

Digital transformation of musical and choreographic art: Preserving national archetypes

Transformação digital da arte musical e coreográfica: Preservando os arquétipos nacionais



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Abstract: The rapid development of digital technologies created the need for the development of methodological approaches to the integration into the performing arts while preserving cultural authenticity. The study aimed to develop a set of criteria for preserving national identity during the implementation of digital innovations in musical and choreographic art. The research adopted a systematic approach to the study of the transformation

of cultural archetypes in the digital space. Specific manifestations of Ukrainian archetypes (Sophianity, the word, the land) and three levels of interaction with digital tools were identified: structural, regulative, and representative. An authenticity assessment table was created that systematised musical elements, choreographic elements, permissible transformations, and technological solutions across three categories: basic elements of national tradition, elements of partial processing, and generative forms. Technological solutions for preserving authenticity were proposed: motion capture systems for recording national plasticity, spectral analysis algorithms for preserving the timbral characteristics of folk instruments, and neural networks for analysing and reproducing folkloric elements. Using the example of the musical and choreographic work "The Passions of Taras" by Yevhen Stankovych, the effectiveness of the developed approaches for preserving cultural codes during digital modernisation was demonstrated.

Keywords: national archetypes; national mentality and identity; artistic tradition; digitalisation of art education and performance; interpretation of art; musical and choreographic performance.

Resumo: O rápido desenvolvimento das tecnologias digitais criou a necessidade do desenvolvimento de abordagens metodológicas para a integração nas artes cênicas, preservando a autenticidade cultural. O objetivo do estudo foi a formação de um sistema de critérios para a preservação da identidade nacional durante a implementação de inovações digitais na arte musical e coreográfica. A pesquisa foi baseada em uma abordagem sistemática para o estudo da transformação de arquétipos culturais no espaço digital. Manifestações específicas de arquétipos ucranianos (Sofianidade, a palavra, a terra) e três níveis de interação com ferramentas digitais foram identificados: estrutural, regulatório e representativo. Foi criada uma tabela de avaliação de autenticidade, que sistematizou elementos musicais, elementos coreográficos, transformações permitidas e soluções tecnológicas para três categorias:

elementos básicos da tradição nacional, elementos de processamento parcial e formas generativas. Soluções tecnológicas para a preservação da autenticidade foram propostas: sistemas de captura de movimento para registrar a plasticidade nacional, algoritmos de análise espectral para preservar as características tímbricas de instrumentos populares e redes neurais para analisar e reproduzir elementos folclóricos. Usando o exemplo da obra musical e coreográfica *A Paixão por Taras* de Yevhen Stankovych, foi demonstrada a eficácia das abordagens desenvolvidas para preservar códigos culturais durante a modernização digital.

Palavras-chave: arquétipos nacionais; mentalidade e identidade nacionais; tradição artística; digitalização da educação artística e performance; interpretação da arte; performance musical e coreográfica.

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1. Introduction

The rapid digitalisation of society and the development of innovative technologies are transforming the performing arts of the 21st century, leading to the emergence of new forms of creative self-expression and audience interaction. Digital tools open opportunities for experimentation in the performing arts, while simultaneously raising questions about preserving artistic authenticity and cultural identity in the era of technological innovation.

The impact of digital technologies on the performing arts is at the centre of academic research. Q. Zhou et al. (2021) presented a retrospective analysis of the integration of computer technologies into choreographic practice over the last twenty years. The study reveals the potential of technologies to expand choreographers' creative possibilities and shape new visual experiences for audiences. The authors systematised the challenges of recognising the abstract qualities of body movement and mediating among the parties involved in the creative process. Based on an analysis of the Human-Computer Interaction (HCI) literature over the past 20 years, the researchers identified key directions for technology development in dance: motion capture systems, interactive environments for choreography, algorithms for generating dance sequences, and platforms for virtual performances. The study also outlines methodological approaches for integrating computational systems into dance practice to develop creative potential and support the creation of choreographic compositions.

Research on artificial intelligence in dance education, conducted by Z. Wang (2024), reveals the multifaceted potential of immersive technologies. Based on empirical data, the author developed an ecosystem model of digital choreographic education that combines virtual mentoring, cognitive simulations, and interactive feedback systems. The proposed model accounts for the specifics of various dance styles and individual learning, according to the developers

of the ChoreoMaster system, K. Chen et al. (2021) presented an innovative approach to automated choreography. The system uses a neural network architecture to analyse musical structural models and generate corresponding dance sequences. Experimental results demonstrate the system's ability to create choreographic compositions that preserve stylistic integrity and align with the rhythmic structure of the musical accompaniment. Professional dancers confirmed the high quality of the generated movements.

Y. You (2022) presents the results of research into online education in the field of choreography, covering the experience of China and international practice. Based on data analysis from students and lecturers, the author developed a competency system for master's programmes in dance education. The study reveals the specifics of developing technical, artistic, and pedagogical skills in a virtual environment and offers methodological recommendations to enhance the effectiveness of distance learning.

An evolutionary approach to the study of dance art is presented in the research of B. Fink et al. (2021), who consider dance as a phenomenon at the intersection of biological and sociocultural processes. Based on ethnographic research and neurobiological experiments, the authors reveal the mechanisms underlying the formation of dance practices, from basic forms of nonverbal communication to choreographic systems. The study describes the formative elements of motor expression and their role in social interaction, group coordination, and cultural transmission. S. Zhang (2020) presents an analysis of the application of learning in dance creation. The research systematises algorithmic approaches to recognising and generating movements, including neural network architectures for analysing spatio-temporal compositional patterns, transfer learning methods for style adaptation, and optimisation systems for choreographic sequences.

I.W. Sugita et al. (2021) investigate the processes of technological transformation of traditional art through the example of the Balinese Drama Gong theatre. The authors analyse

mechanisms of adapting classical forms to the requirements of the digital age, documenting changes in production processes, performance practice, and audience interaction. The study describes methods of preserving cultural authenticity while introducing modern technologies. The psychological aspects of the digital transformation of art are revealed in J.C. Major's (2021) works. The scholar presents a tripartite model of archetypes that describes the mechanisms of perceiving digital art through the interaction of structural (neural structural models), regulatory (behavioural schemes), and representative (cultural symbols) components. The study is based on data from neuroscience, epigenetics, and code biology.

M. Danesi (2020) conducts a semiotic analysis of the transformation of popular culture, exploring the evolution of artistic practices under conditions of digitalisation. The research describes changes in the mechanisms of creation, distribution, and perception of cultural content, analysing the transition from traditional forms to interactive digital formats. The author examines the phenomenon of meme culture as a form of artistic communication in the modern cultural space. T. Kyriakou et al. (2024) analyse the technological aspects of the development of performing arts through the lens of virtual instrumental performances. The study covers the technical characteristics of digital performance: spatial sound localisation systems, algorithms for synchronising performers in virtual space, and methods for minimising latency in online interaction. The authors present an analysis of the aesthetic and perceptual characteristics of virtual stage actions and the directions of development of digital forms of musical performance.

The analysis of academic research indicates the absence of a comprehensive theoretical interpretation of the impact of digital tools on the evolution of musical and choreographic performing arts in the context of preserving cultural authenticity.

The aim of the study is to provide theoretical substantiation of the impact of digital tools on the transformation of musical

and choreographic performing arts through the prism of national archetypes and mentality, and to develop a conceptual model for integrating technological innovations to preserve cultural identity. Achieving this aim requires an analysis of current trends in the use of digital technologies in music and choreography and the study of interaction with national archetypes in the stage space, the identification of the transformation of the creative process under the influence of digital tools using the example of the musical and choreographic work "The Passions of Taras" by Yevhen Stankovych, and the development of recommendations for the implementation of digital innovations in the performing arts with consideration of preserving national mentality and cultural archetypes.

2. Material and Methods

The research employed a qualitative, theoretical-analytical approach grounded in art history and cultural semiotics. The design aimed to identify and interpret the transformation of Ukrainian musical and choreographic archetypes in the context of digitalisation. The research was conducted during January-March 2025 as a theoretical and methodological study of the evolution of stage art under conditions of digitalisation. In the course of the study, such digital elements were considered to include motion capture systems, virtual and augmented reality technologies, algorithms for generating musical and choreographic compositions based on machine learning, sound spectral analysis systems for folk instruments, and projection technologies for visualising cultural symbols in stage space.

The research included three consecutive stages. The first stage covered the analysis of the digital transformation of cultural archetypes inherent in Ukrainian culture. Sophianity —the word and the land — are profoundly ingrained in Ukrainian philosophy and art and reflect its unique perspective. According to N. Turpak (2020), Ukrainian mentality originated within the Kyiv philosophical tradition, which put Sophia (knowledge) at the core of cultural self-understanding, symbolising divine-earthly balance. The poetic

and prophetic tradition of Taras Shevchenko and O. Potebnia's linguistic symbolism has impacted Ukrainian culture's view of the Word as a bearer of sacred truth (Shekhovtsova-Burianova, 2021). As R. Gorban (2019) shows, the archetype of the Land symbolises Ukrainian civilization's agrarian roots and holy relationship with nature, which shapes the national worldview's optimism and life-affirmation. These archetypes form the spiritual foundation of Ukrainian culture and provide reliable symbolic codes for national identification in musical and choreographic performance.

The basic archetypes (Persona, Anima/Animus, Shadow, Self) and the transformation into twelve archetypal figures (Ruler, Creator, Sage, Innocent, Explorer, Rebel, Hero, Magician, Jester, Everyman, Lover, Caregiver) were studied. The manifestations of archetypes through structural elements in musical and choreographic art were examined, in particular through rhythmic formulae and compositional structures. Specific manifestations of archetypes in Ukrainian culture were analysed: sophianity, the archetype of the word, and the archetype of the land.

At the second stage, an art-critical analysis of the musical and choreographic work "The Passions of Taras" was conducted. The dramaturgical concept of the work was studied through nine parts ("Prologue", "Mary's Lament", "Prayer", "Voice of the People", "Prophet's Monologue", "Repentance", "Enlightenment", "Glorification", "Epilogue") (Vasylenko, 2021). Musical archetypes were analysed: dumka intonations with characteristic melismas, znamenny chant, bell-like sonority (Chekan, 2021). Choreographic elements were studied: the plastic monologue of the soloist, canonical gestures of prayer, mass scenes with elements of folk dance, spatial structures (circle, star, line) (Karpenko, 2023; Rospopa and Nimilovych, 2023).

Musical and choreographic work "The Passions of Taras" was chosen as a representative example of Ukrainian archetypes in a digital context. This choice was based on several considerations. Thematically, the work synthesises the fundamental archetypes of Ukrainian culture, revealing the philosophical basis of national

artistic identity. Structurally, it combines traditional folk elements, such as intonations of thought and folk-dance compositions, with contemporary musical dramaturgy, creating a model of symbolic continuity between tradition and innovation. In addition, "The Passions of Taras" has been the subject of experimental reinterpretations using multimedia projection, digital sound synthesis, and motion capture technologies, making it suitable for analysing the preservation of cultural authenticity in digital performance environments.

The third stage included developing parameters for preserving national authenticity amid digital integration. A comparative analysis of traditional elements and digital transformations was conducted across three categories: basic elements of national tradition, elements of partial processing, and generative forms. In musical material, modal structures (Hutsul, Dorian, Phrygian modes), metrorhythmic formulae (kolomyika, kozachok rhythms), and characteristic melodic turns (fourth-fifth progressions, neighbour tones around pivotal notes) were analysed. For choreographic elements, technical elements of plasticity were studied (arm positions in women's dance, prysiadka and aerial tricks in men's dance), spatial structures (circle, star, line), and rhythmic patterns (triple metre, syncopation). Technological solutions included spectral analysis of the acoustic characteristics of folk instruments, motion-capture systems for preserving national plasticity, and algorithms for generating dance sequences.

The interpretation of results was based on a comparative analysis of traditional and digital forms of performing arts. The preservation of semantic connections and cultural context during technological transformation was evaluated by comparing spectral characteristics and plastic elements with authentic samples. As control materials, reference elements of Ukrainian art were used, systematised in the studies of N. Turpak (2020), Yu.I. Chekan (2021)

and D. Karpenko (2023) enabled an analysis of the conformity of digital transformations with traditional forms of national art.

Sources were chosen using explicit criteria. First, the required materials are focused on digital technologies and performing arts, including music, choreography, and stage performance. Second, the selected papers have to be scholarly and from 2019–2024 peer-reviewed journals or monographs. Third, sources that emphasised Ukrainian philosophical and artistic traditions, especially those about Sophianity, the word, and the land, were preferred. Finally, the featured works had to provide analytical or technological frameworks for digital art transformations, such as motion capture, neural networks, or spectrum analysis.

3. Results

3.1. Evolution of cultural archetypes in the context of the digitalisation of music and choreographic art

The theoretical study of the digital transformation of music and choreographic art focused on the interconnections among cultural archetypes, national mentality, and technological innovations. In global scholarship, theories of mentality developed through the study of the collective unconscious and its influence on cultural identity. According to J.E. Vedor (2023), archetypes manifest through structural, regulative, and representative models that determine the modes of artistic expression in the digital age. For a better understanding of this transformation, it is necessary first to examine the very essence of the archetype.

C.G. Jung studied mythology and the art of early civilisations to establish the archetype hypothesis. C.G. Jung established the collective unconscious by demonstrating that universal symbolic structures exist across cultures, regardless of geographic or temporal distance. Jung believed archetypes were innate psychological structures that shaped a worldview. Archetypes appeared in simple rhythmic formulae to complex creative frameworks in music and choreography. C.G. Jung recognised Persona, Anima/Animus, Shadow, and Self as the core structures

of the collective unconscious. Behaviour models change a personality's external image to better align with social adaptability. Anima represents the feminine in the male mind and Animus the masculine in the female, representing the dualism of the psychic system. The Shadow contains repressed parts of the psyche that can be destructive or productive. The Self, the primary archetype, maintains personality integrity and integration. C.G. Jung's theory showed that the underlying archetypes might evolve into twelve archetypal figures that appeared in society and art. Ruler, Creator, Sage, Innocent, Explorer, Rebel, Hero, Magician, Jester, Everyman, Lover, and Carer. Each figure represents a different part of collective experience and is expressed differently in art (Major, 2021; Petric, 2023).

Musical and choreographic images are built on archetypal figures. The Magician archetype represents metamorphosis through transformational musical structures and plastic solutions, whereas the Hero archetype represents overcoming difficulties through dramatic musical forms and choreographic works. Creative music and choreography express the Creator archetype. Ballets and large-scale choreographic creations may feature characters who embody multiple archetypes, creating a complicated semantic system. Thematic elements that express archetypal qualities interact in music (Winston and Uppunda, 2024; Mygal et al., 2024).

Along with the broad theory of archetypes, an awareness of specific art representations arose. J.C. Major (2021) advanced the understanding of art archetypes through the monomyth. All mythological storylines and creative representations follow the hero's journey: leaving the familiar world, overcoming obstacles, obtaining sacred wisdom, and returning with a gift for humanity, according to the author. This structure appeared in music and choreography as movement developed and improved in quality. Campbell saw art as a way to express archetypal ideas through each medium. Archetypes in Ukrainian culture are essential for research. N. Turpak (2020) found basic archetypes that shaped Ukrainian art in his theoretical meditation on Ukrainian psychology.

The researcher examined the origins of these archetypes as symbolic structures preserved in national memory and expressed through diverse forms of artistic expression.

Sophia was expressed through harmonious organisation of creative material: form-building in music, canonical proportions of motions in dance, and a holistic stage space in scenography. Sophia was both an aesthetic concept and a worldview of a nation's culture. The Word archetype grew from verbal to sophisticated synthetic constructs, combining with many art forms. Musical theatre included verbal and musical aspects, while dance created a plastic system of signs with specific semantic meaning. Dance and music expressed the Earth archetype's link to natural cycles and the landscape, which characterised spatial thinking. The performing arts space interaction system was based on this archetype (Gorban, 2019; Turpak, 2020). Yu.I. Chekan (2021) grouped music archetypes into three levels. Based on sonata form, variety, and cyclicity, structural archetypes emerged. Musical material was developed through repetition, contrast, and variation, using compositional archetypes—the intonational level comprised calls, laments, and spring songs, which were transformed into electronic sounds. Performances showed melodic articulation through strokes, dynamics, and agogics. While folk dance genres used metro-rhythm, melody, mode, harmony, and frameworks to express archetypal images, they also gained importance. Ukrainian musicians of the 19th century used folk dances to preserve and disseminate national culture in their instrumental music (Yashnyk and Turitsyna, 2023).

D. Karpenko (2023) notes that the comprehension of archetypes in choreographic culture is expressed in folk-stage dance, where archetypal images acquire clear plastic forms. In the productions of P. Virsky, archetypes formed a system of artistic structures which, through plasticity, spatial compositional solutions, and dramaturgical approaches, reflected national symbols. The combination of traditional archetypal content with modern stage formats was manifested in productions such as "Why the Willow

Weeps" and "Hops", in which archetypes of the natural world were given stage embodiment. The hopak in the choreographic system was distinguished by its transformation from a village dance into a cultural archetype. Its structure reflected characteristic features of Ukrainian choreography and archetypal content, including elements of sacred practices from the ancient Slavic tradition and martial movements from the Cossack era. The dance form of the hopak fixed the notions of personal freedom and strength, forming the symbolic code of Ukrainian culture (Ismail, 2024; Melnyk, 2024). The artistic structure of the dance functioned as an expression of national identity within choreographic art.

O. Potebnia contributed to the understanding of the interconnection of language, folklore, and archetypes, regarding folk creativity as a holistic semiotic system in which each element bore semantic meaning (Shekhovtsova-Burianova, 2021). In the scholar's conception, dance and song genres appeared not merely as forms of folk self-expression, but as complex semiotic structures that accumulated the collective experience of generations. Research showed that, in folk dances, not only external behavioural models but also archetypal content determined the national worldview. Such an approach allowed the interpretation of folklore genres as mechanisms for preserving and transmitting cultural codes, in which choreographic vocabulary, musical rhythm, and the spatial organisation of movement served as bearers of archetypal meanings. Attention was given to the study of rituals and beliefs as sources for understanding archetypal structures that appeared among different peoples regardless of geographical location or historical period. The universal nature of archetypes in the collective unconscious across cultures, as manifested in folk creativity, was substantiated. Theoretical concepts of archetypes thus gained new significance in the conditions of the digitalisation of art. In choreography, archetypes underwent complex transformation. At the level of plastic forms, movement archetypes were fixed in the main elements of folk dance through squats, stamping steps, and sways. Spatial archetypes defined the traditional forms of dance

compositions through circular, linear, and diagonal constructions, which in the digital environment were supplemented by projections and virtual objects. Dramaturgical archetypes evolved from classical principles of dance action development into interactive forms using digital technologies (Sălăjan-Morar, 2023).

To systematise the identified transformations of archetypes in the digital artistic space, Table 1 presents a comprehensive analysis of the transformation of archetypal images in the context of the digitalisation of the artistic space. The evolution of traditional archetypes and their adaptation to modern technological possibilities were examined, demonstrating the multidimensionality of the interaction between cultural constants and innovative forms of artistic expression.

Table 1 – Realisation of cultural archetypes in contemporary artistic space.

Archetype	Traditional manifestation	Forms of implementation in digital art
Hero	Dramatic musical forms; choreographic compositions of overcoming; narrative structures of development	Interactive performances using motion capture; adaptive performance scenarios with AI generation; immersive VR performances with dynamic plot development
Creator	Experimental compositions; innovative choreography; original performance techniques	Algorithmic composition based on neural networks; generative choreography using ML; interactive synthesis of sound and movement
Sage	Philosophical musical forms; meditative choreography; ritual practices	Biometric control of the sound environment; neuro-interfaces for performance control; meditative VR spaces with biofeedback
Magician	Transformational structures; illusory stage effects; mysterious forms	Holographic projections with interactive control; AR transformations of stage space; multimodal stage illusions
Lover	Lyrical musical forms; paired dance compositions; romantic narratives	Emotionally adaptive performance systems; virtual duets with AI partner; interactive love arias with biometrics
Rebel	Avant-garde forms; experimental choreography; provocative solutions	Glitch-art performances with live sound; chaotic algorithmic compositions; deconstructive digital systems
Researcher	Experimental forms; cross-cultural syntheses; innovative techniques	Real-time data sonification; AI research of movement patterns; experimental control interfaces
Innocent	Naïve imagery, pure melodic and rhythmic forms	Simplified digital interfaces evoking childlike purity; minimalistic AR scenography

Everyman	Folk communal collective scenes, rhythm	Crowd-simulation participatory VR technologies, installations
Caregiver	Lullabies, gestures of protection	Interactive conveying audiovisual empathy through environments biofeedback
Shadow	Dissonant contrasts of light and harmonies, motion	Dark-toned effects visual embodying mapping, inner glitch conflict
Self	Symphonicunity, harmonic culmination	Multimodal sound, fusion movement, performances and integrating projection

*Note: VR – Virtual Reality, AR – Augmented Reality, AI – Artificial Intelligence, ML – Machine Learning.
Source: compiled by the authors based on N. Turpak (2020) and Y.I. Chekan (2021).*

The presented systematisation enables a more detailed analysis of the levels of interaction between digital instruments and cultural archetypes. The model of interaction between digital instruments and cultural archetypes revealed three levels of transformation in artistic practices. At the technical level, the adaptation of performance forms took place through the introduction of high-precision motion capture systems, which used cameras and markers for three-dimensional recording of movements in real time, such as OptiTrack and Vicon, which ensured accuracy of recording to the millimetre, and virtual reality systems for the creation of virtual performance environments. Augmented reality technologies enabled the integration of digital objects into the real stage space. Digital audio workstations enabled real-time processing and synthesis of sound (Kyriakou et al., 2024; Rexhepi et al., 2024).

In choreography, the genre of Screendance (dance explicitly created for the camera, combining choreography with cinematographic techniques) developed through the use of slow-motion technologies, which enabled movement to be recorded at up to 1,000 frames per second. Motion-tracking systems, such as Kinect and Perception Neuron, ensured the transfer of real movement into virtual space. Software enabled the creation of interactive visual effects that responded to dancers' movements in real time.

The semantic level of transformation encompassed the conversion of traditional symbols into digital space. In the Ukrainian context, this manifested as the integration of folklore

elements into electronic music: archetypal musical intonations of lament and invocation acquired new sounds through granular synthesis and the sampling of traditional instruments (bandura, trembita). In choreography, the archetype of the circle was transformed through circular projections and light patterns, while traditional ornaments were projected onto stage constructions and performers' costumes via video-mapping systems.

Virtual instrumental performances were transformed by the introduction of motion-capture systems for musicians. An electromyographic (EMG) sensors that measure the electrical activity of muscles during contraction) recorded performers' muscular activity, enabling detailed recordings of performance technique. The analysis of this data using machine learning served as the basis for the development of adaptive training programmes and generative models of composition (Wang, 2024; Zabiaka et al., 2023). Such technologies created the prerequisites for a new approach to music pedagogy, in which digital recordings of performance movements became an instrument for preserving the technical elements of national performing schools.

3.2. Art studies analysis of the embodiment of national archetypes in the musical-choreographic performance "The Passions of Taras"

The creativity of Yevhen Stankovych defined the pathways of Ukrainian musical art's development at the end of the 20th and the beginning of the 21st centuries. The composer's authorial style was formed through the combination of Carpathian folklore with modern compositional techniques, which manifested in the system of musical dramaturgy. In the large-scale musical-stage works "When the Fern Blooms", "The Terrible Vengeance", and "The Passions of Taras", the mastery of symphonic thinking and the ability to create multidimensional theatrical canvases were revealed. The folk opera "When the Fern Blooms" and the opera-drama "The Terrible Vengeance" demonstrated a new approach to the embodiment of

national archetypes through the synthesis of music and plasticity. The dramaturgical concepts of these works were distinguished by philosophical depth, expressiveness of musical language, and the organic combination of folklore elements with modern means of expression (Rospopa and Nimilovych, 2023; Krypchuk et al., 2025).

The dramaturgical concept of "The Passions of Taras" by Yevhen Stankovych was based on the key poems of T. Shevchenko. The composer selected fragments from the works "The Dream", "The Caucasus", "To the Dead, the Living and the Unborn...", "Maria", which revealed the spiritual-philosophical and national ideas of the Kobzar. The architectonics of the work was built through nine parts, each of which showed a particular archetypal image: the "Prologue" introduced evangelical motifs, the "Lament of Maria" embodied the maternal principle, the "Prayer" revealed the sacred sphere, the "Voice of the People" represented collective will, the "Prophet's Monologue" reflected spiritual guidance, "Repentance" and "Enlightenment" showed the path of spiritual transformation, "Glorification" elevated the idea of unity, and the "Epilogue" synthesised all image spheres into a single cathartic space. Such structural organisation of the work allowed the composer to reveal a complex system of musical archetypes that embodied the layers of national consciousness. According to N. Turpak (2020), archetypes function as underlying symbolic structures that constitute the constants of national spirituality.

The system of musical archetypes in the work "The Passions of Taras" revealed layers of national consciousness. The archetype of the Prophet was embodied through specific musical elements: dummy intonations with characteristic melismas on main tones, improvisational melody, and the use of fourth-fifth progressions in baritone recitatives. In the choreographic solution, this image was emphasised through the plastic monologue of the ballet soloist, where expressive movements reflected inner struggle and spiritual enlightenment. The lone figure of the dancer against the background of the choral masses created a visual image of prophetic service. The interaction of these archetypal images,

according to D. Petric's (2023) theory, developed a multidimensional system of psychological symbols that resonated with the collective unconscious of the nation.

The archetype of the Mother of God as a symbol of maternal protection was manifested through the synthesis of lamenting and sacred intonations. In the "Lament of Maria," characteristic elements of Ukrainian laments were used – descending second intervals, quartal exclamations, melismas on vowels. In the choreography, this image was embodied through plastic motifs of grief and prayer. Smooth, wave-like movements of the hands and gradual transitions from low to high positions reflected the transformation of personal sorrow into a symbol of nationwide purification. The znamenny chant, as the basis of the Sophia archetype, symbolised the spiritual wisdom of the ancestors. The choral parts in the "Prayer" were built on the principles of medieval monody, creating an effect of timelessness. The ballet group in these episodes used elements of sacred plasticity—slow movements and canonical gestures reminiscent of church paintings. This created a visual image of spiritual contemplation, as Yu.I. Chekan (2021) notes that such a synthesis of sacred and folk elements was a characteristic feature of Stankovych's creativity, which also manifested in other works.

The archetype of the People as the embodiment of collective will was revealed through the transformation of folklore elements. In the "Voice of the People," vesnianka intonations became the basis for developed choral fugues. The choreographic solution included elements of folk dance transformed through modern plasticity. The mass ballet scenes created the image of popular unity, where individual parts dissolved into the general movement.

Bell-like sonority as a symbol of spiritual transfiguration evolved from direct imitation of church bell ringing to complex sound complexes. In choreography, this was reflected through a system of circular movements that created visual analogies with the swinging of bells. In climactic moments, the plastic solution emphasised the sound's all-encompassing character. According

to R. Gorban (2019), such an approach to the embodiment of the collective principle reflected the optimistic worldview of Ukrainian mentality, in which people appeared as active creators of their own destiny. The interaction of these archetypes in the musical-choreographic synthesis formed a national mental sensation. By combining traditional elements with modern artistic language, the work revealed the foundations of Ukrainian spirituality. In the "Epilogue," all archetypal images merged into a single cathartic space, where music, plasticity, and dramaturgy created a holistic picture of national rebirth.

The influence of "The Passions of Taras" on the formation of national mental sensation was manifested through the embodiment of key archetypes in a new musical stage form. In "Enlightenment," the plastic compositions of soloists against the backdrop of choral masses created a visual image of spiritual transformation—from the loneliness of the prophet to unity with the people. In the "Lament of Maria," choreography revealed the evolution of the maternal archetype from individual grief to a symbol of national purification through canonical gestures of prayer and lament.

According to the research of V.A. Sălăjan-Morar (2023), in the contemporary stage, art spatial solution played a key role in the creation of a holistic artistic image. In "The Passions of Taras," this was manifested through a multilevel stage space that enhanced the influence of archetypal images. In the climactic scenes of "Glorification" and "Epilogue," the placement of choral groups at different levels of the stage, in interaction with the dancers, created the effect of a temple rite. The combination of znamenny chant with elements of folk polyphony, bell sonorities with dummy intonations, formed a new type of national musical-theatrical art.

The choreographic solution of mass scenes revealed the transformation of folklore elements. In the "Voice of the People," elements of folk dance, reinterpreted through modern plasticity, reflected the vitality of tradition. In the final scenes, the interaction between soloists and the corps de ballet embodied the unity of individual and collective principles in national culture. The

research by N. Rospopa and O. Nimilovych (2023) confirmed that Stankovych's creativity remained relevant in the modern cultural space, particularly through its ability to organically combine traditional archetypes with innovative means of expression.

3.3. System of parameters for preserving national authenticity in the process of digital integration of musical-choreographic art

The methodology of assessing the artistic value of digital integrations in musical-choreographic art unfolded through a system of authenticity parameters. In the musical material, the preservation of cultural codes was defined by specific criteria: correspondence to modal structures of folk music (Hutsul, Dorian, Phrygian modes), established metro-rhythmic formulae (kolomyika, kozachok rhythms), and characteristic melodic turns (fourth-fifth progressions, ornamentation of main tones). In choreography, the criteria included technical elements of plasticity (hand positions in female dance, squats and aerial tricks in male dance), spatial constructions (circle, star, line), and rhythmic patterns (triple metre, syncopation). The analysis of the implementation of digital technologies in stage art revealed a multilevel system of integration. According to M. Coeckelbergh (2020), technological solutions evolved from basic projection systems and digital sound to motion capture systems, AR/VR technologies, and algorithmic compositions.

In choreography, authenticity was determined by the preservation of national plasticity, spatial organisation, and rhythmic articulation (Bidyuk, 2019). Technical and plastic elements were maintained through the faithful reproduction of canonical gestures and poses, hand positions in women's dances, squats, and aerial tricks in men's hopak forms, while spatial constructions such as the circle, star, and line continued to serve as symbolic embodiments of unity and cosmic order in folk culture. The rhythmic organisation of movement, often based on triple metre and syncopation, maintained the organic connection between bodily motion and collective ritual rhythm.

Digital replication of these choreographic characteristics required high-precision motion capture and pose-estimation systems capable of recording movement in real time with millimetre accuracy. Such systems, as noted by Wang (2024), enabled the translation of regional motion styles into digital space without loss of expressive authenticity, and the resulting datasets served as a foundation for constructing digital avatars whose gestures preserved the biomechanical logic and emotional resonance of national dance.

The integration of digital tools was conceptualised as a three-tier system of influence on authentic material. At the first level, the basic elements of national tradition were subject only to digital enhancement without alteration, for example through spectral cleaning of sound or high-definition recording of gesture. At the second level, partial processing allowed moderate transformation by means of algorithmic variation and adaptive mapping, which introduced melodic or choreographic improvisations guided by neural networks. The third level, generative forms, encompassed autonomous digital synthesis based on national databases, where algorithmic systems created new musical or choreographic structures while remaining guided by traditional parameters. These relationships, systematised in Table 2, correlated musical and choreographic elements with permissible degrees of technological modification and appropriate digital tools, thus providing a methodological matrix for evaluating cultural integrity in hybrid digital works.

Table 2 – Assessment of authenticity of digital integrations.

Category	Musical elements	Choreographic elements	Permissible transformations	Technological solutions
Basic elements of national tradition	Modal structures, metrorhythmic formulas, characteristic melodic turns	C a n o n i c a l movements, spatial constructions, rhythmic patterns	Digital timbre processing, spatial sound localisation	S p e c t r a l analysis, spatial sound systems
Partial processing elements	Variations of folk melodies, modifications of rhythmic structures	A d a p t a t i o n of traditional movements, transformation of spatial solutions	A l g o r i t h m i c variations, reactive modifications	Motion capture, g e n e r a t i v e algorithms
Generative forms	Synthesis of new melodies based on folklore databases, algorithmic compositions	G e n e r a t i o n of movement sequences, creation of spatial structures	A u t o n o m o u s content generation, i n t e r a c t i v e transformations	Neural networks, m a c h i n e learning systems

Source: compiled by the authors based on K. Chen et al. (2021), K.M. Darda and E.S. Cross (2023), Z. Wang (2024).

The implementation of digital innovations was realised through ethnographic analysis and the creation of a database of authentic elements, recording semantic connections and cultural context. The technological realisation transformed traditional forms through spectral analysis of acoustic characteristics of folk instruments and the preservation of timbral specificity through reproduction of overtone structure. The preservation of national mentality was revealed through the integration of mathematical models of traditional symbolism into generative algorithms, according to A. Aristidou et al. (2023) reported that neural networks reproduced variations in melodies and movements, taking into account regional peculiarities—modal structures, metrorhythmic formulae, plastic elements. The artistic integrity of the production was achieved through the synchronisation of acoustic and digital elements, in which electronic processing considered the specificity of folk music-making, and projection systems transformed traditional ornamental motifs in accordance with the dramaturgical development.

At the performative level, artistic integrity was achieved through the synchronisation of acoustic, visual, and kinetic components. Electronic processing followed dramaturgical development, with dynamic modulation of light and sound corresponding to the emotional peaks of the performance. Projection systems employed real-time mapping to transform ornamental motifs in synchrony with musical rhythm, creating new layers of meaning while preserving the archetypal symbolism of traditional forms. The integration of these digital and traditional elements marked the transition from mechanical reproduction to technological co-creation, in which innovation and heritage functioned as complementary forces. An essential part of this system was the establishment of control protocols for monitoring digital transformations in real time (Kyriakou et al., 2024). Comparative spectral mapping was applied to assess the similarity between authentic and digitally processed sounds; motion-correspondence indices were used to evaluate deviations of choreographic sequences from canonical templates; and semantic-symbolic validation procedures verified the alignment of generative outputs with recognised cultural codes. The results of this monitoring were visualised through analytical dashboards, enabling choreographers and ethnomusicologists to assess the authenticity coefficient of each production component. In this way, digital aesthetics developed as a field in which algorithmic precision was reinforced rather than diluted national expressiveness (Zhou et al., 2021).

The system of parameters for preserving national authenticity represents an interdisciplinary framework that combines ethnographic analysis, information technology, and aesthetics. It calibrates digital transformation according to measurable musical, choreographic, and semantic indicators. By establishing explicit criteria for permissible modification and embedding cultural semantics within algorithmic structures, the proposed approach offers a sustainable model for integrating innovation into traditional art without undermining its national foundations.

4. Discussion

Based on the conducted research, it was established that digital instruments transformed stage art through three primary levels of interaction: technical (motion capture systems, virtual reality), semantic (transformation of symbols in digital space), and artistic (integration of technologies into the creative process). The results confirmed the conceptual idea that preserving cultural authenticity in the context of digital innovations requires a comprehensive approach that takes into account national archetypes and mentality. From a comparative perspective, Ukrainian archetypes demonstrate both universal and distinctive features in relation to global cultural models (Kavun, 2021). The archetype of Sophia, rooted in the Kyiv philosophical tradition, is parallel to the Greek concept of Sophia as divine wisdom. Still, in Ukrainian culture, it acquires an active ethical dimension, expressed through creative harmony and shared spirituality. The archetype of the Word has analogues in East Asian ideas about the sacred sound (Om) and the Japanese concept of kotodama, but its Ukrainian embodiment retains a prophetic and nation-forming function rooted in the Shevchenko tradition. The archetype of Earth resonates with the agrarian archetypes found in Balinese and Andean cultures, but its Ukrainian manifestation uniquely combines agrarian images with Christian and existential symbolism. These comparisons show that the Ukrainian digitalisation of art is not simply an adaptation of global trends, but a reinterpretation of universal symbols through national cultural codes.

A comparative analysis with existing studies allows us to position these results more clearly within the framework of contemporary science. For example, while K.M. Darda and E.S. Cross (2023) emphasised the aesthetic ambiguity of computer-generated choreography and the ambivalent audience response to algorithmic dance, this study goes beyond perceptual analysis, demonstrating the potential of archetype-based modelling to guide algorithmic composition. The developed system of authenticity parameters (Table 2) offers a methodological solution to the

problem identified by K.M. Darda and E.S. Cross: it operationalises cultural codes within a generative framework, thereby allowing the machine to act not as an independent creator, but as an interpreter of inherited artistic structures. This represents an epistemological transition from automation to cultural co-creation.

A comparison with T.A. Boiko and M.G. Tatarenko (2021) further clarifies how the adaptive mechanisms of traditional elements can extend beyond theatrical costumes and masks into the algorithmic realm of virtual scenography. By combining the visual and symbolic levels of performance through motion capture and projection mapping, this study shows how digital tools can reproduce the ritual functions of folk masks in immersive environments, supporting rather than dissolving authenticity.

In the context of the transformation of national symbols, M. Kulyniak (2022) studied the archetype of the “Madonna of Ukraine” in musical art. The conducted research deepened understanding of the mechanisms of adaptation of archetypal images in the digital environment, revealing new forms of interaction between traditional symbols and technological innovations in stage space. While M. Kulyniak considered the transformation of the archetype mainly through musical means of expression, the obtained results demonstrated a broader spectrum of technological possibilities for embodiment. In particular, it was found that the use of virtual reality systems and projection technologies enabled the creation of a multidimensional stage space in which the archetype of the “Madonna of Ukraine” was revealed through the synthesis of visual, sound, and spatial elements. The researcher’s observations on the preservation of the sacred meaning of the archetype during transformation were confirmed in the context of digital innovations, where technological means enhanced the emotional impact of traditional symbols without loss of cultural significance.

The analysis of the introduction of digital technologies into art education conducted by N. Ovcharenko et al. (2020) identified key directions of technological modernisation of the educational process. The results obtained supplemented the researcher’s

observations, revealing the mechanisms for preserving cultural identity during the implementation of innovative educational technologies and identifying the need to develop specialised methods for teaching performing arts using digital tools.

A. Pavlyshyn's (2022) research on the symbolic language of Ukrainian art established a connection between historical archetypes and modern forms of artistic expression. During the research, additional levels of symbol transformation in the digital environment were discovered, expanding A. Pavlyshyn's observations focus solely on visual aspects. The results demonstrated a comprehensive evolution of traditional symbols through visual projections, sound processing of folklore elements, and the creation of virtual spaces, confirming the possibility of preserving cultural codes during the technological modernisation of stage art.

In the work of O. Fabryka-Protska et al. (2024), the mechanisms of the influence of cultural identity on performing arts in conditions of globalisation were studied. The results of the conducted research deepened the authors' conclusions, revealing the specificity of the interaction of national archetypes with digital technologies and identifying the criteria for preserving authenticity during the technological modernisation of stage art. In the study, N. Ularu (2020) revealed the impact of technological innovations on the transformation of art education. The conducted analysis expanded the researcher's observations, identifying the need to create a balanced system for implementing digital tools that considers both technological capabilities and the preservation of cultural heritage.

D. Petric (2023) studied psychological archetypes in the context of the collective unconscious, proposing a threefold model of analysis through structural, regulative, and representative components. The results of the conducted research confirmed D. Petric's theory of the transformation of archetypes in digital space, discovering similar levels of interaction when integrating technologies into stage art. In particular, structural archetypes were manifested through the principles of digital space organisation,

regulative ones through algorithms of managing performance processes, and representative ones through visual and sound images created with the help of technologies. Such correspondence confirmed the universality of the proposed model for analyzing the transformation of archetypes across contexts.

The fundamental contribution to the understanding of Ukrainian ethnoculture, made by N. Turpak (2019) through the analysis of the philosophical heritage of Serhii Krymskyi, revealed the mechanisms of preserving national identity. The research conducted supplemented these conclusions, demonstrating how the archetypes of Sophia, the word, and earth were transformed by digital technologies in contemporary stage art. The archetype of Sophia was reflected in the harmonious organisation of digital space; the archetype of the word evolved through the integration of verbal elements into multimedia forms; and the archetype of the earth was manifested in spatial solutions using projection technologies and virtual reality. The discovered regularities confirmed the viability of traditional archetypes in conditions of technological modernisation of art.

V. Shekhovtsova-Burianova (2021) studied the manifestations of archetypes of Ukrainian collective consciousness in contemporary art, tracing the evolution and adaptation to new forms of artistic expression. The results of the conducted research expanded the researchers' conclusions, showing the role of digital technologies in transforming traditional archetypes and revealing mechanisms of preservation amid technological innovation. It was established that digital tools created new opportunities for the embodiment of archetypal images through interactive forms of viewer engagement, spatial projections, and soundscapes. The transformation of performing practices was accompanied by the preservation of archetypes' symbolic content, confirming the ability to adapt to new forms of artistic expression without losing cultural authenticity.

In the subsequent analysis of the development of the concept of Ukrainian mentality, N. Turpak (2020) considered the socio-value aspects of the philosophical research of the Kyiv school. The obtained results deepened the researcher's observations, identifying new manifestations of national mentality in the context of the digital transformation of art and determining the mechanisms for preserving cultural codes during the implementation of technological innovations. In particular, it was established that digital technologies did not destroy traditional mental structures but created new channels of transmission and reproduction. The transformation of performing practices under the influence of technologies was accompanied by the preservation of worldview foundations, which confirmed the researcher's observations regarding the resilience of national mentality in conditions of cultural change.

The musicological study by O. Vasylenko (2021) revealed the interpretations of poetic words in Yevhen Stankovych's oratorio "The Passions of Taras". Comparison with the results of the conducted research revealed parallels between traditional forms of musical dramaturgy and digital transformation, confirming the possibility of preserving meaning during the technological modernisation of performing forms. In the context of digital integration, archetypal images embedded in the work's musical dramaturgy acquired new forms of visual and spatial embodiment. The use of multimedia technologies expanded the expressive possibilities of performance while preserving the work's dramaturgical integrity and symbolic content. The analysis confirmed that technological innovations could enhance the emotional impact of traditional musical forms.

The research results highlighted the complex interplay between digital technologies and traditional forms of stage art. The need to develop methodological approaches to the implementation of innovations while preserving cultural authenticity has given rise to new perspectives on how to maintain national identity in the context of the digital transformation of the artistic sphere.

5. Conclusions

The study revealed a system of transformation of musical and choreographic art under the influence of digital technologies. The evolution of cultural archetypes in the digital environment was found to occur at three levels of interaction: representative, which includes the production of visual and aural images; regulative, which concerns algorithms for managing performance processes; and structural, which establishes the fundamental principles of digital space organisation. It was determined that there were elements of archetype manifestation in Ukrainian culture. Specifically, the archetype of the earth shaped the nature of spatial solutions through projection technologies, the archetype of the word found its reflection in multimedia artistic expression, and the archetype of Sophia was realised in a harmonious approach to the organisation of the digital environment.

To maintain national authenticity amid digital integration, a set of guidelines was developed. This system supports three main categories of transformation: generative forms, elements with partial adaptation, and fundamental elements of national tradition. The use of solutions was suggested as part of technical support for the preservation of authenticity. These included spectral analysis algorithms that preserve the timbral characteristics of folk instruments, motion capture systems for the detailed reproduction of national plasticity, and neural networks for the analysis and reconstruction of folklore elements. The musical and choreographic piece "The Passions of Taras" served as an example of the efficacy of the suggested method, showing how traditional forms may be made more expressive without sacrificing cultural identity.

The study's results enable specific recommendations for integrating digital technologies into the performing arts while preserving national identity and cultural archetypes. The introduction of digital tools, such as motion capture systems, augmented and virtual reality, or algorithmic composition, should

be preceded by a comprehensive ethnographic and semiotic analysis aimed at identifying the symbolic meanings inherent in local artistic traditions so that technological additions enhance rather than distort cultural archetypes. Practical implementation requires the creation of a multi-level digital archive that brings together authentic musical and choreographic materials, including motion capture recordings of national dances, spectral databases of folk instruments, and annotated folklore corpora, providing a methodological basis for both education and artistic creation. Artificial intelligence systems must be trained on regionally selected data sets and include cultural filters that preserve the modal and rhythmic structures characteristic of national art, thereby preventing the homogenisation of artistic expression. Art education requires hybrid curricula that combine traditional techniques with digital experimentation, with courses on the digital interpretation of cultural archetypes and the ethical aspects of technological integration, promoting the development of cultural sensitivity and technological literacy. The creation of interdisciplinary laboratories bringing together composers, choreographers, digital engineers, and ethnographers will facilitate the joint creation of performances that integrate digital media while preserving the symbolic continuity of national heritage. Finally, all digital interventions in the performing arts must undergo expert cultural assessment to ensure authenticity, respect for sacred symbols, and conformity with community values, thereby ensuring that technological innovations in the performing arts become an instrument of cultural continuity rather than cultural replacement.

The practical significance of the results lies in the formulation of methodological recommendations for introducing digital innovations into the field of stage art. The developed table for assessing the authenticity of digital integrations may serve as an effective tool in art education, particularly in the development of educational programmes and in production activities aimed at creating modern theatrical performances. In addition, this table may be helpful within projects focused on the preservation and

popularisation of cultural heritage. Algorithms for monitoring digital transformation processes based on a multi-level filtering system were also proposed. This system enables the preservation of national identity during the technological modernisation of performance art.

The introduction of digital technologies into stage art opens new opportunities for art education, enabling students and young artists to deepen their understanding of traditional forms of artistic expression through modern technologies. The use of tools such as motion capture, neural networks, and spectral analysis promotes the development of new teaching methods that combine theoretical knowledge with practical skills in working with digital technologies. This enables students not only to master traditional techniques but also to become participants in the innovation process, actively integrating digital solutions into the practice. The application of such technologies may significantly enhance the professional training of teachers and lecturers, as well as serve as the basis for the development of new educational programmes aimed at preserving cultural heritage in the context of globalisation and digitalisation.

The lack of quantitative measures to evaluate the level of cultural authenticity preservation in the digital conversion of performance art is a limitation of the study. The creation of a set of quantitative metrics for assessing how digital technologies affect stage art's ability to preserve national identity is a viable avenue for future study.

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All authors contributed to the study conception and design. Material preparation, data collection and analysis were performed by V.K., S.P. and I.S. The first draft of the manuscript was written by H.K. and L.K. All authors commented on previous versions of the manuscript. All authors read and approved the final manuscript.

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