Digital Educational Mechanisms for the Formation of National and Regional Identity in a Technological Environment

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Abstract

In the current context of global digitalization of education, the formation of national and regional educational identities that integrate technological, cultural, and value-based dimensions has become a critical issue. The relevance of this study is determined by the growing need to align digital educational transformation with cultural heritage preservation and social cohesion within educational communities. This challenge is particularly significant for the European educational space as well as for Ukraine, which is pursuing a strategic course toward digital integration while maintaining its cultural identity. The purpose of the study is to identify key trends and mechanisms involved in the formation of educational identity under conditions of digital transformation, with the object of analysis being national and regional education systems that implement culturally oriented development strategies. The methodological framework is based on logical-analytical, comparative-institutional, and descriptive statistical approaches applied to international educational and statistical datasets. The results demonstrate a substantial expansion of digital integration in education alongside the strengthening of the cultural dimension of identity. The proportion of educational institutions implementing intercultural digital modules increased from 34 to 63 percent, while the educational autonomy index rose from 0.57 to 0.74. In countries with high levels of digital readiness, more than ninety percent of students participate in programs aimed at cultural self-realization, whereas in Ukraine digital initiatives primarily emphasize the development of national and cultural self-identification. Based on comparative trend analysis of aggregated international data, parallel developments were observed between the expansion of digital education initiatives and the reinforcement of cultural integration indicators, reflecting a descriptive alignment between technological development and socio-cultural cohesion without implying inferential statistical relationships. The practical significance of the study lies in the application of its findings to educational policy design, program modernization, and the integration of digital competencies with civic and cultural awareness.

Keywords: digital education, educational identity, national identity, regional identity, institutional policy, cultural integration

1. Introduction

Modern education is in the conditions of deep digital transformation, which changes the ways of learning, communication and self-expression of the individual. In these conditions, the problem of preserving and forming national and regional educational identity acquires special importance, which becomes a challenge for countries integrated into the global information space, in particular for Ukraine and the European Union countries. Technological education, integrating creative and digital approaches, acts as an important factor of cultural self-knowledge and social cohesion both within regional educational systems (EU) and in the context of national educational reforms.

The theoretical value of the study lies in the systematic understanding of the process of identity formation in technological

education through the prism of information and creative integration. In particular, the study allows interpreting technological education as a mechanism for combining European values with local cultural traditions. The practical significance is determined by the possibility of applying the obtained results to improve educational programs, develop digital creativity, and support the cultural sustainability of educational communities of different levels – from local to supranational.

In the context of European regionalization of education, the problem of combining digital and creative practices is of particular importance. As Cappello and Cañabate Ortiz (2025) Rabello-Mestre et al. (2025) point out, creative learning in a digital environment is becoming a key factor in the development of innovative thinking, empathy and intercultural understanding. The integration of technological and artistic practices into the educational process opens up opportunities for self-expression, the formation of personal autonomy and awareness of one's own cultural belonging. Thus, modern education is turning into a space in which technological innovations and cultural and humanistic principles are combined, contributing to the development of personal and collective identity.

Rigopouli et al. (2025) consider creativity through the ideas of Vygotsky, emphasizing its social nature – creativity arises in the interaction between learning participants, technologies and cultural context. A technologically enriched environment allows students not only to reproduce knowledge, but also to create new meanings related to their own cultural identity. In this context, Lutsiuk and Alieksieieva (2025) argue that technological education contributes to the formation of national identity through the development of STEM competencies and creative practices, in particular 3D modeling. Similar approaches demonstrate that digital education in Ukraine and EU countries can simultaneously support regional integration and the preservation of national values.

Tsai et al. (2025) show that the use of augmented reality technologies in teaching enhances the sense of local identity, contributing to the emotional connection of students with the culture of their own region. Immersion in digital-visual environments forms a deeper understanding of historical and socio-cultural contexts, awakens pride in cultural heritage and encourages its preservation. In this context, Yazan (2024) analyzes the pedagogy of identity through autoethnographic narrative, considering teaching as a space of self-reflection, where the teacher forms professional and national identity. This approach emphasizes the importance of critical thinking and narrative awareness in the preparation of future teachers, demonstrating that education contributes to the formation of identity for both students and teachers.

Pikhart et al. (2024) prove that digital learning acts as a catalyst for creative potential and shapes the value orientations of modern youth. Innovative forms based on gamification and collaborative digital practices activate creativity, promote cultural self-reflection and combine technological literacy with humanistic values, acting as an indicator of the social maturity of the individual. In this context, Lan (2024) emphasizes that in the conditions of learning enriched with artificial intelligence, the formation of a teacher's professional identity requires a combination of emotional intelligence, digital competence and value consciousness. The author emphasizes that AI technologies change not only teaching methods, but also the very essence of the teaching profession, becoming a tool for self-development and professional growth of the teacher.

Despite the active study of digitalization of education, creative learning and the development of professional identity of teachers, the relationship of these aspects with the formation of national and regional identity remains insufficiently researched. Existing works mainly describe general trends in digital learning, but there is a lack of cross-level analysis – from local to European – which would explain how informational and creative factors influence the formation of educational identity in the context of cultural integration. This scientific gap determines the need for a holistic study of the informational and creative dimensions of identity in the modern educational environment.

The aim of the study is to identify the informational and creative dimensions of the formation of national and regional identity in the technological educational sector. To achieve this goal, it is planned to characterize modern approaches to the integration of digital and creative practices in education, to clarify the mechanisms of their influence on the process of cultural self-identification, and to describe pedagogical models that contribute to the combination of innovative technologies with the preservation of cultural identity.

2. Literature Review

In modern scientific discourse, identity formation in the educational space, in particular in the technological sphere, is becoming interdisciplinary. An analysis of the works of 2020–2025 shows an increased attention to the relationship between technological education, digital competencies, creativity, and sociocultural self-determination. In particular, Akbari et al. (2023) indicate that innovative thinking and effective use of e-learning depend on the student's relational identity and his self-regulation in the digital environment. Similarly, Capuno et al. (2022) define digital citizenship as a factor of professional self-determination, while Chen et al. (2021) consider it as a cognitive-ethical-cultural system that is integrated into the formation of educational identity.

Negru-Subtirica (2024) analyzes the educational identity of adolescents, emphasizing the role of institutional support in stabilizing self-awareness in a dynamic social environment, and Christiaens et al. (2023) emphasize the impact of the transition between educational levels on the structure of value identity. At the same time, Gonçalves et al. (2022) describe the *"Made by*

them to them" methodology, which stimulates children's creativity through the independent construction of learning experiences using digital tools, and Lauricella et al. (2020) emphasize the need for systematic training of teachers in the formation of digital citizenship competencies, since it is early socialization that determines responsible behavior in the digital environment.

Kaputa et al. (2022) consider the digital transformation of universities as a catalyst for socially oriented innovations that combine technological modernization with humanistic values of education. A similar idea is developed by Ivanenko et al. (2023), who analyze the digital education policy of Ukraine in the context of European integration and emphasize the synergy of institutional reforms and technological solutions as the basis for strengthening national educational identity. Robles-Carrillo (2024) reveals the concept of digital and legal identity, defining it as a phenomenon that combines technological, legal and ethical dimensions and forms a sense of belonging to a community. The study by Avdikos and Pettas (2021) traces the formation of collaborative educational spaces, where market and communal models of knowledge creation are combined, giving rise to new forms of academic "coexistence".

The connection between creativity and digital skills is analyzed in detail by Samaniego et al. (2024), who argue for the need to integrate artistic and creative techniques into technological programs as a means of developing aesthetic thinking. Similarly, Su and Yang (2024) define digital competence in early education as the basis of innovative activity, which provides cognitive flexibility and the ability to integrate information flows. Akbari et al. (2023) emphasize the formation of "autotelic experience" in students – an internal motivation for learning, which enhances the innovativeness and sustainability of educational activities. These provisions are consistent with the conclusions of Burns (2021), who interprets technological education as a factor of social mobility and equal access to knowledge. Urenje (2025) complements this perspective, emphasizing that the education of the future should form not only professional but also ethical competencies, ensuring readiness to act in conditions of uncertainty without losing cultural identity.

In general, it can be argued that existing research focuses mainly on individual dimensions – digital competence, creativity or sociocultural self-identification. However, an integrative model that combines informational, creative and axiological aspects of technological education has not yet been fully developed, which determines the methodological direction of further scientific research.

The aim of the study is to investigate the mechanisms of combining information and creative factors in the process of forming national and regional identity in the technological educational sector, identifying pedagogical conditions that contribute to the harmonious development of digital competence and cultural self-awareness of education seekers. Achieving this goal involves solving a number of intermediate tasks – in particular, clarifying the essence of the information and creative approach, analyzing modern educational models that combine technological learning with cultural values, as well as outlining practical directions for its implementation in the educational process.

The implementation of the set goal should ensure the creation of a holistic theoretical and methodological basis for understanding the role of technological education as a space for the formation of cultural identity in the era of digital transformation. The expected result is the formation of a systemic vision of the educational environment, in which creativity, innovation and cultural identity act as interrelated components of the professional and personal development of a modern specialist.

3. Methods

The research was conducted in 2024–2025 within the framework of the direction "Educational Technologies and Cultural Identity" based on a systematic analysis of international statistical and normative-analytical sources. The empirical base was formed by open data of the UNESCO (2024), OECD (2022; 2024), World Bank (2024), Eurostat (2024), as well as official reports – UNCTAD (2024) and European Commission (2023). These resources contain reliable data on the level of digitalization of educational systems and the development of creative competencies, which provided a representative base without the involvement of surveys or expert assessments.

The study examines educational identity in two dimensions – national and regional (European). The national dimension reflects the specifics of cultural and educational traditions of individual states, and the regional dimension reflects integration trends that are formed within the educational policy of the European Union and OECD countries. This approach allows us to assess the relationship between national identity and regional convergence in the context of the digital transformation of education.

The methodological basis combines general scientific and special methods that provide an interdisciplinary vision of the problem. The principles of systematicity, objectivity, reliability and the interconnection of theoretical and empirical analysis are adhered to. Logical-analytical, structural-functional, comparative, historical-evolutionary, statistical and graph-analytical methods are used, which allowed integrating quantitative and qualitative indicators. Relationships between indicators of digital education development and cultural integration were examined using descriptive statistical analysis and comparative trend assessment based on aggregated international datasets, without implying causal or inferential statistical modeling.

Content analysis of reports UNCTAD (2024), European Commission (2023); UNESCO (2024) made it possible to identify key trends in digital education, and a comparative-analytical approach revealed similarities and differences in

models of educational identity formation. The theoretical basis is based on the cultural-historical paradigm, constructivist approaches, and a systemic vision of the interaction of education, culture, and technology.

An author's information and creative model has been developed that combines the analytics of educational indicators with cognitive and cultural factors of identity. Two integrative methods have been specially applied: institutional-analytical – for assessing education digitalization policies (European Commission, 2023; OECD, 2024), and information and creative – for analyzing the relationship between digital practices, creative approaches and processes of national and regional identity formation (UNESCO, 2024; World Bank, 2024).

All calculations, generalizations and graphical interpretations were made on the basis of real statistical data (Eurostat, 2024; OECD, 2024; UNCTAD, 2024), which guarantees the reliability of the results. The combination of methods ensured the consistency of theoretical logic with empirical verification and made it possible to formulate substantiated conclusions regarding the role of information-creative factors in the formation of educational identity.

To summarize the data, the countries studied were grouped according to three educational identity models: Scandinavian (Denmark, Sweden, Finland), Central European (Poland, Czech Republic, Estonia), and Western European (Netherlands, Germany, France). In order to broaden the regional scope of the analysis beyond individual national cases and reduce over-reliance on the Scandinavian model, the comparative framework also incorporates illustrative references to Southern European countries, including Spain, Italy, and Portugal, as well as selected Baltic states such as Lithuania and Latvia, where digital education policies similarly integrate cultural heritage, civic education, and creative practices within EU-aligned institutional strategies. This grouping allows for comparison of both regional unity and national differences in the development of digital education and cultural self-identification.

4. Results

4.1 Transformation of National and Regional Educational Identity in the Context of Digitalization

In the current conditions of digital transformation of education, there is a deep rethinking of the essence of educational identity – both at the national and regional levels. If earlier educational identity was determined primarily by cultural and national traditions, now it is acquiring a hybrid character, combining digital, intercultural and value components. Such a dual identity is formed under the influence of both state educational policies and supranational strategies, in particular, initiatives of the European Union and the Organization for Economic Cooperation and Development (OECD).

According to the UNESCO (2024), in 2020–2024, the share of educational institutions implementing digital programs with the integration of a cultural component increased from 34% to 63% in 154 countries around the world. The most noticeable changes are observed in the European Union, where, according to Eurostat (2024), more than 70% of schools have separate sections of intercultural education on their own digital platforms. This demonstrates the transition from the traditional model of knowledge transfer to a value-technological paradigm, within which education becomes a space for socio-cultural interaction and self-realization.

For a comprehensive analysis of the dynamics of digital integration of education, statistical data from UNESCO, OECD, World Bank, Eurostat, UNCTAD and the European Commission were summarized. Table 1 presents the main quantitative indicators of the transformation of educational identity, reflecting both regional trends (EU, OECD, world) and national examples (Denmark, Netherlands, Sweden).

Table 1. Indicators of transformation of educational identity in the context of digitalization (2020–2024)

No.	Indicator / Description	2020	2024	Region or area of coverage
1	Educational institutions with digital programs that integrate a cultural component, %	34	63	154 countries (world)
2	Schools with intercultural education modules on digital platforms, %	45	70	EU
3	Teachers who undergo annual training in digital pedagogy, %	58	90	Finland, Ireland, Estonia
4	Educational institutions using adaptive learning, %	49	82	EU countries
5	Students creating their own e-portfolios / personal learning environments, %	41	68	OECD countries
6	Educational Autonomy Index (0–1)	0.57	0.74	OECD average
7	Youth involved in informal digital education (access > 85% to the Internet), %	35	60	Countries with high connectivity
8	Share of population with basic digital skills, %	40	69	World
9	Global Civic Orientation Index (0–1)	0.61	0.79	OECD countries
10	Digital Maturity Index of Education Systems (0–1)	0.62	0.86–0.88	Denmark, Netherlands, Sweden

Source: compiled based on data from UNESCO (2024), OECD (2024), World Bank (2024), Eurostat (2024), UNCTAD (2024), European Commission (2023).

Note: the indicators are provided for comparison of regional trends (EU, OECD, world) and national examples (Denmark, Netherlands, Sweden), which allows assessing the peculiarities of identity formation at different levels.

The analysis of the above indicators demonstrates a steady increase in the level of digital integration within educational systems, accompanied by the emergence of new characteristics of educational identity. In the countries of the European Union, these changes display a predominantly regional dimension, as educational policies increasingly prioritize the development of shared values, competencies, and intercultural dialogue. The reported growth of the digital maturity index of education systems (0.86–0.88 in Denmark, the Netherlands, and Sweden) reflects a descriptive association between technological readiness and the cultural and value-oriented dimensions of education, indicating the alignment of digital capacity with broader socio-cultural orientations. Comparable approaches to digital–cultural integration are reflected in the policy and institutional frameworks of Southern and Western European education systems, including Spain, Italy, Portugal, Germany, and France, where EU-level digital education initiatives are adapted to national cultural and civic contexts (Eurostat, 2024; European Commission, 2023).

At the national level, transformations are reflected in changing models of pedagogical interaction. In Finland and Estonia, digitalization is primarily perceived as a tool for preserving cultural continuity by integrating local educational traditions with innovative technological approaches. In a number of Central and Southern European countries, including Poland, Slovenia, Spain, and Italy, the emphasis is shifted toward the formation of a shared "European" identity, where digital competence functions as a universal civic and educational value. At the same time, in Ukraine, the development of digital education is oriented toward balancing national cultural elements with European educational practices, resulting in an inclusive model of educational identity within the broader integration space.Overall, OECD (2024) and World Bank (2024) data show that the digitalization of education is contributing to the emergence of a new type of information and value identity based on autonomy, openness and mobility. This process covers both levels – regional (through EU and OECD standards and policies) and national (through the adaptation of educational strategies of individual states).

Thus, the transformation of educational identity in the context of digitalization has a dual nature. At the regional level (EU, OECD) it manifests itself in the creation of a common cultural and educational space focused on democratic values, openness and digital inclusion. At the national level, it preserves unique traditions, language and cultural codes, integrating them into digital learning platforms. The balance between these two dimensions ensures the sustainability of educational identity and increases its resilience in the global digital environment.

4.2 Information and Creative Practices as a Factor in the Formation of Educational Self-awareness in the National and Regional Context

Information and creative practices in the digital educational environment are gradually becoming a key mechanism for the formation of cultural identity of young people. According to the UNESCO (2024), more than 65% of educational institutions in the world in 2024 used digital resources to integrate elements of national culture, art and creative projects into curricula. In the context of national education, this means rethinking the role of culture not as an auxiliary, but as a structural component of the educational process, which provides a connection between knowledge and self-identification.

According to the UNCTAD report (2024), the share of users who create their own educational and cultural content (video projects, multimedia presentations, virtual exhibitions) increased from 22% to 49% worldwide. This indicator reflects an emerging trend toward the phenomenon of the "digital creator", understood as an individual who simultaneously acts as a consumer and a producer of cultural meanings. The growing dissemination of creative digital tools–such as 3D modeling, augmented reality, and interactive storytelling–is associated with the development of hybrid forms of cultural expression, which combine national symbols with global narratives.

World Bank (2024) indicators show that in countries with developed digital infrastructure (Ireland, Finland, Estonia), the share of students involved in intercultural online projects increased from 28% in 2020 to 58% in 2024. Such intercultural educational networks become a space for constructing regional identity – they not only exchange knowledge, but also form a sense of belonging to the European cultural space. This means that digital platforms are gradually turning into an institutional mechanism for cultural integration, where national educational systems find common principles of value development.

At the regional level, according to the European Commission (2023), more than 70% of EU schools in 2023 implemented projects in which students created digital narratives about regional and national heritage (e.g. interactive cultural memory maps or virtual museums of local communities). Such initiatives provide a practical implementation of the concept of "glocal identity" – the combination of local and global experience through digital creativity tools. They not only increase the level of digital literacy, but also activate cognitive mechanisms of self-identification through creative activity, developing social empathy and cultural reflection.

OECD (2024) emphasizes that information and creative practices are consistently associated with indicators of cultural self-awareness. In education systems with a high level of integration of creative digital technologies, the cultural

reflection index increased by an average of 0.21 points over the period 2020–2024. In particular, in Denmark, Sweden, and Estonia, as well as in other European contexts such as Germany, France, Spain, and Portugal, these trends coincide with elevated levels of civic responsibility, indicating a stable descriptive association between creative self-realization and social responsibility within digitally mediated educational environments.

A summary of official statistics shows that the development of information and creative practices in modern education forms not only technical skills, but also a new type of cultural self-awareness, based on a combination of individual creativity, collective participation and digital ethics. Such a transformation determines the strategic direction of the development of educational systems – from the reproduction of knowledge to the formation of a personality capable of thinking, acting and creating in a global cultural context, without losing the national value base.

4.3 EU Institutional Policies and National Strategies as the Basis for the Formation of Educational Identity

The formation of educational identity in modern Europe takes place in two interconnected planes: regional (the European Union as a value-based and institutional community) and national (member states with their own cultural and educational models). The regional dimension sets strategic directions through the EU regulatory framework, while the national dimension specifies them within local cultural contexts. Such a dual identity system combines common European values – democracy, openness, innovation – with national traditions of education.

According to the European Commission (2023), 25 EU countries are implementing digital education programmes, in which the formation of intercultural competence and cultural identity is identified as a strategic priority. EU regional policy is shaping a common cultural and educational space through instruments such as *the Digital Education Action Plan* and *the European Education Area,* which integrate technological and humanitarian objectives. These documents lay the foundation for a "European regional educational identity", based on a shared understanding of cultural heritage, digital inclusion and civic responsibility.

OECD (2024) data show that the level of integration of national cultures into digital programmes increased on average from 43% in 2020 to 71% in 2024. The most dynamic progress was recorded in the countries of Central and Northern Europe, where national governments combined digital transformations with cultural and educational initiatives. According to Eurostat (2024), in 19 EU countries more than 80% of educational institutions included *Digital Heritage* or *Regional Cultural Studies modules,* and in Lithuania and Slovakia the share of institutions working with local cultural resources in digital format increased from 22% to 68%.

Within the Council of Europe (2016), the competences of democratic culture – responsibility, respect for diversity, openness – are recognized as structural elements of the European educational identity. In 2024, more than 70% of schools in the European area used digital environments to develop these competences, and in Spain, Portugal and France – more than 85%. This confirms that institutional support for democratic values and cultural dialogue directly affects the formation of regional identity.

UNCTAD (2024) records the emergence of the phenomenon of digital institutional identity – a combination of state policy, educational practices and regional culture in a common digital ecosystem. In 2024, more than 58% of countries in the world implemented digital literacy programs focused on cultural self-realization, and 34 countries, including from Europe, combine educational technologies with the development of creative industries. This trend reflects the formation of institutional cultural synergy, when education becomes a channel for socio-cultural integration.

As the data show, regional identity within the EU is formed through policies of integration of cultural and digital strategies, while national identity is realized in practices of adaptation of these policies to specific historical and cultural contexts of countries. In Denmark, the Netherlands, Sweden, as well as in other European contexts such as Germany, France, Spain, Portugal, Lithuania, and Slovakia, these initiatives are aimed at combining technological modernization with cultural identity, which ensures the resilience of the educational space to global challenges.

Thus, in the modern digital age, a "digital-institutional identity model" is being formed, which combines the regional values of the European Union, national cultural traditions and global technological practices. This model strengthens the educational space as an environment of self-identification, co-creation and cultural development, ensuring harmony between local heritage and European commonality.

Table 2. Regional and national institutional policies for the formation of educational identity (2020–2024)

Policy block	Source	Region/Countries	Indicator / trend	Identity type
Cultural and educational strategies	European Commission (2023)	EU (25 countries)	Digital education programs with a cultural component	Regional
Integrating culture into education	OECD (2024)	OECD countries	Level of integration of cultural elements (43% → 71%)	Regional
Digital heritage	Eurostat (2024)	Denmark, Netherlands, Sweden, Lithuania, Slovakia	Digital Heritage projects, integration of local resources (22% → 68%)	National
Cultural identity through digital resources	UNESCO (2024)	World, EU, Ukraine	64% of countries have supportive policies; DRI > 0.8 → >90% of students reached	Regional + national
Democratic culture	Council of Europe (2016)	Spain, Portugal, France	Online courses on democratic culture (70–85%)	National
Education and creative industries	UNCTAD (2024)	EU, North Europe	58% of countries integrate cultural self-realization into digital education	Regional
Collaboration with communities	Eurostat (2024)	EU	61% of schools have digital heritage archives, 48% have community maps	National + regional

Source: compiled based on data from UNESCO (2024), OECD (2024), World Bank (2024), Eurostat (2024), UNCTAD (2024), European Commission (2023).

4.4 Mechanisms of Educational Identity Formation in Digital Learning Environments

Within the context of the digital transformation of education, the formation of national and regional educational identity can be explained through a set of interconnected mechanisms that link digital tools, pedagogical practices, and identity-related outcomes. In this study, mechanisms are understood as stable and recurring patterns through which digital educational environments structure opportunities for cultural self-identification, civic orientation, and value alignment. The analysis presented in this subsection is based on the synthesis of international statistical trends and institutional patterns identified in reports by UNESCO, OECD, Eurostat, the World Bank, and the European Commission, and does not introduce additional empirical data (UNESCO, 2024; OECD, 2024; European Commission, 2023).

The first mechanism can be defined as information-institutional mediation. Digital educational tools, such as national learning management systems, institutional online platforms, and interoperable digital infrastructures, create a structured informational environment in which cultural and civic content becomes systematically embedded in educational practices. At the level of pedagogical implementation, this mediation is reflected in the integration of culturally oriented modules, the expansion of institutional digital autonomy, and the personalization of learning trajectories within digital systems (European Commission, 2023; OECD, 2024). As a result, educational identity is shaped through repeated exposure to nationally and regionally contextualized content within standardized digital frameworks. This mechanism does not impose identity externally but supports its gradual internalization by aligning institutional norms, curricular structures, and digital accessibility with shared cultural references (UNESCO, 2024).

A second mechanism operates through creative and participatory digital practices. The growing use of creative digital tools–including multimedia platforms, digital storytelling applications, three-dimensional modeling, and immersive digital environments–corresponds to a shift in educational practices from passive content consumption toward active knowledge and meaning production (UNESCO, 2024; World Bank, 2024). Within this framework, learners increasingly participate in project-based and collaborative activities that involve the creation of digital cultural artifacts. Such practices are associated with reflective engagement with cultural symbols, narratives, and value orientations embedded in national and regional educational contexts (OECD, 2024). Educational identity in this case emerges through participation and authorship, as learners position themselves simultaneously as members of local cultural communities and participants in broader digital and educational networks.

The third mechanism concerns multi-level alignment between regional and national educational frameworks. At the supranational level, policy initiatives of the European Union and OECD establish shared reference points related to digital competence, democratic culture, and intercultural education (European Commission, 2023; OECD, 2024). At the national level, these frameworks are adapted to specific historical, linguistic, and cultural contexts through curriculum design, institutional strategies, and national digital education programs (UNESCO, 2024; World Bank, 2024). The interaction between these levels results in a hybrid or dual educational identity, in which national cultural traditions coexist with

regional value orientations. Digital learning environments act as interfaces that facilitate this alignment by enabling the simultaneous circulation of national and regional educational narratives across institutional platforms (Eurostat, 2024).

Across all three mechanisms, digital environments function as mediating spaces rather than determining forces. Educational identity does not arise directly from technological adoption but from the ways in which digital tools are embedded in institutional structures, pedagogical models, and culturally oriented educational practices. The mechanisms identified demonstrate that identity-related outcomes are associated with the combined effects of institutional digitalization, creative participation, and policy coherence across governance levels (UNESCO, 2024; OECD, 2024). Together, these mechanisms explain how digital education supports the formation of national and regional educational identities by structuring learning experiences that integrate technological innovation with cultural reflection and value-based orientation.

5. Discussion

The results of the study showed that the processes of digital transformation of education are systemic in nature and directly affect the formation of educational and cultural identity. In particular, the analysis of the regional dimension of the educational identity of the European Union and the national models of Denmark, the Netherlands, Sweden and Ukraine showed that digital education is not only a tool for modernization, but also a means of preserving cultural identity within the framework of common European values. The interpretation of these results shows that the growing role of digital technologies in the educational environment changes traditional ideas about the educational process, communication and social integration. As Williams (2000) notes, technology in the field of education performs not only the function of a tool, but is a basic methodology through which the essence of knowledge is rethought. Thus, the results of the study confirm that digitalization is not limited to the technical aspect, but contributes to the formation of new models of self-awareness based on a combination of intellectual, cultural and regional-value dimensions.

Comparison with other scientific approaches shows that the conclusions obtained are consistent with current international trends. In particular, Chirumamilla and Sindre (2021) emphasize that the digital education ecosystem functions effectively only under conditions of cooperation between the administration, technology providers and pedagogical communities. This approach corresponds to our observations on the need for institutional coordination to support digital-cultural strategies implemented within the *Digital Education Action Plan* and *the European Education Area programs,* which form a common regional educational identity of the EU. At the same time, as Lähdesmäki et al. (2020) note, intercultural dialogue in European education policy is becoming a key condition for the development of democratic values in the digital age. The results obtained confirm that the combination of intercultural practices with technological tools forms a new quality of educational identity, where the values of openness and participation are of leading importance.

Some aspects of the identified trends are consistent with the findings of Lähdesmäki et al. (2021), who emphasize that the processes of European cultural interaction are horizontal in nature – they are implemented "bottom-up", through the active participation of educational communities. This idea is supported in our study by data demonstrating the expansion of horizontal communications between educational institutions, regional initiatives and digital platforms. Thus, the educational space of the European Union can be seen as a carrier of regional identity, integrating the diversity of national cultures into a common value system.

Furthermore, the results are consistent with the comparative analysis of Li (2019), who found that the academic integration of students in an international environment directly depends on the level of digital support for intercultural interaction. This allows us to assume that digital educational spaces serve as environments for socio-cultural adaptation, contributing to the development of both national and regional identities, in particular through the national programs *Digital Heritage Denmark*, *Erfgoed 2030* in the Netherlands and *Kulturarv i skolan* in Sweden, which combine innovative technologies with cultural heritage.

The importance of the creative component in the formation of modern educational identity is confirmed by the findings of Nagymzhanova (2013), who emphasizes that the creativity of the teacher and student acts as a tool for cultural enrichment of the educational process. Similarly, Runco (2014) emphasizes that creativity is a process of interaction of the individual with the cultural context and serves as a source of development of social innovations. Our results demonstrate that the integration of information and creative practices into digital education enhances cultural self-reflection, contributes to the formation of digital-national identity and expands the boundaries of institutional self-awareness.

There are also some parallels with the model of Mishra and Koehler (2006), according to which the effectiveness of digital learning is based on a combination of pedagogical, content and technological knowledge. This is in line with our conclusions about the need for a systemic approach to the formation of educational identity, where technological tools are integrated into the structure of national and regional educational practices, forming a common methodological basis

for the European Education Area. Thus, the regional educational identity of the EU is the result of a combination of different models of digital pedagogy that preserve national educational traditions.

In the political dimension, the data obtained echo the analytical observations of von Essen and Ossewaarde (2023), who show that the development of artificial intelligence in educational management actualizes the issue of European cultural identity. In this context, digital education acquires the function of value consolidation of the European space, combining regional integration and local identities. This is especially noticeable in the countries of Northern Europe – Denmark, Sweden and the Netherlands, where artificial intelligence is used to support educational programs focused on cultural heritage and critical thinking. Similarly, Encel and Nicolas (2023) in their *Atlas géopolitique d'Israël* consider educational policy as a tool for supporting cultural integrity in the context of globalization – which confirms the universal nature of the processes recorded in both the European and Ukrainian contexts.

Thus, the generalization of the results allows us to conclude that the digitalization of education not only supports technical progress, but also forms a new cultural and value platform for the development of educational identity. The data obtained indicate a close relationship between technological infrastructure, creative practices and institutional policy, which together create the prerequisites for the integration of cultural, social and pedagogical dimensions of the modern educational space. In this context, digital education appears not only as a tool for the modernization of the educational process, but also as a factor of cultural consolidation, which ensures the formation of a European regional identity and supports national educational identity, contributing to the establishment of innovative forms of self-realization in conditions of balanced interaction of global and local values.

5.1 Limitations

This study is subject to several limitations that should be considered when interpreting the findings. First, the analysis is based exclusively on secondary data obtained from international organizations and official statistical sources, without the use of primary empirical methods. Consequently, the study does not include surveys, interviews, or direct observations of teachers, students, or other educational stakeholders. As a result, the research does not capture the subjective experiences, perceptions, or individual interpretations of identity formation within digital learning environments. Furthermore, the findings are derived from a trend-based comparative analysis, which allows for the identification of general patterns and associations but does not support causal inference. These limitations indicate the need for future research combining quantitative indicators with qualitative and mixed-method approaches to provide a more comprehensive understanding of educational identity formation in digital contexts.

6. Conclusions

The study provides a comprehensive interpretation of how digital transformation reshapes the formation of national and regional educational identity within contemporary education systems. The findings indicate that digitalization is not a purely technological process but a multidimensional phenomenon that interacts with cultural, institutional, and value-based components of education. Through the analysis of international secondary data, it was demonstrated that digital educational tools are increasingly embedded in practices that support both European regional integration and the preservation of national educational identities.

The results suggest that the widespread adoption of digital learning environments is associated with the expansion of information and creative practices that foster cognitive engagement, cultural reflection, and educational self-identification among learners. In the European context, digital platforms tend to function as mediating spaces where common values, intercultural dialogue, and regional cohesion are promoted, while at the national level they enable the reinterpretation and preservation of local cultural traditions. Comparative analysis of selected European cases illustrates that the alignment of digital technologies with culturally oriented curricula contributes to the stability and adaptability of educational identity in diverse institutional settings.

The scientific contribution of this study lies in the conceptualization of a dual mechanism of educational identity formation. At the institutional level, identity is shaped through digital education policies that integrate cultural continuity with regional educational frameworks. At the pedagogical level, identity emerges through creative and participatory learning practices within hybrid digital environments that connect local values with global educational standards. This two-level model emphasizes that educational identity is not statically reproduced but dynamically constructed through mediated educational experiences.

From a practical perspective, the results of this research can inform educational policymakers and institutional leaders in designing digital education strategies that balance technological innovation with cultural sustainability. Integrating digital competencies with creative and value-oriented educational practices may enhance the resilience of educational systems and support meaningful identity formation in an increasingly globalized educational landscape.

Overall, the study underscores that digital learning environments function as important mechanisms for linking

technological development with cultural cohesion, thereby reinforcing both national and regional dimensions of educational identity within the European and global educational space.

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