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Visual communication and user experience design in shaping the digital museum environment: Theoretical and practical aspects

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Abstract. The relevance of this study is conditioned by the need to develop new approaches to designing digital museum spaces that would combine humanitarian and technological knowledge, meet contemporary audience needs, and contribute to the development of an inclusive, accessible, and culturally rich experience. The purpose of the study was to comprehensively analyse the role of visual communication and user experience design in the development of a contemporary digital museum space, and to identify the main concepts, principles, and approaches to creating an effective museum experience in a digital environment. To achieve this goal, the author used structural and functional, comparative, historical methods, and methods of design analysis, semiotics of visual images, principles of architectonics of user experience design and interface usability. The basic principles of interface organisation were defined, contemporary approaches to creating interactive and inclusive user experience were analysed, and the practical significance of implementing innovative design solutions in the museum sphere was outlined. It was determined that the digital museum environment is formed at the intersection of cultural studies, art history, information technologies, and design communications. Successful examples of digital museums and online archives where user experience design and user interface design transform the way cultural heritage was perceived were analysed. Based on an analysis of successful examples of digital museums (Google Arts & Culture, British Museum, Museum of Modern Art) user experience design and user interface design have been found to have a significant impact on the accessibility, personalisation, and emotional perception of cultural content. Theoretical and methodological approaches to the interaction of user experience design and visual communication in the museum environment were formulated, identifying new formats of interface visualisation that can activate interest in a cultural product in the digital sphere. The research can be used by specialists in the field of museum business, graphic design, interface development, and digital humanities to create innovative exhibition practices

Keywords: UI-UX design; design interactions; use of AR/VR; multimedia; graphic design; human-centred design

INTRODUCTION

In the 21st century, museums are becoming not only repositories of tangible and intangible assets, but also active participants in the global cultural dialogue. Digitalisation permeates all spheres of public life, and the museum business is no exception. Under the influence of the digital revolution, museums are changing approaches to exhibition activities, presentation, and interpretation of cultural heritage, forming a new concept – the digital museum environment. This environment is not limited to creating virtual copies of exhibits or online archives, but involves a deep integration of advanced technologies, interface solutions, visual communication and UX-design (User Experience Design), which together provide a qualitatively new user experience. The user expects from the digital museum not only high-quality visualisation of exhibits, but also the opportunity to interact with them, get additional information, participate in virtual tours, quests,

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interactive lectures, etc. The relevance of the research is conditioned by the need for effective methods of organising museum content, creating an intuitive interface that provides flexible, deep, and personalised interaction with museum content, regardless of the physical presence in the institution.

An analysis of previous studies shows that UX design issues in the cultural context have been actively developed since the early 2000s in connection with the digitalisation of cultural institutions. In the field of visual communication, G. Kress & T. van Leeuwen (2020) made a significant contribution by proposing a socio-semiotic approach to the analysis of visual images, emphasising their ability to construct meaning in digital media. Their ideas open up new perspectives in the interpretation of museum expositions: visual elements not only inform, but also develop the cultural identity of the institution, appealing to the context, experience, and expectations of the audience. The digital museum space is increasingly seen as a hybrid environment where physical, virtual, and augmented experience components are combined. R. Parry & V. Dziekan (2021) focused on the multichannel nature of museum communication, pointing out the growing role of multimodality and emotional saturation of digital projects. They also stressed the need to develop storytelling strategies that engage the user in active interaction rather than passive consumption of information.

Despite a significant number of international scientific publications, the issues of integrating UX design into the museum sphere, in particular in the Ukrainian context, remain insufficiently covered. E. Mkpojiogu & O.E. Okeke-Uzodike (2022) focused on emotional user interaction, which proposed a multi-layered UX design model that considers both cognitive and affective aspects of user interaction. This approach is particularly valuable for the museum environment, where the effectiveness of a digital platform is evaluated not only by its functionality, but also by its depth of engagement and cultural significance. In their research, Q. Zhuang *et al*. (2022) conducted a comprehensive analysis of the role of UX navigation in virtual museums, highlighting it as one of the main conditions for an effective digital user experience. The researchers noted that a well-thought-out navigation structure, including a clear virtual space architectonics, a logical sequence of interactions, and a feedback system, is crucial for maintaining user orientation in a digital environment. Special attention was paid to microinteractions – short, intuitive actions (for example, highlighting an object when hovering or playing audio) that form an emotional connection with content and increase engagement. In addition, the researchers emphasised the importance of personalised interfaces that consider individual needs, interests, and the level of training of the user.

At the Ukrainian scientific level, the contribution of V.O. Volynets (2021) is important, which emphasised the need to implement design thinking in museum practice. According to the researcher, a contemporary museum should consider the user not as a passive observer, but as an active participant in the cultural process. She focused on changing the role of design – from a decorative or technical element to a strategic tool for cultural communication. The analysis by Y.O. Kachkovska (2024), which examined the digital transformation of museum communication in Ukraine through the prism of human-centredness, was valuable for this study. The researcher emphasised the need to overcome the communication barrier between the cultural institution and the visitor, developing ideas of inclusivity, accessibility, and personalisation. The Polish researchers A. Kobylska & M. Dzieńkowski (2024), who applied the SUS (System Usability Scale) methodology and eye-tracking in their study of European virtual museums, was of methodological importance. They concluded that a clear visual hierarchy, navigation logic, and placement of information blocks not only improve usability, but also contribute to a deeper emotional immersion in the museum's narrative.

Considerable attention in the analysis of contemporary research was paid to multimodal and multisensory experiences, which significantly enriches the user's interaction with digital museum content. E. Pietroni (2025) argued that an effective digital museum environment should provide not only visual perception, but also audio and tactile interaction, contributing to a more complete emotional and cognitive immersion in a cultural narrative. He noted that the use of augmented reality (AR) and 3D sound technologies allows creating a "presence effect" even in a remote format, which is especially important for the representation of complex objects of material culture and the reconstruction of their habitat. The researcher also emphasised the importance of inclusive design, which involves engaging users with different physical abilities by expanding the sensory range of the experience.

In turn, J. Hutson & T. Olsen (2021) pointed to the risks associated with excessive technologisation of the museum business. They stressed that without a clear humanitarian framework, technological innovations can lead to superficial or fragmentary visualisation that loses touch with the cultural context of artefacts. The researchers advocated integrating technology with a critical narrative: each digital element should be subordinated to museum content, serving as a means of deeper interpretation, not just entertainment. In their concept, the museum acted not as a platform for demonstrating digital effects, but as a mediator of cultural knowledge, where UX design should provide not only convenience, but also the significance of interaction.

Thus, despite the growing interest in UX design in the museum context at the global level, in the Ukrainian scientific community, this topic still remains on the periphery of academic discourse. Existing research mostly

covers aspects of visual culture or digital humanities in fragments. Comprehensive interdisciplinary approaches that combine UX design, UI design (User Interface), and visual communication in a museum environment are rare. The purpose of the study was to comprehensively analyse the impact of visual communication and UX design on the evolution of the digital museum space, and to identify the main concepts, principles, and practical approaches that ensure the development of an effective and inclusive museum experience.

MATERIALS AND METHODS

In the course of the research, a set of methods of scientific knowledge was used, which helped to systematically cover the problem of UX design in the museum environment and ensure scientific reproducibility of the results. The main methods were content analysis, comparative analysis, case study, expert assessment, and observation methods. The choice of these methods was conditioned by the interdisciplinary nature of the study, which covers the fields of design, digital technology, museum business, and inclusive communication. Content analysis was used to study in detail the structure, navigation, functional solutions, and visual design of digital interfaces of museum platforms. The comparative analysis method was used to evaluate the effectiveness of UX solutions in various institutional and cultural contexts. The case study method allowed for an in-depth analysis of each specific example of digital experience within the selected museum platforms, while the expert assessment method helped to critically analyse the level of compliance of interfaces with current international standards of digital accessibility and inclusion. The method of observation consisted in empirical interaction with user interfaces in an online environment with the capture of key characteristics of UX design.

The study took place in several consecutive stages. At the first stage, the purpose and objectives of the study were formulated, which provided for the analysis of UX design of museum platforms in the context of inclusivity and digital transformation. The second stage consisted of investigating theoretical sources that included scientific papers, industry reports, methodological recommendations, and guides from international organisations. The third stage covered the selection of cases for analysis. The fourth stage involved a detailed content analysis of each case according to unified criteria. The fifth stage consisted of a comparative analysis of the results obtained, and the final stage was the generalisation of conclusions and determination of effective UX design strategies.

The analysis included three cases of digital museum platforms, in particular, Google Arts & Culture (n.d.), The British Museum (n.d.), Museum of Modern Art (MoMA, n.d.). The criteria for selecting cases were the availability of an interactive digital platform, an innovative approach to UX design, the implementation of inclusive solutions, and representativeness in the international or local cultural space. The analysis of cases was carried out according to a number of criteria, in particular, the level of intuitive navigation, adaptability of the interface to various devices, the presence of inclusive elements (contrast, subtitles, sign language, accessibility for people with visual impairments), aesthetic integrity of visual solutions, the ability to personalise the user experience and the degree of technological innovation (use of AR (augmented reality), VR (virtual reality), 3D (three-dimensional) interactive maps, multimedia).

A number of materials were used in the study, including digital interfaces of museum sites, visual documents, screenshots, and methodological materials from open sources. A separate place was taken by official recommendations and guides, in particular, the Smithsonian Digital Accessibility Guidelines (Smithsonian Institution, n.d.) and WCAG 2.1 (W3C Recommendation, 2025). UX design development practices from leading agencies such as IDEO (n.d.) and Nielsen Norman Group (Neusesser, 2023) were also applied. The study was partly based on the methods of other researchers, in particular, the principles of Design Thinking, User-Centred Design, and Agile UX frameworks that were adapted to the needs of analysing digital museum services (Norman, 2013; Gothelf & Seiden, 2013). Official museum information resources, open institutional reports, analytical platforms Google Arts & Culture (n.d.) and Europeana (n.d.), and specialised media and publications in the field of museum digital strategies were actively used to collect primary information.

Thus, the research methodology was formed at the intersection of empirical observations, theoretical propositions, and applied analysis, which ensured its repeatability and scientific validity. The use of qualitative methods within the framework of an interdisciplinary approach helped to comprehensively cover the subject of research, adapt existing research tools to the specifics of digital museum services, and build a scientifically based strategy for analysing UX design. The existing methodological framework can be used for further research in the field of digital transformation of cultural institutions, in particular, in the context of inclusive design and interactive communication.

RESULTS AND DISCUSSION

The results of the study showed that the digital museum environment is formed at the intersection of several fields of knowledge and practices, including cultural studies, art history, information technology, graphic and interface design. Visual communication in this context is not only a matter of aesthetics, but also a means of structuring information, increasing its accessibility, and creating an emotional connection with the user. Digital museums actively use the principles of identity, colouristics, typography, animation, infographics, interactive

visualisations to form a unique style and enhance the content of expositions. UX design provides logical and easy navigation, adaptability to different devices, personalisation of content, and consideration of the needs of different groups of users, including people with disabilities. An important aspect is also the integration of elements of gamification, social interaction, and feedback tools that help to increase visitor engagement and create a sustainable interest in cultural heritage.

As a result of the analysis, key features of UX solutions used in digital museums to improve user interaction were identified. The study covered three examples: Google Arts & Culture, the British Museum's virtual platform, and MoMA's digital strategy. These cases allowed analysing different approaches to visualisation, navigation, accessibility, and personalisation of the user experience. Google Arts & Culture is characterised by a high level of technological complexity and versatility. The platform integrates a responsive design that allows users to comfortably view content from any device. An important UX element is personalised recommendations based on the user's behavioural analysis. The platform also offers high-quality 3D models, interactive exhibitions, and augmented reality features that promote an immersive experience. However, despite these advantages, the interface of Google Arts & Culture is sometimes perceived as technocratic and devoid of emotional depth, because all museums are presented in a standardised form without considering local flavour or institutional identity.

The British Museum takes a slightly different approach. The main focus is on chronological navigation – users can explore exhibits in a historical context. The platform has a simple, logical structure that works well in an educational format. However, the functionality in terms of personalisation and interactivity is limited: there are no advanced AR/VR tools, navigation is not always intuitive, and the visual design looks outdated. However, the presentation of information is balanced and meaningful, which contributes to intellectual involvement. MoMA focuses on visual simplicity and aesthetics. The interface of the digital platform is minimalistic, which allows focusing on the exhibits. An important UX feature is the absence of unnecessary visual elements, which emphasises the focus on contemporary art as such. However, MoMA's user experience is less profound in terms of content – the platform does not provide detailed contextualisations or interactive features that could enhance the cognitive component. Personalisation is only partially implemented, and inclusivity functions are limited.

Digital museums use a variety of UX design tools that aim to facilitate navigation, improve access to information, immerse the user in cultural content, and be inclusive. These solutions not only increase user satisfaction, but also allow museum institutions to expand their audience. Among the innovative international examples, it is also worth mentioning the VirtuWander platform presented by Z. Wang *et al.* (2024). It uses artificial intelligence to personalise museum routes and content, which significantly improves the user's cognitive immersion and reduces access barriers. The system adapts to the user's level of interest, considers their emotional reactions, and offers relevant content that opens up new horizons in the humanitarian application of AI technologies. Another important example is the MEUX (Museum Exhibition User Experience) model developed by E. King *et al*. (2022) at the University of Warwick. This model focuses on matching curators' expectations with actual behavioural patterns of visitors. MEUX emphasises the need for interdisciplinary collaboration between designers, curators, and audience representatives to create more relevant and flexible formats for museum interaction. It also draws attention to the importance of testing hypotheses in the UX design process and dynamically configuring the interface according to use cases. To better understand exactly how UX tools are implemented in digital museum environments, Table 1 summarised key solutions, their functionality, and implementation examples.

Table 1. UX solutions in digital museums

UX tool	Functionality	Implementation example
Responsive design	Optimisation of the interface for different devices (smartphones, tablets, PCs).	Google Arts & Culture, MoMA.
Interactive navigation	Ability to quickly navigate the structure of a website or exhibition.	British Museum (Virtual Tour).
Search by filters	Narrowing the selection of exhibits by topic, time, region, etc.	British Museum.
AR/VR solutions	Virtual tours, 3D models of exhibits, immersive experience.	Google Arts & Culture.
Inclusivity	Contrast, fonts, subtitles, voice guidance, and sign language video guides.	Mystetskyi Arsenal, Smithsonian.

Source: compiled by the author based on the Google Arts & Culture Review (n.d.), MoMA (n.d.), The British Museum (n.d.), Smithsonian Institution (n.d.), Mystetskyi Arsenal… (n.d.)

When discussing these results in a broader context, it is worth referring to the study by S. Capece *et al*. (2024), where it was established that a critical factor for successful UX in the cultural sphere is the possibility

of an individual user experience. This is particularly well implemented in Google Arts & Culture, which uses machine learning algorithms to generate recommendations based on user interests and behaviour. Simultaneously, in the cases of the British Museum and MoMA, individualisation does not play a significant role, which limits the effectiveness of UX solutions. Another study by S. Chang & J. Suh (2025) highlighted the importance of immersive technologies (AR/VR) in creating an emotional connection between the user and cultural content. This allows tracing a certain discrepancy between theoretical conclusions and practical applications: Google Arts & Culture actively uses these tools, while in MoMA and the British Museum they are almost not used. This indicates a different degree of technological integration in the digital strategies of cultural institutions. One of the important areas of development of virtual museums is interactivity and gamification, which open up new opportunities for attracting an audience, ensuring not only passive consumption of information, but also active participation of the user in the learning process. As indicated by E. Nofal *et al*. (2020), gamification and visual narratives significantly increase the involvement of young people in historical content. This was also confirmed in the current analysis: platforms that use immersive approaches (for example, Google Arts & Culture) showed higher user interaction rates. In addition, the results correlate with the findings of Y. Avni *et al.* (2025), which emphasised the need to comply with the principles of inclusivity – including for users with disabilities, which is the basis of contemporary UX design standards.

Inclusivity requires separate consideration, as it determines the ability of a virtual museum to provide equal and comfortable access to content for users with different levels of digital literacy, cognitive and sensory characteristics, and taking into consideration the linguistic and cultural diversity of the audience. In many Western studies, this aspect is mentioned in passing or in fragments. For example, in the paper by X.T. Zhu *et al.* (2020), the focus was primarily on visual accessibility, while other needs, such as subtitles, language support, or adaptation for visually impaired people, remained out of focus. Current analysis has shown that inclusivity remains a weak point even in leading museums, despite the importance of this characteristic for the digital space. Thus, the results of the study confirmed global trends in the field of UX design of digital museums, but also revealed a number of challenges. Among them – lack of emotional involvement, limited inclusivity, weak personalisation in most cases (except for Google Arts & Culture). As noted by N. Buniak (2022), the development of an inclusive environment is a systematic process that involves specially organised interaction of all participants, and therefore, requires a deeper understanding in the digital context of museum communication.

Designing a museum interface begins with studying the target audience, its expectations, behavioural patterns, and technical capabilities. Contemporary approaches to UX modelling are based on the principles of User-Centred Design (UCD), when all decisions are made considering the needs of the user. Design Thinking, a creative approach that combines research, ideation, prototyping, and testing solutions in a real-world environment, also plays an important role. Special attention should be paid to the adaptability of the digital museum environment to various platforms – desktops, tablets, smartphones, VR/AR devices. The Mobile-first strategy is becoming more relevant, as most users interact with museums through mobile devices (Chuenchaichon *et al.*, 2024). This requires special attention to optimising interfaces, simplifying navigation, and providing quick access to the main content.

The process of designing a museum interface is multi-faceted and consists of several key stages that provide a comprehensive approach to creating a high-quality and inclusive digital museum experience:

1. Audience research and analysis – identifying target groups of users based on their age, cognitive, technical, and cultural characteristics; conducting interviews, surveys, and behavioural patterns to identify needs, expectations, and potential barriers to using a digital museum.

2. Investigation of the context and content of the museum – an in-depth analysis of the thematic and cultural content of the exhibition, and the technical limitations of the platform and user devices.

3. Formulation of the interface concept – development of information architecture, definition of basic usage scenarios, selection of a visual communication style that corresponds to the museum's identity.

4. Prototyping – creation of low-level (wireframe) and high-level interface prototypes with the inclusion of interactive and inclusive elements.

5. Testing and iteration – conducting usability tests, collecting and analysing feedback, and making adjustments to improve the quality of the user experience.

6. Implementation and support – integration of the interface into the museum's digital platform, monitoring performance, updating considering changes in technologies and user requests.

In the practice of creating digital museum platforms, several UX design methodologies with different accents are used: User-Centred Design – a systematic approach involving users at all stages to create the most relevant and user-friendly interface; Design Thinking – an iterative creative process that promotes rapid generation of ideas and hypothesis testing; Agile UX – integration of UX principles into flexible development methodologies, which ensures prompt response to changes. These methodologies complement each other, and the choice of the optimal one depends on

the specific project goals and audience characteristics (Lechner & Banakh, 2019). For a better understanding of the features of each of the approaches in designing UX museum digital platforms, their comparative analysis is given. Table 2 presented the main characteristics, advantages, and disadvantages of methodologies, and the areas of their most effective application. This systematic approach allows choosing the optimal strategy for modelling the user experience, depending on the project goals and audience specifics.

Table 2. Characteristics of methodologies

Methodology	Main features	Advantages	Disadvantages
User-centred design	Active user engagement at all stages of development.	High relevance and user-friendliness of the interface.	High resources for research and analysis.
Design thinking	Iterative, creative process: empathy, ideation, prototyping, testing.	Promotes innovation and flexibility of approach.	Less structured, requires more time to experiment.
Agile UX	Integration of UX into flexible development cycles, close cooperation with developers.	Fast adaptation to changes, continuous improvement of the product.	Lack of a complete concept at the beginning requires gradual development.

Source: compiled by the author based on D. Norman (2013), J. Gothelf & J. Seiden (2013), F. Tosi (2020)

This systematic approach allows to create museum digital platforms that are not only aesthetically pleasing, but also functional, intuitive, and accessible to a wide range of users. Especially important is the adaptability of the interface to different devices, and the introduction of inclusivity principles that ensure equal access to cultural heritage. After defining the key methodologies and stages of user experience design, it is important to pay attention to the role of visual communication in digital museums, as it is not only convenience and functionality, but also aesthetic appeal that enhances user interaction with the exhibition. Visual elements help to create a unique atmosphere, deepen cultural immersion, and contribute to a better perception of museum content.

Visual communication in digital museums covers a wide range of tools: from developing a unique identity to creating interactive maps, infographics, animations, video and audio-visual materials. It is important that the visual style is not only attractive, but also corresponds to the theme of the museum, emphasises its uniqueness, and contributes to a deeper immersion in the cultural context. The semiotic approach allows analysing how visual images, colours, and compositional solutions affect the interpretation of expositions, form associations, and evoke an emotional response (Tormahova, 2023).

In practice, successful cases of digital museums have demonstrated a close integration of UX and UI design. The analysis confirmed the importance of accessibility, in accordance with the WCAG 2.1 standards, which were used as criteria in evaluating interface solutions (W3C Recommendation, 2025). For example, the Google Arts & Culture platform, which, like other cases, was evaluated according to the principles of IDEO (n.d.) and Nielsen Norman Group (Neusesser, 2023), offers users interactive tours of museums around the world with a high level of usability, intuitive navigation, 3D navigation, the ability to save favourite exhibits and share impressions on social networks (Fig. 1).

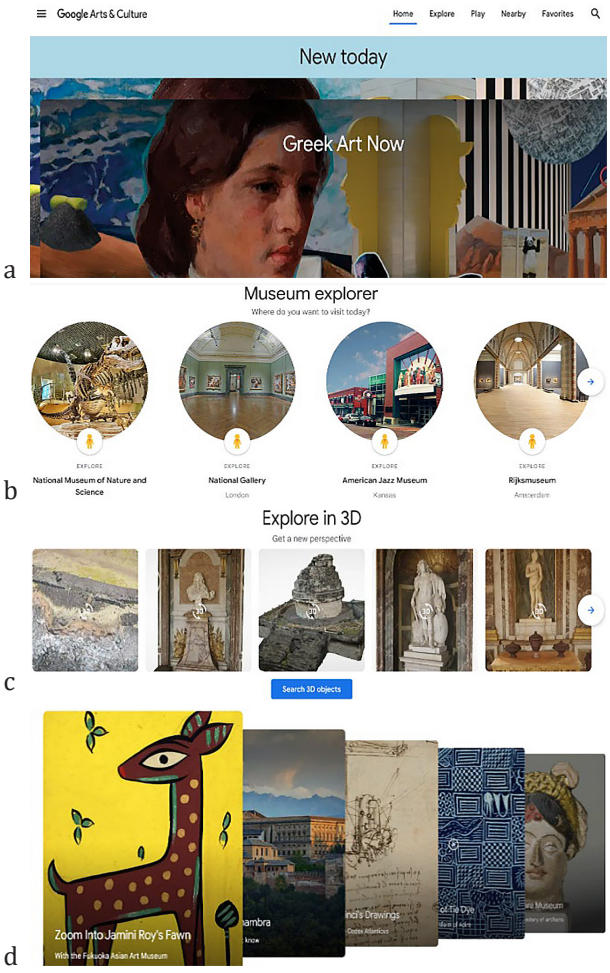

Figure 1. Google Arts & Culture
Note: a – usability; b – intuitive navigation; c – 3D navigation; d – personalised route
Source: Google Arts & Culture (n.d.)

A virtual tour of the British Museum is characterised by a convenient ability to personalise the route with a flexible category structure, the ability to quickly find the necessary information using filters and search (Fig. 2).

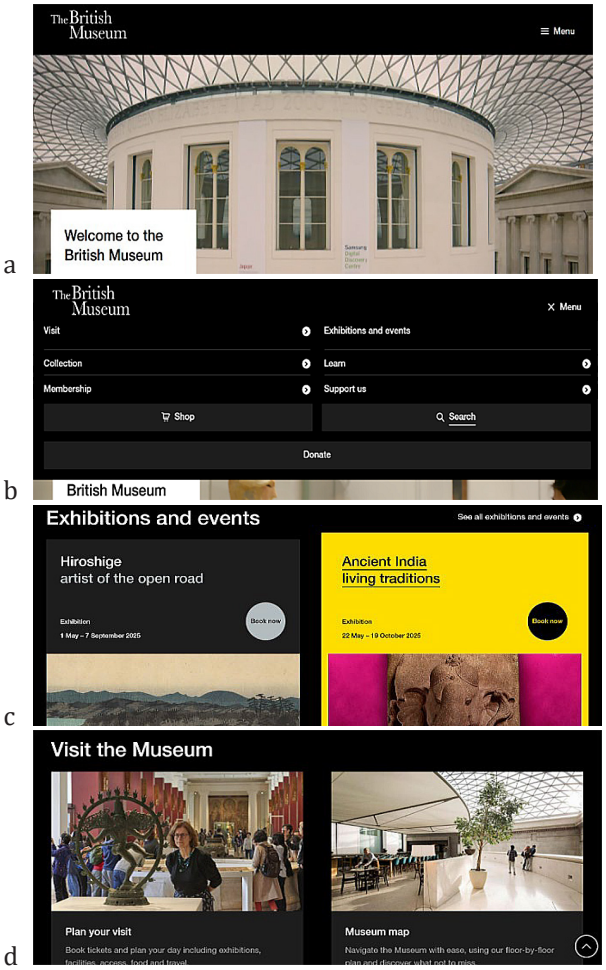

Figure 2. British Museum
Note: a – visual minimalism style; b – search filter; c – category structure; d – 2D navigation
Source: The British Museum (n.d.)

The MoMA collection is implemented in the style of visual minimalism, which helps to focus attention on the exhibits, while providing easy and fast access to additional materials. An important trend is the use of infographics, AR/VR technologies, and animations that allow creating an emotional impact on the visitor, immerse them in a virtual environment, and model new scenarios for interaction with cultural heritage (Fig. 3). For example, AR applications allow "animating" exhibits, displaying them in the context of historical events, and visualising complex processes or phenomena. VR expositions offer the opportunity to visit inaccessible or destroyed objects, see them in different historical periods, take part in virtual excursions, quests, and game scenarios (Pietroni, 2025).

Personalisation of the experience is becoming an increasingly important component of the digital museum environment. Based on the use of artificial intelligence and behavioural data analysis, museums can offer individual routes, recommendations based on interests, browsing history, and time spent near exhibits. This increases engagement, promotes deeper immersion in the topic, and creates a sense of uniqueness of the experience (Parry & Dziekan, 2021). Inclusivity is another key principle of contemporary UX design in the museum sphere. It involves creating interfaces that are accessible to people with different physical and cognitive characteristics. Among the solutions are contrast adaptation, the use of large fonts, providing voice support, subtitles, support for sign languages, and the ability to customise the interface according to individual user needs.

Figure 3. Museum of Modern Art (MoMA)
Note: a – visual minimalism styles; b – use of infographics; c – use of animations; d – use of AR/VR technologies
Source: MoMA (n.d.)

Successful examples of such practices were demonstrated by the world's leading museums and digital platforms, which were analysed in the current study.

The British Museum actively implements the principles of Universal Design: online expositions are accompanied by text descriptions, have an adaptive interface, zoom support, subtitles for video materials and compatibility with screen readers. MoMA offers intuitive digital tours, sign language video content, and custom contrast and font settings for visually impaired people. These tools were created with the involvement of inclusion experts and considering the needs of different categories of users. The Google Arts & Culture digital platform provides access to thousands of museum exhibits from around the world, providing the ability to zoom in on high-quality images, read accompanying text in large font, translate into different languages, and virtual travel with interactive navigation – all of which makes art closer for people with different physical or cognitive characteristics.

The Mystetskyi Arsenal in Ukraine is actively developing digital projects, offering virtual exhibition halls with 3D modelling of expositions, interactive maps, and multimedia guides that allow diving deeper into the cultural context (Mystetskyi Arsenal..., n.d.). Special attention is paid to adapting content for different age groups and inclusivity, in particular, creating audio guides for people with visual impairments and gesture support for people with hearing impairments. In addition, museums such as the Metropolitan Museum of Art (n.d.) in New York and the Victoria and Albert Museum (n.d.), implement innovative solutions, including VR tours, interpretation of exhibits using augmented reality, and personalised recommendations of expositions based on the user's interests.

Notably, the introduction of contemporary UX solutions in the museum sphere requires not only technical knowledge, but also a deep understanding of the cultural context, specifics of exhibits, values and expectations of the target audience. It is important to ensure a balance between innovation and authenticity, to prevent the loss of content or simplification of complex cultural phenomena. The successful integration of UX design and visual communication allows museums to overcome the barriers of time, space, social and physical constraints, creating an inclusive, dynamic and exciting space for all categories of visitors. Separately, it is worth noting the role of UX design in building trust in the digital museum. Intuitive, transparent, user-friendly interface, clear structure, quick access to information, the ability to get feedback, support for different languages, adaptation to user needs – all this contributes to increasing loyalty, creating a positive image of the museum and increasing its competitiveness in the global market.

Visual communication, in turn, allows creating a unique visual narrative that enhances the content of the exhibition, forms an emotional connection with the visitor, and contributes to a deeper understanding of cultural phenomena. The use of advanced visual technologies – from 3D modelling to generative graphics, from interactive maps to animated infographics – opens up new opportunities for presenting complex historical or artistic topics, making them accessible, understandable, and engaging for a wide audience. Equally important is the issue of sustainability and security of the digital museum environment. Protecting personal data, ensuring the stable operation of platforms, regularly updating content, maintaining high standards of ethical interaction – all this is the key to the long-term success of digital museums, their ability to adapt to the challenges of the time, and meet the expectations of society.

Thus, contemporary UX solutions and visual communication not only expand the possibilities of museums in the digital environment, but also contribute to creating a deeper and more emotionally rich experience for visitors. However, these processes cannot be isolated or purely technical – they must be considered in a broader socio-cultural context. As digital transformation spans more and more areas of public life, the museum industry is also actively looking for effective solutions to improve audience engagement. In this context, an integrated approach to the implementation of UX design and visual communication is of particular importance, which allows not only to modernise museum practices, but also to transform the very essence of cultural interaction. The combination of innovative technologies with cultural sensitivity, strategic thinking, and user orientation is important in the development of the museum sphere. It is this synergy that creates the prerequisites for the development of a sustainable and inclusive museum space.

CONCLUSIONS

As a result of the research, it was proved that visual communication and UX design are not only technical or aesthetic tools, but also fundamental components of contemporary museum activities. They ensure the integrity, efficiency, inclusivity, and sustainability of the digital museum environment, contribute to the development of cultural literacy, the creation of new models of interaction between the museum and society, open up new horizons for the preservation, popularisation, and understanding of cultural heritage in the 21st century. The study confirmed that UX design and visual communication are key factors for the effective functioning of digital museum platforms. The contemporary digital museum environment is formed at the intersection of humanitarian and technological approaches, where aesthetics, intuitive interface, personalisation of experience, and inclusivity become the basic components of cultural communication.

Based on a comparative analysis of the cases of Google Arts & Culture, the British Museum and MoMA, it was found that successfully implemented UX/UI solutions significantly affect the perception of cultural content, expand the audience, and reduce access barriers. Thus, the use of AR/VR, personalised routes, responsive

design, and visual hierarchy allows users to deepen interaction with exhibits, form an emotional connection, and expand knowledge. Evaluation of UX solutions was carried out by analysing the content of digital museum platforms, studying cases and observing, which helped to identify effective approaches to creating visually rich, convenient, and inclusive digital expositions. It was revealed that the most effective UX strategies are based on the principles of design thinking, semiotics of visual images, and digital accessibility standards.

Summing up, it is necessary to emphasise the need for further interdisciplinary research aimed at integrating UX design, visual communication, and technologies in the museum environment, especially in the Ukrainian context, where such practices are still in the initial stage of development. The prospects for further research are the development of national UX standards for museum platforms, the introduction of innovative technologies (neural interfaces, meta-universe expositions, generative design), and an in-depth analysis of the impact of digital solutions on the cultural identity, the development of creative industries, and increasing the competitiveness of museums in the world market.

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Візуальна комунікація та дизайн користувацького досвіду у формуванні цифрового музейного середовища: теоретико-практичні аспекти

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Анотація. Актуальність цього дослідження зумовлена потребою у розробці нових підходів до проєктування цифрових музейних просторів, які б поєднували гуманітарні та технологічні знання, відповідали сучасним запитам аудиторії та сприяли формуванню інклюзивного, доступного і культурно насиченого досвіду. Мета статті полягала у комплексному аналізі ролі візуальної комунікації та дизайну користувацького досвіду у формуванні сучасного цифрового музейного простору, а також у виявленні основних концептів, принципів і підходів до створення ефективного музейного досвіду у цифровому середовищі. Для досягнення цієї мети використано структурно-функціональний, компаративний, історичний методи, а також методи дизайн-аналізу, семіотики візуальних образів, принципи архітектоніки дизайну користувацького досвіду та інтерфейсного юзабіліті. Визначено основні принципи організації інтерфейсу, проаналізовано сучасні підходи до створення інтерактивного та інклюзивного користувацького досвіду, а також окреслено практичне значення впровадження інноваційних дизайн-рішень у музейній сфері. Визначено, що цифрове музейне середовище формується на стику культурології, мистецтвознавства, інформаційних технологій та дизайн-комунікацій. Проаналізовано успішні приклади цифрових музеїв та онлайн-архівів, де дизайн користувацького досвіду та дизайн користувацького інтерфейсу трансформують спосіб сприйняття культурної спадщини. На підставі аналізу успішних прикладів цифрових музеїв (Google Arts & Culture, Британський музей, Museum of Modern Art) було виявлено, що дизайн користувацького досвіду та дизайн користувацького інтерфейсу значною мірою впливають на доступність, персоналізацію та емоційне сприйняття культурного контенту. Сформульовано теоретико-методичні підходи до взаємодії дизайну користувацького досвіду та візуальної комунікації у музейному середовищі, а також у виявленні нових форматів інтерфейсної візуалізації, здатних активізувати інтерес до культурного продукту у цифровій сфері. Дослідження може бути використане фахівцями у сфері музейної справи, графічного дизайну, інтерфейсної розробки, цифрової гуманітаристики для створення інноваційних експозиційних практик

Ключові слова: UI-UX-дизайн; взаємодії дизайну; використання AR/VR; мультимедіа; графічний дизайн; людиноцентричний дизайн