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STEAM Education as a Tool for Shaping National Competence in Contemporary Ukrainian Society

[Edukacja STEAM jako narzędzie kształtowania kompetencji narodowych we współczesnym społeczeństwie ukraińskim]

Streszczenie: W kontekście walki Ukrainy o państwowość, suwerenność kulturową i podmiotowość na arenie międzynarodowej kategoria kompetencji narodowej nabiera fundamentalnego znaczenia w filozofii edukacji. W artykule uzasadniono konieczność wprowadzenia tej kategorii do dyskursu filozoficzno-edukacyjnego jako konstrukcji integracyjnej, odzwierciedlającej aksjologiczne, ontologiczne, gnoseologiczne i prakseologiczne wymiary rozwoju osobistego w koordynatach narodowo-kulturowych. Edukacja STEAM jest analizowana jako innowacyjny instrument kształtowania kompetencji narodowej w warunkach postkolonialnej dekonstrukcji i cyfrowej modernizacji społeczeństwa ukraińskiego. Nacisk kładziony jest na potencjał edukacyjny interdyscyplinarnych projektów STEAM, obejmujących sztukę mediów, ekspozycje VR, projektowanie dźwiękowe i cyfrowe, modelowanie algorytmiczne, nauczanie projektowe (PBL) itp. Technologie te sprzyjają kształtowaniu tożsamości narodowej opartej na wartościach poprzez symboliczne, bogate emocjonalnie i zaangażowane społecznie nauczanie. Kompetencja narodowa jest rozumiana jako metaparadygmatyczna kategoria współczesnej filozofii edukacji, która stanowi odpowiedź na wyzwania wojny, dziedzictwa kolonialnego i globalizacji.

Summary: In the context of Ukraine's struggle for statehood, cultural sovereignty, and subjectivity on the world stage, the category of national competence acquires fundamental significance in the philosophy of education. The article substantiates the need to introduce this category into the philosophical and educational discourse as an integrative construct that reflects the axiological, ontological, gnoseological, and praxeological dimensions of personal development in national and cultural coordinates. STEAM education is analyzed as an innovative tool for shaping national competence in the context of postcolonial deconstruction and digital modernization of Ukrainian society. The emphasis is on the educational potential of interdisciplinary STEAM projects, including media art, VR exhibitions, sound and digital design, algorithmic modeling, project-based learning (PBL), etc. These technologies contribute to the formation of a value-oriented national identity through symbolic, emotionally rich, and socially engaged learning. National competence is understood as a meta-paradigmatic category of contemporary philosophy of education that serves as a response to the challenges of war, colonial heritage, and globalization.

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Słowa kluczowe: Homo Digital, kompetencje narodowe, kompetencje obywatelskie, wychowanie narodowe, edukacja, wiedza naukowa, aparat kategorialny, filozofia edukacji, instytucje społeczne, socjalizacja, współczesne społeczeństwo ukraińskie, konstrukcja filozoficzno-edukacyjna, przestrzeń edukacyjno-kulturowa, kultura narodowa, tożsamość narodowa, edukacja STEAM, projekty media-art, praktyki społeczno-kulturowe, technologie motion capture, wystawy VR, projektowanie dźwięku, projektowanie cyfrowe, modelowanie algorytmiczne, nauczanie oparte na projektach (PBL), projektowanie STEAM, STEAM+C, prezentacja projektu.

Keywords: Homo Digital, national competence, civic competence, national education, education, scientific knowledge, categorical apparatus, philosophy of education, social institutions, socialization, modern Ukrainian society, philosophical and educational construct, educational and cultural space, national culture, national identity, STEAM education, media art projects, sociocultural practices, motion capture technologies, VR exhibitions, sound design, digital design, algorithmic modeling, project-based learning (PBL), STEAM design, STEAM+C, project presentation.

Introduction

In the current conditions of transformation of Ukrainian society on the path to strengthening statehood, the issue of forming key competencies that ensure the harmonious development of the individual in national and global contexts is becoming particularly relevant. Despite its centuries-old history, cultural heritage, and significant intellectual potential, Ukraine has long remained in the shadows and has been underrepresented in global cultural, educational, scientific, and technological discourse. This is due not only to external factors of political isolation, but also to the long-term colonial policy of the Russian Empire, then the Soviet Union, and now the Russian Federation. The result was the loss of Ukraine's own voice in the global dialogue. In the context of the full-scale war of 2022, the issue became very acute, as our society faced a significant challenge: either we declare ourselves a full-fledged subject, or we lose ourselves completely. During the war that the Russian Federation has unleashed and is waging against Ukraine, there is an urgent need to implement systematic measures aimed at strengthening the national-patriotic education of children and young people – the formation of a new Ukrainian who acts on the basis of national and European values. The social institution of education plays an important role in this process, within which the process of socialization of the individual and the internalization of norms and values takes place.

The modern interpretation of an individual's life experience in the context of the digital modernization of contemporary Ukrainian society reflects a qualitatively new form of symbolic existence. The product of the 21st century is Homo Digital, a bearer of innovative ethical guidelines who immerses himself in simulated virtuality and increasingly interprets the surrounding reality through the prism of the digital field, realizing its artificiality and the possibility of programmatic control of its characteristics. The contradictions that arise in the process of the formation of the digital environment are embodied in various spheres of an individual's life and provoke dual tendencies in their development. The comprehensive nature of these transformations not only exacerbates the technological and communication aspects of the information age, but also brings to the fore a complex set of philosophical dilemmas and sociocultural challenges caused by the phenomenon of digital identity formation (Petinova O., Nesterova O., 2024). However, at the same time, as a response to this

challenge, STEM is being actively introduced into the educational process, providing its capabilities and becoming a tool for the formation of key personal competencies.

Aim of the paper: to integrate the concept of national competence into the philosophical and educational discourse and to identify the possibilities of STEAM education as a tool for its formation in the context of postcolonial deconstruction and digital modernization of contemporary Ukrainian society.

National competence in the categorical apparatus of the philosophy of education

In accordance with the Order of the Ministry of Education and Science of 6 June 2022 No. 527, concerning the formation of competencies within the framework of national-patriotic education, special emphasis is placed on the formation of civic-patriotic, spiritual-moral, military-patriotic and environmental competencies as components of national education. This Order is a normative document that systematically formalises the competence-based approach to national-patriotic education and ensures its holistic formation in the educational process (Nakaz, 2022).

The term «competence» has a long history of use in scientific literature, where it was initially applied mainly to a person's professional activity and high level of professional skill. Subsequently, researchers expanded the boundaries of this concept to include other areas of life. In contemporary scientific discourse, this term can be found as a key concept in psychology, pedagogy, sociology and philosophy, which testifies to its interdisciplinary, integrative and meta-subject nature. Competence is a multidimensional construct and can relate to both individuals and social communities, reflecting not only the level of knowledge, skills and abilities, but also the degree of independence, education, value system and ability to effectively solve non-standard tasks. Today, competence is most often understood as a person's ability to act successfully and achieve results in a particular field of activity, using their knowledge, skills, abilities and other personal qualities. It includes not only the possession of certain knowledge and skills, but also the ability to apply them in practice, adapt to new conditions and solve problems.

As V. Machusky notes, in a number of philosophical concepts, the concept of «competence» is often considered in the context of the formation of experience and a component of scientific knowledge, either as empirical knowledge or as experimental practice. At the same time, experience is interpreted as a fundamental factor of social and historical dynamics, a means of activity and a driver of change in culture. Culture itself plays the role of a mechanism for transmitting social experience from generation to generation. The researcher concludes that competence in the applied dimension is seen as the ability to effectively perform practical tasks using scientifically based knowledge. A «practical task» is understood as a goal, the achievement of which changes the external situation under certain conditions. The main difference between a practical task and an educational task is that the result of the former is a change in the state of the subject, while the latter is the acquisition of new knowledge and ways of acting that did not previously exist in their cognitive experience. Mastering these methods means a psychological transformation of the personality. V. Machuskyi offers his own definition of competence in a practical sense, defining it as the subject's experience and ability to effectively solve certain practical tasks using relevant

scientific knowledge. He understands a practical task as a goal that involves changing the external situation under certain conditions (Machuskyi V., 2025).

O. Tsilmak conducts comprehensive research on the systematic classification of types of key competencies, their types and subtypes, and reveals the structure of competencies. Regarding the distinction between similar concepts, he concludes that «competence» is the scope of authority of an organisation, institution or individual who possesses certain knowledge and can effectively use it in practice, while «competent» is someone who is able to act in a highly professional manner based on the knowledge, skills, skills, and professional and life experience, «competence» is the ability of a person to effectively apply the acquired knowledge, skills, and abilities in a particular field of professional activity and everyday life, and «competencies» are certain constructs that determine the orientation of a competent person. The researcher notes that competence can be classified according to its form of manifestation, degree of coverage and type. In terms of form of manifestation, competencies can be conscious (when a person understands what elements are involved in a particular activity and begins to implement them purposefully) and unconscious (when the acquired skills have already become an integral part of behaviour and are used automatically, without additional reflection). In terms of scope, competencies can be subject-specific (relating to individual academic disciplines), specialised (formed within a specific professional or activity area) and general (applied in various areas of life). These types reflect the depth of knowledge, skills, experience, information support and other components necessary for effective activity (Tsilmak O., 2009).

In the process of competence formation, the philosophy of education plays a significant role as a worldview foundation, methodological and axiological basis for transformations taking place in the field of Ukrainian education in wartime conditions. The philosophy of education makes it possible to integrate the national and global dimensions of education, which is especially important in the context of the orientation towards national-patriotic and European values declared in Order No. 527 of the Ministry of Education and Science, outlines the boundaries and possibilities of combining the authentic (Ukrainian) and universal (European, human) in the formation of a new generation of citizens, ensuring the integrity of educational influence, avoiding both cultural isolationism and thoughtless borrowing of foreign models, defining the content and meaning of education as a complex process of personality formation, capable not only of adapting to society, but also of actively influencing it through awareness of their own identity, responsibility, freedom of action and moral choice. In the context of the challenges posed by the war, the philosophy of education creates a foundation that helps to rethink the values of Ukrainian education and formulate its humanitarian mission, which consists in reviving the subjectivity of Ukrainians as cultural, political and moral actors on the world stage. The philosophy of education also performs a critical function by helping to identify and overcome the remnants of colonial thinking in educational discourse, which manifest themselves in the distortion of ideas about one's own history, language and traditions, and in the devaluation of humanitarian knowledge. Its task is to develop autonomous Ukrainian thinking that is capable of dialogue, but at the same time has its own voice in the global intellectual field. It is a tool for conceptualising the idea of the «new Ukrainian», who not only loves and honours their country, symbols, and traditions, but is also a person who acts ethically, thinks critically, and is capable of reflection and solidarity, because

patriotism is a deep existential responsibility to the past and future of the nation. In light of the challenges associated with war, global restructuring of educational strategies and social transformation, the philosophy of education not only justifies but also guides the process of forming key competencies, filling it with value content, setting methodological guidelines and creating conditions for the development of true educational subjectivity as the ability of an individual to act independently, consciously and responsibly in the process of their own education, to be an active participant (rather than a passive object) in the educational process, to formulate their own goals, make choices, take decisions, reflect on their own experience and take responsibility for it. Educational subjectivity is a manifestation of anthropocentrism in education, where a person is seen as an autonomous, unique and self-reflective subject of development, which contrasts with the outdated paradigm of passive knowledge acquisition and supports the ideas of partnership, subject-subject interaction, individualisation and humanisation of education.

Civic-patriotic, spiritual-moral, military-patriotic and environmental competencies, as defined in the Order «On Certain Issues of National-Patriotic Education in Educational Institutions of Ukraine» (Nakaz, 2022), although formally belonging to pedagogical and educational discourse, at the same time have a philosophical basis and can be considered as categories of the philosophy of education, since each of them has an axiological nature and is based on the values of freedom, justice, dignity, etc. For example, civic and patriotic competence is based on values such as love for the homeland, historical memory, and political responsibility. Spiritual and moral competence encompasses ethical and moral-philosophical principles that are at the core of the philosophical tradition. Military and patriotic competence is based on the philosophical principles of heroism, service, and existential choice in life-threatening situations. Ecological competence has its philosophical roots in eco-philosophy and the ideals of sustainable development of society. Competencies express the value orientation of education, which is the subject of the study of the philosophy of education. It is this that determines the purpose, content and meaning of these competencies, reflecting on how they shape the subject of culture, nation and world. The philosophy of education allows us to move from a functional definition to an essential understanding, considering the individual as a bearer of freedom, thought and responsibility. All of the above-mentioned competences are not just knowledge or skills, but a manifestation of personal maturity, of an individual's subjective attitude towards themselves, society and the world. They do not exist without philosophical awareness, as they touch on the ontological and existential planes that belong to philosophy, are rooted in philosophical concepts of culture, identity, and morality, form the ontological image of a person as a subject of education, and determine the goal of the educational process in the context of national and global challenges. At the same time, they embody the humanistic ideal of education, which is the basis of the philosophy of education. These competencies should not only be implemented in pedagogical practice, but also theoretically understood as philosophical categories that reveal the nature of the «new Ukrainian» in an era of struggle, responsibility and national revival.

In the current historical context, when Ukraine faces the existential challenge of preserving itself as a state, nation and cultural community, the philosophy of education is called upon not only to comprehend the processes of transformation, but also to

introduce new categories that correspond to the current changes in social life. In our opinion, one of such categories, which should become a philosophical and educational construct of the new generation of Ukrainians, is the category of «national competence». The formation of competencies in the educational process involves not only the acquisition of knowledge about culture, language and history, but also the development of a conscious national identity as a way of thinking and acting that demonstrates a person's responsibility to their people, state and cultural tradition. This is no longer just a component of civic education, but a value-based worldview foundation that shapes the subjectivity of the new Ukrainian.

Contemporary philosophy of education must respond to new socio-cultural challenges, one of which is the decommunisation, decolonisation and derussification of educational thinking. In this process, in our opinion, national competence emerges as the very integral competence that contains axiological (based on the system of Ukrainian values – dignity, freedom, historical memory); ontological (expresses the existential connection of the individual with the national environment as a condition for their development); gnoseological (involving critical knowledge of one's own culture in interaction with others); praxeological (aimed at active action for the benefit of the nation – from participation in public life to the defence of the state) aspects.

Despite its proximity to the concept of «civic competence», national competence has a different nature and is formed not only through legal or institutional mechanisms, but through identification with the national «we», internal acceptance of a common destiny, history, pain, and hope for the future. It is a value-laden competence that appeals to the philosophy of memory, culture, language as a living space of identity, and contemporary transformations.

Any established competence includes knowledge (facts, concepts, ideas, theories related to a specific field of activity); skills (the ability to apply knowledge to perform specific actions, solve problems, develop strategies); abilities (skills, brought to automatism, that allow you to perform certain actions effectively); experience (practical experience, acquired in the course of activity, which contributes to the improvement of skills and abilities); value orientations (personal beliefs, principles that determine attitudes towards activity and its results) and attitudes (psychological attitudes that determine readiness to perform certain actions, respond to certain situations), which allow a person to act successfully in a particular field.

National competence, being an integral key competence, also covers all of the above elements. It is their combination that ensures the ability of an individual to act successfully, responsibly and consciously in the context of national life, forming a stable identity, patriotism and readiness for national service. Knowledge in the context of national competence is not only factual awareness, but also an intellectual and value foundation on which patriotic consciousness, civic activism and inner stability of the individual in the context of national challenges are built. Let us present national competence in the structure of the formed competence (Table 1).

Table 1.
National competence in the structure of established competence

Component	Content
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Knowledge	of Ukrainian history and culture, its national symbols, language, legal foundations of statehood, geopolitical realities; prominent figures, historical events, etc.
Abilities	Ability to use nationally oriented knowledge in everyday communication, educational, cultural, and public activities; ability to formulate arguments in favour of national values.
Skills	Ability to act patriotically automatically: to respect national symbols, to use the Ukrainian language as the language of everyday use, to participate in public initiatives, rituals of remembrance, to adhere to traditions, etc.
Experience	Practical participation in cultural, educational, volunteer, and civic initiatives; experience defending Ukrainian interests in difficult or crisis situations (particularly during war).
Value orientations	Prioritizing dignity, freedom, independence, historical memory, national sovereignty; respectful attitude towards cultural heritage; commitment to democratic principles of state development.
Attitude	Open and responsible attitude towards serving one's nation; readiness to take action aimed at protecting and developing the nation; demonstration of resilience, solidarity, and active citizenship

The formed national competence is also manifested through several aspects. The cultural aspect involves the ability of an individual to identify themselves through national cultural heritage, traditions, the symbolic meaning of spiritual achievements, and language as carriers of identity. At the same time, however, this aspect demonstrates the ability to engage in intercultural communication that does not devalue one's own culture, but rather strengthens it in interaction with the world. The historical-hermeneutic aspect focuses on the interpretation of historical narratives, the rethinking of the distorted colonial legacy, the restoration of historical justice, and the giving of adequate value to one's own national experience in the educational process. It is important in the context of decolonial pedagogy. The identification aspect manifests itself through the formation of national self-awareness by recognizing oneself as part of a nation. This process encompasses both the emotional-psychological and cognitive spheres of the personality, allowing it to take root in the national space without closing itself off from the world. The ethical aspect implies moral responsibility to one's own people, concern for the common good, and the ability to act on the basis of ethical norms developed in the national cultural space. It is about embodying the values of honors, dignity, conscience, and patriotism in everyday behavior. Political aspect: in modern conditions, when education is an instrument of national security, national competence also includes understanding political processes, critical thinking about the information environment, and readiness to defend national interests, not only by force of arms, but also through participation in democratic processes.

The philosophy of education conceptualizes national competence as a systemic category that provides a link between personal subjectivity and collective identity, actualizing cultural and historical memory in the process of social formation. Since the social institution of education is a key agent of socialization, the philosophy of education develops a methodology for developing education development strategies,

analyzing educational content, pedagogical practices and policies. This is currently an important task in countering global homogenization by strengthening national specificity without losing universality. The philosophy of education is the theoretical foundation that allows us to understand national competence not as a technical set of skills, but as a holistic, systematic, value-oriented construct that ensures the sustainable national self-determination of the individual in a transforming world. The philosophy of education plays a key role in the theoretical understanding, definition of the essence, structure and functions of national competence, and gives the concept of «national competence» meaningful integrity, considering it not simply as a set of skills or knowledge, but as a value-oriented phenomenon that combines ethics, ontology, gnoseology and practice. By calling national competence a systemic category, we mean that it encompasses various dimensions of personal existence – knowledge, experience, emotions, beliefs, actions; it is interdisciplinary in nature (at the intersection of philosophy, pedagogy, cultural studies, law, political science); it is formed within the education system but is realized in life (civic, cultural, political); it acts as a key mechanism for the preservation, transmission and reproduction of national identity.

How do civic and national competences relate to each other? Although they share a common value orientation, they differ in their essential content, goals and areas of implementation. As for the definition of the concept of «civic competence», there are various options, for example, it is defined as the ability of a person to exercise their rights and obligations in a democratic society, to actively participate in the life of the community and the state, to adhere to the principles of the rule of law, tolerance and social justice. This competence is a structural component of state education policy, articulated in the State Standards for Primary, Basic and Complete General Secondary Education (Derzhavni standarty). The Concept of the New Ukrainian School defines the basic principles of reforming general secondary education in Ukraine, which envisage changes aimed at transforming Ukrainian schools into effective social institutions for shaping citizens who are capable of selflessly serving the Ukrainian people, actively participating in the economic development of the Ukrainian state, and who are ready for a successful life and competitive in modern society. The Concept defines the model of a school graduate as a well-rounded, comprehensively developed personality capable of critical thinking; a patriot with an active position who acts in accordance with moral and ethical principles and is capable of making responsible decisions; an innovator capable of changing the world around them, developing the economy, competing in the labor market, and learning throughout their life. Among the list of competencies, we find civic and social competencies (Liashenko O., 2021). In the Professional Standard «Higher Education Institution Lecturer» in Section II. General Information about the Professional Standard, the goal of the profession is defined as the formation of not only professional, but also worldview and civic competencies, moral and ethical values in higher education seekers (Profesiynyi standart, 2024).

T. Matseikiv notes that one of the key competences of a student is civic competence, which is understood as a set of knowledge, skills, abilities, experiences, emotional and value orientations, and personal beliefs that help a person realize their place in society and successfully fulfil themselves as a citizen of the Ukrainian state. Civic competence is formed in the educational process through various subjects and educational influences exerted by teachers and class teachers. The structure of civic

competence includes the following components: cognitive – a certain amount of civic knowledge; value-based – the presence of value orientations in the student, which determine civic goals, attitudes, and personal positions; activity-related – procedural (a system of knowledge, skills, and abilities that create opportunities for effective functioning and self-realization of a person in society and a democratic state). The components of civic competence can be effectively formed on the basis of an interdisciplinary approach using material from many disciplines and fields of knowledge. This approach assumes that the formation of civic competence as a desired learning outcome permeates or encompasses (to a greater or lesser extent) most other subjects and transforms their teaching, in particular into organized, systematic and action-oriented learning for the formation of a responsible and informed citizen. In this case, civic education content is integrated into other subjects, the so-called «carriers», primarily those most closely related to political and social issues, such as geography, law and economics (Matseikiv T., 2019).

Both Ukrainian and foreign researchers have paid considerable attention to the analysis of civic competence in terms of social interest (Münkler H., 1997; Metzger A., et al., 2018). In particular, M. Sydorkina defines civic competence as a set of qualities and qualifications that determine participatory ability and participatory readiness, interest in increasing not only personal but also common achievements, i.e., orientation towards the public good or a sense of solidarity, which indicates a readiness for actions, deeds, and efforts for which no material compensation is expected or is insignificant. It defines the main groups of competencies in the structure of civic competence, including cognitive competencies, ethical competencies and value choices (the motivational and value aspect of civic competence), social competencies (the ability to interact based on the principles of democratic law), and reflective competencies. Social interest to a certain extent influences a person's worldview and determines their tendency to choose strategies of civic interaction, as well as the structuring of a person's worldview and their positioning of themselves within it (Sydorkina M., 2019).

Unlike civic competence, national competence is a complex integrative formation based on awareness of one's own belonging to a nation, knowledge of its historical and cultural heritage, language, traditions, symbols, and the formation of a stable national identity. It implies deep respect for cultural heritage, active participation in the preservation of national values, and the development of a patriotic stance. The formation of national competence is especially important in the context of hybrid threats, the devaluation of national identity, and information wars that affect the identity of the younger generation. Despite differences in focus, both competences have common goals: the formation of conscious, responsible citizens capable of acting in the interests of society and the state. Their distinction should be viewed not as a contradiction, but as a complementary interaction, where national competence forms the value basis, and civic competence provides practical mechanisms for implementing this value orientation in public life. Both form two interrelated planes of personal development: the first through the preservation of cultural heritage and national identity, and the second through active participation in public life in accordance with democratic principles. In the context of shaping a new generation of Ukrainian citizens, the integration of these competences into the educational process is a guarantee of

sustainable statehood, social cohesion and the formation of value-based personal agency.

Both competencies are considered key components of socialization, patriotic education and the formation of a democratic culture of personality in contemporary educational discourse. National competence has primarily a cultural and ethnic dimension, while civic competence covers more of a social, legal and political dimension. Both competences are closely related, but are implemented through different mechanisms, educational strategies and forms of social interaction.

National competence is generally defined as an individual's ability to recognize their belonging to a particular nation, to know and appreciate the history, language, traditions and cultural heritage of their country, and to adhere to national values in everyday life. It serves to identify individuals in the national and cultural space and is the basis for the formation of patriotic consciousness. Common to both competences is their value orientation, in particular their focus on developing responsible citizens who are capable of acting in the interests of society, the nation and the state. Both competences involve the acquisition of knowledge, the formation of attitudes and skills that enable individuals to participate actively in the life of the community and the country. The differences, however, lie in their content and areas of implementation. National competence is formed mainly within the framework of humanities education (history, culture, language, literature, philosophy), family education, and the activities of cultural and educational institutions, while civic competence is based on social studies disciplines (law, civic education) and civic experience (volunteering, participation in elections, community activities). But at the same time, they complement each other. Although they have different content, together they form the basis for the development of a conscious, responsible and active personality. The synergy of these competences is a necessary condition for strengthening civil society, consolidating the nation and forming a humanistic education system in Ukraine.

Education that shapes a nation: national competence through STEAM+C

In the current context of Ukrainian education, the development of national competence is becoming one of the key priorities aimed at fostering civic awareness, cultural identity, and social responsibility among young people. STEAM education tools, which combine an interdisciplinary approach with practice-oriented learning, demonstrate high potential for achieving this goal. STEAM education in Ukraine creates a unique educational environment where technological innovations and national-cultural contexts are integrated. The comprehensive approach to using STEAM combines interdisciplinarity, digital content, local topics, and professional pedagogical development, creating a platform for shaping national competence in the current generation of Ukrainian citizens and promoting the education of educated, responsible, technically and culturally prepared patriots of their country. For example, O. Dudka, O. Antoniv, and T. Taras researched STEAM projects on the topic «COVID-19 – a challenge for the whole world» at the Uhryniv Lyceum in Ivano-Frankivsk region and showed that such activities contribute not only to the development of natural and digital competencies, but also to the formation of national consciousness by localising global challenges in the context of students' lives (Dudka O., 2024). As O. Luchaninova notes, the transdisciplinary nature of STEAM education

stimulates the creative, analytical, and critical thinking necessary for students to become aware of their own cultural identity, as well as developing soft skills that ensure responsible citizenship and can broaden the horizons of knowledge through art – creative, analytical, innovative thinking (Luchaninova O., 2023). In turn, T. Posnova and V. Ziatkovsky analyze the adaptation of EU STEAM centers to the Ukrainian space and focus on the role of international programs (Erasmus+, Horizon Europe), mobile laboratories, and digital platforms as tools for promoting Ukrainian culture and shaping cultural identity, arguing that Ukraine's participation in EU programs is an important measure. The creation of STEAM centers with a focus on the creative industry contributes to post-war recovery, innovative development, and economic growth (Posnova T., Ziatkovskyi V., 2024). STEAM education is becoming a key direction for the modernization of education and the development of human capital in Ukraine. It promotes the development of creativity, innovative thinking, and the training of personnel capable of working effectively in a modern high-tech environment (Shevchenko O., et al., 2023).

The integration of European educational models through Erasmus+ programs and institutional cooperation enables Ukraine to combine technological development with the cultivation of national consciousness. For example, more than 20 Ukrainian projects received support in 2023–2024 within the framework of Erasmus+ Capacity Building, including the initiatives «CivicArt – Capacity-Building for Art-Based Civic Education» and «Countryside Studio – heritage promotion», which combine artistic practices with civic education. Thus, combining STEAM tools with global practices allows Ukraine to lead the process of cultural education in the realities of war: this is not only professional training, but also the education of citizens capable of critically reflecting on their national identity through local and global changes. The use of STEAM tools can effectively shape national competence by integrating the Ukrainian historical and cultural context into educational sociocultural practices.

In our opinion, in contemporary educational discourse, national competence is not only knowledge about culture, but also deep emotional involvement, awareness of identity, and active citizenship. STEAM, as an interdisciplinary methodology, has already proven itself to be an effective tool for developing 21st-century skills, but the potential of this model in the context of national identity has not yet been fully realized. For Ukraine, which is undergoing both political and cultural renewal, such integration is extremely relevant. The cultural component in STEAM+C (Culture) is not only about art, but also about identity. As O. Zabuzhko notes, «...culture is not a political superstructure, it is the language of the country, without which we are silent. It removes our invisibility cloak and gives us a name. Culture is values. And if we replace the transmission of values with the transmission of knowledge or information, as has happened, civilization will perish, even without cataclysms. And already we see how everything is shaking: politics, media, communication, and tomorrow the economy will fly away» (Zabuzhko O., 2019).

The introduction of literary fragments into technical disciplines stimulates reflection, emotional understanding, and value loading. The formation of national competence can be influenced by actualizing quotations, introducing a literary phrase at the beginning of the lesson that creates context and mood; through problematic questions, students can formulate a problem related to cultural memory or national values. It is advisable to apply STEAM+C implementation, which consists of

developing solutions using technology, engineering, art, and a reflective journal in which students describe their own understanding of the role of culture in their lives. Such integration allows us to rethink STEAM not as technocratic, but as value-oriented pedagogy based on a humanistic platform. The integration of quotations and literary fragments in the context of the STEAM+C model can take various forms of expression and thus help to combine cultural self-awareness with modern technological forms, forming Homo Digital, who thinks and acts as a bearer of national competence.

The analysis of literary quotations in the context of STEAM+C opens up prospects for the creation of further projects aimed at developing Ukrainian national consciousness through the prism of a generation of authors who fought for the freedom of the state. For example, a quote from V. Stus, «An artist is needed by his people and the whole world only when his creativity merges with the cry of his nation», declares that creativity should flow organically from national experience, especially in times of war. This phrase is actively used in the media, popular science texts, and public speeches. As noted, in particular, in the official informational materials of the President of Ukraine (President of Ukraine, 2023), the expression has become a symbolic manifestation of Vasyl Stus's civic stance, shaped within the collective cultural memory. Creativity must organically stem from national experience, especially in times of war.

STEAM programs can implement this through the design of interactive installations, where the artistic form (media art, sound design, VR) is based on real stories of internally displaced persons or defenders. Stus's works are now very popular among young people on social media, where posts are published with artists who, with the help of artificial intelligence, appear before us alive and inspired. This provides an opportunity to get to know a person whose quotes were popular in the 1960s and remain relevant today, in times of full-scale war.

«My people are endlessly ridiculous... Blind, hunchbacked, and strange... They don't even know who they are...» (Oles O., 1907). O. Oles emphasizes the problem of self-awareness of the Ukrainian nation. The attempt to Russify and destroy the understanding of Ukrainian identity by the empire and the Soviet Union continues to this day. Therefore, the implementation of quotes in the teaching of humanities in cooperation with the latest methods makes it possible to reveal empathy for the national code more deeply. This quote makes it possible to conduct algorithmic time modeling in a STEAM class on the humanities or to create an interactive VR exhibition that demonstrates how war and national identity change over time. The project will help to gain a deeper understanding of who we are as a people and how technological tools can visualize the internal transformations of a nation.

T. Shevchenko's classic «In your own home, you have your own truth, strength, and will» (Shevchenko T., 2003) is a universal quote and a basic expression of national self-awareness. In the STEAM+C context, a project can be created where students develop audiovisual installations (VR + sound design) in which these words come to life through visual images of Ukrainian life, nature, or landmarks. This approach will help students not only develop technically, but also experience and feel the strength, will, and truth of their native culture. Quotes by Lina Kostenko can be incorporated into the STEAM+C context as algorithmic modeling of the sound of the word, revealing its essence through technology. Students can create audio installations in which the word becomes a sonic «substance», and through sound design, digital

storytelling, and algorithmic modeling, they can evoke emotional and cultural resonance. For example, L. Kostenko emphasizes: «Another person's soul, they say, is a dark forest... It's not just that people's ears are blocked – their souls are blocked» (Kostenko, 2018), drawing attention to the loss of the ability to perceive the word, its depth of meaning, and empathy. This quote, placed in a VR-audio environment or an interactive installation, can not only convey meaning but also generate emotional resonance through sound, silence, distortion, or the fading of the voice.

Yuri Lypa's aphoristic statement, «...when three Ukrainians come together, it's already a choir», reveals the prospects for creating a media art project where students record voices in a choir, each with an individual melody emphasizing the idea of collectivity and national harmony. Sound design here emerges not merely as a technical tool, but as an expression of national competence through harmony, the public sounding of voices, and technological implementation. It creates a cultural code that illustrates the collective sensitivity of Ukrainians to harmonious interaction through art – particularly through singing, which serves as a marker of national identity.

The need to create STEAM+C projects lies in the fact that only through empathy, which can be achieved through art, can Ukrainians feel a sense of identity and unity with their state. It is impossible to be proud, to love, to feel, if you have no emotional attachment. Global culture truly becomes such only through active dialogue between national cultures, where each nation contributes its unique knowledge, ideas, and experience. For over a century, Ukraine was under the cultural oppression of the Russian Empire and then the Soviet Union, and was effectively excluded from global cultural cooperation. Russia systematically suppressed the Ukrainian language, literature, science, and intellectual achievements (the Holodomor, the execution of intellectuals). As the Wall Street Journal notes, Ukraine was invisible on the international stage for decades. In the mid-20th century, the topic of Ukrainian statehood was virtually absent from serious American discussions: «...a few decades ago, the nation and its people were largely invisible, ignored by much of the West... By the early 1960s, the question of Ukrainian independence was absent from serious American policy discussions» (Karatnycky A., 2024).

Today, in times of war, Ukraine must not only maintain its cultural discourse, but also actively create and integrate its own content into the global cultural space technologically, artistically, and scientifically, through STEAM+C projects with an emphasis on national identity. It is necessary to create one's own and integrate it into the globe. The global perception of Ukraine is often reduced to geopolitics rather than culture, so the country must assert itself as a subject through art and science. The integration of culture into STEAM education allows for the creation of projects ranging from VR exhibitions to sound design that work towards the international cultural presentation of Ukraine. This corresponds to Appadurai's principles: it is through cultural «flows» that international dialogue takes place (Marín-Morales J. et al., 2020).

STEAM+C can be a real strategy for cultural revival. The modern educational paradigm increasingly demonstrates that the integration of technological, artistic, and cultural components within STEAM+C not only increases students' motivation and technical skills but also promotes cultural self-identification. After years of cultural oppression, Ukraine must use this potential to restore its national presence in the global cultural space. Studying cultural heritage through VR (virtual reality) technology is an extremely effective way to immerse oneself in cultural spaces that are often physically

inaccessible (due to war, geography, or loss of the object). Especially now, when various parts of Ukraine are being destroyed daily during a full-scale invasion, it is necessary to be prepared not only for physical restoration, but also for creative, modern approaches that can preserve the memory of history for future generations. Among the forms of implementing STEAM in education, we can highlight:

1. VR reconstructions of historical monuments: creation of 3D models of destroyed or inaccessible cultural objects – castles, churches, theatres, villages, schools, etc. using photogrammetry, 3D scanning, Unity/Unreal Engine technologies.
2. Interactive VR museums: visitors can «walk» through a virtual museum, view exhibits, listen to audio guides, interact with objects from anywhere in the world, and thus learn more about Ukraine. An example is the VR museum of the shot renaissance with interactive texts by poets and audio recitations.
3. VR theater and performances: virtual visits to theatrical productions based on classic Ukrainian works or historical reconstructions. For example, the creation of a VR production of V. Stefanyk's «The Stone Cross» against the backdrop of the Carpathian countryside.
4. VR eyewitness accounts: projects where video or animation is used to create content based on memories of the Holodomor, war, repression, etc. Viewers can hear stories and see the environment of that time, for example, «Grandmother's House» – an interior with virtual objects and memories of everyday life in the 1930s.
5. Educational excursions in VR format: practical lessons in history or culture in VR, where the teacher conducts an «excursion» in digital space through Google Expeditions or Mozilla Hubs – you can visit Mykolaiv in 1917, Kyiv during the time of Prince Volodymyr, or a fair in Podillia, etc.
6. Gamified simulations: gaming environments where players perform tasks, such as finding an ancient artifact from a certain period, composing a legend about the area, recreating traditions, etc. You can organize a quest called «Treasures of the Sich», where participants solve riddles related to Cossack culture. The advantages of such methods of studying culture are complete immersion, where students do not read about history, but experience it with the involvement of multisensory perception. The use of sound, visuals, and movement makes cultural heritage accessible not only to Ukrainians but also to foreigners and popularizes Ukrainian national heritage, while researchers and scientists can study objects that have been destroyed or are located outside the country.

An analysis of sources has shown that examples of the application of these technologies can be found in international practice. For example, in the Pun, Fung, Chan, and Ko project, schoolchildren studied the heritage of the village of Shek O (Hong Kong) through VR technology, which resulted in a significant increase in their level of knowledge, attitude, and motivation to study history (Pun L. et al., 2024). In his scientific research, R. Videla notes that STEAM+C projects with VR and AR contribute to strengthening local identity and cultural comfort in communities: «...with the rise of immersive technologies like virtual reality and augmented reality ... cultural experiences can be brought to people worldwide, allowing individuals to learn and appreciate different cultures without physically being present» (Videla R. et al, 2024). An analysis of international experience in applying STEAM+C in the context of cultural heritage leads to the conclusion that such practices constitute not only an innovative pedagogical model but also an effective strategy for cultural revival. VR

approaches, as case studies show, contribute to the interactive reconstruction of local heritage and increase the level of engagement in the study of cultural objects.

Creative pedagogy practices demonstrate the value of VR/AR technologies in rethinking social issues such as ecology or identity (Chappell K., Hetherington L., 2023). This approach is particularly relevant to the Ukrainian context, where VR projects can be transformed into themes of internal displacement, war, loss, and resistance. This format allows not only to comprehend the experience, but also to record cultural memory in digital form. This opens up wide opportunities for creating virtual content aimed at strengthening the sense of belonging among internally displaced persons. Through «technological memory», it is possible to restore people's connection with their lost cultural roots. Similar practices can be adapted to war-related topics: VR projects about displaced persons, defense, or cultural resistance. The implementation of this experience in Ukrainian practice is aimed at creating a cultural intervention for internally displaced persons – virtual tours of their native places that have been destroyed or lost due to the war. VR museums increase users' introduction to and immersion in cultural heritage, stimulate intercultural dialogue and emotional engagement. VR platforms dedicated to Ukrainian poets, art schools, and national symbols can be created that are accessible not only to a domestic audience but also to global recognition. For Ukraine, which is experiencing the loss of its material cultural heritage as a result of the war, the use of VR technologies to create virtual tours of destroyed temples, cities, and villages is particularly relevant, allowing memories to be preserved and passed on to new generations in an immersive format.

The theoretical basis for the integration of STEAM into the preservation of Ukraine's cultural heritage is cultural-historical activity theory (CHAT), the theory of immersive learning and embodiment, as well as the concept of Heritage Digital Twin, which acts both as a digital model and a tool that is actively used in science, education, and cultural heritage preservation. For example, projects such as Venice Time Machine or Scottish Ten show how collective digital initiatives («activity systems») transform archival data into a shared interdisciplinary space of action, where participants create content together with technology. Ukrainian STEAM centers can apply this approach through the joint work of students, local experts, and technical specialists on VR reconstructions that revive cultural memory as an object of activity. CHAT defines the basic approach to activity analysis through the interaction of the subject, tools, community, and goal. «Activity systems» are a single analytical unit that forms the content and motivation of joint activity through the interaction of technologies, norms, roles, and a common object (Cong-Lem N., 2022). Examples of digital initiatives such as Venice Time Machine and Scottish Ten demonstrate the practical implementation of this paradigm: collective scanning of archives and monuments transforms local materials into an open space for interdisciplinary collaboration – active participants who use digital tools to create a new cultural context. Over a million pages of archives have been digitized, 3D visualizations of urban transformations have been created, and a multisensory platform for public interaction and research has been developed. Scottish Ten has implemented laser scanning of heritage objects, making digital replicas available to a wide audience (Wilson L., 2012).

Ukrainian STEAM centers can adapt this approach by bringing together students, teachers, researchers, and IT volunteers into an active network of co-creation. For example, collaborative work on a VR reconstruction of a destroyed temple or

theater can serve as a platform where archival materials, 3D modeling tools, and local practices form an educational and cultural space that revives forgotten heritage as an object of collective activity.

Immersive learning is a form of education that uses immersion technologies (e.g., virtual reality (VR), augmented reality (AR), mixed reality (MR)) to create a sense of presence and emotional engagement of the learner in the learning environment. Embodiment, on the other hand, assigns a critical role in cognition and learning to bodily experience, movement, and sensory interaction with the surrounding world. As J. Barbara notes, a model with three components is critical for the transmission of intangible heritage: environmental, social, and cultural presence (Barbara J., 2022). Such VR dance projects have been implemented in Malaysia and China, where virtual representations of folklore provide emotional engagement and cultural understanding (Shafilla S., et al., 2025). In Ukraine, such a model can be implemented through VR installations of the 1960s or the reconstruction of rituals that come to life through physical experience.

The Heritage Digital Twin model formalizes the creation of digital twins of cultural objects using CIDOC CRM and VR/AR interaction, which supports data compatibility and access for researchers (Niccolucci et al., 2023). Similarly, researchers note that VR contains material artifacts with an intangible context, forming an integrated cultural interpretation (Cunha C., et al., 2025). For Ukraine, this means the opportunity not only to reconstruct architecture, but also to build VR spaces of memories and rituals that will allow users to «live» cultural heritage. Heritage Digital Twin creates standardized digital models of monuments that are integrated with VR, AR, and open educational platforms, as well as attached to a cultural and technical context.

The integration of STEAM+C into philosophy is based on the theoretical principles of integrating the humanities component into STEM education. For example, philosophy classes may include an introduction through quotes or aphorisms from famous philosophers; the implementation of collective projects in VR or digital design with the involvement of media art exhibitions and public presentations; and reflection in the form of a written analysis of one's own connection to national heritage. STEAM+C in philosophy becomes not only a method of integrating art and science, but also a tool for shaping national competence. Through technological and artistic practices, students not only acquire digital skills, but also develop the ability to comprehend their cultural identity in a global space. The inclusion of STEAM education in philosophy classes, in particular through media art projects, sociocultural practices, sound design, VR exhibitions, and digital design, contributes to the formation of a multidisciplinary worldview that supports humanistic and nationally determined values.

Philosophy of culture occupies a special place in the system of humanities education – a discipline that studies cultural phenomena in the context of historical memory, national identity, and the value paradigm of society. In the modern educational landscape, where the STEAM approach is being actively implemented, a new vector of interdisciplinary integration is emerging: the use of artistic and technological means (in particular, sound design) for a deeper understanding of national cultural heritage. In the STEAM+C context, sound design performs not only an aesthetic function, but also an ontological one: it allows the listener to experience,

reconstruct, and interpret cultural memory through sound. In cultural philosophy classes, students can implement project-based learning (PBL) by creating sound installations that reflect philosophical themes of national significance: for example, «the sound of war and silence», «soundscape reproduction of memory», «musical reconstruction of intergenerational dialogue». Such projects not only promote immersion in cultural reflection, but also shape national competence through emotional and value identification with historical events and cultural codes.

In this era of digital transformation, modern Ukrainian society is shaping Homo Digital, who possesses the tools of technological literacy and is deeply integrated into the national culture. In this context, STEAM education acquires a sociocultural orientation through the use of media art projects, sociocultural practices, motion capture technologies, VR exhibitions, sound design, digital design, and algorithmic modeling. The basis for the formation of national competence, along with STEM skills, is the integration of local culture into project-based learning (PBL) and STEAM design, where students create culturally significant technological products and present them publicly. For example, research by T. Posnova and V. Ziatkovsky shows that adapting European STEAM experience in creative industries contributes to the development of interdisciplinary competencies. The researchers analyze the impact of STEAM education on the development of creative and analytical thinking, paying particular attention to the importance of integrating culture and identity into the professional training of specialists in the fields of design, media, digital technologies, and gaming platforms. According to the authors, development of competencies such as interdisciplinarity, critical thinking and innovation, which are crucial for specialists in fields such as design, media, digital technologies and gaming platforms (Posnova T., Zyatkovsky, 2024).

N. Soroko's research is based on case studies of the creation of virtual spaces with the integration of cultural, artistic, and technological components, where VR environments with localized digital design were used: participants created virtual exhibitions of Ukrainian monuments with elements of sound design, motion capture technologies, and algorithmic modeling (Soroko N. et al, 2021). Media art projects successfully combine the national context and STEM functionality, forming Homo Digital, capable of explaining culture through technology. The presentation of such projects allows participants to demonstrate national competence through public speaking, cultural reflection, and technological solutions. A. Andreev and O. Andreeva, in their study of the creative environment in STEAM practices, argue that such conditions contribute to the development of creative thinking, self-sufficiency, and national priorities. Student STEAM+C projects, which include elements of cultural reflection through sound, contribute to the formation of philosophical reflection and civic awareness. The authors emphasize that it is the aesthetic and philosophical level of working with artistic material that provides depth of understanding of identity and culture (Andreev A., Andreeva O., 2024). The training of teachers through STEAM innovations contributes to the formation of systematic thinking within the framework of sociocultural practices.

Contemporary research points to the growing role of immersive environments in shaping emotional engagement with cultural content. Thus, J. Marín-Morales emphasizes that «immersive virtual reality, which allows researchers to simulate environments in controlled laboratory conditions with high levels of sense of presence

and interactivity, is becoming more popular in emotion research» (Marín-Morales J. et al, 2020). This means that a VR environment with a properly designed audio system is not just a backdrop, but a powerful affective agent that promotes emotional experience and cognitive immersion. In a subsequent experimental study by the same research group, J. Marín-Morales analyzed heart rate variability during a free exploration of a real museum and its virtual copy through VR glasses. The results showed that although participants self-reported emotional arousal, physiological changes (cardiovascular responses) were different: «...there were differences in terms of cardiovascular responses ... However, we did not find the same arousal-based autonomic nervous system change pattern during the virtual museum exploration» (Marín-Morales J. et al, 2021). Although VR can evoke a subjective feeling of arousal, it is not always accompanied by the same physiological response as in real space. However, physiological dissociation does not diminish the significance of VR as a tool for cultural immersion. The main effect lies precisely in the psychological presence and ontological experience of culture, which is valuable in itself, even if the physiological resonance is weaker.

Sound design plays a particularly important role. According to the study by F. Cuadrado, I. Lopez-Cobo, T. Mateos-Blanco, and A. Tajadura-Jiménez, 3D audio produces a «higher emotional impact» in children aged 9–13, as confirmed by both electrodermal measurements and an increase in the vividness of mental imagery – higher emotional impact of the arousal and 3D audio conditions (Cuadrado F. et al., 2020). In older age groups, children listening to 3D sound demonstrate significantly higher electrodermal activity compared to stereo versions, indicating the effective potential of spatial sound in creating deep emotional immersion. In the Ukrainian context, this opens up considerable opportunities for STEAM+C projects focused on cultural heritage. Soundscapes, audio stories, field recordings, and VR installations with sound design become tools not only for transmitting knowledge but also for shaping national identity through emotional engagement. Sound is not merely a background element, but a mediator of memory, symbols, and meanings, activating cognitive, emotional, and axiological mechanisms. The collective creation of a VR product involves reflective interaction – from historical analysis of materials to their technical embodiment in audio design. At the heart of the model lies project-based reflection, where students, working with recorded voices of witnesses, archives, and texts, transform sound into a tool for understanding their own cultural experience.

The stages of the methodological model for creating a VR product include:

1. Philosophical initiation through the analysis of concepts such as nation, memory, and identity based on texts by Ukrainian philosophers and writers (e.g., H. Skovoroda, O. Zabuzhko, Y. Malaniuk, among others);
2. Technical phase: sound recording in selected locations and editing in DAW environments (Ableton, Audacity, FL Studio);
3. Cultural-aesthetic interpretation through the composition of timbre, rhythm, and voice that carries ethical and historical connotations;
4. Public presentation in the form of a sound installation with elements of philosophical interpretation, including VR visualization.

Thus, VR sound design in STEAM+C projects not only expands the toolkit of digital learning but also creates a space for intellectual patriotism through sound that activates memory, culture, and identity – a factor of strategic importance for

contemporary Ukrainian education, especially in times of war and postcolonial reconstruction. As an example, we propose an adapted model of a team-based STEAM+C project titled «The Sound of Heritage», aimed at immersing learners in cultural memory through the integration of sound design, philosophical reflection, and digital technologies. The project can be implemented as an interdisciplinary course, an elective in higher education institutions, or integrated into the study of philosophical disciplines. Such an approach develops not only digital and artistic skills but also critical thinking, empathy, national consciousness, and the ability to interpret cultural codes – which, in essence, constitutes national competence. The project is based on the principles of project-based learning (PBL), where each team is responsible for a specific phase of the process:

- *Research of local heritage*: participants select an object (a historical building, landscape, figure, or event) of cultural significance to their community;
- *Field sound recording*: capturing ambient sounds on site (e.g., wind in ruins, local voices, bells, or songs);
- *Philosophical-narrative interpretation*: the team develops a narrative exploring what the object reveals about the nation, memory, loss, and revival;
- *Sound composition*: in a digital audio workstation (Ableton, FL Studio), participants create a sound installation by combining sound, music, voice, and silence;
- *VR visualization*: if possible, 3D modeling in Blender or Unity is used, with sound functioning as an interactive agent in the virtual space;
- *Public presentation*: the final installation is presented as part of an exhibition, festival, or online platform.

An analysis of contemporary research in the fields of VR, emotional immersion, and sound design demonstrates that 3D audio and virtual reality technologies are capable not only of enhancing aesthetic perception but also of fostering deep affective immersion into cultural contexts. Experiments conducted by Marín-Morales et al. and Cuadrado et al. show that even when physiological responses do not fully replicate those of real-life experiences, the psychological sense of presence within VR environments provides a unique ontological contact with culture, which is of critical importance for modern education. In this process, sound design functions not as a background element but as a central tool for emotional, cognitive, and axiological interaction with cultural heritage. Within the Ukrainian context, this opens strategic opportunities for the implementation of VR installations and media art projects as part of STEAM+C education, serving as a means of national revival, identity reflection, and memory-making. Practical initiatives such as the «Sound of Heritage» project – which integrates audio installations, philosophical interpretation, and digital technologies – demonstrate that STEAM education in Ukraine can and should fulfill not only a technocultural, but also a worldview-forming and humanistic function. As a result, what emerges is not merely an educational product, but a space of intellectual patriotism, where young people learn to «listen» to their culture and reinterpret it within the framework of a new historical reality.

Conclusions

Therefore, based on the results of our research, we can draw the following conclusions: introducing the category of «national competence» into philosophical discourse is not only a logical but also a necessary step in response to the military and ideological challenges facing contemporary Ukrainian society, which needs to develop a valuable, morally mature personality, whose main task in the social context is to preserve Ukrainian subjectivity in the global space of culture, science, and politics. Without understanding this category as the center of humanitarian philosophy of education, it is impossible to create a new model of Ukrainian education – one that is based on dignity, freedom, historical truth, and shared responsibility for the future of the nation. National competence as a category of contemporary educational philosophy goes beyond the framework of a purely educational construct and functions as a metaparadigmatic category, providing a comprehensive vision of shaping the personality of a citizen and responding to the contemporary challenges of war, colonial heritage, and globalization. Thus, STEAM education in the contemporary Ukrainian context not only expands students' competencies in the technical sphere, but also shapes Homo Digital – an individual equipped with digital skills, critical thinking, and a profound understanding of their own national culture. Through sociocultural practices such as media art, VR, motion capture, sound design, and algorithmic modeling, STEAM projects become powerful tools for national education and the development of national competence via project-based learning and the public presentation of results. The STEAM+C model is not merely an educational tool, but a sociocultural strategy for forming a generation with a strong sense of national self-awareness. STEAM+C combines cutting-edge technologies, interdisciplinarity, and cultural self-identification. Its implementation fosters the development of a resilient national position – a cornerstone of civic maturity and cultural security in the face of hybrid threats and global instability. STEAM+C is not only an interdisciplinary educational model, but a comprehensive strategy for cultural revival, capable of preserving, transmitting, and representing Ukrainian culture within the global digital space. Ukrainian educational institutions must not only integrate these approaches, but also create their own unique products at the intersection of technology, art, and national identity, to assert themselves confidently on the international stage. The use of STEAM+C initiatives in educational and sociocultural practices not only compensates for losses caused by war, but also forms a powerful platform for the modern representation of Ukrainian culture in the world. Through VR, AR, sound design, and digital art, Ukraine not only reclaims its history but secures its unique place in the global cultural dialogue. Within the framework of sociocultural activity, STEAM fosters the development of Homo Digital who possesses not only technical skills but also national competence – grounded in cultural self-awareness, technological expression of culture, public presentation, and reflection. This clearly demonstrates the connection between STEAM education and the processes of national upbringing and cultural development in contemporary Ukraine.

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