz, the most desirable was crepe de chine, crepe georgette, faideshin, and silk; the most popular patterns were geometric and a wide variety of flowers from small to the largest (Kaminska & Nikulenko, 2004). Women's fashion of the 1930s is shown in Figure 4.



Figure 4. Women's fashion of the 1930s
Source: UaModna (2017)

The use of Ukrainian clothing was a popular phenomenon among the rural population in everyday life and on holidays (Fig. 5). Ethnic Ukrainian costume was widely used among young people, especially at weddings, Christmas, Easter holidays, among intellectuals, well-known public figures, and in everyday life, the use of Ukrainian ethnic clothing at public and political events was a popular phenomenon (Oliinyk, 2017). Ukrainian embroidery served as a means of drawing attention to socially significant problems, in particular, during the "Day of the Ear of Wheat" campaign (1912), which aimed to raise charitable funds for starving peasants. Folk clothing was also used as a means of expressing national identity, in particular, during the "Ukrainian demonstration"

for the proclamation of a free Ukraine on April 1, 1917. Ukrainian women's costume was widely used in the activities of choral groups, theatres and art circles.

The 1900s-1930s were characterised by collections of models created by famous fashion designers and artists: Anatol Petrytskyi, Oleksandr Ekster, Yevheniya Prybylska (Fig. 6). Their activities were based on the use of folk motifs in their collections.



Figure 5. Ukrainian girls in national costumes, Luhansk, 1915

Source: A. Baitzar (2018)



Figure 6. Collections of clothing models

Note: a – Anatol Petrytskyi; b – Oleksandra Ekster; c – Yevheniya Prybylska

Source: M. Melnyk (2020), N. Paranko *et al.* (2021), T.V. Kara-Vasylieva (2024), Cultural News of Ukraine (2025)

The identified trends in women's costume of Slobozhanshchyna in the period 1900s-1930s were confirmed and clarified in the works of other researchers. According to M.V. Oliinyk (2018), it was found that urban fashion was indeed radically different from rural fashion, as urban women had wider access to fabrics,

and their clothing was subject to faster changes. This was also evident in the present study, which noted the emergence of more practical clothing, such as dresses with a loose silhouette, blouses with skirts, and elements of men's wardrobe. Additionally, research by M.V. Oliinyk (2018) provided a deeper understanding of

how the ideas of women’s emancipation and changing social roles influenced the choice of clothing, which is reflected in a more free and functional wardrobe, which has become a symbol of the new era.

Thus, the results of this study convincingly demonstrated that the period 1900s-1930s was a time of deep contradictions in the women’s clothings of Slobozhanshchyna. On the one hand, there was a gradual simplification of clothing under the influence of global fashion trends and difficult socio-economic conditions, and on the other hand, the traditional costume acquired a new meaning as a symbol of identity and political resistance. This period is an important stage in the transition from the purely ethnographic use of clothing to its functioning as an element of contemporary urban culture, which prepared the ground for further transformation.

Transformation: Changes in the ethnic fashion of women’s clothing in Slobozhanshchyna (1940-1950).

Analysing the years 1940s-1950s, it is important to note that the war years worsened the country’s economy, industrial enterprises were re-formed into military bases, and there were long delays in the production of clothing, even the most urgent ones. It was revealed that since the beginning of the 1940s, the main style-forming detail of clothing has become padded shoulders, which have increased every year. N.M. Kaminska & S.I. Nikulenko (2004) found that elements of military and sports style appeared in clothing: patch pockets, yoke, deep pleats on the back, straps and shoulder straps, and a belted waist also became fashionable. Women’s skirts have become shorter than in the 1930s, with a predominance of slightly flared and folded models. Evening and holiday dresses of the 1940s were distinguished by slightly flared skirts, cleavage, tight-fitting or draped

bodice and small lantern sleeves, they were often sewn from crepe-satin, faideshin, thick silk, crepe-georgette, crepe-marochen, velvet, panoxamite and panshiphon, decorated with lace, floral appliques, and beads. White lace collars were popular, completing the festive image of a georgette made of a black-brown fox, and among the decorations, beads and large brooches stood out especially. In the collections of Soviet houses of models, samples of clothing with a variety of decorative finishes were widely presented: dresses were supplemented with cord, applique, and embroidery. Blouses and dresses with machine-made lace of the “richelieu” type and decorative pleats have become particularly popular. In the middle of the decade, white semi-transparent blouses made of natural or artificial silk, and striped models, were distinguished by a variety of styles: with lantern sleeves, without sleeves, with a lowered arm-hole, with classic turn-down or small rounded collars, and bow collars. In the 1940s-1950s, brooches and necklaces dominated the most common women’s jewellery. It was determined that during this period, knitted cardigans and jumpers, just below the belt, with a high elastic band, which tightly fit the waist, were decorated with embroidery or knitted patterns, thin jumpers with a large round neck or boat neck were in fashion, they were belted with a thin strap and worn with a narrow skirt. But, nevertheless, dresses remained the favourite clothes of Soviet women: summer – from colourful fabrics, striped fabrics, polka dots, checkered, and with newfangled geometric and abstract drawings; warm – mostly from monophonic wool, often with white lace or small round collars, with plastrons, trimmed with appliques, cords, embroidery, with miniature buttons fastened with air loops. Women’s clothing of the 1940s is shown in Figure 7.



Figure 7. Women’s clothing with shoulder pads, 1940

Source: C. Harvey (n.d.)

In the 1940s-1950s, Ukraine experienced a deep crisis due to the consequences of the Second World War, which led to massive destruction, huge human losses, and the devastation of agriculture. The post-war

Soviet policy of prioritising heavy industry caused an acute shortage of consumer goods, including clothing. In addition, the Famine of 1946-1947, provoked by drought and forced grain procurements, worsened

the already difficult situation of the population. Under these conditions, the traditional women's costume played an important role in the life of Slobozhans and was used at weddings and Ukrainian events (Fig. 8) and in the everyday life of people. Due to the difficult economic situation in the country, amateur fashion became

a popular phenomenon, that is, women themselves began to make clothes for the whole family. Among political figures, Nikita Khrushchev paid great attention to Ukrainian embroidery, considering it an important symbol of Ukrainian culture. Choral and folk groups also continued to use traditional clothing in their activities.



Figure 8. Ukrainian traditional women's clothes at festive events

Note: a – Donetsk, mid-20th century, May Day demonstration; b – Stalino (Donetsk), 1949, celebration of Miner's Day; c – Slovyansk, first half of the 20th century, women's choir

Source: D. Tymoshenko (2018), Ukrainian People Ukrainian-American Magazine (2019), I. Dobrovolenko (2024)

During this period, the first Kyiv House of clothing models in Ukraine appeared, headed by an artistic director from Kharkiv N.A. Lozovskyi. When creating collections, model houses used a combination of Ukrainian folk traditions along with fashionable and contemporary forms of clothing (Fig. 9).



Figure 9. Clothing of artists of model houses, 1950s

Source: Ukrainian Institute of Fashion History (2017)

The analysis of the transformation of women's costume in Slobozhanshchyna in 1940s-1950s, conducted in this study, was consistent and supplemented with the conclusions of the latest research. The conclusions of the study on the preservation of ethnic elements were confirmed by E.H. Butenko (2021). The researcher considered embroidery not only as a decorative element, but as a powerful tool for preserving national identity in the conditions of Soviet unification. This phenomenon can be traced through the spread of "amateur fashion", when women personally decorated their clothes with embroidery, appliques, and lace. This was not only a way to overcome deficits, but also a conscious act of preserving cultural codes. In this context, the study by

O. Shkolna (2025), which analysed the adaptation of Scythian ornamental motifs in European art, is also indicative. Similar to the preservation of embroidery as a carrier of identity in Soviet clothing, the transformation of zoomorphic and geometric forms in Christian medieval decor confirmed the ability of traditional symbols to change shape, preserving cultural significance in new historical and stylistic contexts.

Thus, the period 1940s-1950s was a time of deep transformation of the women's costume of Slobozhanshchyna. It reflected not only global fashion trends caused by the war and its consequences, but also adaptation to the conditions of post-war scarcity through "amateur fashion". During this period, the folk costume, although it continued to be used in everyday life and on holidays, acquired an ideological colouring, becoming a symbol that was used by both political figures and art groups to emphasise Ukrainian identity within the framework of Soviet culture.

Revival and stylisation: Development of ethnic fashion in women's costume of Slobozhanshchyna (1960s-1980s).

1960s-1980s were one of the most difficult periods in the history of Ukraine, in which there were many contradictions about the life of the country's population, because there were both positive and negative events that directly affected the state of life of Ukrainians. Positive aspects were relative stability, a gradual increase in the standard of living (compared to previous periods), improved access to housing, education, and medicine. Negative aspects were economic stagnation, a constant shortage of consumer goods (due to the priority of heavy industry), strong ideological pressure, and the growth of environmental problems. This led to a "grey" market and dissatisfaction of the population.

In the 1970s, geometric prints were used, and hippies began to use soft patterns. In 1972, Kenzo Takada presented a collection in which he combined prints that were previously considered incongruous: a soft floral pattern with a stripe, a cage with a stripe. In the 1980s, bright finishes – rhinestones, and sequins-were used with prints. Leopard print, checkered and floral patterns were particularly popular in the aggressive and seductive fashion trend, while polka dot, checkered, and floral motifs were used as prints in the romantic line. The main emphasis when creating prints was on colour, on the one hand, pastel colours were used, and on the other – bright and provocative. The romantic style was characterised by: colourful bright sweaters; shirts with turn-down collars with rounded ends; a full skirt below the knees, a-line silhouette, with a geometric print; flared trousers of bright colour, with a high waist, which is emphasised by a dark belt; high-heeled shoes in pastel colours. The aggressive and seductive style was characterised by: leopard print on the fabric; mini-length skirts; transparent black tights; tops and blouses with open shoulders (Fig. 10).

Ethnic clothing was widely used in theatres (choral groups “Homin”, “Derevo”), fairs (Sorochinska Yarmarka) and exhibitions, and in everyday life it was practically absent (Fig. 11). Folk women’s costume was also used at parties – holidays, when girls were engaged in making traditional Ukrainian clothing, preparing shirts, plakhts, which they embroidered, knitted and spun, singing folk songs (Kaminska & Nikulenko, 2004). Some elements of ethnic women’s costume were worn for weddings,

themed Ukrainian holidays, and calendar and ritual holidays were also not complete without traditional clothing. In 1960s-1980s, representatives of the national movement – dissidents – were well-known in Ukraine, who wore embroidered Ukrainian shirts to express themselves and defend the rights of the Ukrainian people, their traditions, language, and culture. Their activities pushed the country to the idea of creating its own independent state. All collections of models from these times were made by fashion houses, according to information from the publication by M.V. Oliinyk (2017).



Figure 10. Fashion of the 1970s-1980s
Source: N. Fenchyshyn (2024)



Figure 11. Ethnic clothing in the 1970s

Note: a – folk choir “Homin”; b – Christmas nativity scene of dissidents; c – clothing of Ukrainian houses of models
Source: H. Tereshchuk (2012), Homin (2017), H.V. Kokorina (2017)

The analysis of women’s costume of Slobozhanshchyna in the period 1960s-1980s is confirmed in the works of other researchers who studied this period. According to N.M. Kaminska & S.I. Nikulenko (2004), despite

ideological control, Ukrainian fashion was not completely isolated from world trends, which led to an eclectic combination of Western ideas with Soviet reality. Attempts to emulate the Western patterns and silhouettes mentioned

in the study (for example, leopard print, mini-skirts) were a manifestation of the desire for individuality and contemporary beauty ideals that penetrated the USSR through the "Iron Curtain". These trends co-existed with more restrained and romantic styles that were officially approved by the state, creating a mosaic of fashion trends.

Of particular importance during this period was the role of traditional clothing as a means of political self-identification. This correlates with the results of the study by M.V. Oliinyk (2017), who established that in 1960s-1980s Vyshyvanka became a powerful symbol of Ukrainian identity and resistance to Russification, actively used by dissidents. This was also evident in the the current research, which indicates that clothing has ceased to be just a household item, becoming an instrument of political struggle and a marker of dissent. In the 1960s-1980s, when any manifestation of nationalism was severely persecuted, wearing embroidery was a quiet but decisive act of protest, demonstrating loyalty to own culture and the desire for freedom.

Thus, the period 1960s-1980s was a time of deep duality in Ukrainian fashion. On the one hand, there was a complete departure from the traditional costume in everyday life and its replacement with clothing that imitated both Western and Soviet fashion standards. On the other hand, folk clothing itself, being forced out of everyday life, has acquired new, much deeper roles – from a symbol of national culture on the stage to a powerful means of political protest. This transformation paved the way for a further rethinking of ethnic fashion during Ukraine's independence.

Identity and modernity: Transformation of the female ethnomode of Slobozhanshchyna (1990-2000) and the contemporary ethnocollection. In the 1990s-2000s, during the establishment of independent Ukraine, traditional Ukrainian clothing became particularly important. It not only contributed to the education and stimulation of patriotic feelings of citizens, but also became an important symbol of national identity. The main characteristic features of the fashion of the 1990s in Ukraine were: the widespread use of denim clothing, combining them with denim shirts, bags, and shoes; the hourglass silhouette in the suit became relevant; a variety of corsets quickly became fashionable: from short models that emphasised the waist from the chest, to ordinary ones that covered the area from the chest to the lower abdomen, and elongated options that reached the hips (Fig. 12). Simultaneously, unisex fashion was actively spreading, which was characterised by jeans with t-shirts or loose trousers in combination with sweaters, supplemented with comfortable shoes; bright leggings became popular, which were more like tight trousers in shape and had a variety of colours and textures – bright green, purple, orange, leopard, as the "top" to the leggings, some kind of jacket of contrasting acid colours or sports trowels from a tracksuit were often chosen; sequins,

feathers, leopard fabrics, and nylon tights, lace pattern, boots, mini-dresses were widely used in clothing; sneakers and flat shoes in a sporty style were also popular.



Figure 12. Fashion of the 1990s
Source: N. Yartsenko (2024)

Folk clothing has almost completely ceased to be used in the everyday life of slobozhans. The most complete Ukrainian women's costume could be seen during theatrical performances (the folk dance theatre "Zapovit", the Kharkiv State Academic Ukrainian Drama Theatre named after T.H. Shevchenko, performances of "Stolen Happiness" by I. Franko; V. Merezhko's "The Mill of Happiness", E. Ionesco's "Macbeth"), at ethnic festivals and fairs (Ponomar, 2016). Some elements of ethnic clothing can be observed during public and political events (the organisation "Kalmius Palanka" participated in the celebration of the 500th anniversary of the Zaporizhzhia Cossacks). Religious calendar holidays such as Christmas, Epiphany, Easter, Trinity, Ivana Kupala prompted slobozhans to wear elements of Ukrainian costume. Considering the wedding (Fig. 13), then it should be determined that the use of Ukrainian clothing could simply be traditional, or combined with contemporary clothing, fashionable contemporary clothing made in the Ukrainian style was also used.



Figure 13. Wedding in Slobozhanshchyna
at the end of the 20th century
Source: O. Shcherban (2015)

In 1900s-2000s, many famous designers worked in Ukraine, who, when creating their collections, relied on ethnic clothing, using elements of traditional Ukrainian women’s costume (embroidered shirt,

skirt with machine and hand embroidery, various types of ethnic headwear, neck ornaments made of beads, coins), which was confirmed by O. Mosendz *et al.* (2025) (Fig. 14).



Figure 14. Collections of Ukrainian designers 1900s-2000s

Note: a – collection of O. Polonets; b – embroidered shirts of O. Karavanska; c – collection of O. Telizhenko; d – collection of L. Pustovit; e – collection of I. Karavay; f – collection of Z. Likhachova

Source: Polonets (n.d.), Poustovit (n.d.), Karavay (n.d.), M. Melnyk (2012), A. Kanarska (2013), Your City (2014)

The evolution of women’s clothing in Slobozhanshchyna in the 20th century is a reflection of complex socio-cultural transformations caused by historical events, economic conditions, and ideological changes. Over the course of a century, women’s clothing has been subjected to both

the preservation of traditional elements and the influence of external fashion trends adapted to local realities. Table 2 showed a comparative analysis of the main stylistic features of women’s clothing in different historical periods in relation to the corresponding socio-cultural context.

Table 2. Comparative analysis of the evolution of women’s clothing of Slobozhanshchyna in the 20th century

Period	Key features	Socio-cultural context
1900s-1930s	Combination of traditional elements (embroidery, folk patterns) with the influence of European urban fashion (changes in silhouettes, the appearance of a European cut). Sustainability of folk forms, but gradual integration of new parts and materials.	The First World War, the Ukrainian Revolution, the Civil War, the Famine of 1921-1923, and the beginning of collectivisation. General instability and poverty of the population. On the one hand, the preservation of traditions as an element of stability, on the other – the gradual penetration of new trends through cities.
1940s-1950s	Practicality, functionality, and thrift in clothing. Changes in silhouettes (more direct, simplified shapes), use of available materials. The emergence of “amateur fashion” (self-tailoring, recycling of old clothes). Lack of high-quality fabrics and ready-made outfits.	The Second World War and post-war reconstruction: large-scale destruction, huge human losses, famine of 1946-1947, and the economic priority of heavy industry over light industry. The extremely difficult financial situation of the population, which forced to maximise savings and ingenuity.
1960s-1980s	Gradual introduction of new fashion trends (geometric prints, bright colours), but within the Soviet capabilities. Distribution of unisex elements (jeans, sweaters). Attempts to integrate folk motifs into mass production, but often in a stylised, simplified form.	Relative stability, but economic stagnation, scarcity of quality goods, and ideological control. Influence of Western fashion through film, radio, travel, and black marketeering. Desire for individuality against the background of limited choice.
1990s-2000s	Active reinterpretation and return to folk motifs as a symbol of national identity in independent Ukraine. A combination of traditional elements with contemporary silhouettes and global trends. Growing importance of clothing in the education of patriotic feelings.	Collapse of the USSR, the transition to a market economy, the economic crisis of the early 1990s. Opening borders and free access to world fashion. Search for national identity and its expression through culture, including clothing.

Source: developed by the author

Based on the conducted research, a design project of the contemporary ethnocollection of women's costume "Ukrainochka" was developed, which includes 5 models and is shown in Figure 15. The image of a Ukrainian woman as the personification of beauty, harmony, and spiritual strength was chosen as a source of

creative inspiration for the development of the collection. A significant part of cultural and spiritual achievements was formed under its influence – both through the ability to inspire men to outstanding achievements that later became public domain, and through their own independent creative activities.



Figure 15. Design project of the contemporary ethnocollection of women's costume "Ukrainochka"
Source: developed by the author based on V.M. Ilchuk (2020)

This collection included all the elements of the national women's system of Slobozhanshchyna, namely: a shirt that is present in all models, a kersetka that has been transformed into a contemporary vest (Model No. 1,2,5), an apron that is modernised in the form of a cape (Model No. 2,3,4,5), a skirt (No. 1,5), half-boots. Clothing models are decorated with embroidery with floral and geometric ornaments, and ornamental stripes, lace, and braid on the sleeves, on the bottom of the shirt and plakhta. It is important to note that the sleeves of the shirt of Model No. 5 are decorated with white-on-white embroidery, which is the most characteristic embroidery for the Slobozhanshchyna. The image is completed with hats in the form of a wreath (Model No. 2,4), a cap (Model No. 3,5) and a cap covered with a scarf (Model No. 1), beads made of amber, coins, and coral are used as jewellery.

The study allowed delving deeply into the evolution of women's clothing in Slobozhanshchyna during the 20th century, revealing the complex interaction between traditional ethnic forms and the influence of urbanisation, socio-cultural changes, and global fashion trends. Each period of the century showed unique characteristics that reflected the historical context and women's desire to express themselves through clothing.

The period of the 1990s-2000s, which was a time of revival of national identity in Ukraine, was reflected in the evolution of women's clothing in Slobozhanshchyna, and these trends were confirmed by other researchers. According to L. Ponomar (2016), after a period of Soviet ideological pressure, when folk clothing was largely pushed out of everyday life, it began to be actively used on theatre stages, festivals, and fairs. This was also evident in the current study, which provided specific examples of the use of full Ukrainian dress in performances

at the T.H. Shevchenko Theatre in Kharkiv and at ethnic festivals. This dynamic demonstrates the transition of folk costume from an everyday object to an element of cultural and historical representation, emphasising its symbolic weight.

Special attention in this study was paid to the creativity of contemporary Ukrainian designers who relied on ethnic clothing. These conclusions were confirmed by O. Mosendz *et al.* (2025), who wrote that Ukrainian designers, including those mentioned in the text, actively used elements of traditional costume, turning them into elements of contemporary ethno-fashion. This was also evident in the author's study, which indicates the use of embroidered shirts, skirts, hats, and beads in designer collections. This approach helped to return ethnic elements to fashion, make them popular and aesthetically attractive to the general public, asserting them as part of the contemporary Ukrainian identity.

Thus, the period of 1990s-2000s was a crucial stage in the life of Ukrainian costume. It was revived not as an outdated element, but as a powerful symbol of national identity, which was actively used on stage, in festive rituals, and as a means of political expression. This era opened the door for designers who began to style traditional motifs, integrating them into contemporary fashion. As a result, ethnic clothing has turned from a historical artefact into a dynamic and relevant element of contemporary Ukrainian culture. The comparative analysis carried out in the study, which revealed a complex interaction between traditional ethnic forms and urbanisation, is consistent with the conclusions of all the mentioned scientific papers. They confirmed that the evolution of women's clothing reflects not only historical events, but also a conscious desire to preserve and rethink cultural heritage.

The design project of the contemporary ethnocollection “Ukrainochka” created based on this analysis is a practical embodiment of the identified trends and demonstrates how the traditions of Slobozhanshchyna can become the basis for contemporary creativity. It is a living example of how cultural heritage is becoming a source of inspiration for the future.

CONCLUSIONS

The ethnospecific features of Ukrainian women’s clothing of Slobozhanshchyna in the context of traditions and changes were clarified; the stages of the transformation process of the relationship between ethnic and urban fashion of Slobozhanshchyna in the context of its evolution in the 20th century were determined; the areas of using ethnic and urban Ukrainian women’s costume of Slobozhanshchyna in the 20th century were determined and a comparative analysis of the evolution of women’s clothing was compiled. In the period 1900s-1930s, the preservation of authentic features of the women’s ethnic costume of Slobozhanshchyna, despite the influence of urban fashion, was recorded. Embroidery, cut, bright colours, and the use of natural fabrics remained dominant features. Ethnic elements gradually adapted to everyday use, retaining their symbolic meaning despite the decrease in ritual. In the 1940s and 1950s, the transformation of traditional clothing under the influence of military circumstances, material scarcity, and ideological pressure was revealed. The cut was simplified, decorativeness was minimised, and ethnic elements were reinterpreted in the form of stylised ornaments on functional clothing.

In the 1960s-1980s, there was a revival of interest in ethnic fashion, which was manifested in the stylisation of folk motifs in urban clothing. Elements of traditional costume were actively integrated into contemporary silhouettes and materials, which showed a reinterpretation of ethnic heritage as a source of design solutions. In 1990s-2000s, there was an active rethinking of ethnic fashion as a means of national identification. After

independence, there was an expansion of opportunities for free cultural expression. Traditional elements were combined with current fashion trends, which contributed to the development of unique design concepts, representing Ukrainian culture in a global context. The end result of the study, which summarised all the information, was the creation of a contemporary ethnocollection. The collection not only presented theoretical developments on the transformation and adaptation of ethnic motifs during the 20th century, but also confirmed their practical significance and relevance in the context of contemporary fashion design. The collection is an organic synthesis of the past and present, where traditional elements are reinterpreted, adapted to contemporary silhouettes, materials, and technologies, creating unique images that meet the needs of a modern woman. It emphasised the indissoluble connection with cultural heritage, while integrating it into the global fashion space, confirming the viability and inexhaustible potential of Ukrainian ethnic fashion.

Further research may focus on a more detailed analysis of the impact of social networks and digital technologies on the popularisation of ethnic fashion in Ukrainian society of the 21st century. It was relevant to investigate the process of commercialisation of ethnic clothing, its integration into the mass market, and its impact on authenticity. A promising area is the study of regional features of ethnic costume in other regions of Ukraine and their impact on contemporary fashion, and the study of the experience of using ethnic motifs in men’s and children’s clothing.

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Еволюція етнічного та міського жіночого одягу Слобожанщини протягом ХХ століття

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Анотація. Актуальність поточної роботи зумовлена необхідністю глибокого аналізу та збереження культурної спадщини регіону, оскільки взаємодія традиційних форм та впливів міського середовища на жіноче вбрання Слобожанщини протягом ХХ століття залишається недостатньо вивченою. Метою було комплексне дослідження специфіки еволюції етнічного та міського жіночого одягу, його просторової характеристики та особливостей декоративного оздоблення на території Слобожанщини у ХХ столітті. У дослідженні було використано такі методи наукового пізнання: історичний, культурологічний та порівняльно-історичний аналіз. У межах дослідження надано ґрунтовну характеристику комплексу традиційного жіночого вбрання Слобожанщини, виокремлюючи його типові елементи, силуетні рішення, колористику та символізм. Було проаналізовано характерні для регіону сорочки, плахти, пояси, головні убори, нагрудні та верхні елементи одягу, а також типові орнаменти вишивки та їх композиційне розташування. Дослідження також було зосереджене на аналізі трансформаційних процесів в етнічному та міському жіночому одязі мешканців Слобожанщини протягом ХХ століття. Було проаналізовано чинники, що сприяли змінам, зокрема доступність фабричних тканин, модифікації способу життя, поширення міських модних тенденцій та державна політика щодо народної культури. Розроблено дизайн-проект сучасної етноколекції жіночого костюму. Колекція ґрунтувалася на глибокому розумінні архітектоники, колористики та орнаментики традиційного слобожанського вбрання, адаптуючи ці елементи до вимог сучасної моди. Практична цінність дослідження полягає в можливості застосування його результатів для інтеграції етнічних мотивів у повсякденний та святковий одяг. Отримані результати слугують підґрунтям для створення інноваційних дизайнерських рішень, що сприяють популяризації та переосмисленню національної культурної спадщини

Ключові слова: етнографія Слобожанщини; традиційний костюм; трансформація одягу; колекція; самодіяльна мода; вишивка



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Research on the application of colour-changing materials in smart packaging design: Forms, functions, and innovations

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Abstract. The relevance of the research stemmed from the positive role that colour-changing materials played in smart packaging design. It not only addressed consumers' demand for interactive packaging experiences but also enhanced the additional value of packaging design. The purpose of this study was to explore the current applications and development trends of colour-changing materials in smart packaging design. It was investigated how these materials can be used to convey product information, improve user experience, and increase the functional value of packaging. This study employed the following methods: literary and empirical analysis. Case study analysis and visual analysis methods were applied to examine visual effects. The research systematically analysed how different brands (Anrealage, Disney, Phillips Distilling, Maeil Milk, Leaf Bandage, Warm Me, McDonald's, Yuan Qi Forest, Coors Light, Naked, Coca-Cola, Lipton, Monster Party) utilised colour-changing materials in their packaging designs and the visual effects achieved. The synergistic innovation space of colour-changing materials in smart packaging design was confirmed. The study revealed that most brands' smart packaging employed two types of materials: photochromic and thermochromic. These materials exhibited reversible colour changes under external stimuli, which enabled real-time visualisation of product quality, temperature variations, and anti-counterfeiting verification. It generated visual signalling, enhanced brand differentiation, and transformed conventional packaging design. Furthermore, the research also identified a new method that supports customisable colour-changing materials, which provided both theoretical and practical advancements in this field. The practical significance of this study lies in the application of colour-changing materials in smart packaging design, which enhances the entertainment value and interactive function of packaging, and will contribute to the market competitiveness of packaging products and the development of the industry

Keywords: visual impact; visual design; responsive surfaces; user experience; colour visualisation

INTRODUCTION

Packaging, as one of the most frequently encountered elements in daily life, is undergoing a profound functional paradigm shift. According to A.P. D'Almeida & T.L. de Albuquerque (2024), driven by both consumption upgrading and technological advancement,

packaging design has transcended its traditional roles of product protection and visual communication, evolving from static containers to intelligent interfaces. As an innovative paradigm in packaging design, smart packaging integrates advanced materials and technologies

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to endow packaging with smart features such as sensing, responding, and interacting, thereby reshaping the relationship between products and consumers. This is particularly relevant, as consumers increasingly seek interactive and personalised experiences, making the exploration of intelligent, responsive packaging solutions both timely and necessary.

Packaging design has evolved from a traditional dual focus on aesthetics and functionality to a multi-dimensional research field encompassing market dynamics, consumer behaviour, and technological innovation. Against the backdrop of rapid advancements in material science and information technology, packaging trends during this period exhibited growing characteristics of intelligence and interactivity. However, J. Lydekaityte & T. Tambo (2020) pointed out that smart packaging was not merely a physical container, but functioned as an intermediary between digital and physical product management, bridging the stages from packaging design to market sales. This perspective complemented the attributes of smart packaging design. In applied research, E. Drago *et al.* (2020) used a systematic analytical approach to explore the multiple functions of smart packaging in the food industry, including food safety monitoring, preservation technologies, enhanced information interaction, and improved consumer perception. Meanwhile, according to the empirical research by L. Du *et al.* (2025), smart materials and Internet of Things (IoT) technology were able to regulate food storage environments in real time. Their research demonstrated the practical application benefits brought by smart packaging design. Both studies showed that smart packaging technology held promise in improving food quality, extending shelf life, and optimising communication mechanisms between consumers and products through real-time data feedback.

D. Elkhattat & M. Medhat (2021), from the perspectives of brand communication and user experience, emphasised that smart packaging should serve as a vital medium for brand emotional expression and consumer interaction, thus expanding the semantic space of packaging design. This perspective received further validation by I. Gigauri *et al.* (2024), who employed a questionnaire survey method to collect data on consumers' cognition, attitudes, and purchase intentions toward branded smart packaging. The study combined these findings with descriptive statistical analysis to identify key influencing factors. Results demonstrated that consumers exhibited high interest in smart packaging technologies and expressed positive attitudes toward brands adopting such designs. The perspectives complemented each other. They provided insights into the positive role that smart packaging design played in brand communication value. Smart packaging materials emerged as the key technological support and a 21st-century research focal point, with their functionality and design potential driving significant attention.

A. Ozcan (2020) demonstrated that the integration of materials and their technological expression played a fundamental role in smart packaging design innovation. Y. Su *et al.* (2020), through bibliometric analysis, categorised smart packaging materials into three types based on their working principles: functional materials, structural materials, and information-sensing materials, and provided a theoretical foundation for the classification system of smart packaging materials.

In specific research on colour-changing materials, S. Mahović Poljaček *et al.* (2024) constructed a photosensitive colour-changing packaging system based on the principle of photochromism through experimental methods. These materials changed colour in response to different wavelengths or intensities of light, thus conveying product information or environmental conditions with a highly visible effect. N. Mergu & Y.A. Son (2021) used comparative analysis to study the response mechanism of thermochromic packaging, systematically reviewed the development of organic, inorganic, liquid crystal, and polymer thermal-sensitive materials since thermochromic coatings were first developed in Germany in 1983. Their findings suggested that thermochromic materials change colour with temperature variations by altering their absorption rate of visible light. According to a study by Y. Zhou & R. Guo (2024), the gas-sensitive colour-changing packaging developed by the Japanese TO-Genkyo studio further extended the perceptive dimension of smart packaging, allowing it to indicate the freshness, ripeness, or gas leakage of food through spatial changes in gas composition, which offered significant practical value in food packaging design. These researchers have expounded and conducted experiments on colour-changing packaging design materials from the aspects of photochromism, thermochromism, and gas chromism.

Different scholars have validated the practical effectiveness of colour-changing materials through specific experimental results, yet further exploration is needed regarding their application in various types of packaging design. The purpose of this study was to analyse material applications and design methodologies, with a particular focus on photochromic and thermochromic materials. The research examined their visual impact, user experience, and creative expression.

MATERIALS AND METHODS

This study employed multiple methods to investigate the application of colour-changing materials in smart packaging design. On the one hand, the literature review method was utilised to examine scientific publications and industry reports related to colour-changing materials and smart packaging design from 2018 to 2025. This approach helped to identify the current research landscape, existing achievements, and unresolved challenges, thereby pinpointing potential research entry points and innovative areas. Through

academic databases such as Web of Science and Scopus, high-impact-factor journals were prioritised for analysis, which enabled the systematic organisation and synthesis of relevant literature to extract valuable insights and perspectives. Particular emphasis was placed on elucidating the intrinsic relationships among material properties, morphological expressions, and functional implementations of photochromic, thermochromic, and other smart materials.

On the other hand, the case study method was adopted to conduct in-depth analyses of smart packaging designs incorporating colour-changing materials. This approach served as a practical foundation for summarising design principles while identifying real-world application challenges and proposing targeted improvement measures. Case selection was based on three core criteria: innovation, user experience, and commercial value. These indicators respectively corresponded to the visual effect of packaging, consumer perception, and market performance, thus comprehensively covering the three key dimensions of product, user, and market. To ensure representativeness, the study examined smart packaging cases from prominent brands, including Anrealage (Trinera, 2023), Disney (The Disney case, n.d.), Phillips Distilling (Packaging machinery automation, 2022), Maeil Milk (Red Dot, 2021), Leaf Bandage (Yankodesign, 2016), Warm Me (Freeman, 2015), McDonald's (Baidu, 2024), Yuan Qi Forest (Jinjia, 2022), Coors Light (2017), Naked (Beijing Zhiyoumai Technology, 2015), Coca-Cola (Shineray, 2018), Lipton (Packaging manager, 2017), Monster Party (Bloclo, n.d.). Each case was analysed in terms of packaging design characteristics, types and application methods of colour-changing materials employed, the functional realisation of the packaging, market feedback, and consumer evaluations. In the specific analysis, a visual analysis approach was further applied to assess colour performance and visual impact across different smart packaging designs. Additionally, during the research process, supplementary data from professional information websites were incorporated. These data were primarily sourced from market research institution (Food and Beverage Innovation report, 2024) and image websites, and provided updated sample references for the study. The reliability and accuracy of these sources were rigorously evaluated to ensure data quality and credibility throughout the investigation. By integrating these methods, this study ensured a robust, multi-dimensional investigation into the application of colour-changing materials in smart packaging design.

RESULTS AND DISCUSSION

At the forefront of smart packaging design, colour-changing materials redefined the sensory dimensions of product packaging through their exceptional environmental responsiveness and dynamic visual interaction capabilities. This breakthrough not only

accelerated the intelligent transformation of packaging as a medium but also served as a core driver of technological innovation in the industry. By analysing the working principles and performance characteristics of different types of colour-changing materials, the study explored integration strategies for visual communication. Case studies summarised how these materials enhanced packaging functionality, improved user experience, and created brand value, providing theoretical references and practical guidance for designers and packaging engineers. Additionally, the study identified technical challenges and future innovation directions in the application of colour-changing materials, which offered insights to promote the development of smart packaging industries.

Forms and functions of colour-changing materials in smart packaging design.

Previous studies have established an important theoretical foundation for understanding smart packaging design. A. Azzi *et al.* (2012), through a structured literature review, proposed a multidimensional research framework that includes product features, market environment, and user needs, which marked a shift from traditional formalism to a systemic, user-centred approach. D. Schaefer & W.M. Cheung (2018) further analysed this view through case studies and theoretical induction, focusing on the concept, application prospects, and major challenges of smart packaging. They highlighted its potential to enhance user experience, improve product monitoring and tracking, and optimise supply chain management. However, their research was biased towards smart technologies such as sensors, Radio Frequency Identification (RFID), and the Internet of Things, overlooking the role that colour-changing materials play in smart packaging. This study designed a chart of the discovered results and the classification of colour-changing materials and the functions each material can achieve (Fig. 1). In addition, this study identified recent industry trends toward customisable smart packaging solutions that incorporate colour-changing materials, enable brands to tailor interactive effects to specific products and target audiences. While C. Liu *et al.* (2019) recognised the technical maturity and potential applications of these materials, which aligned with the author's findings. But the current research further explored their integration into practical packaging design and highlighted their role in enhancing user experience and brand value. Despite challenges related to durability and cost, colour-changing materials offered an accessible, visually engaging pathway for advancing smart packaging beyond electronic solutions. Building on this academic context, the present research systematically examined and categorised the forms and functions of colour-changing materials in smart packaging design. Specifically, photochromic materials changed

colour under light exposure served anti-counterfeiting purposes and enriched visual perception by providing dynamic feedback. Thermochromic materials reacted to temperature fluctuations, thereby supported brand communication, indicating temperature and freshness, and created interactive sensory experiences.

Gas-sensitive materials responded to variations in gas concentrations, allowing real-time freshness monitoring and enhancing consumer trust. These materials, through their inherent environmental responsiveness, transformed packaging into an interactive medium that communicated directly with users.

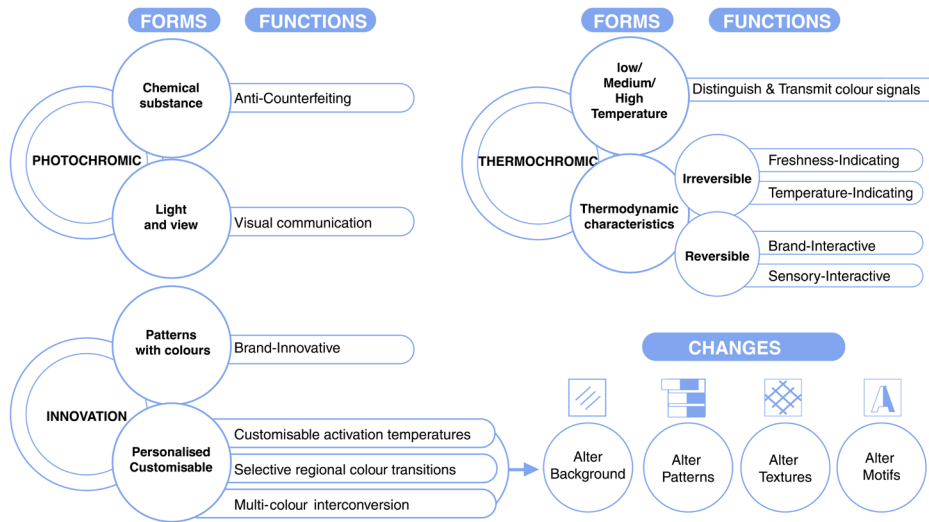


Figure 1. Forms, functions, and innovation of colour-changing materials

Source: completed by the authors' research

Opportunities for photochromism in the context of smart packaging design. According to the research overview of photochromic materials by P. Cheng *et al.* (2024), Photochromism refers to the reversible colour change exhibited by certain chemical substances upon exposure to optical radiation. This phenomenon involves a structural isomerisation transition at the molecular level, manifesting as a pronounced shift in absorption spectra. According to X. Xu & R. Huang (2025) research, in the ground state of photochromism, substance A undergoes a photochemical reaction under specific wavelengths, converting to the excited state substance B. After cessation of irradiation, substance B reverts to substance A's original form and colour, achieving reversible chromatic transformation. For instance, at the Winter 2023 Paris Fashion Week, the Japanese brand ANREALAGE showcased a ground-breaking material experiment (Fig. 2). Designer Kunihiko Morinaga innovatively employed photochromic technology to transform monochromatic white garments into dynamic colour carriers. When exposed to specific wavelengths of ultraviolet light, the minimalist fabric surfaces instantaneously revealed intricate patterns. This real-time visual transformation challenged the static nature of conventional textiles and redefined the interactive relationship between wearers and their environment. Through the innovative application of materials science, the project demonstrated new possibilities for functional aesthetics.



Figure 2. Photochromic clothing design for the Winter 2023 Paris Fashion Week

Source: P. Trinera (2023)

Currently, photochromism is primarily applied in packaging design for two purposes: as an advanced anti-counterfeiting visual identifier, and to create smart packaging with visual interactivity. As the viewing angle or lighting conditions change, these materials exhibit colour shifts, thereby enabling anti-counterfeiting functionality. For example, the product labels at Shanghai Disney Resort incorporated photochromic materials to create a multi-layered dynamic visual

presentation through precise photochromic effects (Fig. 3). In their default state, the labels display castle motifs and the brand logo. When the viewing angle or lighting conditions alter, the labels dynamically reveal a visual effect of fireworks in motion. Simultaneously, variations in the viewing angle allow observers to perceive changes in the fireworks' colours, along with the gradual emergence of hidden microscopic details such as the "Disney" lettering. This dynamic authentication mechanism, based on optical properties, not

only enhances the reliability of anti-counterfeiting technology and user interaction but also strengthens brand recognition through narrative-driven visual language. According to the findings of J. Wan *et al.* (2023), the application of photochromic materials has demonstrated great brand value in anti-counterfeiting and information security. Meanwhile, according to F.R. Zang (2021), photochromic materials can produce strong visual attraction by combining with logo of package design, which is conducive to brand communication.



Figure 3. Shanghai Disneyland photochromic anti-counterfeiting packaging design

Source: The Disney case (n.d.)

The photochromic packaging design introduced by Phillips Distilling in 2021 redefined the interactive paradigm of spirits packaging (Fig. 4). Grounded in the core concept of "Bring the Light", this design integrated the properties of photochromic materials with innovative packaging strategies, establishing a dynamic interaction between the product and environmental sunlight. By leveraging photochromic materials, the packaging undergoes real-time

spectral shifts upon exposure to ultraviolet light. Initially appearing black and colourless at the bottle-neck, concealed chromatic lettering gradually emerges under ultraviolet activation, extending axially toward the main label area. Upon removal from light, the colours fade, while the black "UV" brand outlines remain visible, thereby creating a dual mechanism that combines transient aesthetic engagement with persistent brand recognition.



Figure 4. Phillips Distilling Company "bring the light" colour-changing vodka packaging design

Source: Packaging machinery automation (2022)

Photochromic materials demonstrated dual breakthroughs in smart packaging design through their dynamic light-responsive properties: they revolutionised anti-counterfeiting systems while reconstructing user interaction paradigms. The technology simultaneously addressed security authentication and experience optimisation needs via real-time visual feedback mechanisms, with commercial brand applications confirming its significant efficacy in enhancing product value.

Application of thermochromism in smart packaging design. Thermochromism refers to the phenomenon where a material changes colour in response to temperature variations, thereby indicating temperature changes through colour shifts. According to the research by J. Chen *et al.* (2024), thermochromic materials can be classified in two ways: based on their temperature range or their thermodynamic properties. According to the temperature range, thermochromic

materials are categorised into three types: low, medium, and high-temperature variants. High-temperature thermochromic materials typically exhibit red hues, medium-temperature ones appear orange, while low-temperature materials display blue hues. Based on their thermodynamic characteristics, thermochromic materials are further divided into two types: irreversible and reversible. Irreversible thermochromic materials undergo permanent colour changes that cannot be reversed. In contrast, reversible thermochromic materials can undergo multiple colour changes in response to temperature fluctuations. These properties determined their applications: irreversible types for safety monitoring, while reversible types enable dynamic interaction. Meanwhile, according to the research findings of C. Breheny *et al.* (2024) in the specific smart packaging design of food, irreversible thermochromic materials rely on thermal decomposition or oxidation reactions to record one-time temperature events, making them suitable for monitoring freshness or indicating temperature breaches in safety-critical packaging.

Dairy company Maeil Milk developed a smart milk packaging system integrated with irreversible thermochromic ink to visually indicate product freshness (Fig. 5, a). The packaging featured a gradual colour transition, where the blue “milk” label progressively fades as the product approaches expiration, ultimately transforming into the warning word “ill”. This innovative design visually tracked freshness while conveying safety warnings through semantic transformation, demonstrating smart packaging’s potential for effective information delivery. Similarly, irreversible thermochromic inks not only offered functionality but also provided users with an aesthetic experience. The “Leaf Bandage” served as an example (Fig. 5, b), the Leaf Bandage utilises thermochromic ink, with its packaging gradually shifting from green to yellow and finally dark yellow over time. This colour change visually indicates product expiration. In terms of form design, a bionic approach is adopted, where the leaf-shaped design language not only fulfils functional requirements but also endows the product with distinctive emotional value, exemplifying the human-centric characteristics of packaging design.

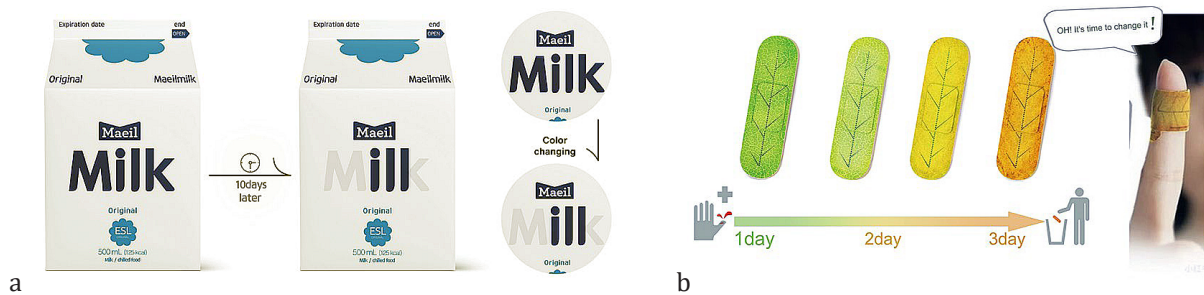


Figure 5. Freshness-indicating thermochromic packaging design

Note: a – Maeil Milk thermochromic smart packaging design; b – Leaf Bandage colour-changing smart packaging design
Source: Yankodesign (2016), Red Dot (2021)

Reversible thermochromic inks have demonstrated significant potential in dynamic visual interaction and brand communication, a finding corroborated by Q. Li *et al.* (2024). Their research argued that these materials could enhance product originality and aesthetic appeal in food packaging applications, which increased consumer engagement and purchase intention through improved visual interactivity and personalisation. This is consistent with the conclusion drawn by L. Spytka (2024), who noted that consumers are more likely to respond positively to products with emotionally appealing design elements that evoke joy, comfort, or pleasant memories, thereby reinforcing the effectiveness of visually innovative packaging. According to the Food and Beverage Innovation report (2024), the official Instagram account of McDonald’s Singapore posted a thermochromic packaging design on January 10, 2024, received 153,000 likes – a figure that was a hundred times higher than its average post engagement, sparking widespread discussion among global internet

users. This design employs advanced reversible thermochromic ink technology: when filled with iced water, the originally metallic silver aluminium cup undergoes an instantaneous colour transformation, gradually transitioning into a refreshing green hue (Fig. 6, a). It exemplifies the seamless integration of colour-changing materials with packaging visual aesthetics. Another example is the Chinese brand “Yuan Qi Forest”, which introduced an innovative “blossoming” sakura packaging design for its sparkling water (Fig. 6, b), utilising reversible thermochromic materials. When the product temperature dropped below 8°C, the cherry blossom patterns on the packaging, originally in bud form, undergo a phase-change colour transition, unfolded into a fully bloomed petal display. This created a temperature-responsive visual interaction that integrates material properties, seasonal imagery, and consumption scenarios, demonstrated the brand’s pioneering exploration in smart packaging design. Similarly, Coors Light revolutionised its packaging with

temperature-sensitive “Rocky Mountains” graphics (Fig. 6, c). At a simple temperature, the mountain outlines appear faint and grey, but when chilled below 4.5°C, the contours gradually sharpen and fill with a

progressive blue hue. This visual transformation effectively evokes consumers’ association with the beer’s refreshing coolness, achieving a precise translation of product characteristics into a user experience.



Figure 6. Thermochromic smart packaging design series

Note: a – McDonald’s thermochromic packaging design; b – Yuan Qi forest thermochromic sparkling water packaging design; c – Coors Light thermochromic beer packaging design

Source: Coors Light (2017), G. Jinjia (2022), Baidu (2024)

The yoghurt brand “Warm Me” utilised thermochromic ink to create dynamic packaging visuals that responded to temperature changes (Fig. 7). Below 20°C, the packaging displayed a dormant penguin; between 21-24°C, the penguin’s eyes gradually opened, and signalled the ideal eating temperature. This material-driven interaction not only provided functional guidance but also enhanced user experience by translating design concerns into emotional connections.



Figure 7. “Warm Me” thermochromic yoghurt smart packaging design

Source: E. Freeman (2015)

In terms of sensory interaction, the cosmetic brand Naked used an innovative mechanism of tactile-visual interaction using reversible thermochromic materials (Fig. 8). When touched, the packaging underwent a blush-like colour shift, mimicking natural skin tones. This biomimetic design seamlessly integrated product functionality with sensory marketing strategies while fostering an emotional connection between users and the packaging. Through the application of this approach, the brand established a distinct competitive edge in the market through differentiated packaging innovation. Thermochromic materials offered dual smart packaging benefits: irreversible types provided safety monitoring through permanent colour changes, while reversible variants enabled interactive user experiences and brand communication. Collectively, they transformed packaging from passive containers to interactive media. The research found that this technology bridged product functionality, user engagement, and commercial value through visual communication, marking smart packaging’s transition to industrial-scale adoption.



Figure 8. Packaging design of Naked thermochromic sensory interactive cosmetics

Source: Beijing Zhiyoumai Technology (2015)

Innovation of colour-changing materials in smart packaging design. With the advancement of colour-changing materials and smart packaging design, these innovations opened up new expressive dimensions for visual design. The research by Y. Zhu (2024) and S. Ayinuer *et al.* (2021) demonstrated that the dynamic behaviour of colour-changing materials significantly influenced emotional states and shaped perceptions of product attributes. Building on this foundation, the present study found that such effects required deliberate integration with graphic design components to maximise communicative efficacy. Specifically, in thermochromic packaging systems, the synergy between material-driven colour transitions and structured visual motifs enhanced brand distinctiveness, information legibility, and personalised user engagement. For example, the Coca-Cola company introduced a thermochromic packaging design concept for its “Summer” themed collection (Fig. 9, a). This design featured an “ice cube” as the primary visual element,

employing thermochromic inks to create a dynamic visual transformation. When the product is chilled, the ice cube patterns on the bottle shifted to a blue hue, accompanied by changes in the visual imagery. This form of combining graphics and colours with colour-changing materials enhances visual expressiveness and information accuracy. Similarly, Lipton launched a limited-edition iced tea could with temperature-responsive properties during Belgium’s Electronic Music Festival (Fig. 9, b). When refrigerated to the optimal serving temperature, the originally plain can gradually reveal a vibrant light-blue tint along with the word “LOVE”. The brand crafted an interactive slogan, “Chill the Can and See the Love”, ingeniously transforming the product usage process into an emotional engagement tool. This innovative approach, which merges packaging functionality with emotional experience, resonated strongly with consumers upon release, delivering a remarkable marketing impact. While delivering the colour and text of the product, it also reinforced the brand image.

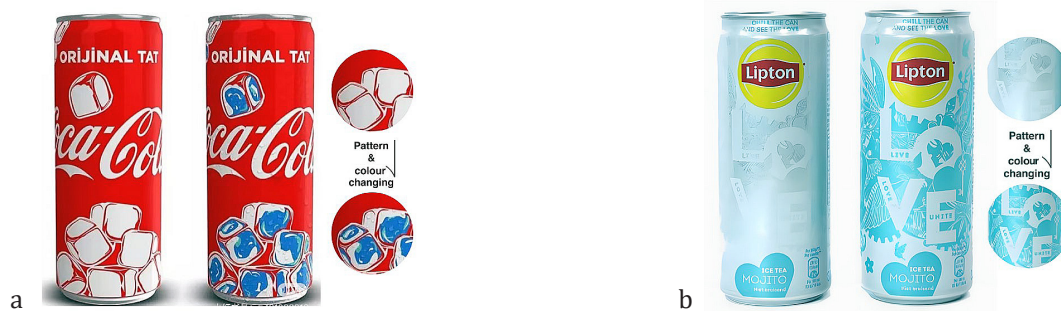


Figure 9. Innovative colour-changing smart packaging design series

Note: a – Coca-Cola colour-changing smart packaging design; b – Lipton “LOVE” theme colour-changing soda smart packaging design

Source: Packaging manager (2017), Shineray (2018)

Through market research with one packaging material supplier – Kunbei Label Printing (Bloclo, n.d.) revealed that contemporary applications of colour-changing materials extended beyond facilitating visual communication between packaging graphics and product attributes in smart packaging systems. Significantly, these materials enabled customisable design solutions that substantially augment the innovative capacity of modern packaging design. Taking beverage packaging as an example, modern thermochromic materials achieved three breakthrough functionalities: customisable activation temperatures, selective regional colour transitions, and multi-colour interconversion. Leveraging these properties, designers could dynamically alter background patterns, textures, decorative motifs, and even brand logo colours (Fig. 10). This colour-changing material application not only redefined interactive packaging experiences but also enhances product value by stimulating consumer curiosity and engagement. In summary, although existing studies have made progress

in the classification, functional mechanisms, and experimental approaches of colour-changing materials, there remain certain limitations in research. (1) Methodologically, most researchers have focused on experimental and qualitative analyses to define and experiment with the principles of colour-changing packaging, but there is a lack of exploration of the artistic expression and visual aspects of packaging design. (2) In terms of research content, although theoretical definitions are valuable, studies heavily oriented toward materials and chemistry have diluted the intrinsic meaning of packaging design. (3) In application, while colour-changing materials have established stable systems in the chemical and textile industries, their use in packaging design was still mainly limited to localised indications and labelling functions, with untapped potential for integrating visual language and building emotional experiences. Additionally, the absence of a designer’s perspective and specific methods for user involvement calls for further investigation.



Figure 10. Personalised colour-changing smart packaging design

Source: Bloclo (n.d.)

CONCLUSIONS

The current study systematically examined the applications of colour-changing materials in smart packaging design, focusing on their forms, functions, and innovations. The research found that photochromic materials demonstrated dual value in anti-counterfeiting identification and dynamic visual expression. “Disney packaging labels” illustrated how they enhance anti-counterfeiting measures, while Phillips Distilling’s photochromic packaging increased purchase intention of customers by 64%. The study analysed reversible and irreversible thermochromic materials and identified their distinct functions. Irreversible thermochromic materials proved effective in information visualisation, such as food freshness monitoring, as demonstrated by the “Maeil Milk” smart packaging design. Reversible thermochromic materials showed significant benefits in enhancing user interaction experience, improving commercial efficiency, and achieving sensory interaction, as seen in the “Coors Light” and “Naked” packaging. Furthermore, the research proposed two innovative applications for colour-changing materials: functional pattern integration balancing aesthetics and human-centred design; and personalised,

customisable systems enabling adjustable colour and texture and transition parameters, thus expanded creative possibilities. However, current applications still face limitations, necessitating designers to develop material cognition frameworks that extend beyond visual presentation to focus on the relationship between material properties and user experience. Future research could investigate the technical feasibility and market acceptance of colour-changing materials in various packaging applications. Additionally, studies should investigate the environmental impact and explore the potential for combining these materials with other smart technologies, such as 3D printing and augmented reality, to maximise their benefits in smart packaging solutions.

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CONFLICT OF INTEREST

None.

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Дослідження застосування матеріалів, що змінюють колір, у розумному дизайні упаковки: форми, функції та інновації

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Анотація. Актуальність дослідження зумовлена позитивною роллю, яку відіграють матеріали, що змінюють колір, у розумному дизайні упаковки. Вони не лише задовольняють попит споживачів на інтерактивний досвід використання упаковки, але й підвищують додаткову цінність її дизайну. Метою цього дослідження було вивчити сучасне застосування та тенденції розвитку матеріалів, що змінюють колір, у дизайні розумної упаковки. Було досліджено, як ці матеріали можуть бути використані для передачі інформації про продукт, покращення користувацького досвіду та підвищення функціональної цінності упаковки. У цьому дослідженні були використані наступні методи: літературний та емпіричний аналіз. Для вивчення візуальних ефектів було застосовано методи аналізу конкретних ситуацій та візуального аналізу. У дослідженні було систематично проаналізовано, як різні бренди (Anrealage, Disney, Phillips Distilling, Maeil Milk, Leaf Bandage, Warm Me, McDonald's, Yuan Qi Forest, Coors Light, Naked, Coca-Cola, Lipton, Monster Party) використовували матеріали, що змінюють колір, у дизайні упаковки, і які візуальні ефекти були досягнуті. Це підтвердило синергетичний інноваційний простір матеріалів, що змінюють колір, у дизайні розумної упаковки. Дослідження показало, що більшість брендів використовують два типи матеріалів для смарт-упаковки: фотохромні та термохромні. Ці матеріали демонстрували оборотну зміну кольору під впливом зовнішніх подразників, що дозволило в реальному часі візуалізувати якість продукції, температурні коливання та перевіряти на подробиці. Це створило візуальну сигналізацію, посилило диференціацію брендів і трансформувало традиційний дизайн упаковки. Крім того, дослідження також визначило новий метод, який підтримує кастомізовані матеріали, що змінюють колір, що забезпечило як теоретичний, так і практичний прогрес у цій галузі. Практична цінність цього дослідження полягає в застосуванні матеріалів, що змінюють колір, у розумному дизайні упаковки, що підвищує розважальну цінність та інтерактивну функцію упаковки, та сприятиме підвищенню ринкової конкурентоспроможності пакувальної продукції та розвитку галузі

Ключові слова: візуальний вплив; візуальний дизайн; адаптивні поверхні; користувацький досвід; кольорова візуалізація



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Temporality and deconstruction as interrelated strategies in contemporary clothing design

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Abstract. The study was devoted to identifying the connections between temporality as an aesthetic category and deconstruction as a creative trend in contemporary clothing design. The article used a comprehensive approach that combined methods of cultural, visual-analytical and art analysis, which made it possible to study deconstruction and temporality not only as separate concepts, but also as interrelated strategies in clothing design and design in general. The use of these strategies and the analysis of their interconnection were justified, in particular, how the sense of time and its cyclicity is embodied in deconstructive forms, as well as methods of experimental clothing design. It has been determined that the combination of these approaches forms a unique concept of time, which is assembled in parts, corresponding to the contemporary postmodern worldview. Particular attention was focused on the manifestations of these strategies in contemporary design practices and their interpretation in Ukrainian and world fashion. Deconstruction has proven to be an effective tool for actualising time as a conceptual category. Typical techniques that combine temporal and deconstructive methods have been systematised. Using examples from the work of leading international and Ukrainian designers (Maison Margiela, Comme des Garçons, Junya Watanabe, DZHUS, Litkovska, Gunia, KSENIASCHNAIDER), the article showed how contemporary artists integrate temporal sensitivity into design, specifically through the deconstruction of traditional forms. In particular, the Ukrainian context reveals its own attempts to “work with memory.” It has been confirmed that deconstruction in clothing design not only destroys fashion standards but also creates a new aesthetic of time, where the past, present, and future coexist in a single visual system. The results of the study offer innovative approaches to creating meaningful authorial clothing collections, in particular through the use of deconstruction and temporality. The materials can be used in educational programmes, scientific works and practical design activities

Keywords: futurism; conceptual fashion; cultural context; asymmetry; anti-structure; postmodernism; semiotics

INTRODUCTION

In contemporary cultural discourse, clothing design takes on special significance in the context of temporality and deconstruction, reflecting new approaches to the perception of time, structure, and identity. In conditions of global instability, digital transformations and rethinking of consumer practices, fashion emerges as a critical reflection on changeability, memory and transitional states. Therefore, the relevance of the study is determined by the need for theoretical understanding of these phenomena within the framework of the latest design strategies at the beginning of the 21st century. In the 2020s, the theme of deconstruction in design has been

reinterpreted through a reference to philosophical and aesthetic concepts in the contemporary scientific space. In particular, K. Shevchuk's (2021) study analysed the features of deconstructive methods in the work of Japanese, Belgian and Ukrainian designers, where deconstruction is seen as a tool for a conceptual rethinking of fashion through the prism of culture, identity and time. According to K. Shevchuk (2024), digital transformations in clothing design have been outlined, which are associated with the flexibility of visualisation, design and forecasting of processes that directly indicate the changing nature of time in a virtual environment.

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The temporal aspects of fashion in connection with the transformations of the fashion industry were examined by I. Gardabhadze (2023), focusing on the cyclicality and dynamism of styles and the influence of digital platforms on the speed of updating visual codes. In this context, the research by V. Cherevach (2023) was important, analysing digital clothing as a manifestation of a new post-temporal fashion, devoid of a material carrier but embedded in the visual communication of contemporary culture. This approach echoes the concept of H. Chon (2021), who considered sustainable practice as a special mode of fashion temporality, where material culture and bodily experience of time form an alternative paradigm for the development of costume design. The author explored fashion that embodies a new perception of time, its interpretation and representation. The author also analysed how the rhythms of trends and style adaptation reveal the temporal nature of fashion, and how material objects acquire meaning through the socio-cultural unfolding of sustainable practices. At the same time, these ideas are consistent with the research of Z. Lyu & Y. Lee (2023), who, within the framework of a neo-deconstructivist approach, emphasised intertextuality, material durability and the search for new design strategies aimed at expanding the operational potential of clothing.

In contemporary fashion studies, it is important to examine nostalgia and retro aesthetics as factors in the formation of trends. Thus, in the article by I. Ugrehelidze (2024), attention was focused on the phenomenon of the revival of vintage in contemporary design practices. The author analysed the terms “vintage”, “nostalgia” and “trend” in detail and traced how historical fashion codes are integrated into contemporary design through prints, fabrics, accessories and decorative techniques. The role of nostalgia as a mechanism that influences consumer preferences and determines the popularity of retro trends is particularly emphasised. The study also highlighted the importance of designers in shaping the ways in which retro aesthetics are used, which in turn expands the possibilities of design and creates conditions for the individualisation of style. Thus, the study revealed the social aspect of fashion, emphasising that the revival of vintage is not only a stylistic trend but also a means of self-expression and identification for consumers.

The article by N. Mokhtari Dehkordi & M. Vaezizade (2021) explored the phenomenon of deconstruction in contemporary fashion design using the example of Maison Martin Margiela collections. The authors used a qualitative descriptive and analytical approach to reveal how the aesthetics of deconstruction manifests itself through the violation of traditional ideas about the form, proportions and functionality of clothing. The study paid particular attention to the influence of post-modernist philosophy, in particular the ideas of J. Derrida, where the destruction of established meanings is

interpreted as a way of rethinking beauty and fashion. The work emphasised that Margiela’s creativity is not limited to visual experiments, but embodies deeper cultural codes – the grotesque, carnival, and playing with time – which makes it an important link in the formation of a neo-deconstructive paradigm in fashion. However, the problem of interpreting deconstruction and temporality as interrelated categories in clothing design has hardly been addressed in scientific literature. Thus, the aim of the study was to analyse the relationship between temporality and deconstruction and to identify the functional and aesthetic role of temporality and deconstruction as interrelated strategies in the formation of a new design language in contemporary clothing.

■ MATERIALS AND METHODS

In the process of researching temporality and deconstruction as interrelated strategies in contemporary clothing design, a set of general scientific and special methods of cognition was used. The main methods were comparative method, content analysis, visual analysis, as well as the method of historical and cultural contextualisation. Analysis and synthesis made it possible to break down the concepts of temporality and deconstruction into their constituent elements, establish their semantic, formal, and ideological characteristics, and synthesise the information obtained into general conclusions about their interaction in contemporary design. The comparative method was used to compare different design approaches to temporality in the global and Ukrainian contexts. Content analysis was applied to critical texts, interviews with designers, and reviews of collections in *Vogue* and *F&A* style to identify conceptual emphases in design statements. Visual analysis was conducted to evaluate the form, texture, style, deconstructive elements, and compositional solutions in designers’ collections. The method of historical and cultural analysis made it possible to comprehend the contexts in which temporal thinking in fashion is formed, in particular through the rethinking of heritage, archivality, and ethnic codes.

At the first stage, the field of research was formed, and the key concepts of “temporality” and “deconstruction” and their meanings within the contemporary cultural paradigm were outlined. The next stage was the collection of materials, scientific sources, designer catalogues, visual materials, analytical reviews, as well as publications from professional platforms and media. The analytical stage involved a visual and content analysis of selected design collections, aimed at identifying strategies for representing time and deconstructive techniques. Particular attention was paid to the concept of the collections, the nature of the design solutions, and the use of materials and symbols. Next, a comparative analysis of Ukrainian and global examples was conducted to establish the specifics of the local context and its interpretation of global trends. The final stage was the

formulation of conclusions about the role of temporality and deconstruction as tools of a new design language that combines visual, content and conceptual components.

The study used archives of collections on the official websites of brands, scientific and critical publications, and books on fashion theory. Materials from Ukrainian design platforms were also actively used. Official resources such as *Vogue*, *Elle*, *WWD*, *FAB style*, etc. were used to collect factual data, visual material, and analyse design interpretations. The following global designers were included in the analysis: Martin Margiela (deconstruction), Yohji Yamamoto (philosophy of time), Rei Kawakubo, Demna Gvasalia, Iris van Herpen (technological futurology). Ukrainian designers: Ksenia Schneider (upcycling, post-Soviet aesthetics), Litkovska (Ukrainian code), Juice (transformability, modularity). The analysis was conducted with the theme of time (archival, folklore, futurism), using deconstructive methods (asymmetry, open construction), a critical or narrative approach to design, and taking into account the availability of visual and textual sources. Criteria for analysis: collection concept, design solutions, work with materials, symbolism, cultural codes, type of representation of time (retrospective, archive, simulation of the future).

RESULTS AND DISCUSSION

In contemporary cultural discourse, clothing is increasingly interpreted not only as an element of everyday use or a means of individual self-expression, but also as a complex visual-communicative system capable of reflecting deep socio-cultural processes. This approach leads to a rethinking of clothing design as a conceptual practice that integrates aesthetic, philosophical, anthropological, and critical strategies. The categories of temporality and deconstruction are particularly relevant, which at the current stage of design development act as both artistic techniques and independent analytical tools for understanding fashion in the paradigm of time, memory, identity and cultural transformation. Temporality in clothing design is seen as an aesthetic category that reflects different models of time perception, from retrospective nostalgia to futuristic projections. In design practices, this manifests itself through the citation of historical silhouettes, the use of material ageing techniques, archival thinking, or, conversely, through the use of innovative technologies and the creation of visual scenarios of the future. Clothing takes on the role of a materialised temporal construct, where fabric, cut, and form represent social, cultural, and personal narratives.

Deconstruction, as a strategy of visual and conceptual destruction of integrity, emerges in design practice as a means of critically rethinking classical structures, norms, and forms. It allows to question established ideas about function, beauty, symmetry, and the logic of form. In the context of fashion, deconstruction helps to bring hidden socio-cultural signs to the surface and

form an alternative language of design. Visual techniques of deconstruction, unstitching, multilayering, incompleteness, and asymmetry convey a state of crisis, search, and hybridity, while at the same time contributing to the formation of new aesthetic norms. The use of a deconstructive approach becomes a tool for visualising temporal shifts, combining the past with the present, simulating the future, cyclicity, archivality, and the destruction of linear time. Thus, clothing appears as a carrier of multi-layered meanings that represent not only physical form but also the conceptual structure of time.

When considering the work in the context of clothing design, it is necessary to refer to the scientific interpretation of the concept of “temporality,” as the concept reveals the connection between time, the process of creating clothing, and its use. Temporality describes the perception of time, its passage, presence or absence in human experience (Heidegger, 1962). Thus, L. Bilyakovich (2018) considered temporality as a structural factor in the formation of fashion trends, which has a dynamic nature and is subject to analytical prediction within the framework of fashion analytics. The philosophical perception of time in clothing design is often based on ontological and interpretative tradition, in particular on the ideas of M. Heidegger (1962), who considered being as always “temporary” and the objective world as an experience of “presence.” It is this perspective that allows to see clothing as an artefact of experiencing time. It is the way in which a person experiences time, which manifests itself in various spheres – art, design, culture, architecture and the fashion industry. In particular, the irrational as sensually experienced in time, as an experience of the past, present and future, can be represented through stylistics, visual images and conceptual ideas.

Considering temporality in clothing design, a certain interaction between the perception of time and clothing itself can be identified. According to J. Derrida (1978), there are such categories of time as the past, present and future. The author interpreted texts as open, unstable structures where meaning is not fixed but constantly moving. Therefore, this logic can be transferred to fashion through the practices of silhouette destruction, playing with form, irony, and rejection of established norms. S. Evans (2003) deepened this understanding in the context of fashion by analysing borderline phenomena – destruction, death, modernity as key elements of avant-garde clothing. In the paradigm of the past, time is viewed as nostalgia, when clothing is styled after a particular era, such as the 1920s or 1970s – vintage dresses or flared jeans, which designers are actively using in their practices in the 2020s. The moment of the present, manifested in the format of “here and now,” is a dynamic manifestation of temporality, which is reflected in fashion practices and responds to current social and cultural events, referring

to the future as an abstract concept that opens up space for experimentation with materials, technologies and the latest form-creating approaches characteristic of

futuristic visions. Examples of the visual embodiment of fashion images representing the past, present and future in the context of temporality are shown in Figure 1.



Figure 1. Representation of the past, present and future in clothing design

Note: a, b – past: vintage look of the 1920s and 1970s; c – present: eco-themed clothing; d – future: futuristic temporality, experiments with form and the latest technologies (use of AI)

Source: Elle (n.d.), Sookmyungflower Vinyoo (n.d.), Vogue (n.d.)

A separate manifestation of time in clothing design is the reinterpretation of the past, when designers use elements of historical costumes in a modern context in their work, for example, a dress inspired by Ukrainian folk costumes (Fig. 2).



Figure 2. Reinterpretation of Ukrainian folk costume, HISTROV, spring/summer 2025

Source: Histrov (n.d.)

Temporality in clothing design appears as a means of visualising the connection with time and memory, which is realised through the use of specific fabrics, shapes, colour schemes, visual images, and sometimes sensory elements, such as scents. Thus, temporality acts as a form of communication, i.e. clothing is capable of conveying information about when it was created or to whom it appeals. At the beginning of the 21st century, there is a clear trend in clothing design towards reflection on time, i.e. its transience and repetitiveness. This temporal sensitivity reveals the visual embodiment of

deconstruction as a design strategy that deliberately violates construction and stylistic norms. After all, deconstruction, in a philosophical sense, is not only the decomposition of form into parts (details), but also a critical reflection on the structure of the costume. In the context of postmodern fashion, another key strategy in clothing design is deconstruction. As J. Derrida (1978) noted, it is deconstruction that is a way to rethink and show the temporal multi-layeredness of an image. References to the past, quotations of forms and images and their transformation, artificial ageing of materials, and emphasis on wear and tear and fragmentation are reflected in Figure 3. Thus, deconstruction allows these temporal and spatial manifestations to be materialised through changes in cut, asymmetry, incompleteness, or the reassembly of elements (details) from different periods of fashion history.

The relationship between temporality and deconstruction strategies plays a key role in contemporary clothing design, although these approaches have different philosophical foundations, they are often used as a single whole in design practice. When combined, they form complex, multi-layered aesthetic structures (constructions) of clothing, as their coexistence is based on a common desire to overcome normativity and linearity in the perception of clothing as a product of time. Deconstruction and temporality act as tools for rethinking time. Thus, both strategies point precisely to a “shift” in the traditional as a multi-vector reading of the past, present and future in the form of fragments or quotations. As an example, we can cite the designs of Yohji Yamamoto (Fig. 4) or Maison Margiela (Fig. 5). Their works demonstrated “outdated” silhouettes combined with the destruction of modern construction, deliberate ageing or the expression of the concept of image through already old materials (Mardgiela, 2009).

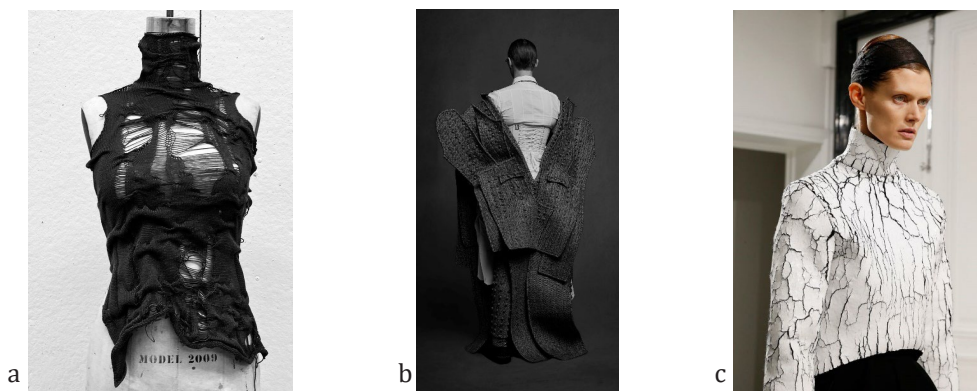


Figure 3. Manifestations of deconstructive temporality

Note: a – Soren on Macbeth, China, 2024; b – Thom Browne Fall/Winter, USA, 2017; c – Balenciaga, Spain, fall 2013 / Hussein Chalayan spring, 2013

Source: Vogue (n.d.)

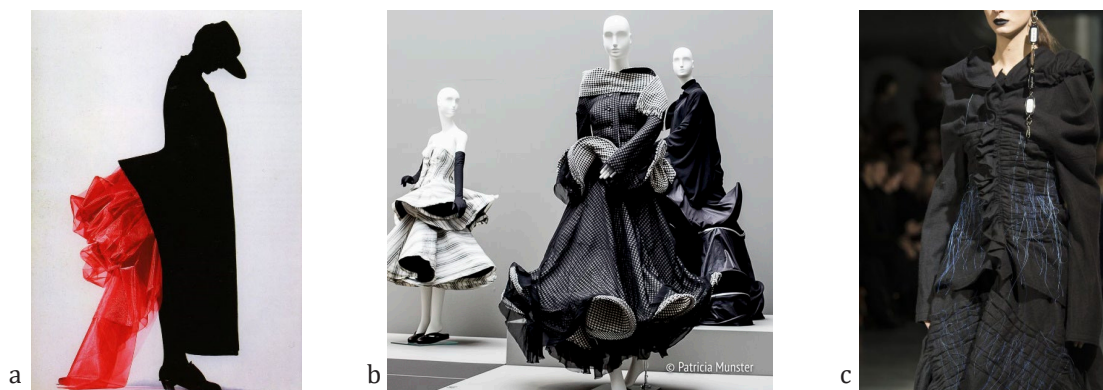


Figure 4. Examples of time interpretation in Yohji Yamamoto brand costumes

Note: a – 1986 collection; b – 2003 collection; c – 2017 collection

Source: Wanderful (n.d.)

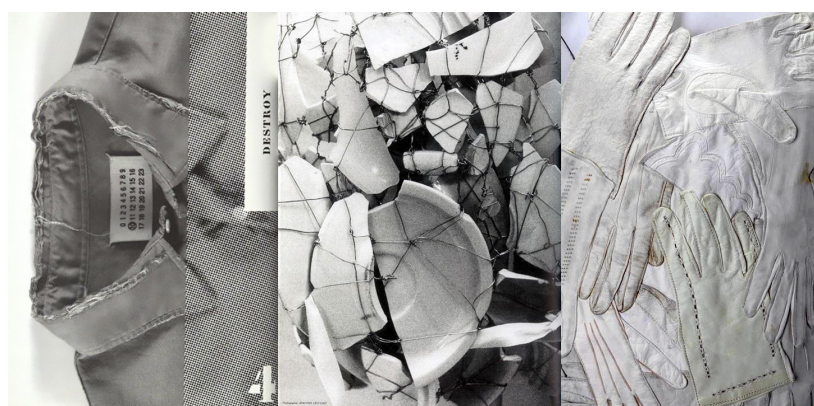


Figure 5. Examples of time interpretation in Maison Margiela costumes, The Exhibition collection, 2008, Belgium

Source: Vogue (n.d.)

In recent studies, clothing design is viewed as a field of complex interaction between time, culture, and identity. Research by V. Cherevach (2023) introduced the concept of digital fashion as a phenomenon that levels material space and simultaneously transforms the temporal perception of clothing. In the virtual environment,

the image of clothing exists not in the chronological logic of consumption, but as an event rooted in visual communication. Such dematerialisation reinforces the idea of fashion as a variable, open process that operates not in linear but in fragmentary time. This study demonstrated consistency with this position, as temporality was

considered a factor that determined the logic of design decisions and structured the stages of form creation. Temporality is also associated with the concepts of memory, nostalgia, and retro aesthetics. In this aspect, time appears not only as a sequence, but as a layered structure of experience activated through image. In comparison with the results obtained in this study, it was established that the directions of temporality outlined in the literature manifested themselves not only at the level of concepts, but also in the practices of deconstruction of silhouette, materiality, and methods of presentation.

A common feature between deconstruction and temporality is the formation of form through fragmentation. Both aesthetic categories are characterised by a rejection of integrity, where the construction deliberately loses stability, elements from different historical eras are stitched together, and visually conflicting materials are combined. The inverted parts of the product and cut silhouettes are like the actualisation of the traces of time and its manifestations. Temporality in fashion, like deconstruction, rejects the idea of the absolute novelty of “progress.” Design decisions are based on recycling the past, but not as copying, but as a reflective appeal to cultural memory. In other words, through rethinking and transforming the old, something completely new is created, but with a deep understanding of the past (Lahoda, 2021).

Despite the very similar characteristics in the forms and manifestations of temporality and deconstruction

in clothing design, it is important to distinguish between the conceptual differences. Thus, temporality focuses on the temporal aspect – clothing as a carrier of memories, as a result of the accumulation of historical experience. Deconstruction, on the other hand, in this context, is aimed at destroying internal rules. It is not only about the aesthetic effect, but also about the philosophical criticism of the stability of form. The unique experience of clothing design in the context of temporality and deconstruction was formed as a result of profound socio-cultural transformations. This is particularly evident in the national revival and historical sense of fashion. Designers rethink elements of traditional costume and its stylistic features and interpret them in contemporary contexts. In the design practices of Vetements, Comme des Garçons, and Junya Watanabe, this symbiosis manifests itself in the combination of “past and present,” that is, items from different times and different historical forms are combined into a single whole, and as a result, their own interpretations of costumes, images, and ideas are created (Fig. 6). A significant contribution to the understanding of the body as a place of fashion manifestation was made by J. Entwistle (2000), who proposed the concept of a “socially clothed body,” where clothing functions as a means of visually structuring identity inscribed in a temporal context. Thus, deconstruction helps to express temporality, and temporality fills deconstruction with philosophical depth of meaning.



Figure 6. Examples of temporality combining the past with the present

Note: a – Vetements, France, spring-summer 2024; b – Comme des Garçons, Japan, 2017; c – Junya Watanabe, Japan, spring-summer 2006

Source: WWD (n.d.), Wanderful (n.d.)

In contemporary research, temporality and deconstruction are considered not only as separate conceptual approaches, but as interrelated strategies that form a new aesthetic paradigm of fashion. Temporality in the fashion industry is represented through references to historical eras, the use of vintage visual symbols, the imitation of fabric ageing processes, and the creation of futuristic images that model alternative visions of the future. As noted by O. Zhydkykh & O. Tryhub (2018),

the transformation of Ukrainian ethnic motifs in contemporary clothing involves the layering of temporal strata – from archaic forms to experimental contemporary interpretations. In this context, digital technologies become a tool for rethinking temporality. B.O. Protzyk *et al.* (2023) emphasised that digital clothing allows modelling objects that exist beyond the physical limitations of time, creating new forms of creative expression. O. Yezhova *et al.* (2024) proved that the use of 3D

modelling and virtual platforms opens up opportunities for the simultaneous implementation of deconstructive and temporal strategies, ensuring the multi-layered nature of visual and semantic series. In the authors' research, these trends were developed in combination with the analysis of cultural codes and a visual-analytical approach, which made it possible to deepen deconstructive strategies in the material environment.

Deconstruction plays a critical role in this process – it challenges established fashion canons by breaking down traditional silhouettes, exposing internal seams, disrupting symmetry, and experimenting with texture and multi-layering. N. Paranko *et al.* (2021) emphasised that such techniques in Ukrainian designer clothing are not only an

aesthetic game but also a form of cultural commentary that reflects on identity and memory, as proven in the author's research. Another example of rethinking the past in the context of clothing design is the work of Estonian designer Marit Ilison, which represented a return to the past in a contemporary context. Colourful vintage wool blankets with patterns originate from the Soviet Union of the 1970s and 1980s, when they were very common. In terms of temporality and memory connections, blankets were often associated with very personal memories. The blankets were made of high-quality wool, which was later recycled into raw material for knitted sweaters. In fact, this is a temporal reinterpretation of the old into the new as part of past experience (Fig. 7).



Figure 7. Marit Ilison. Estonia, collection “Longing for Sleep” 2015

Source: Marit Ilison (n.d.)

The symbiosis of art and fashion, particularly evident in deconstructive design practices, was analysed in the work of A. Geczy & V. Karaminas (2012), where fashion is interpreted as a visual text with a high degree of interpretability. S. Pitiot & I. Herpen (2023) worked at this intersection, whose monograph demonstrated the integration of technology, body and time in the creation of clothing that exists between the material and the digital. The works of Dutch designer Iris van Herpen attract attention precisely in the context of temporality. The designer works at the intersection of fashion, science, technology and art, and her work is filled with deep philosophical dimensions that go beyond traditional clothing design. Temporality in her work is associated with a sense of movement, transformation and the passage of time. For example, her collections often use organic forms that imitate growth, excitement, evaporation or metamorphosis. The names of her collections refer to natural or physical processes: “Hypnosis”, “Aeriform”, “Between the Lines”, emphasising the temporal state of the body and matter (Fig. 8). Modern technologies create the effect of living, dynamic clothing that changes in space and time and experiences its own temporality. Deconstruction in her clothing collections manifests itself through the blurring of boundaries

between the body and clothing, as if the construction envelops the body, floats around it and removes it from the centre of the composition. By breaking down classic silhouettes into molecular structures, fractions, and patterns, she often reinterprets the concepts of femininity, corporeality, and matter in her works, which is why her collections look like “the future” because the clothing becomes almost inhuman, timeless, and the deconstruction calls into question the very essence of fashion, clothing, and the human body.

Ukrainian scholars are also actively exploring the processes of temporality and deconstruction in clothing design. For example, K. Shevchuk (2022) analysed deconstruction as an intercultural phenomenon, emphasising that the destruction of a holistic form is a way of critically rethinking norms, hierarchies, and traditions. In a later work, K. Shevchuk (2024) emphasised the role of digital technologies as a mediator between deconstructive aesthetics and temporal shifts, where 3D visualisations allow clothing to be modelled in potential future scenarios, in particular before it is materialised. Ukrainian designers actively use the language of temporality and deconstruction as a tool for artistic reflection on time, memory and national identity. This approach recreates a new quality of domestic

fashion – critical and sensitive to experience. Through rethinking, a unique direction of Ukrainian deconstructivism is emerging through the prism of time. A striking example of conceptual design is the Ukrainian brand DZHUS. One of its distinctive features is the idea of transformed clothing that changes its function, form and, as a result, appearance. This author's technique can be interpreted as a metaphor for the transience of time, where clothing is not seen as something permanent and stable, but rather as a living, changing body that reacts to life circumstances and directly to the mood of the wearer (person). It is precisely the

transformational concepts and polymorphism of citation that reflect the transience of states that correspond to the temporal rhythms of the modern world (day-night, private-public, peace-war). The ABSOLUT Autumn-Winter 24/25 collection (Fig. 9) represented temporality through instability, a sense of transience, identity and protection. It is the aesthetics of a crisis reality, where any thing becomes multifunctional, responding to a lack of resources and time. Iryna Dzhus, designer, embodied temporality as a design strategy, where clothing is an object of time integrated into contemporary existence.

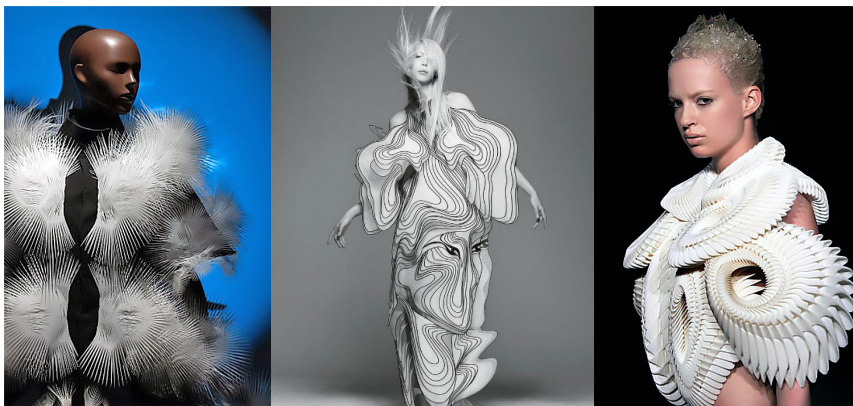


Figure 8. Examples of futuristic temporality Iris van Herpen, 2013, the Netherlands

Source: Iris van Herpen (n.d.)



Figure 9. DZHUS, Ukraine, "ABSOLUT" collection, autumn-winter 2024

Source: FAB style (n.d.)

A separate dimension of temporality emerges in the context of sustainable fashion. V. Budyak *et al.* (2024) analysed the ecological discourse in contemporary fashion as a key factor in the transformation of consumer practices. They emphasised that temporality in this context is associated with a conscious extension of the life cycle of clothing, an emphasis on material durability and experiments with recycling, which forms a new ethical position in relation to fashion. Another Ukrainian brand that combines art, design and cultural

heritage is Gunia Project (Fig. 10). Its activities represent a striking example of a temporal strategy focused on revitalising (recreating) the past through the aesthetics of the current cultural context. The brand's main strategy is to recreate and reinterpret traditional Ukrainian symbols, techniques and costume forms in a contemporary context. Gunia recreates the past and activates historical memory through the stylisation of images, giving them a new meaning. Gunia's costumes reflect the multi-layered nature of fabrics as well as the

multi-layered nature of time: the past as a source of inspiration (ethnographic archives, Ukrainian symbols, decorative and applied arts); the present as contemporary visual culture; and the future as a vision for the

preservation and development of identity. Thus, this example of deconstruction of temporal design demonstrated a rethinking of traditional values while preserving their basic symbolic meanings.



Figure 10. Gunia Project, Ukraine, “Vilce”, spring-summer 2025

Source: Elle (n.d.)

The work of Ukrainian designer Lilia Litkovska reflects temporality as a “slowing down of time”. The designer often uses elements of traditional clothing, such as shirts, jackets, and belts, transforming them into contemporary styles and forms (Fig. 11), which is a reflection on history through the material representation of the contemporary form of costume. In costumes, the designer often uses deconstruction techniques, which are temporal in themselves, such as spreading the structure

of an item in space and time, open seams, unfinished edges of products – as a metaphor for imperfect time, post-memory or fragmentary experience of modernity, multi-layeredness and incompleteness as a visualisation of the transience of the moment and openness to change. It is about the aesthetics of contemplation, which emphasises a respectful attitude towards craftsmanship and the creative process as a multi-layered experience that goes beyond typical fashion trends.



Figure 11. Litkovska, Ukraine, “Vesnyanka,” spring-summer 2023

Source: Vogue (n.d.)

The collections of another well-known Ukrainian brand, KSENIASCHNAIDER (Fig. 12), are a striking example of how temporality as an aesthetic, conceptual and sociocultural category is embodied in contemporary

fashion. This is a work with the concept of re-proportioning, i.e. reloading old proms, denim, army jackets, work clothes, etc. Reinterpreting the historical and the everyday, using upcycled materials, modifying the

silhouettes of denim products, layering and texturing as a “accumulation of memory”, but not literally recreating the past, it is time and experience that become tools for play. The brand’s philosophy is sustainable development,

revealing temporality as an ethic of awareness of time, consumption and responsibility. The KSENIASCHNAIDER brand is a striking example of the integration of tradition, innovation and historical experience into fashion.



Figure 12. KSENIASCHNAIDER, Ukraine, Spring-Summer 2024-2025

Source: Vogue (n.d.)

Clothing design in the modern cultural space reveals time through form, material, methods of creation and ways of reconstructing meanings, in which temporality and deconstruction appear as interrelated tools for understanding fashion not only as an aesthetic phenomenon, but also as a cultural and social one. Thanks to the above, it is possible to analyse the typology of manifestations of temporality in contemporary clothing design. Retrospective temporality involves the use of elements from the past, in particular traditional costumes or historical forms that refer to a specific time or style. Cyclical temporality manifests itself in the repetition of fashion styles and costume forms that return in new cultural contexts, in particular in the reproduction of the style of the 2000s in the present day. Archival temporality consists in appealing to collective memory, reconstructing archival sources and visualising them in fashion. Deconstructive temporality is expressed in the deliberate disruption of the integral structure of clothing, the destabilisation of form as a metaphorical manifestation of time, the visualisation of postmodern fragmentation and the critique of stability. Transformational temporality reflects the changeability of the form of clothing according to time, space or need, emphasising flexibility, mobility and ecological adaptation. Situational temporality consists in the embodiment of personal experiences of time, moments or events in clothing, which contributes to the individualisation of the image and gives it emotional expressiveness, particularly in the form of art objects or performance costumes. Futuristic temporality is associated with the vision of clothing design in the future and includes the use of new technologies, artificial intelligence and the creation of digital clothing.

CONCLUSIONS

The study found that temporality and deconstruction are not only separate conceptual approaches to clothing design, but also interrelated aesthetic and methodological strategies that shape the new paradigm of contemporary fashion. Thus, temporality in fashion discourse manifests itself through references to historical eras, the use of visual codes from the past, the use of vintage elements, the imitation of fabric ageing processes, and the creation of futuristic images that model scenarios of the future. Thanks to this, clothing appears as an open object, capable of changing over time and rethinking its own semantics. The study proposes a typology of manifestations of temporal experience in clothing, from stylisation of the past and retro aesthetics to concepts of constant incompleteness, when the finished look of a product is fundamentally absent. This approach contributes to the enrichment of the visual language of fashion and expands the range of design interpretations of time.

Deconstruction, in turn, plays a critical role in design practice. It challenges established fashion canons by destroying traditional silhouettes, disrupting symmetry, bringing internal seams to the outside, using asymmetrical cuts, layering, and experimenting with textures. An analysis of the work of Martin Margiela, Demna Gvasalia, Yohji Yamamoto and Rei Kawakubo has shown that these designers actively combine deconstructive techniques with temporal references to create multidimensional images. In the Ukrainian context, temporality is often associated with the reinterpretation of folk heritage, the transformation of ethnic codes, and the use of archaic techniques as tools for preserving collective memory and identity.

The combination of these approaches allows for the formation of a unique design language in which global trends are reinterpreted nationally. Prospects for further research are linked to the expansion of an interdisciplinary approach to the study of temporality and deconstruction in fashion, in particular through the integration of cultural, philosophical, technological, and marketing analysis. Further scientific research may focus on studying temporal strategies in digital fashion, the influence of algorithmic trend forecasting on design decisions, and the transformation

of the concept of time in the context of instant online consumption.

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Темпоральність і деконструкція як взаємопов'язані стратегії у сучасному дизайні одягу

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Анотація. Дослідження присвячено виявленню зв'язків між темпоральністю як естетичною категорією та деконструкцією як творчим напрямком в сучасному дизайні одягу. У статті використано комплексний підхід, що поєднав методи культурологічного, візуально-аналітичного та мистецтвознавчого аналізу, що дозволило дослідити деконструкцію і темпоральність не лише як окремі поняття, але і як взаємопов'язані стратегії в проектуванні одягу і дизайні в цілому. Обґрунтовано використання цих стратегій і аналіз їх взаємозв'язку, зокрема, те, яким чином втілюється відчуття часу і його циклічність у деконструктивних формах, а також методи експериментального проектування одягу. Визначено, що поєднання цих підходів формує унікальну концепцію часу, який зібраний по частинах, що відповідає сучасному постмодерному світовідчуттю. Особлива увага зосереджена на проявах цих стратегій у сучасних дизайнерських практиках та їх інтерпретації в українській та світовій моді. Деконструкція виявилась ефективним інструментом актуалізації часу як концептуальної категорії. Систематизовано типові прийоми, що поєднують темпоральні й деконструктивні методи. На прикладах творчості провідних світових і українських дизайнерів (Maison Margiela, Comme des Garçons, Junya Watanabe, DZHUS, Litkovska, Gunia, KSENIASCHNAIDER) показано, як сучасні митці інтегрують темпоральну чутливість у дизайн, саме шляхом деконструкції традиційних форм. Зокрема, український контекст виявляє власні спроби «роботи з пам'яттю». Підтверджено, що деконструкція в дизайні одягу не лише руйнує модні стандарти, а й створює нову естетику часу, де минуле, теперішнє і майбутнє співіснують у єдиній візуальній системі. Результати дослідження пропонують інноваційні підходи до створення змістовно насичених авторських колекцій одягу, зокрема через використання деконструкції та темпоральності. Матеріали можуть бути застосовані в освітніх програмах, наукових роботах і практичній дизайн-діяльності

Ключові слова: футуризм; концептуальна мода; культурний контекст; асиметрія; антиструктура; постмодернізм; семіотика



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Application of aesthetic principles in the creation of inclusive urban environments

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Abstract. The development of the modern inclusive urban environment of advanced countries increasingly considers aesthetic principles that help to make the space not only functional and accessible to all, but also aesthetically pleasing, thus achieving internal comfort through aesthetic influence. The purpose of this study was to identify and classify the aesthetic principles of forming an inclusive urban environment at the beginning of the 21st century. The study was based on the analysis of the literature on inclusive design and methods of aesthetic development of urban areas. The study proved that the aesthetics of an inclusive urban environment positively influences the well-being and experience of people with disabilities. It was determined how aesthetic elements can be used to improve navigation, orientation, and safety for people with disabilities. The study explored new and creative ways of integrating aesthetics and inclusivity that extend beyond basic accessibility requirements, creating a more comfortable and attractive urban space. Aspects that help to achieve the optimum combination of practicality and aesthetic appeal were identified, making the inclusive environment convenient for everyone and at the same time preserving its aesthetic value. The study analysed and highlighted the aesthetic principles that are most effective for creating a truly inclusive and functional urban environment. The practical significance of the findings lies in the fact that the use of aesthetically designed solutions, such as contrasting colours, clear navigation, and tactile surfaces can substantially improve orientation and safety for people with various types of disabilities. This contributes to the psychological well-being and sense of belonging of all users, regardless of their physical capabilities

Keywords: accessibility; urbanism; environmental design; spatial harmony; barrier-free environment; ergonomics; visual appeal

INTRODUCTION

The issue of inclusive urban environments is gaining increasing significance. This involves creating spaces that are accessible and comfortable for all categories of the population, including people with disabilities. However, inclusivity is not limited to mere functional accessibility. The aesthetic component plays a crucial role, significantly affecting users' psychological well-being, sense of dignity, and overall quality of life. Application of aesthetic principles in the design of inclusive urban spaces not only ensures physical access but also helps create a harmonious, attractive, and inspiring environment that fosters social integration and enhances the emotional state of all its inhabitants.

Therefore, the identification and classification of aesthetic principles for shaping contemporary inclusive urban environments necessitate a thorough analysis of publications by both Ukrainian and international researchers. S. Balasubramanian *et al.* (2022) analysed key physical, visual, and aesthetic aspects. The researchers identified the influence of aesthetic elements on user activity, reactions, and perceived colours. The study results demonstrated that the diversity and attractiveness of an environment – specifically facades, colours, building proportions, maintenance, and the presence of greenery – are intricately linked to people's desire to walk. M. Kovalchuk (2025) investigated the application

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of inclusive design principles to create comfortable and aesthetically appealing spaces. The analysis revealed that inclusive design principles enable the creation of products that are not only functional but also evoke positive emotions and satisfy the needs of a wide range of users. Kovalchuk identified and substantiated the specifics of applying inclusive design principles to create an aesthetic environment. The researcher demonstrated how these principles influence the processes of forming ergonomic, aesthetic, and inclusive spaces.

C. Evangelinos & S. Tsharaktschiew (2021) assessed the aesthetic preferences of users and their impact on urban transport infrastructure. The researchers analysed how the visual and aesthetic characteristics of the urban environment, such as facade design, colour palette, building proportions, quality of service and landscaping affect people's behavioural reactions, their activity, and preferences for movement, particularly walking. The researchers substantiated the features of the application of the inclusive design principles in the development of the aesthetic environment and its impact on the creation of a comfortable, safe, and accessible space for all. The key areas of development of an aesthetic inclusive environment were covered to improve the quality of life in urban transport infrastructure. G. Xiangmin *et al.* (2022) presented an analysis of the development and validation processes for a dynamic method of assessing the visual attractiveness of commercial streets using eye-tracking technology. Their study involved collecting data on gaze fixation points, saccades (rapid eye movements), fixation durations, and eye movement trajectories within real or virtual environments. Analysing this data helped to identify urban landscape elements that attracted the most attention, evoked interest, or, conversely, were sources of cognitive load or discomfort.

M. Lamirande (2023) focused on the study of current practices and theoretical approaches to inclusive design. The study analysed the various methodologies and tools used to create products, services, and environments that are accessible and convenient for a wide range of users, accommodating their diverse capabilities, needs, and experiences. H.P. Johannes *et al.* (2021) presented a study of the impact of visual design on litter prevention in urban and public spaces. The study examined specific elements of visual design, such as the placement of litter bins, their visibility and design, the cleanliness of the area, the quality of materials, lighting, and the overall aesthetics of the space that can influence people's desire to maintain tidiness. E.M. Alnikov (2020) investigated an innovative approach to designing an inclusive environment through the lens of aesthetics, using the potential of additive technologies (3D printing). The analysis presented the possibilities of 3D printing in the production of individualised tactile navigation elements, adapted furniture, decorative details, and other architectural components that are ergonomic, safe, and visually pleasing all at once.

While earlier studies explored various aspects of inclusive design, further clarification of its aesthetic dimensions is still necessary. The purpose of present study was to identify and systematise the key aesthetic principles that can be effectively integrated into the design of modern inclusive urban spaces.

MATERIALS AND METHODS

The applied research methodology was fully consistent with the tasks set, including a wide range of scientific approaches. It included a wide scope of scientific frameworks that correspond to the set goals and objectives, such as systematisation and grouping of existing aesthetic principles and their manifestations in inclusive design; art historical analysis, where the visual and aesthetic characteristics of urban objects and spaces were studied in detail. This analysis covered such aspects as imagery, stylistic features, form, colour palette, textures, and materials. It allowed assessing the impact of these elements on the perception of the environment by users. A comparative analysis was also employed to establish distinct approaches to the integration of aesthetics and inclusivity in the urban environment, identifying best practices and effective solutions both in Ukraine and abroad. The materials for the study included scientific articles, monographs, and reports on architecture, environmental design, urban sociology, perceptual psychology, and inclusive practices, as well as photos and videos of urban spaces and objects demonstrating a variety of aesthetic solutions. Additionally, planning and design documentation on urban infrastructure, materials from international conferences and symposia on urbanism and inclusive design, as well as data from field observations and personal visitors to various cities, such as Kyiv, Lviv, Chernivtsi, were used. Direct observations were made of the interaction of diverse categories of users (specifically, people with disabilities, elderly people, etc.) with elements of urban infrastructure. This included recording behavioural reactions, the nature of activity, and the perception of visual aspects in real conditions of urban space. The study also involved a detailed review and analysis of successful projects of inclusive urban environments, where aesthetic principles were effectively integrated. Specific design solutions, materials, planning, and their influence on accessibility and attractiveness were assessed. This helped to identify key visual design patterns that enhance both inclusivity and overall aesthetic appeal in urban environments.

RESULTS AND DISCUSSION

The development of an inclusive urban environment is one of the crucial tasks of modern urban planning. The application of aesthetic principles not only makes the city attractive but also contributes to its perception as a harmonious and hospitable space, where everyone feels part of the community. The modern inclusive urban environment is formed based on such principles

as visual harmony and attractiveness through the lens of accessibility, functional aesthetics and ergonomics, socio-cultural and emotional significance, as well as ecological aesthetics and sustainable development (Kovalchuk, 2025). These principles can be further classified and analysed in greater detail from

the perspective of inclusive design. The principle of visual harmony and attractiveness through the lens of accessibility becomes a significant prerequisite for inclusion, inviting people to interact, facilitating orientation, and creating a sense of security. It has the following typology, presented in Figure 1.

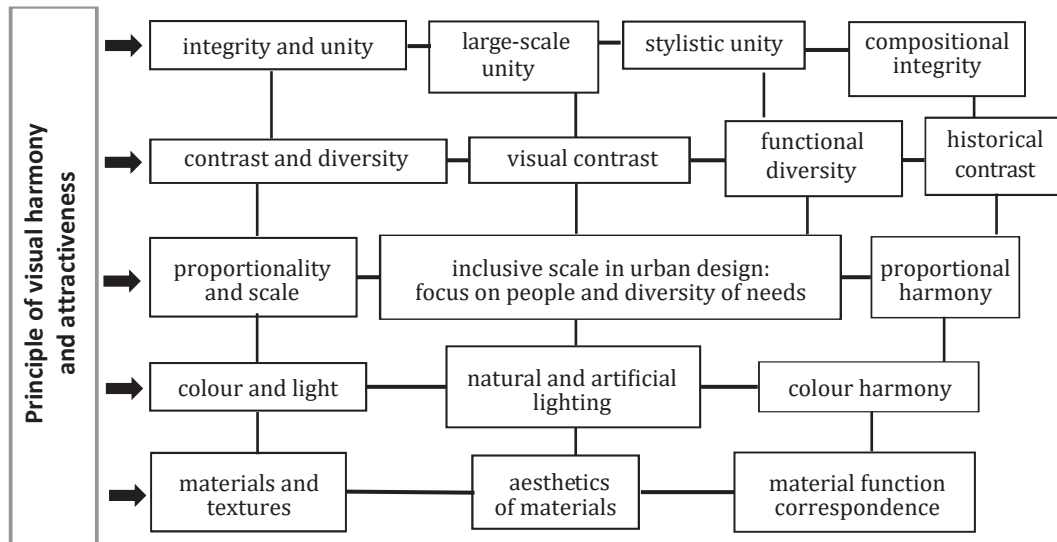


Figure 1. Typological structure of the principles of visual harmony and attractiveness

Source: created by the author of this study

The key result is the creation of a psychologically comfortable and pleasant inclusive environment. When an urban space is visually harmonious, it evokes a sense of calm, order, and security. For people with increased sensitivity, cognitive disorders, or those who

are easily disoriented, this harmony reduces stress and anxiety (Kryvuts & Katrichenko, 2016). Balanced lighting, a pleasant colour palette, the absence of visual noise – all this contributes to everyone’s mental well-being (Fig. 2).

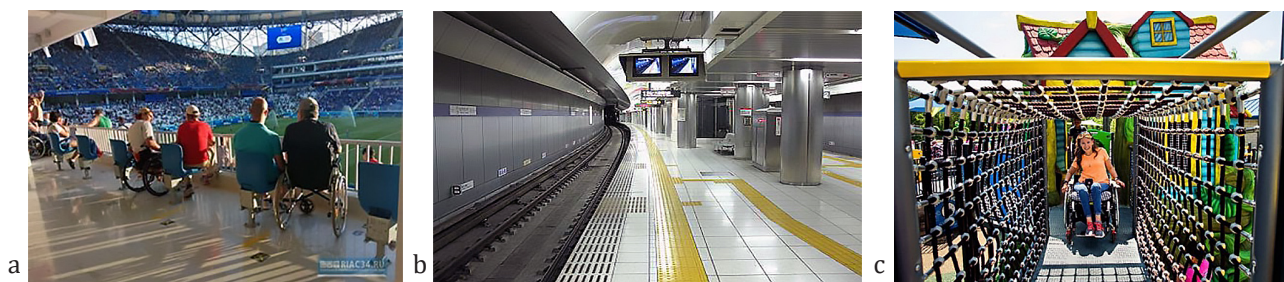


Figure 2. Psychologically comfortable and pleasant inclusive environment

Note: a – inclusive equipped area for wheelchair users during a football match; b – modern inclusive design of a metro station; c – inclusive playground

Source: Science Photo Gallery (n.d.)

The principle of functional aesthetics and ergonomics ensures that the space is not merely visually appealing, but also intuitive, user-friendly, and safe for every person. This reflects the transition from the perception of beauty as an adornment to its understanding as an integral component of human purpose and well-being. It is through the integration of forms that serve specific needs and design focused on the interaction of people with space that true harmony is achieved (Johannes *et*

al., 2021). This approach to integrating form and function also extends to the visual communication environment. For a comprehensive assessment of the accessibility of images, only one method is sufficient. It is necessary to incorporate processes that evaluate the quality of the accompanying text, as this is instrumental in ensuring a comprehensive functional aesthetics and ergonomics of information perception for all users, considering their individual needs (Alahmadi &

Drew, 2018). Specifically, the linguistic clarity, consistency of terminology, and adaptation to various literacy levels play a crucial role in making information accessible to a wider audience. Applying ergonomic principles in visual communication means that information

should be presented in a way that minimises cognitive load and ensures maximum efficiency of its perception (Smirnova, 2020). The principle of functional aesthetics and ergonomics is revealed in the following types presented in Figure 3.

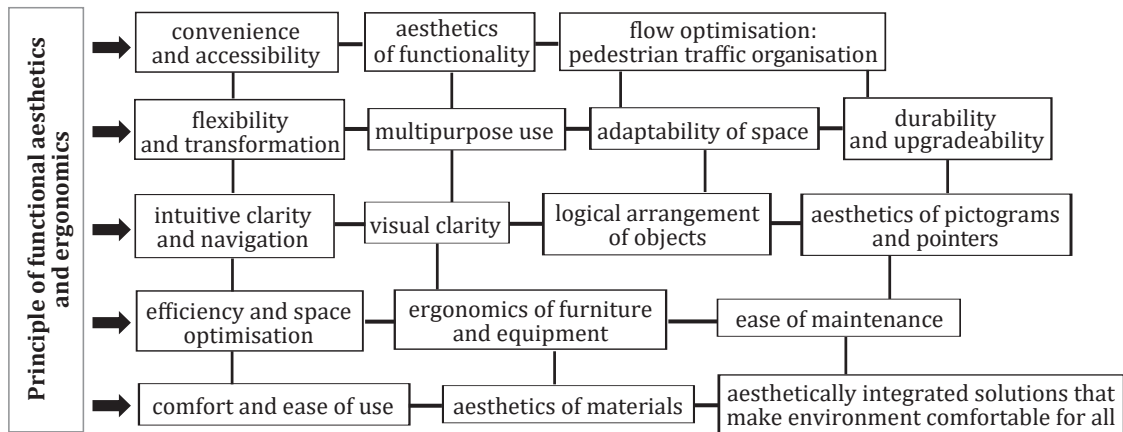


Figure 3. Typological structure of the principle of functional aesthetics and ergonomics

Source: created by the author of this study

When applying the principles of functional aesthetics and ergonomics, the result is the creation of products, systems, and environments that harmoniously combine practicality, convenience, and visual appeal.

This approach ensures not only high efficiency and safety of human interaction with the object, minimising physical and cognitive load but also evokes positive emotions and aesthetic pleasure (Fig. 4).



Figure 4. Ergonomic and aesthetically pleasing products and environments

Note: a – inclusive walking device with fixed weight load; b – ergonomic wheelchair transformer; c – Jackson Street in St. Paul, reconstructed by Toole

Source: Science Photo Gallery (n.d.)

The principle of sociocultural and emotional relevance is a concept that merits greater consideration in the context of inclusive solutions, despite its frequent underestimation. This principle extends beyond purely functional and physical aspects, exploring the manner in which objects and environments influence an individual’s mental state, self-perception, and social integration (Osadcha *et al.*, 2019). Therefore, the principle of sociocultural relevance emphasises that design does not exist in a vacuum. It is embedded in a certain cultural context, reflects the value of society, shapes and is

perceived through the lens of social norms, traditions, and symbols. For people with disabilities, this means that design should not only ensure physical accessibility, but also destroy stereotypes, reduce stigmatisation, and promote their full participation in society (Orshansky, 2019). Products and environments should not be “special” or “medical”, but integrated, aesthetically appealing, and emphasising individuality, not merely functional limitations. It is these principles of sociocultural and emotional relevance that are crucial in inclusive design when developing clothing for

working women with physical disabilities, because clothing should not only provide comfort and functionality, but also emphasise their identity, professionalism, and promote social integration without stigmatisation (Carroll & Kincade, 2009). The principle of

sociocultural significance in the context of design and ergonomics encompasses the profound influence of objects and environments on social interaction, cultural norms and personal perceptions, which determines its multifaceted typology (Fig. 5).

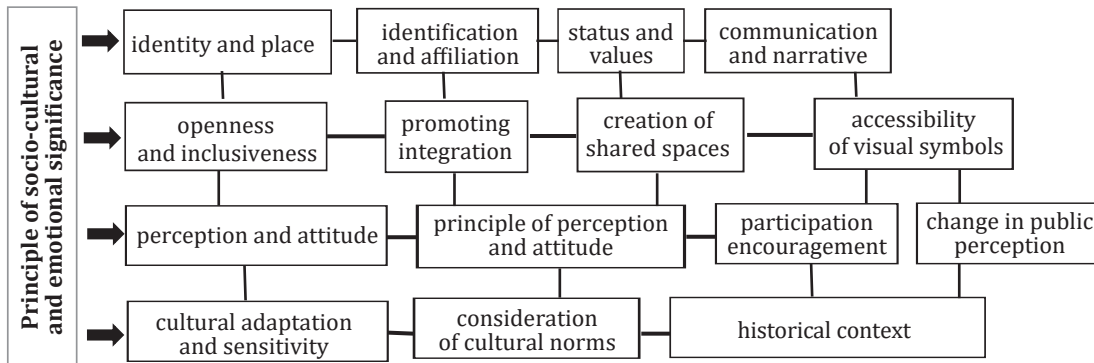


Figure 5. Defining types of sociocultural and emotional value

Source: created by the author of this study



Figure 6. Inclusive space and products created using the principles of socio-cultural and emotional significance
Note: a – inclusive Queen Elizabeth Olympic Park; b – natural motifs of Spain in the decoration of wheelchair wheels; c – inclusive sports complex
Source: Science Photo Gallery (n.d.)

Application of the principles of sociocultural and emotional significance in creating an inclusive environment transforms space and objects, giving them functionality that extends far beyond simple physical accessibility. This means that inclusion is achieved not only through the removal of physical barriers, but also through the development of an environment that actively accommodates the psychological, social, and cultural needs of a person (Krasnikova, 2018). The result is an environment that actively destroys social barriers and stereotypes, contributing to deep integration and a sense of belonging. The primary role in this process is played by the use of colour combinations. Colour is a powerful tool that influences emotional state, psychological perception, and cultural associations, and therefore its conscious use in inclusive design contributes to the achievement of the above principles. A judiciously curated colour palette can engender a sensation of calmness, stimulate activity, facilitate enhanced navigation, delineate spatial domains, attenuate anxiety levels, and

underscore a sense of cultural affiliation. This approach serves to foster a sense of belonging while concurrently mitigating tangible manifestations of division. Thus, colour becomes not simply an aesthetic element, but an integral component that allows implementing a truly inclusive environment that meets not only the physical, but also the socio-cultural and emotional needs of all users (Ralko *et al.*, 2023). In this context, colour also performs a communicative function, facilitating navigation and promoting an intuitive perception of space, regardless of the user’s age, experience, or cognitive characteristics. Such an approach not only provides functional comfort, but also evokes positive emotions, a sense of dignity and confidence, allowing each person to fully interact with the surrounding world and society (Bulatov, 2023) (Fig. 6).

The principles of ecological aesthetics and sustainable development are interrelated approaches aimed at creating inclusive, harmonious, and environmentally responsible design and operation of systems. Ecological

aesthetics focuses on visual appeal and an emotional connection to nature, integrating natural forms, materials, and processes into design to evoke feelings of calm, harmony, and respect for the environment. It seeks to ensure that functional and urban spaces are not simply utilitarian, but also environmentally sensitive and visually pleasing, enhancing the quality of life and human well-being (Steiner, 2019). Sustainable development provides a practical framework to achieve a long-term balance between social, economic, and environmental needs, requiring the use of renewable resources, waste

minimisation, energy efficiency, reduced impact on ecosystems, and the promotion of social justice. These design approaches differ from the existing sustainable design paradigm, which, while focused on technological and material solutions to achieve environmental efficiency, lacked attention to real-world experiences, individual needs, and actual user activity (Evans, 2018). The principle of ecological aesthetics and sustainable development, which integrates beauty and functionality with environmental responsibility, can be typologically characterised by the following key criteria presented in (Fig. 7).

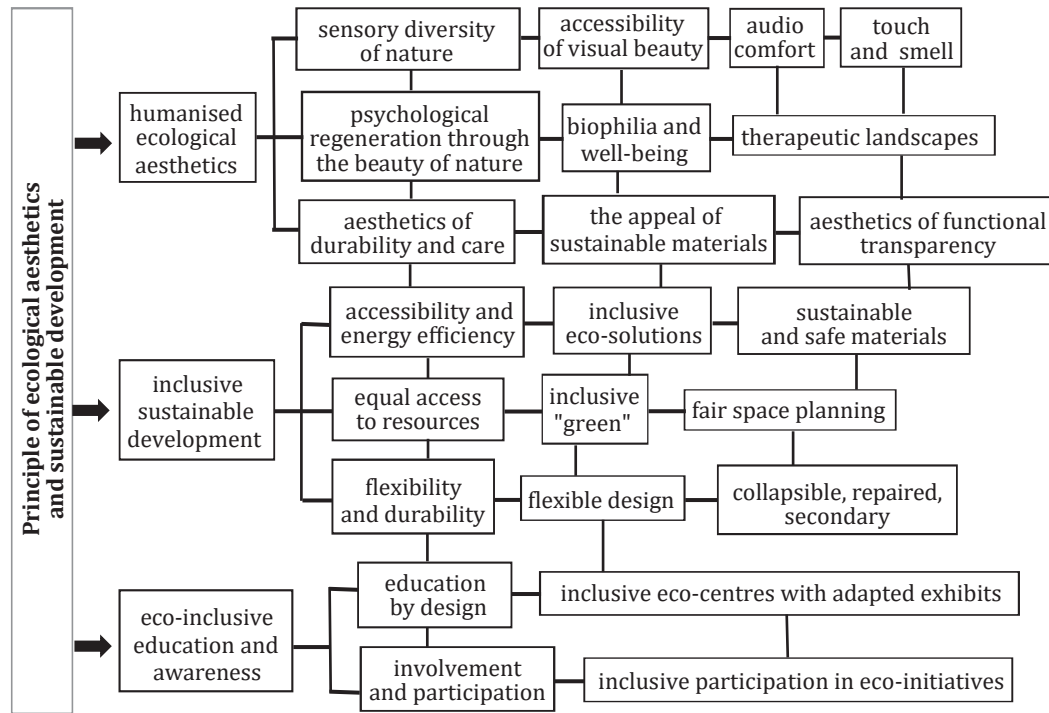


Figure 7. Defining types of ecological aesthetics and sustainable development of an inclusive environment
Source: created by the author of this study

The developed typology reveals the relationship between the principles of ecological aesthetics and sustainable development in the context of the development of an inclusive urban space. Application of these approaches allows creating an environment that is not only visually attractive, but also functional, safe, and responsible towards nature and society. The integration of natural elements contributes to psychological well-being and ensures the accessibility of green areas for all. The use of sustainable materials and energy-efficient solutions guarantees durability, safety, and minimisation of the ecological footprint, which makes the space healthier for all residents, including people with special needs. The study highlighted the significance of social justice and equal access to a quality environmental environment. Additionally, design can create educational opportunities and actively involve people with disabilities in environmental projects, promoting their active contribution to sustainable development.

As a result, such an integrated approach creates not only beautiful, but also liveable, equitable, and responsive urban spaces, where everyone feels comfortable and dignified (Fig. 8). The result of combining these principles is the creation of innovative solutions that are not only functional and aesthetically perfect, but also actively contribute to the conservation of natural resources, the reduction of the ecological footprint, and the development of a more sustainable, healthy, and environmentally conscious society. This enables the design of a future where human needs are met without compromising the capabilities of future generations. I. Bondar (2022) explored innovative design trends as a key factor in shaping the modern urban environment. The researcher analysed the influence of new concepts, technologies, and materials on the creation of functional, aesthetically pleasing, and sustainable urban spaces. Bondar paid special attention to the integration of the principles of human-centred Smart

City design, green architecture, and adaptive infrastructure solutions. The researcher found how these trends contribute to improving the quality of life of residents, optimising urban resources, and ensuring ecological balance, proposing methodological approaches to the implementation of leading design innovations in the practice of urban planning and development. E.-N. Untaru *et al.* (2025) analysed aspects focusing on the effectiveness of biophilic design in the context of a hospital and its impact on employees. The researchers analysed how the integration of elements of nature and natural systems into the design of the workspace

contributes to emotional well-being, increased environmental satisfaction, and strengthened attachment to the workplace among staff. The study examined how access to the natural world, vegetation, natural materials, and vistas of nature can reduce stress, increase productivity, and overall job satisfaction in conditions of high emotional stress typical of staff. These findings were consistent with the results of the present study, where the integration of natural elements into inclusive urban environments was shown to foster psychological well-being, reduce anxiety, and enhance inclusivity through emotional and sensory engagement.



Figure 8. Ecological aesthetics and sustainable development in the context of the development of an inclusive urban space

Note: a – inclusive green roof, San Francisco; b – inclusive Azor Beach; c – inclusive Big Bend Park

Source: Science Photo Gallery (n.d.)

A. Ricciardel *et al.* (2025) explored the multifaceted process of urban regeneration, considering it from the stage of space design to their social integration. Particular attention was paid to the issue of innovation and its connection with organisational aesthetics. The researchers analysed how visual appeal, harmony, and functionality of design affect the success of regeneration projects. Specifically, the researchers considered the role of aesthetic solutions in the development of an inclusive and comfortable environment that promotes active community participation and social cohesion. The present study confirmed that aesthetic and ergonomic principles play a key, not secondary, role in shaping inclusive urban spaces by directly affecting user comfort, interaction, and sense of security. I. Ryzhova *et al.* (2024) examined barrier-free architecture in the context of inclusiveness and sustainable development, identifying a series of key principles for creating an accessible environment. In contrast to their generalised approach, the present study examined detailed typologies of aesthetic principles in inclusive design, which allowed structuring visual, ergonomic, socio-cultural, and environmental aspects as independent analytical categories.

M.D. Trupp *et al.* (2022) investigated whether short-term interaction with online digital art can positively affect a person's well-being. The researchers performed a comparative analysis of the impact of online presentations of art and culture on several psychological indicators: mood, anxiety level, subjective

well-being, and feelings of loneliness. The study found that even a brief virtual immersion in the world of art can serve as an effective tool for improving emotional state and reducing negative psychological manifestations. This study empirically confirmed the above principles. By comprehensively analysing the impact of diverse types of art, as well as inclusive design, on the well-being of people with special needs in adapted spaces, the scope of earlier studies was expanded and new findings were obtained. However, M.D. Trupp *et al.* (2022) did not examine the long-term duration of these positive effects. It was also worth considering that the quality and format of online presentations can vary significantly, and it is unclear to what extent these findings can be generalised to all forms of digital art. Furthermore, the question stays open whether virtual immersion can completely replace physical interaction with art. The latter often provides the unique atmosphere of galleries and museums, social interaction, and a deeper sensory experience, while the principle of socio-cultural and emotional significance may be weakened or altered in the virtual environment.

H. Loodin & O. Thufvesson (2022) investigated the architectural styles that best contribute to the creation of attractive streetscapes, with a particular focus on the aesthetic preferences of city centre managers. Their analysis presented key visual and aesthetic characteristics of architectural solutions that shape the urban environment, including building facades, materials, colour

schemes, proportions, and the overall harmony of the development. However, a key aspect of their study, which was controversial, lied in the special attention paid to the aesthetic preferences of city centre managers, which, on the one hand, allows understanding what priorities and visions dominate among the decisionmakers in the urban development. On the other hand, it is unclear whether the preferences of city centre managers are representative of the wider community of residents and users of these spaces. The urban environment is created not only for management, but also for thousands of people with diverse aesthetic views, cultural preferences, and functional needs. The present study addressed this issue by including observations of different user groups in an inclusive urban environment, which allowed evaluating aesthetic and functional aspects from the perspective of real users with diverse needs and sensitivities. Aesthetics in this context plays the role of a tool capable of integrating functional solutions into a holistic, attractive, and understandable image of the city (Alnikov, 2020). The conducted study helped to systematise aesthetic principles and substantiate their application in the context of creating inclusive spaces. However, E.M. Alnikov (2020) did not detail the specific methods and criteria for assessing the effectiveness of such integration in practice, nor did the researcher consider potential conflicts between aesthetic solutions and functional accessibility, which are the subject of a deeper analysis in the present study.

This study was based on the findings of Ukrainian and international researchers who analysed the role of aesthetics in creating inclusive urban environments. Their work covers a wide range of issues, from visual accessibility and comfort to the psychological perception of space by people with diverse needs. The examination of their findings identified key principles and approaches that serve as the basis for developing effective solutions in this area. Specifically, these sources emphasised the significance of emotional resonance, cultural relevance, and multisensory engagement in shaping environments that are not only accessible, but also meaningful and welcoming to diverse user groups.

CONCLUSIONS

The study identified effective and creative strategies that provide an organic combination of aesthetics and inclusion. Analysis of the latest methods showed that they enable the development of urban spaces that exceed basic accessibility standards, significantly

increasing their level of comfort and visual appeal. It was found that the harmonious integration of aesthetic principles with accessibility requirements contributes to increasing the level of comfort and attractiveness of urban spaces. The study identified the key factors that help achieve synergy between practicality and visual appeal, making an inclusive environment not only comfortable, but also aesthetically valuable for everyone.

Within the framework of the study, a series of typologies were developed to systematise approaches to designing inclusive environments. Specifically, the typology of the principle of visual harmony and attractiveness in the context of accessibility emphasises the role of aesthetic elements in improving navigation and orientation without compromising visual value. The typology of functional aesthetics and ergonomics organises approaches to creating spaces that simultaneously meet aesthetic standards and ensure user convenience. The typology of ecological aesthetics and sustainable development integrates beauty and functionality with environmental responsibility, expanding conventional notions of aesthetics through the lens of environmental awareness and long-term viability. The typology of socio-cultural significance in design and ergonomics highlights the value of social and cultural context in shaping inclusive spaces.

Further research should focus on in-depth study of the socio-cultural and emotional impact of specific aesthetic elements. This includes analysing how colour solutions, lighting, textures, shapes, and materials affect the psycho-emotional state and cognitive processes of people with diverse types of disabilities – e.g., with autism spectrum disorders, sensory or cognitive impairments. A special role should be given to experimental research, specifically, conducting controlled experiments to investigate the impact of certain aesthetic elements (colour, shape, lighting, texture) on the perception of space by different population groups, including people with disabilities.

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CONFLICT OF INTEREST

None.

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Застосування естетичних принципів у створенні інклюзивного міського середовища

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Анотація. Формування сучасного інклюзивного міського середовища передових держав все більше враховує естетичні принципи, які допомагають зробити простір не тільки функціональний та доступний для всіх, але і естетично привабливим, таким чином досягаючи внутрішнього комфорту за рахунок естетичного впливу. Метою дослідження було визначити та класифікувати естетичні принципи формування інклюзивного міського середовища на початку XXI століття. Дослідження ґрунтувалося на аналізі літератури з питань інклюзивного дизайну та методів естетичного облаштування міських територій. Доведено, що естетика інклюзивного міського середовища позитивно впливає на самопочуття та досвід людей з інвалідністю. Визначено, як естетичні елементи можуть бути використані для поліпшення навігації, орієнтації та безпеки для людей з інвалідністю. Досліджено нові та креативні способи інтеграції естетики та інклюзивності, що виходять за межі базових вимог доступності, створюючи міській простір більш комфортним та привабливим. Визначено аспекти, які допомагають досягти оптимального поєднання практичності та естетичної привабливості, щоб інклюзивне середовище було зручним для всіх і одночасно не втрачало своєї естетичної цінності. Проаналізовано та виокремлено естетичні принципи, які є найбільш ефективними для створення справді інклюзивного та функціонального міського середовища. Практичне значення отриманих результатів полягає в тому, що застосування естетично продуманих рішень, таких як контрастні кольори, чітка навігація та тактильні поверхні, можуть суттєво покращити орієнтацію та безпеку для людей з різними видами інвалідності. Це сприяє психологічному добробуту та відчуттю приналежності у всіх користувачів, незалежно від їхніх фізичних можливостей

Ключові слова: доступність; урбаністика; дизайн середовища; гармонія простору; безбар'єрність; ергономічність; візуальна привабливість



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The visual environment as a directorial tool: The art of location in children's video content

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Abstract. In the contemporary media landscape, children's video content is one of the leading tools for development, education, and entertainment, while the visual environment acquired the status of an independent language of communication. Despite the widespread presence of children's media products on digital platforms, directorial principles of location design for young audiences remained insufficiently explored in the Ukrainian cultural and artistic context. The study aimed to analyse the role of the visual environment as a directorial tool in the production of children's video content for digital platforms, using the channels Smile Family and Smile Family Spanish as case studies. The research was based on a review and analysis of theoretical sources in the fields of perception psychology, colour theory, film language, and semiotics. To examine practical material, methods of visual-structural frame analysis, spatial composition, symbolism, and the organisation of visual elements in locations were applied. The study systematised key directorial techniques for creating visually appealing, emotionally expressive, and narratively coherent environments for child audiences. The research identified typical models for using colour as an emotional and narrative device, principles of symmetrical and asymmetrical composition, techniques for filling space with symbolically charged objects, and the role of editing dynamics in shaping perception. Successful case studies illustrated how a thoughtfully designed location functioned not as a background but as an active participant in the interaction, influencing the rhythm, emotional tone, and narrative structure. The applied methods – analysis of sources in perception psychology, colour theory, and semiotics, along with visual-structural frame analysis – integrated both academic approaches and practical tools for directors and producers. The results contributed to the advancement of directing methods, artistic design, and visual planning in the creation of children's media content for digital platforms

Keywords: composition; visual dramaturgy; scenography; colour psychology; stylistic design; media perception; aesthetics of digital content

INTRODUCTION

The growing popularity of video platforms among young audiences worldwide has transformed screen space into a key environment for shaping emotional, cognitive, and social experiences. Given the daily engagement of children with visual narratives on platforms such as YouTube, TikTok, and Netflix, it becomes increasingly necessary to reassess the role of spatial direction, viewing it not solely as a means of aesthetic expression but also as a significant factor in fostering educational outcomes and supporting cognitive and

socio-emotional development. Despite the relevance of this issue, the artistic organisation of locations in children's content remains largely unexplored in both international and Ukrainian academic discourse.

In this context, the study by M. Fan & W. Cai (2022) demonstrated that a creative visual environment, which provides emotional comfort and interactive opportunities, significantly stimulates children's creativity and cognitive activity. The study emphasised the role of nonverbal ambient cues, such as colour,

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lighting, and spatial arrangements, in early childhood media that support children's engagement and learning. Their findings suggested that when children are exposed to thoughtfully designed visual environments, their capacity for imaginative play and focused attention increases, which positively influences cognitive development. Similarly, Y. Xu & S. Wu (2022) addressed the role of symbolic spatial harmony in children's media. The research revealed that visually balanced compositions, achieved through the careful arrangement of shapes, colours, and objects, enhance children's emotional sensitivity and improve their ability to retain information. By highlighting the importance of semiotic design elements, such as icons, metaphors, and symbolic objects, the study argued that these elements act as essential mediators of meaning that aid young viewers in decoding complex narratives. This semiotic approach underscored how children do not simply consume media passively but actively interpret visual cues to construct perception.

Furthermore, R. Liu *et al.* (2022) conducted an eye-tracking study involving 110 child participants to investigate the effects of spatial organisation in immersive 360° video content. The results confirmed that visual cues, such as directional arrows, highlighted areas, and textual annotations, significantly enhanced children's visual focus and comprehension of the content. This study provided empirical evidence that spatial structuring within video frames is fundamental in development of children's visual language skills and support of deeper cognitive engagement. The ability to guide viewers' attention in such immersive environments is particularly relevant in digital media, where visual overload can otherwise hinder learning. S. Pourbagher *et al.* (2021) further explored the impact of colour palettes in educational media, emphasising the importance of harmonious and consistent colour usage. Their research showed that carefully selected colour schemes reduce cognitive load, create a calm and attractive atmosphere, and positively influence mood and cognitive functions, thereby supporting learning effectiveness and emphasising the need for careful selection of colour palettes in design of educational content. Building on these notions, A. Bortolotti *et al.* (2025) used eye-tracking technology to provide empirical evidence on how specific hues capture visual attention and shape gaze fixation patterns. Their research highlighted that certain colours not only attract attention more effectively but also evoke emotional responses that deepen engagement with the media. By demonstrating a direct link between colour selection and viewer involvement, this study reinforces the idea that colour is not merely an aesthetic choice but a strategic tool in visual storytelling for children.

In the context of international research, the Ukrainian cultural and developmental context is essential. O. Litichenko & D. Masteruk (2023) conducted

a study of preschool children in Ukraine, revealing that colour functions as a primary expressive tool in early childhood artistic activity. Their findings indicated that children's colour preferences are influenced by both individual emotional motivations and the gradual internalisation of gender stereotypes. This dual influence shapes how children use colour for self-expression and has substantial implications for designing visual media that respects and nurtures diverse identities. Moreover, A. Turubarova *et al.* (2025) examined how colour affects the psycho-emotional state across different age groups of Ukrainian children. The research demonstrated that younger children tend to respond more impulsively to warm colours such as reds and orange, which can stimulate energy and excitement. In contrast, older children prefer colder and more muted shades, reflecting a developmental shift towards emotional regulation and calmness. These findings underscored the importance of age-appropriate colour design in children's media to ensure that visual environments are both engaging and supportive of emotional well-being. Given the visual patterns identified in the use of space, colour, and symbolism in children's video content, the study aimed to analyse how directorial approaches to shaping the visual environment correlate with the characteristics of the children's audience's perception of the plot, based on available scientific sources and examples of media production.

The study was conducted based on a qualitative analysis of children's video content published on the YouTube channels "Smile Family Spanish" and "Smile Family". Nine videos with over 100 million views during the period 2021-2025 were selected for analysis. The videos were chosen according to the following criteria: the presence of a distinct visual environment (both interior and exterior); active use of space in dramaturgy; involvement of colour symbolism and props as narrative elements; participation of the author of the research in the creation of these videos as director, showrunner, script developer, and actor. Among the videos analysed were "Slava and Max pretend play hot vs cold challenge", "Sasha and Anya doing shopping in toy store and play in pop-it & simple dimple room", "Arina plays hide and seek in a cardboard challenge", "Pretend play Barbie & Ken and pink vs blue colour challenge", "Slava pretend play doing morning routine from the to do list", "Dana participates in rich vs poor vs Giga rich playhouse decorating competition", "Slava and Max play huge maze challenge", "Dana and Danny - best school story challenge black vs pink with friends", "Funny challenges in playhouse for kids". The study employed a review-based analytical approach to specialised literature in perception psychology, colour theory, cinematic language, and media direction. Additionally, methods of visual-structural analysis were applied to frames, spatial layouts, and symbolic visual elements within real-world children's media environments.

THE VISUAL ENVIRONMENT AS A COMPONENT OF CHILDREN'S NARRATIVE INTERACTION

The visual environment in children's video content is not merely a background element but a dynamic narrative component that significantly influences perception, emotional response, and the material comprehension. According to J. Piaget & B. Inhelder (1969), children under the age of 6-7 perceived reality primarily through imagery rather than logical-abstract forms. Consequently, visual images, colour, spatial arrangements, and frame dynamics become the primary tools for children's exploration of the world. E.H. Erikson (1950), in theories of personality development, emphasised the role of predictability and environmental stability in establishing a basic sense of trust. From this perspective, a well-structured visual environment contributes to a child's sense of confidence, emotional well-being, and psychological security. This concept is

illustrated in the Smile Family video "Pretend play Barbie & Ken and pink vs blue colour challenge" (Fig. 1), where the location was designed around a bright contrast between two worlds – the pink "Barbie" space and the blue "Ken" zone. The left side of the room reflects Barbie's style: a pink background, fluffy carpet, toy furniture, and accessories that recreate a doll-like atmosphere. The right side represents Ken's world: a blue background, surfboard, inflatable toys, and a poster of Ken in a beach style, evoking a sense of relaxation and adventure. The division between the two zones is emphasised by vivid colours and thematic character posters. This contrast makes the space interactive: the child can "travel" from Barbie's room into Ken's world, encouraging imagination and engagement. The visual setting functions as a nonverbal code – recognisable without the need for explanation – thus enhancing the viewer's trust and comfort through spatial and emotional consistency.



Figure 1. A room split into a pink Barbie half and a blue Ken half

Source: Pretend play Barbie & Ken and pink vs blue colour challenge (2023)

H. Gardner (1983), in a theory of multiple intelligences, identified "visual-spatial intelligence" as a core cognitive domain responsible for spatial reasoning, visual memory, and the ability to interpret visual information. This underscores the importance of structuring children's content not only with visual appeal but also in a way that fosters spatial imagination, analytical skills, and creative thinking. Modern educational theories emphasise the significance of a well-designed environment in fostering cognitive and creative capacities. Visually complex environments can either stimulate or overwhelm perception, rendering the balance between detail and simplicity essential for educational effectiveness. L. Terreni (2019) argued that early childhood spaces acted as expressive "third teachers," where aesthetic decisions about layout, colour, lighting, and cultural symbolism shaped social-emotional climate and support learning and well-being. The environment was expected to be not only safe and aesthetically pleasing but also functionally organised to support various types of learning activities. The presence of defined zones for play, learning, and rest

enhanced independence, focus, and intrinsic motivation. Visual organisation, including object placement, colour use, lighting, and visual cues, directly affects how a child navigates the space, absorbs information, and engages with surroundings. J.S. Bruner (1966), G. Kress & T. van Leeuwen (2020) conceptualised visual environment as a distinct language with its grammar and structure. Children, from an early age, learned to "read" spatial arrangements, colour symbolism, forms, and character interactions. This process contributed not only to cognitive skill development but also to imagination, critical thinking, and the capacity for creative interpretation. A signature feature of many scenes is the use of a single material as the dominant visual element. For example, in Smile Family's cardboard room and cardboard prison, the entire location, including walls, props, and furniture, was made of cardboard, as illustrated in Figure 2. This technique immerses the viewer in a playful, "detached reality" – familiar yet imagined. Such solutions serve both practical and artistic functions: they reduce sensory overload while creating an original and vivid visual space.



Figure 2. Cardboard location

Source: Slava pretend play doing morning routine from the to do list (2021), Arina plays hide and seek in a cardboard challenge (2024)

Set designers, responsible for the use of colour, materials and forms to build stylistically unified and aesthetically expressive objects, are central in creating cohesive visual language. Frequently, visual environments are built around a dominant material – for example, fully cardboard interiors (classrooms, prisons, rooms) or fur-covered learning spaces. This approach both enhances the sense of “alternate reality” and reduces visual clutter, optimising perception.

COLOUR, SYMMETRY, AND OBJECTIVITY USED IN CHILDREN’S VIDEO CONTENT

Colour is a fundamental component in shaping the visual language, designed for children. According to C.J. Boyatzis & R. Varghese (1994), colours consistently evoked specific emotional reactions in children – for example, red was linked to activity, blue to tranquillity, and green to a sense of safety. Thoughtfully selected colour schemes in educational media were found to influence both attention and emotional involvement. S. Özdemir *et al.* (2023) found that preschoolers with autism spectrum disorder and typically developing peers exhibited significantly longer gaze fixations on faces, and particularly on eyes, during 3D animations compared to standard video, across varying levels of social interaction. This suggests that richer visual environments (such as 3D animations) amplify social attention and may offer enhanced engagement opportunities for children with neurodiverse profiles.

Colour is one of the key elements of visual space in children’s video content. Its impact extends to both the emotional spectrum and narrative structure. In children’s perception, colour is associated with emotions, actions, safety, or danger – a mechanism actively utilised in directorial frame construction. Such principles underpin the use of colour coding, commonly employed across educational and entertainment media for children. A. Bortolotti *et al.* (2025) showed via eye-tracking that colours not only captured children’s attention but also steered it toward relevant elements of the story. A key factor in the viewer’s engagement with media is determined by the visual organisation of space – including colour schemes, spatial composition, symbolic objects, and other elements of visual language designed to attract attention, stimulate cognitive engagement, and create an emotionally supportive environment for children. A practical example of such visual structuring is present in the Smile Family video “Slava and Max pretend play hot VS cold challenge”. In this video the visual environment is used as a key dramaturgical element. The space was intentionally divided into two zones – red and blue – reflecting the theme of the game and immediately highlighting which side was “hot” and which “cold”. All props, furniture, and even small accessories were colour-coded accordingly. A clear visual structure was created, helping children orient within the game and focus on its rules. This is illustrated in Figure 3.



Figure 3. A space divided into blue and red zones

Source: Slava and Max pretend play hot VS cold challenge (2021)

Empirical evidence from classroom design, as demonstrated by P. Barrett *et al.* (2015), confirmed that environmental variables, such as colour, flexibility, light, and complexity, can explain up to 16% of the variation in pupils' learning outcomes. L. She *et al.* (2024) emphasised the importance of a harmonious colour palette in video-based learning: the eye-tracking study with 78 university students comparing no-colour, single-colour, and multi-colour cues demonstrated that moderate use of colour cues directed visual concentration, organised information, and enhanced retention and transfer, while both absence and excess of colour can increase cognitive load. These findings underline the dual role of colour in educational media, conveying emotional tone and reinforcing narrative clarity, without overwhelming the learner. Furthermore, E.B. Goldstein (2017) highlighted the role of colour in a child's sensory experience, affecting the formation of the emotional background of perception. J.W. Beentjes *et al.* (2001) demonstrated that even preschool-aged children (mean age ~5-6) could interpret visual formal features such as colour changes, cuts, zooms, dissolves, and split screens in televised content. Their findings demonstrated that these visual elements were actively decoded by children to infer shifts in time, perspective, mood, or significance – highlighting the dual role of colour not only in attracting attention but also in conveying emotional tone and narrative cues within children's video content.

Just as colour provides emotional and narrative orientation, the structural layout of the frame reinforces cognitive coherence. Among these, symmetry functions in children's content as a tool of visual alignment and supporting the comprehension of sequences. The organisation of space within the frame has a profound influence on the perception of structure, rhythm, and logic in video. Symmetry is often associated with harmony, stability, and order – all essential attributes of a child-friendly environment. P.J. Locher *et al.* (1998) empirically investigated how balance operates as a key organising principle in visual compositions. The study revealed that, when creating complex displays using various shapes, adult participants, regardless of artistic training, consistently aligned elements around the geometric centre of the image and achieved symmetric distribution of structural "weight". This demonstrates that balance functions as an intuitive anchor, structuring spatial layouts for coherence and perceptual harmony. Such findings align with foundational Gestalt concepts – similarity, proximity, closure, and symmetry – contributing to visual fluency and ease of comprehension. R.R. Behrens (1998) detailed the application of these Gestalt principles in design, such as symmetry, rhythmic repetition of forms, and balance, all contributing to the predictability necessary for children's perception. R. Arnheim (1974) considered these structures as components of

"visual logic", which shapes a child's ability to navigate visual environments. Objects in the frame serve not only decorative but also deeply semantic functions. Their placement, shape, colour, and interaction with characters contribute to the construction of visual language. P. Messaris (1994) highlighted that images can trigger associative thinking, with objects functioning as signs, especially for children, whose verbal thinking has not yet become dominant.

B.R. Robin (2008) emphasised that object-based content provide digital stories the power of identification, as children project themselves onto familiar items. This mechanism of identification through tangible and recognisable objects is especially relevant in visual media designed for early childhood audiences, where the boundary between play and narrative is often fluid. Familiar objects not only anchor attention but also serve as entry points into imaginative worlds, enhancing emotional resonance. Building on this, S.L. Calvert (2008), in an analysis of advertising strategies, highlighted the power of visual symbolism, particularly its potential to evoke meanings quickly and effectively without the need for verbal cues. In children's media, this symbolic shorthand becomes a substantial narrative element, compressing complex ideas into simple, visually intuitive forms. B. Block (2021) asserted that visual storytelling begins with space: colours, textures, and architectural features of the location define the mood of the scene. The perspective reinforces the idea that spatial design is not a neutral background but an active agent in constructing narrative meaning. When integrated with object-based and symbolic content, spatial elements can guide children's interpretation of events, moods, and character intentions.

For example, "Dana participates in rich vs poor vs Giga rich playhouse decorating competition" (2023) demonstrated how location zoning and set design can reveal the director's concept and visually convey the essence of the story. In the video, the space is divided into three distinct zones – representing a rich girl, a very rich girl, and a poor girl. Each area is carefully designed using visual cues such as furniture, textures, lighting, and colour palette to emphasise the social status of each character. G. Rose (2001) added that spatial interpretation can be used to demonstrate deeper meanings embedded in visual texts to children. In this context, a room with soft pastel tones may signal safety or comfort, while sharp angles and bold colours might suggest excitement or conflict. Thus, space becomes a semantic layer that children learn to read intuitively. In support of this, T.L. Childers & M.J. Houston (1984) showed that images are retained in memory more effectively than words – particularly among younger audiences. This finding underscored the importance of investing in rich, carefully composed visual environments, as they not only facilitate comprehension but also enhance long-term recall and emotional impact.

The study showed that colour, symmetry and objectivity are key tools in the visual environment of children's video content, influencing children's attention, emotional engagement and cognitive orientation. Colour is used both as an emotional and structural function, symmetry provides visual order, and familiar objects facilitate plot comprehension and character identification. Together, these tools create an accessible, logical, and emotionally rich environment that immerse children in the narrative.

MOTION DYNAMICS, EDITING, AND HYPERBOLE AS TOOLS OF IMAGINARY INTERACTION

In children's videos, both interior and exterior settings often reflect archetypal models: the "magical

room", the "fairy-tale forest", or the "adventure city". These spatial concepts enhance narrative immersion and emotional engagement. A vivid example appears in "Slava and Max play huge maze challenge" (Fig. 4), where the location was styled as a vibrant, colourful maze, where the walls are covered with geometric patterns made of repeating stripes in pink, yellow, green, and blue. This artistic choice not only created a festive and dynamic atmosphere but also added complexity to navigation: the colours and patterns visually blend, requiring more focus from participants. The design creates brighter and more engaging appearance, turning the maze challenge into an adventure. Viewers experience a sense of immersion in a playful world, where simple tasks feel more exciting thanks to the visual intensity and contrast.



Figure 4. A play maze with walls decorated in colourful geometric patterns

Source: Slava and Max play huge maze challenge (2022)

Building on this, S. Field (2005) noted that each scene should contain a turning point, and in children's content, a change in location frequently fulfils this dramaturgical function. Moreover, as highlighted by P. Brook (1968), frame composition, motion dynamics, and spatial layout help children comprehend spatial and environmental relationships. The way a video is edited, including its rhythm, length of shots, and sequence of scenes, significantly influences how children comprehend the storyline. R. Smith *et al.* (1985) conducted pioneering research demonstrating that young children (ages 4-6) could accurately interpret montage – comprehending changes in time, perspective, and narrative structure through editing patterns in televised media. Their findings suggested that rhythmic cutting and sequence organisation in children's animation served as effective tools for conveying emotional shifts and pacing, laying a theoretical foundation for the concept of "musical montage" in children's media. This perspective is echoed by W. Murch (2001) defining editing as "thinking" rather than merely connecting elements.

Expanding on the role of editing, D. Bordwell & K. Thompson (2019) explained that editing serves as a method of constructing visual logic, which is essential

for a coherent and comprehensible narrative. Similarly, B. Salt (1992) stressed the need for every editing transition to be motivated: even rapid shifts in shots must make sense to the child viewer. Further supporting this view, B. Tversky *et al.* (2002) underlined the importance of visually portraying causal relationships as a foundational component of narrative comprehension. Notably, the personalisation of visual rhythm and pacing is another essential aspect. N. Kucirkova & R. Flewitt (2018) demonstrated that when visual rhythm, pacing, and content are adapted to a child's unique traits – through adaptive sequencing, interactive pace controls, or user-centred editing – engagement increases and comprehension improves, highlighting the role of adaptive editing in children's video experiences. These findings were further reinforced by V. Shtets & O. Melnyk (2024), demonstrating that the technical and expressive tools of stop-motion animation significantly enhance emotional engagement and narrative comprehension, underscoring the communicative power of rhythmic and stylistic editing in audiovisual design for young audiences. In addition to rhythm and editing, a key stylistic feature in children's media content, especially in projects led by Volodymyr Kozachuk,

is the use of artistic hyperbole and fantastical elements. Oversized props such as a time machine, exaggerated vehicles, furry refrigerators, or paper supermarkets create imaginative yet recognisable worlds that engage a child's imagination. Despite their whimsical nature, these objects are functionally clear and based on familiar visual forms, making them easily comprehensible. An illustrative case was "Sasha and Anya doing shopping in toy store and play in pop-it & simple dimple room"

room", where location is built around a hyperbolised visual element – the pop-it toy, which at the time of filming was a highly popular trend. In this case, the hyperbolisation exceeded the scope of a single prop: the art department transformed the entire space into a giant playable pop-it environment, with oversized colourful walls fully immersing the children in the toy's universe. These large-scale set pieces created striking "wow shots" that instantly captured attention (Fig. 5).



Figure 5. A full-scale play environment designed as giant pop-it walls

Source: Sasha and Anya doing shopping in toy store and play in pop-it & simple dimple room (2021)

This blend enhances emotional engagement and sparks curiosity – essential mechanisms for sustaining attention among young viewers. Hyperbole in authorial visual design serves not only aesthetic purposes but also functions as a substantial cognitive and emotional engagement drivers, rendering motion dynamics, editing, and exaggeration relevant elements in the construction of meaningful, immersive experiences in children's visual narratives.

VISUAL CUES, ATTENTION, AND INCLUSIVITY

Theoretical and empirical evidence, including eye-tracking research, demonstrates that structured visual environments (e.g., layout, colour cues, motion) embedded in children's educational video content effectively guide attention and enhance learning outcomes (van Gog & Scheiter, 2010). Eye-tracking research highlighted the importance of identifying boundary conditions for video design, including factors such as learner age, prior knowledge, and content type. Strategically placed visual cues were also noted to enhance focus and memory retention in multimedia learning environments. Eye-tracking technology identifies which video elements are most engaging, especially in immersive formats with panoramic views. R.A.J. de Belen *et al.* (2024) used computational vision and eye-tracking to analyse preschoolers' viewing patterns and found that specific visual attention patterns in video content can accurately predict the presence and symptom severity of autism spectrum disorder with up to 94.6% accuracy. Such research underscored that spatial layout, motion

salience, and scene structure can significantly influence engagement and interpretation in children, suggesting a foundation for more inclusive and adaptive visual communication strategies in specialised media settings. This is particularly evident in a Smile Family video themed around the "Four elements" (Funny challenges in playhouse for kids, 2023), where the environment was visually segmented into four distinct zones – fire, water, air, and earth. Each space was designed with deliberate attention to colour, texture, object shape, and movement, enabling children to identify each element intuitively, even in the absence of verbal narration. This approach reflects the principle of visual self-sufficiency, wherein the spatial design itself becomes the primary conveyor of meaning. Such design choices are especially relevant in inclusive media environments, where linguistic or cognitive barriers may limit traditional forms of comprehension. By relying on sensory-rich, clearly differentiated visual cues, the video ensures broader accessibility and supports diverse viewing needs, including for children with limited language development or neurodivergent processing styles. A similar example is present in the Smile Family Spanish video "Dana and Danny – best school story challenge black vs pink with friends", where location was styled as a split environment: the left (black) zone evoked a gothic, mysterious atmosphere. The background included dark curtains that framed the setting, with a large pair of white wings mounted behind, providing a striking contrast. A human skeleton prop stood prominently in the centre, enhancing the eerie effect. On the black shelving unit,

various themed plush toys, robotic figures, and spooky decorations were carefully arranged, reinforcing the dark and dramatic tone. The overall design of this

section emphasised theatricality and a slightly macabre mood, tailored to support the Halloween-inspired character performance (Fig. 6).



Figure 6. Dark-themed corner

Source: Dana and Danny – best school story challenge black vs pink with friends (2023)

The complexity of visual environments and the presence of character cues in video content significantly influence children’s attention allocation, cognitive load, and learning outcomes. Meta-analyses and experimental research emphasised that instructor or character presence, combined with visually rich environments, affects both engagement and comprehension. For instance, M. Beege *et al.* (2023) demonstrated that visual and social cues, such as gestures, gaze direction, or facial expressions, moderated efficiency of instructional video reception. Similarly, J. Meier *et al.* (2023) demonstrated that under conditions of varying visual complexity, social cues in instructional videos helped

guide learners’ attention, reduced perceived cognitive overload, and enhanced learning outcomes. Additionally, studies on young children’s emotional and cognitive development showed that visual cues and character interactions were substantial (Cavadini *et al.*, 2024). The grammar of visual design, as articulated by G. Kress & T. van Leeuwen (2020), provide a theoretical framework for determination of how visual elements operate as a cohesive language in children’s media. Based on the theoretical analysis and practical cases (e.g., the Smile Family Spanish and Smile Family channels), the following recommendations are proposed for content creators in Table 1.

Table 1. Visual guidelines for children’s video content		
Principle	Implementation	Expected Effect
Visual environment as a character	Locations are crafted with meaningful details (colour, shape, texture) to support narrative and mood.	Builds an emotional atmosphere and strengthens storytelling.
Audience-specific colour palette	Colour schemes are selected according to age group: bright contrasts for preschoolers, soft tones for older children.	Enhances emotional resonance and age-appropriate engagement.
Symbolic use of objects	Props are chosen to convey symbolic meanings, e.g., plush toys for comfort or instruments for creativity.	Reinforces educational and emotional messages through visual cues.
Spatial focus through composition	Compositional techniques such as symmetry or diagonal lines are used to guide visual attention.	Directs focus on key actions and supports narrative coherence.
Interactive, multi-level location design	Locations include layered visuals, secret areas, and playful spatial features.	Stimulates imagination and encourages viewer engagement.
Testing with target audience	Visual solutions are piloted with small child focus groups prior to full production.	Ensures clarity, appeal, and developmental appropriateness of visual content.

Source: compiled by the author

Application of these recommendations will contribute to the creation of visually rich and emotionally supportive content for children, enhancing its educational value and making the setting a true co-narrator of the story. In conclusion, the visual environment in children’s video content is not a passive background but an active

directorial element that enhances spatial sensitivity, associative thinking, creative imagination, and emotional involvement. The integration of space, colour, symbolism, and character interaction forms a coherent visual language that creates favourable conditions for learning and discovery in contemporary media culture.

CONCLUSIONS

The conducted study, based on the analysis of theoretical sources and practical case studies (particularly the Smile Family Spanish and Smile Family videos), has demonstrated that the visual environment is a key directorial tool in the creation of children's video content. The study determined that location serves not only a decorative function but also acts as a full-fledged means of influencing narrative perception, emotional immersion, and plot dynamics. The analysis demonstrated that colour choices, compositional symmetry or asymmetry, the semiotic load of objects, and editing dynamics are fundamental elements of the visual language that actively contribute to the dramaturgy. The study proved that cohesive spatial design, particularly through the use of a dominant material (e.g., cardboard or faux fur), enhances the emotional expressiveness of the scene and facilitates spatial perception for the child. Hyperbole and stylisation were emphasised, as the study confirmed that fantastical or exaggerated

visual elements do not hinder comprehension. On the contrary, due to familiar shapes and colours, they stimulate cognitive activity and help sustain the viewer's attention. The study established that well-designed visual environments create conditions for the intuitive "reading" of meaning without the need for verbal explanation. Future research may further explore the interaction between visual environments and children's age-specific cognitive characteristics, as well as analyse the effectiveness of visual solutions in personalised media content with adaptive storytelling.

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Візуальне середовище як режисерський інструмент: мистецтво локації в дитячому відеоконтенті

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Анотація. У сучасному медіапросторі дитячий відеоконтент є одним із провідних інструментів розвитку, навчання й розваги, а візуальне середовище набуває статусу самостійної мови комунікації. Попри значне поширення дитячого медіапродукту в цифрових платформах, режисерські принципи формування локацій для дітей залишаються недостатньо вивченими в українському культурно-мистецькому контексті. Метою статті було проаналізувати роль візуального середовища як режисерського інструменту у створенні дитячого відеоконтенту для цифрових платформ, на прикладі каналів «Smile Family» та «Smile Family Spanish». Робота ґрунтувалася на огляді й аналізі теоретичних джерел у сфері психології сприйняття, теорії кольору, кіномови й семіотики. Для вивчення практичного матеріалу застосовувалися методи візуально-структурного аналізу кадрів, просторової композиції, символіки й організації візуальних елементів у локаціях. У результаті дослідження було систематизовано ключові режисерські прийоми створення візуально привабливого, емоційно виразного та сюжетно цілісного простору для дитячої аудиторії. Виявлено типові моделі використання кольору як емоційного та наративного інструменту, принципи симетричної та асиметричної композиції кадру, прийоми наповнення простору предметами з семіотичним навантаженням, а також роль монтажної динаміки у формуванні сприйняття. На прикладі успішних кейсів було продемонстровано, як грамотно спроектована локація стає не тлом, а активним учасником взаємодії, що впливає на ритм, емоційний настрій і структуру оповіді. Застосовані методи – теоретичний аналіз джерел з психології сприйняття, теорії кольору, семіотики, а також візуально-структурний аналіз кадрів – дозволили інтегрувати як академічні підходи, так і практичні інструменти для режисерів та продюсерів. Отримані результати сприятимуть вдосконаленню методів режисури, художньої постановки й дизайну у процесі створення дитячого медіаконтенту для цифрових платформ

Ключові слова: композиція; візуальна драматургія; сценографія; психологія кольору; стилістичне оформлення; сприйняття медіа; естетика цифрового контенту

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