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ТРАНСДИСЦИПЛИНАРНОСТЬ КАК ВЕКТОР РАЗВИТИЯ СОВРЕМЕННОГО АРТОБРАЗОВАНИЯ

Аннотация

В статье рассматривается трансдисциплинарность как актуальное направление в развитии высшего арт-образования. В условиях стремительных технологических и социокультурных трансформаций третьего тысячелетия образование и искусство оказались перед рядом новых вызовов, требующих не просто адаптации, но и глубокой переоценки своего целеполагания и методологических ориентиров. Современная эпоха по своей нестабильности, информационного перенасыщения, глобализации и взаимосвязанности ставит под сомнение традиционные дисциплинарные границы, которые долгое время определяли структуру академического и художественного знания. В этом контексте возрастает значение трансдисциплинарного подхода как метода, способного преодолевать фрагментарность и создавать новые формы целостного мышления. Трансдисциплинарные подходы способствуют не только интеграции знаний из различных областей, но и формированию новых актуальных форм мышления и взаимодействия, тем самым возрождая новую образовательную и культурную парадигму в артобразовании, где требуется не просто знание, а способность критического переосмысления и совместного действия в различных областях исследования.

Ключевые слова: трансдисциплинарность, артобразование, культурная память, национальные ценности, современный контент, музыкальное образование.

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ТРАНСДИСЦИПЛИНАРЛЫҚ – ЗАМАНАУИ АРТБІЛІМІНІҢ ДАМУЫ ВЕКТОРЫ РЕТІНДЕ

Аңдатпа

Мақалада трансдисциплинарлық - жоғары білім беру жүйесінде арт-білім беруді дамытудың өзекті бағыты ретінде қарастырылады. Үшінші мыңжылдықтың қарқынды технологиялық және әлеуметтік-мәдени өзгерістері жағдайында өнер мен білім беру жағдайының бейімделуі ғана емес, сонымен бірге оның мақсатын айқындап көздеу және әдіснамалық бағдарларын қайта қарастыра отырып бағалауды талап ететін бірқатар жаңа мәселелерге тап болуда. Заманауи әлем өзінің тұрақсыздығымен, ақпараттың тым көп болу жағдайымен, жаһандану тұсында академиялық және көркем білім беру құрылымында дәстүрлі түрде жүргізетін әдістерді пәндер арасында қайта қарастыруды талап етеді. Осы тұста, трансдисциплинарлық тәсілдің маңыздылығы қолданыстағы мәселерді шешумен қатар оның формаларын қайта қарастыра отырып құруға қабілетті әдіс ретінде қарастырылады. Трансдисциплинарлық тәсілдер түрлі салалардағы білімді біріктіруге ғана емес, сонымен қатар ойлау және өзара іс-әрекеттің жаңа да өзекті нысандарын қалыптастыруға ықпал етеді, осылайша артбілім беруде өзгеше тәсілмен білім беру және мәдени парадигманы жандандыру сәселесінде тек білім ғана емес, сыни қайта ойлау және зерттеудің әртүрлі салаларында бірлесіп әрекет ету қабілетін талап етеді және қарастырылады.

Түйін сөздер: трансдисциплинарлық, артбілім, мәдени жады, ұлттық құндылықтар, заманауи контент, музыкалық білім.

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TRANSDISCIPLINE AS A VECTOR OF DEVELOPMENT MODERN ART EDUCATION

Abstract

The article considers transdisciplinarity and considers the current direction in the development of higher art education. In the context of rapid technological and sociocultural transformations of the third millennium, education and art faced a number of new challenges that require not only adaptation, but also a deep reassessment of their goal-setting and methodological guidelines. The modern era, in its instability, information oversaturation, globalization and interconnectedness, calls into question the traditional disciplinary boundaries that have long determined the structure of academic and artistic knowledge. In this context, the importance of transdisciplinary approach as a method capable of overcoming fragmentation and creating new forms of holistic thinking is growing. Transdisciplinary approaches contribute not only to the integration of knowledge from different fields, but also to the formation of new relevant forms of thinking and interaction, thereby reviving a new educational and cultural paradigm in art education, where not just knowledge is required, but the ability to critically rethink and act together in various fields of study.

Keywords: transdisciplinarity, art education, cultural memory, national values, modern content, music education.

Introduction. At the present stage of globalization, science and education are facing new problems along the way, putting forward the problem of using modern new approaches in the framework of disciplines, in addition to using traditional systematic approaches. Environmental, cultural, social and technological challenges require an integrative approach, which is why transdisciplinarity in education and science has become increasingly popular in recent decades. This approach goes beyond the traditional transdisciplinary interaction, striving to create new knowledge through synthesis, collaboration and collaborative thinking. Transdisciplinarity is of particular importance in the higher education system, where it is considered as a way of forming critical, flexible and creative thinking. The transdisciplinary approach is developing especially actively in the field of art education, as it is one of the forms of aesthetic and emotional expression, as well as a value orientation towards culture and art of one's identity.

Art education is a special area of research, as it is located at the intersection of pedagogy, cultural studies, sociology and art history. In the light of the modern context, all art ceases to be solely a means of individual self-expression or a form of representation of reality. Increasingly, it is perceived as an autonomous and active form of research, critical reflection on the world around us, and a platform for social interaction. Today, art not only reflects reality, it also enters into a dialogue with it, synthesizing and transforming the hidden structures of various phenomena and thereby becoming a method of cognition, along with philosophy and anthropology. All of these processes make it possible to explore complex phenomena not only through logical thinking, but also through bodily, sensory, auditory, and imaginative perception. Scientists from different eras, still discussing the disclosure of this concept, note that «transdisciplinarity» takes on several meanings (Ardashkin, 2007). Some scientists associate it with a new field of knowledge (Bažanov, 2015), a principle of research that goes beyond the discipline (Knyazeva, 2011; Kiyashchenko, 2017; Mokij & Luk'janova, 2024), with a «new style of thinking» (Mokij & Luk'janova, 2021), while others claim that it is a «meta-discipline», «super- or hyperdiscipline», pedagogical technology of mastering methodological knowledge (Mokij & Luk'janova, 2024) and others.

T.N.Taranova (Taranova, 2017) and M. Serres (Serres, 2015) argue that «transdisciplinarity forms a (transdisciplinary) worldview position», which teaches skills in interpreting disciplinary knowledge through universal patterns. Others argue that transdisciplinarity explains concepts and concepts that do not coincide in content (Solodova, Efimov et al., 2015). And the most accurate, in our opinion, is the definition given by Doctor of Philosophy, Professor According to E.N. Knyazeva, transdisciplinarity «means synergy between disciplines and genuine integration of knowledge», as «...a research strategy

crosses disciplinary boundaries» (Knyazeva, 2011). There is also a scientific opinion that transdisciplinarity is a teaching tool and integrates quantitative research methods (Atkinson-Toal, 2026). Anyway, this concept is quite well-rooted in science and in recent decades we can observe its introduction into the field of pedagogy and teaching methods.

Basic provisions. Conceptualization of transdisciplinarity is the essence and content. The concept of transdisciplinarity encompasses not only the unification of various fields of knowledge, but also going beyond academic discourse, involving practitioners, artists, and community representatives in the creation of knowledge. This allows us to take into account the «more-than-rational» aspects of human experience - sensory, intuitive, bodily, symbolic (Mukeeva & Kakimova, 2025). In art, this becomes especially important, since artistic thinking by its very nature strives for synthesis and ambiguity.

The choice of transdisciplinarity as a methodological approach in art education is necessary, since modern art increasingly appears not as an isolated creative statement, but as the result of joint experience, social interaction and research. Considering musical art in this context, it can be noted that it acts not only as a form of aesthetic pleasure or emotional expression, but also as a powerful tool for analyzing cultural, political and historical processes. The role of music in preserving national memory and cultural identity is particularly significant. Musical traditions, folk melodies and songs, as well as intonational features of the musical language serve as a living «carrier» of the historical experience, values and worldview of the people. Through music, not only the stylistic features of the epochs are transmitted, but also collective feelings such as joy, sorrow, struggle, hope, etc. It becomes a sounding memory, sometimes more stable and valuable. Before identifying and considering the forms of transdisciplinarity in the field of art and education, one should immerse oneself in the methodology of conceptualizing transdisciplinarity and its implementation through a systematic analysis of various theoretical approaches and positions of researchers who consistently deepen the understanding of this phenomenon - from fragmentary mentions to complex theories and detailed conceptual models.

Despite a significant amount of research on transdisciplinarity, the problem of introducing transdisciplinary practices into the system of music and art education focused on the integration of cultural memory, national values and digital technologies remains insufficiently developed. In particular, there are no models for project-oriented training of music education undergraduates based on a trans-disciplinary approach. *The aim of the research* is to theoretically substantiate and experimentally test a trans-disciplinary approach in the preparation of music education undergraduates through the integration of cultural memory, national values and digital artistic practices. *The hypothesis of the study* is that the introduction of trans-disciplinary educational cases based on the integration of musical, visual and digital art contributes to an increase in the level of cultural reflexivity, transdisciplinary thinking and professional competence of undergraduates.

Materials and methods. In this study, to identify, analyze, synthesize and summarize the research results related to the study of the concept of transdisciplinarity in art education, we used the method of data interpretation – metasynthesis, as one of the more valid and effective methods in obtaining a holistic view of the research problem. This method allowed combining the conclusions of different interpretations based on common themes and conceptual theories to recreate a single interpretative form of understanding the essential characteristics of transdisciplinarity in the art education system. This allowed us to summarize the established knowledge and understanding of the categories of musical art in a new interpretation and interpret the knowledge gained, creating a theoretical level for a deep understanding of the substantive basis of art education as such. This method was chosen based on the specifics of the research nature and the need to extract common topics, the life experience of undergraduates and in-depth analysis presented in the materials of the textbook developed by the team of authors of the draft. The method of metasynthesis has made it possible to develop comprehensive themes reflecting a transdisciplinary approach to uncovering cultural memory and national values at the intersection of various art forms. The topics of the manual specifically addressed the integration of cultural components, including cultural heritage, traditional knowledge and values in the context of art education.

The next method was statistical processing of empirical data using the IBM SPSS Statistics. The methods of descriptive and comparative statistics were used at the analysis stage. The arithmetic mean (M), standard deviation (SD), and percentage distribution of the data were used to describe the results. In order to assess the effectiveness of the implementation of a transdisciplinary approach in the training of undergraduates, the results were compared before and after the implementation of project-oriented cases. To determine the statistical significance of the differences, the Student's paired t-test was used, which makes it possible to assess changes in indicators of cultural reflexivity, the ability to transdisciplinary synthesis, the level of creativity and digital competence of students. The statistical significance of the differences was determined at a confidence level of $p < 0.05$.

The interviews were conducted among the faculty and undergraduates. The interview questions were designed in accordance with the research objectives and included topics such as the role of cultural memory and national values in art education. In the process of researching this problem, the following methods were also used: systematization and analysis of theoretical, pedagogical, psychological, scientific and methodological literature on the topic of transdisciplinarity; empirical method (pedagogical observation, interviews, questionnaires in the form of test questionnaires, as well as mathematical and statistical methods for processing the results obtained during the identification of future specialists' values a transdisciplinary approach as a method capable of developing holistic thinking in a new educational and cultural paradigm in art education.

Results. The introduction of transdisciplinary facilities in the process of training future music teachers was carried out through the integration of relevant content components into the teaching of specialized disciplines of the educational program «7M01402 - Music Education» of the Abai Kazakh National Pedagogical University. The experimental part of the study was implemented through the testing and step-by-step implementation of the developed training modules in the Master's degree educational process. In particular, the key aspects of the transdisciplinary approach are reflected in the module «Scientific and methodological foundations of transdisciplinary research in the modern content of art education». The training module focuses on understanding the interaction of traditions and innovations in art education, as well as on developing the ability to integrate classical artistic heritage with modern forms of expression, digital technologies and transdisciplinary practices. Undergraduates studied modern pedagogical approaches synthesizing art, culture, and technological learning tools. Special attention was paid to the analysis of the role of cultural memory in the development of artistic thinking, the formation of a value attitude towards art and the ability to cultural reflection.

The course «Transdisciplinarity in the historical development of art» focuses on cultural and historical continuity, considering art as a tool for the transmission of historical memory and the formation of national values. Special emphasis is placed on the phenomenon of cultural memory as a source of professional artistic and musical creativity. The students analyzed the mechanisms of cultural continuity, explored the role of art in the formation of collective identity. The transdisciplinary analysis revealed semantic connections between art history, philosophy, cultural studies and pedagogy, contributing to a deeper understanding of art as a carrier of historical and cultural codes.

The next introduced course of the module is the discipline «Cultural memory and the phenomenon of national values in art education», aimed at developing students' deep understanding of the relationship between culture, memory and art, as well as developing the ability to comprehend and preserve national artistic heritage in the context of globalization and cultural transformation. In the course, the concepts of «culture», «national values», and «art education» are analyzed through the prism of philosophy, cultural studies, and pedagogy. Cultural memory is considered as a form of collective identity, fixed in symbolic forms - works of art, architecture, musical and choreographic heritage. At the same time, art acts as a medium that ensures the transmission of cultural meanings from generation to generation and the preservation of national narratives. The above concepts are analyzed in their interrelation, which makes it possible to identify the mechanisms by which cultural meanings are transmitted from generation to generation, strengthening identity and forming the basis for artistic expression.

Special attention in the experimental part of the study was paid to understanding and integrating the national origins of professional musical and artistic creativity in the context of modern education. In the

course of the activity, folklore and ethnic motifs represented in academic art were considered, which made it possible to establish the relationship between cultural continuity and traditional forms of artistic expression. Undergraduates were offered research and project assignments focused on the interpretation, adaptation and actualization of traditional artistic material by means of modern digital and transdisciplinary practices. Participation in these projects contributed to the formation of pedagogical design skills among future teachers, the ability for transdisciplinary analysis, as well as the development of cultural reflection as a component of professional competence. This approach ensured not only the mastery of the content, but also the active position of the student in the process of creating an educational product based on the traditional cultural code.

In order to comprehensively assess the effectiveness of the introduction of a transdisciplinary approach in the training of teachers in the field of music and art education, a multi-stage methodological scheme was implemented, including the following key positions:

1. Development and testing of educational cases and transdisciplinary projects integrating the components of musical, visual and digital art. At the same time, the emphasis was on practice-oriented learning and the stimulation of cultural and reflective activities that contribute to the formation of creative thinking and aesthetic sensitivity.

2. Conducting a pedagogical experiment using control and experimental groups aimed at identifying the impact of transdisciplinary educational practices on the level of formation of professional and universal competencies of undergraduates in pedagogical fields.

3. Development of a system of indicators and criteria for evaluating learning outcomes, covering such parameters as the ability to transdisciplinary synthesis, the level of development of creative thinking, cultural awareness, mastery of digital tools of artistic expression and the depth of pedagogical reflection.

4. Collection and analysis of empirical data obtained during the pedagogical experiment. Both quantitative and qualitative methods, i.e. metasynthesis, were used, including questionnaires, peer review, and content analysis of undergraduates' design and reflective work.

5. Organization of methodological support for transdisciplinary learning, including the development of practice-oriented methodological recommendations, conducting training seminars and master classes for teachers, as well as adapting the results obtained to other components of the educational program.

The experimental work was carried out with the participation of teaching staff and undergraduates ($n = 30$) who completed a cycle of classes based on transdisciplinary cases. The introductory part included the problematization of modern teacher education, focused on the development of creative, digitally literate and culturally reflective personalities. It is established that the introduction of cases integrating musical, visual and digital art is an effective tool for the formation of the above competencies.

The implementation of training cases in the conditions of a master's degree contributes to the formation of a holistic cultural perception among future teachers and the ability to flexibly adapt traditional artistic forms in the modern educational space. The approbation of the methodology showed a high degree of student engagement, an increase in the level of transdisciplinary activity, as well as an increase in the ability to pedagogically interpret cultural phenomena in a dialogue between tradition and modernity.

The implementation of cases in educational practice took place in the context of a project-oriented learning model, where the key principle was the independent development of cultural and artistic phenomena through the prism of transdisciplinary analysis and digital interpretation. Students were involved in the process as active subjects exploring and constructing new forms of artistic expression at the intersection of musical, visual and digital art. At the stage of case implementation, special attention was paid to the following forms, such as:

- organization of group project activities involving the distribution of roles (curator, designer, music editor, digital architect, etc.);

- the teacher's moderation of the decision-making process, where the teacher's task was not so much to transfer knowledge as to create conditions for creative, analytical, and culturally reflective interaction;
- integration of digital tools as a medium of expression, rather than as an auxiliary resource. Digital technologies were used as a means of artistic transformation of traditional material.

For example, the creation of the case «Musical Portrait of National Heritage» allowed participants to correlate personal and collective experiences with images of cultural memory, visualize sound archetypes and comprehend heritage through digital visualization and editing. Such projects have contributed to a deeper understanding of the role of art as a mediator between personality and the cultural code of society. The conducted classes confirmed that the use of transdisciplinary cases initiates:

- development of communication and creative skills, especially in the process of joint artistic design;
- an increase in metacognitive activity related to planning, self-assessment, and reflection on one's activities;
- increasing motivation to learn by including personally relevant and socio-cultural content.

The generalization of the experience gained was carried out in the format of an open presentation of projects and a subsequent reflective session, during which students not only presented the results, but also discussed the artistic, conceptual and pedagogical aspects of the implemented cases. Particular importance was attached to understanding the complexity of integration and awareness of the pedagogical potential of transdisciplinary practices.

Thus, the practical implementation of the cases provides for the integration of components of traditional culture and modern digital forms of expression, not only in expanding the horizons of pedagogical thinking, but also contributing to the formation of a stable professional identity of a new generation teacher. The logic of experimental pedagogical work on the approbation of a transdisciplinary approach in the educational process of undergraduates of the educational program «7M01402 - Music Education» through successive stages of artistic and pedagogical activity reflected the following aspects:

- *Tradition and cultural memory act* as the starting point of a transdisciplinary process that sets the value foundations of artistic and pedagogical activity.

- *Art (musical and visual) acts* as a mediator, transforming traditional cultural meanings into educational forms.

- *Digitalization provides* new ways of artistic expression and interpretation, making it possible to actualize tradition in the context of globalization and modern educational practices.

On this basis, project tasks are formed aimed at integrating traditional and innovative in the educational process to test a transdisciplinary approach in music and art education. For our research in the field of a transdisciplinary approach in music and art education, we have developed project-oriented tasks for undergraduates that should combine the integration of traditional culture, modern digital practices and pedagogical design. Setting such tasks made it possible to implement the key principles of the transdisciplinary approach - the combination of various fields of knowledge, the formation of new forms of pedagogical experience and the development of students' ability to cultural reflection.

In the course of solving these tasks, undergraduates did not just study the material, but were involved in the creation of educational and cultural products based on a transdisciplinary approach. This format made it possible to provide conditions for the active involvement of students in research and creative activities, which corresponds to modern principles of art education and is the most important methodological base in the retraining of future specialists. Table 1 shows the formulated tasks, their goals and expected results (See tab. 1).

Table 1 – Project-oriented tasks for undergraduates

<i>Project task</i>	<i>Aim</i>	<i>Expected result</i>
Analysis of cultural memory through art	To explore national musical and artistic traditions as carriers of cultural memory	Multimedia project (digital exhibition, installation), demonstrating cultural codes
Integration of tradition and digital technologies	Comprehend cultural heritage through modern digital tools	Digital project (audio editing, VR/AR interpretation, visualization of traditional material)
Case study «Musical portrait of national heritage»	Create an educational case combining music, folklore, and visual materials	An educational case for pedagogical practice reflecting the role of music as a cultural code
The project «Tradition and Modernity»	Combine classical heritage and modern forms of art education	Group teaching module with elements of intercultural dialogue and innovative practices
Transdisciplinary educational product	Integrate musical, visual and digital art into a single lesson structure	A developed lesson cycle/lesson that stimulates creativity, collaboration and reflection
Reflective project «Art as a cultural mediator»	To show the role of art in the preservation and actualization of national values	An essay, video project, or presentation that reveals the mediative function of art

The implementation of project assignments leads to the creation of an educational product (training cases, digital projects, multimedia presentations), which enriches the pedagogical arsenal and has shown that a project-oriented learning format stimulates undergraduates to take an active research position, develops transdisciplinary analysis skills and contributes to the formation of professional identity. Of particular importance were projects related to the understanding of cultural memory, where traditional artistic material became the basis for digital interpretation and pedagogical reinterpretation. The final result is the formation of the competencies of a new generation of teachers: cultural reflexivity, the ability to transdisciplinary synthesis, creative and critical thinking, as well as possession of digital means of artistic transformation. The interrelation of these stages of artistic and pedagogical activity on the introduction of a transdisciplinary approach in the educational process of undergraduates is shown in Figure 1.

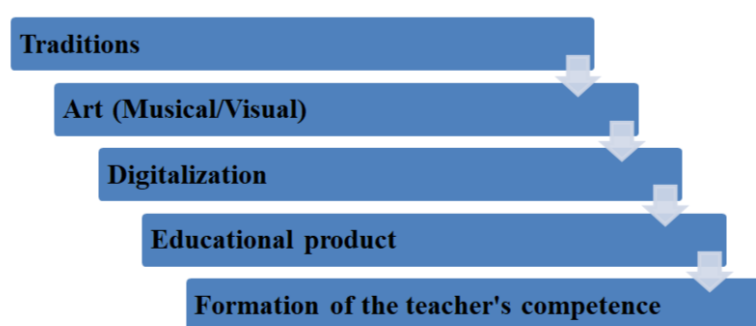


Figure 1 – Practical implementation of the transdisciplinary approach in the educational process of undergraduates

Based on the results of the classes, diagnostics was carried out in order to obtain data on the effectiveness of the introduction of a transdisciplinary approach into the educational process of the master's degree program. To assess the effectiveness of this approach, four interrelated criteria were identified. The first was a *cultural-reflective criterion* aimed at identifying the level of students' understanding of cultural memory, national values, as well as the ability to interpret cultural heritage by means of art. This criterion made it possible to determine the degree of formation of cultural reflection,

understanding of the historical and cultural context and the ability to integrate national values into artistic and educational activities. Methods of interviewing and questioning undergraduates, as well as content analysis of reflective materials and creative works were used to evaluate it.

The next one was a *transdisciplinary criterion* that characterizes the ability of students to integrate musical, visual and digital art within a single educational space. Particular attention was paid to the level of transdisciplinary thinking, the ability to establish relationships between different areas of artistic knowledge and to apply an integrated approach to the development of educational projects. The evaluation of this criterion was carried out through pedagogical supervision and expert evaluation of the completed project work.

The third criterion was the *creative design criterion*, reflecting the level of formation of undergraduates' ability to develop and implement author's artistic and educational projects based on a transdisciplinary approach. This criterion assessed the ability to generate original ideas, apply creative methods in solving pedagogical and artistic problems, as well as the ability to design educational practices that integrate various types of art and modern forms of cultural communication. Particular importance was attached to independence in project activities, the ability to artistically interpret cultural materials and create innovative educational products. Methods of analysis of design work, expert assessment of creative tasks, as well as presentation and protection of copyright projects were used for diagnostics.

The fourth was the *digital-artistic criterion*, aimed at identifying students' proficiency in modern digital technologies in the field of art and education. This criterion made it possible to determine the degree of formation of skills in using digital tools to create, process and present artistic content, as well as the ability to integrate digital resources into the educational process. An important indicator was the willingness of undergraduates to use multimedia, interactive and digital platforms in artistic and pedagogical activities. The evaluation of the digital-artistic criterion was carried out through the analysis of digital creative works, observation of the practical activities of students, as well as an expert assessment of the level of proficiency in specialized programs and digital educational resources.

The results of the study revealed the positive dynamics of the development of the studied indicators after the introduction of transdisciplinary educational cases and project-oriented tasks in the educational process of undergraduates. The analysis of the initial data showed that before the start of the experimental work, the majority of students demonstrated an average level of formation of the criteria under study.

The lowest indicators were recorded according to the *digital-artistic criterion* ($M = 49.4 \pm 5.1$), which indicated insufficient use of digital means of artistic interpretation and limited experience in integrating digital technologies into educational practice. If we take into account the indicators of the *transdisciplinary criterion*, it shows the overall average level ($M = 51.8 \pm 4.9$), and it shows that the synergistic approach to music, visual and digital art is somewhat more relevant to its capabilities. The *cultural-reflective criterion* was characterized by a value of ($M = 55.3 \pm 5.2$) which indicated the presence of basic ideas about cultural memory and national values in art education, but revealed insufficient depth of their artistic and pedagogical understanding.

The indicators of the *creative design criterion* were ($M = 53.6 \pm 5.6$) reflecting limited experience in designing transdisciplinary educational products. After the implementation of the project-oriented cases and the introduction of a transdisciplinary approach, statistically significant changes were identified in all the indicators studied (See Table 2).

Table 1. Results before and after the intervention

Criteria	Before the intervention of the $M \pm SD$ experiment	After the intervention of the $M \pm SD$ experiment	Increase
cultural-reflective	55.3 ± 5.2	84.7 ± 4.1	+ 29.4
transdisciplinary	51.8 ± 4.9	82.4 ± 3.8	+ 30.6
creative-design	53.6 ± 5.4	86.2 ± 4.3	+ 32.6
digital-artistic	49.4 ± 5.1	85.8 ± 4.0	+ 36.4

From the obtained results, statistical processing of the research results was carried out in the IBM SPSS Statistics software package. Descriptive statistics methods were used to analyze the data: arithmetic mean (M), standard deviation (SD), percentage analysis, and comparative data processing. The effectiveness of the implementation of the transdisciplinary approach was assessed according to four criteria: cultural-reflective, transdisciplinary, creative-design and digital-artistic. To determine the statistical significance of the changes, the paired Student's criterion - test (t) was used, which was calculated using the formula:

$$t = \frac{d}{Sd/\sqrt{n}}$$

Here, where «d» is the average difference between the indicators before and after the experiment. «Sd» is the standard deviation of the differences; n is the sample size. The calculation was carried out according to four criteria under study: cultural-reflective, transdisciplinary, creative-design and digital-artistic. The results showed a statistically significant increase in indicators for all criteria: cultural-reflective (t = 22.37; p < 0.05), transdisciplinary (t = 24.67; p < 0.01), creative-design (t = 25, 16; < 0, 01) and digital artistic (t = 26, 94; < 0, 01). Consequently, the results showed a statistically significant increase in all the studied indicators (p<0.05), which indicates the effectiveness of introducing a transdisciplinary approach to the training of undergraduates in music and art education.

Consequently, the proposed scheme visualizes the progressive relationship between cultural tradition, modern technologies and pedagogical development, which confirms the productivity of a transdisciplinary approach in music and art education, ensuring not only a practice-oriented result, but also the in-depth development of the competencies of future art teachers. The presented stages demonstrate that tradition and cultural memory serve as the starting point of the educational process, in which art serves as a mediator, and digital technologies open up opportunities for new artistic interpretation. On this basis, project assignments are formed, the result of which is an educational product that contributes to the formation of a whole range of competencies among future teachers: cultural reflexivity, value attitude to national heritage; the ability to transdisciplinary synthesis and design educational cases.; creative and critical thinking; mastery of digital tools of artistic expression.

Thus, the conducted analysis allows us to identify three main forms of art participation in transdisciplinary educational initiatives. It should be emphasized that these positions do not pretend to be a normative definition of the degree of participation or the model of involvement of art in transdisciplinary education. On the contrary, they are intended to serve as a heuristic tool for further reflection, critical analysis, and practical experimentation. We suggest only considering the proposed positions as guidelines that can be adapted to the specifics of a particular transdisciplinary collaboration, taking into account which forms of participation are most relevant at certain stages of joint activity and the boundaries between them may shift depending on the dynamics of a particular training, its goals, participants and context of implementation.

Discussion. The analysis of literary sources was carried out in several directions, which provided an integrated and multifaceted approach to studying the state of the problem under study. One of the key directions is the characterization of the phenomenon of transdisciplinarity in modern scientific discourse. A term that was introduced into scientific use at one time by despite certain differences in her interpretation, is considered by scientists as a form of knowledge integration, involving the interpenetration of concepts, methods and approaches from various disciplines, thereby forming a special level of meta-knowledge (Bedir Erişti, & Freedman, 2024). In current foreign research, transdisciplinarity is mainly represented by two directions. The first focuses on the epistemological aspects of this phenomenon and is related to the development of the theory of knowledge. The second direction focuses on the methodological support of complex socio-humanitarian projects, where a transdisciplinary approach acts as a tool for solving multidimensional problems (Garcia, 2023).

Currently, the phenomenon of transdisciplinarity has received a fairly wide coverage in the scientific literature. In particular, in a number of studies, if we look, for example, at the works of R. Garcia and B.

Nicolescu (Garcia, 2023; Nicolescu, 2024), the most common interpretations of this concept are presented. However, a single, generally accepted definition of transdisciplinarity has not yet been formed, which indicates the ongoing theoretical and methodological understanding of this phenomenon.

Within the framework of this study, it seems appropriate to identify the differences between such close but fundamentally different concepts as interdisciplinarity, multidisciplinary (or multidisciplinary) and transdisciplinarity. These forms of scientific interaction reflect the different stages and levels of development of integrative research in modern science.

Thus, according to E.N. Knyazeva, multidisciplinary (the term multidisciplinary is more often used in international practice) is a «non-integrative coexistence of disciplines», within which each scientific field retains its own terminology and theoretical attitudes, without undergoing significant changes and without entering into qualitative interaction with other disciplines (Knyazeva, 2011). In turn, V.S. Moki emphasize that even when working with a holistic research object, a multidisciplinary approach requires scientists to adhere to the framework of the dominant scientific paradigm (Mokij & Luk'janova, 2024).

In contrast, transdisciplinary presupposes a deeper level of interaction between disciplines, manifested in the exchange of knowledge, methodological approaches and scientific language. This ensures mutual enrichment and contributes to the formation of a productive synthesis of theoretical positions, practical solutions and technological developments within the framework of a common research context.

When transcending traditional academic and institutional structures, transdisciplinarity begins to function as a temporary integrative mechanism and acts as a collective «pivot» capable of forming a sense of common ground for communities and groups in a state of constant dynamics, redefinition and transformation. In the context of art education, where creative, research, and pedagogical processes are closely interrelated and interpenetrate, the unifying function of transdisciplinarity is the emergence of flexible, adaptive, and innovation-oriented educational practices capable of responding to rapidly changing cultural, social, and institutional conditions (Kakimova et al., 2025).

The position of art in transdisciplinary educational initiatives is one of the key research issues aimed at identifying the role and functions of art in the framework of art education. A number of studies identify three main positions that determine the status of art in a transdisciplinary educational context. The first position is instrumentalized, in which art is considered primarily as a utilitarian and applied resource that serves as support for the implementation of educational tasks. In this case, artistic and musical practices are subordinated to the goals of other disciplines and are used as a means of visualization, motivation or communication. The second position reflects a transdisciplinary framework in which art acts as the central structure-forming basis. Here, it not only initiates an educational case, but also defines the methodological and substantive framework for transdisciplinary interaction. The third position understands art as a transdisciplinary approach that promotes deep integration and transformation of knowledge between disciplines. In this case, art becomes a mediator and a catalyst for changes in the very structure of the educational process, forming new ways of thinking and practice (Burnard et al., 2022).

The differences between the highlighted positions of art in transdisciplinary educational initiatives can be interpreted as reflecting different degrees of involvement in the transdisciplinary process. For a deeper analysis of the presented approaches, it is advisable to rely on M. Mobjörk's research (Mobjörk, 2010), which clarifies the general understanding of transdisciplinarity through the typologization of roles performed by participants in transdisciplinary interaction. In particular, the author suggests a distinction between consultative and participatory forms of transdisciplinarity, which is a useful analytical tool for interpreting the differences between the positions under consideration. The first and second positions correspond to the consultative type of transdisciplinarity, where participants who do not belong to the academic environment are invited to participate in the research process, but their role is limited to responding to the already set research framework and goals. As M. Mobjörk emphasizes, in this case such participants «play the role of responders responding to an already conducted study» (Mobjörk, 2010).

At the same time, the second position demonstrates a certain shift towards an alternative approach. Here, art ceases to be an exclusively supportive element and acquires an autonomous status: it forms its own research perspectives, defines the framework of cases, and initiates transdisciplinary interaction on its own grounds, rather than those established solely by the academic community. In this sense, the second position represents a transitional form between consultative and participatory transdisciplinarity, approaching the latter in terms of subjectivity and influence on the formation of research practice. The results of the conducted pedagogical experiment indicate that the inclusion of transdisciplinary cases in the process of training future music teachers has a complex impact on the development of professional and universal competencies. Undergraduates involved in the project-oriented exploration of cultural phenomena at the intersection of musical, visual and digital art have demonstrated a significant increase in the ability to transdisciplinary synthesis, creative thinking and cultural reflection. A particularly important result was the willingness of students to interpret and actualize traditional artistic material in digital and transdisciplinary forms, which confirms the productivity of combining cultural memory with modern educational practices (Nowotny et al., 2001).

The discussion of the obtained results allows us to highlight the transdisciplinary potential of art as an educational mediator, which is consistent with the conclusions of foreign researchers Nowotny H., Scott P., Gibbons M., Scholz R.W., G. Steiner who consider transdisciplinary imagination as the basis of pedagogical innovations and transdisciplinary educational cooperation (Scholz et al., 2006; Scholz & Steiner, 2015). In this context, art acts as the core of the educational process, creating conditions for the generation of new forms of knowledge and pedagogical practice. Projects related to the understanding of cultural memory and national heritage have acquired particular importance in the experimental work. Music and art in general performed the function of a «sounding memory» and a cultural mediator, which is confirmed by research in the field of transdisciplinarity and philosophy of science (Mukeeva & Kakimova, 2025; Burnard et al., 2022). The use of such practices allowed students to actualize their value attitude towards traditions and form a stable professional and cultural identity.

Equally important was the integration of digital technologies, which expanded the possibilities of artistic interpretation. Projects based on the use of VR/AR tools, multimedia platforms and artificial intelligence technologies have demonstrated the potential of digitalization in art education, which corresponds to international research in this field (Scholz et al., 2006). In addition, during the execution of the project tasks, educational products (educational cases, multimedia projects, digital installations) with educational, methodological, cultural and semantic value were obtained. This result is consistent with the practice of transdisciplinary initiatives described in the framework of the Connected Art educational programs, combining artistic and scientific approaches into a single pedagogical system (Scholz & Steiner, 2015).

Consequently, experimental data confirm the productivity of a transdisciplinary approach in music and art education. At the same time, it is necessary to take into account the methodological limitations of the experiment, associated with a small sample and the use of self-assessment techniques. A promising area of future research is to expand the sample, apply longitudinal strategies and cross-cultural comparisons, which will allow for a deeper identification of the educational and cultural potential of transdisciplinary practices.

Conclusion. The conducted research has confirmed the effectiveness of the transdisciplinary approach in music and art education, demonstrating its ability to integrate cultural heritage, art and modern digital practices into a single educational space. The inclusion of project-oriented tasks allowed the undergraduates to form a set of professional competencies: cultural reflexivity, the ability to transdisciplinary synthesis, pedagogical design skills, mastery of digital tools of artistic interpretation. The analysis of the data obtained showed that tradition and cultural memory act as fundamental foundations, art performs a mediative function, digitalization provides new forms of expression, and project tasks are transformed into educational products with educational, methodological, cultural and semantic value. This conclusion is consistent with international studies that emphasize the role of transdisciplinary imagination and innovative forms of education, the importance of art as a carrier of cultural memory, as well as the potential of digitalization in the transformation of art education.

Thus, the transdisciplinary approach can be considered as a promising model for the development of music and art education, providing a synthesis of tradition and innovation in the training of teachers of the new generation.

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