THE EFFECTIVENESS OF USING INTERACTIVE METHODS IN TEACHING ARTS

LA EFICACIA DEL USO DE MÉTODOS INTERACTIVOS EN LA ENSEÑANZA DE LAS ARTES

Olena Martynenko [1*]
E-mail: marynaolk3@gmail.com
ORCID: https://orcid.org/0000-0001-8056-4380
Mariia Klepar [2]
E-mail: KleeparM25@gmail.com
ORCID: https://orcid.org/0000-0003-1671-3710
Olena Shevtsova [3]
E-mail: O.n.shevstsova2@gmail.com
ORCID: https://orcid.org/0000-0002-5318-5286
Tetiana Stratan-Artyshkova [4]
E-mail: TiStrataan@gmail.com
ORCID: https://orcid.org/0009-0008-1379-8302
Iryna Boiko [5]
E-mail: boiiikoIr@gmail.com
ORCID: https://orcid.org/0000-0002-3951-678X
[1] Berdyansk State Pedagogical University, Zaporizhzhia, Ukraine.
[2] Vasyl Stefanyk Prykarpattia National University, Ivano-Frankivsk, Ukraine.
[3] Volodymyr Vynnychenko Central Ukrainian State University, Kropyvnytskyi, Ukraine.
[4] Volodymyr Vynnychenko Central Ukrainian State University, Kropyvnytskyi, Ukraine.
[5] Pavlo Tychyna Uman State Pedagogical University, Uman, Ukraine.
*Corresponding author

ABSTRACT

Modern art education requires effective approaches that promote the development of creative potential and improve the quality of learning. The aim of the study was to determine the effectiveness of interactive methods in teaching arts. The research employed the following methods for this purpose: a pedagogical experiment, observation, questionnaire survey, testing, standardized questionnaires (Creative Self-Efficacy Scale, Academic Motivation Scale – College Version, Kaufman Domains of Creativity Scale, Art Judgment Test). Correlation analysis, analysis of variance (ANOVA) and Mann-Whitney test were used to process the results. The study showed a significant increase in the creative competencies level after the implementation of interactive methods. The average indicator increased from 3.2 ± 0.8 to 4.4 ± 0.5 ($p < 0.01$). Positive dynamics were also recorded in the development of artistic and analytical thinking. The average value increased from 3.2 ± 0.7 to 4.3 ± 0.5 ($p < 0.01$). The intrinsic motivation level increased from 3.2 to 4.3, extrinsic — from 3.5 to 4.1. The amotivation indicator decreased from 2.8 to 2.1. The effectiveness of individual interactive methods was established. The highest results were demonstrated by project activities (4.5 ± 0.4), followed by workshops (4.2 ± 0.5) and discussions (3.9 ± 0.6). The practical use of the results is to introduce interactive methods into the curricula of art subjects. The results can also become the basis for the development of methodological recommendations and teacher training programmes. Research prospects are related to the analysis of the long-term impact of interactive technologies. It is appropriate to expand the sample to include students of other majors. An important direction is to study the effectiveness of interactive methods in distance and blended learning.

Keywords:

interactive methods, art subjects, creative competencies, artistic and analytical thinking, learning motivation, art education.

RESUMEN

La educación artística moderna requiere enfoques efectivos que promuevan el desarrollo del potencial creativo y mejoren la calidad del aprendizaje. El objetivo del estudio fue determinar la efectividad de los métodos interactivos en la enseñanza de las artes. La investigación empleó

los siguientes métodos para este propósito: un experimento pedagógico, observación, encuesta de cuestionario, pruebas, cuestionarios estandarizados (Escala de Autoeficacia Creativa, Escala de Motivación Académica - Versión Universitaria, Escala de Dominios de Creatividad de Kaufman, Prueba de Juicio Artístico). Se utilizaron análisis de correlación, análisis de varianza (ANOVA) y la prueba de Mann-Whitney para procesar los resultados. El estudio mostró un aumento significativo en el nivel de competencias creativas después de la implementación de métodos interactivos. El indicador promedio aumentó de 3.2 ± 0.8 a 4.4 ± 0.5 (p < 0.01). También se registraron dinámicas positivas en el desarrollo del pensamiento artístico y analítico. El valor promedio aumentó de 3.2 ± 0.7 a 4.3 ± 0.5 (p < 0.01). El nivel de motivación intrínseca aumentó de 3,2 a 4,3, el extrínseco de 3,5 a 4,1. El indicador de desmotivación disminuyó de 2,8 a 2,1. Se estableció la efectividad de los métodos interactivos individuales. Los resultados más altos se demostraron con actividades de proyecto (4,5 ± 0,4), seguidos de talleres (4,2 ± 0,5) y debates (3,9 ± 0,6). El uso práctico de los resultados es introducir métodos interactivos en los currículos de las asignaturas de arte. Los resultados también pueden convertirse en la base para el desarrollo de recomendaciones metodológicas y programas de formación docente. Las perspectivas de investigación están relacionadas con el análisis del impacto a largo plazo de las tecnologías interactivas. Es apropiado ampliar la muestra para incluir a estudiantes de otras especialidades. Una dirección importante es estudiar la efectividad de los métodos interactivos en el aprendizaje a distancia y combinado.

Palabras clave:

métodos interactivos, materias artísticas, competencias creativas, pensamiento artístico y analítico, motivación para el aprendizaje, educación artística.

INTRODUCTION

In the face of dynamic social changes, the modern educational process requires the active implementation of innovative approaches that can ensure effective students' preparation for professional activity. One of the key areas of improving teaching methods in higher education institutions (HEIs) is the use of interactive methods (Buehl, 2023). These methods are aimed at enhancing cognitive activity, developing creative potential and practical competencies. This is especially relevant in teaching arts that require the integration of theoretical knowledge, artistic experience, and creative skills (Simamora, 2020).

Art education is focused on developing of artistic and figurative thinking, aesthetic taste, skills in interpreting works of art, and creating one's own creative projects (Hawari & Noor, 2020). Traditional methods based on the

reproductive type of learning are giving way to innovative technologies, among which interactive approaches occupy a leading place. The use of interactive methods contributes to increasing the efficiency of learning material, enhances students' cognitive activity and creates conditions for the implementation of the principles of personally oriented learning (Hwang & Chang, 2023). In the context of art subjects, this enables productive interaction of participants in the educational process, promotes the development of communication skills and collective creative activity skills.

The appropriateness of introducing interactive methods in teaching art disciplines is due to the need to form professional competencies necessary for future professional activity in the field of culture and art (Zhai & Wibowo, 2023). Project work, discussion platforms, workshops, trainings, creative laboratories ensure the comprehensive development of the cognitive, emotional-value and activity spheres of the personality (Lai, 2021). These forms contribute to the integration of theoretical knowledge with practical experience, the formation of the ability to reflect, independent analysis of artistic activity, and the creation of original artistic projects (Dewey, 2024).

An interactive approach in art education provides not only optimization of the assimilation of educational material, but also stimulates the development of critical thinking (Winner, et. al., 2020). An important feature of interactive methods is the orientation towards subject-subject interaction. This implies an equal partnership between the teacher and the student in the process of creating an artistic product (Kolomiiets et al. 2025).

In view of the need to prepare a competitive specialist in the field of art, the use of interactive methods is considered a necessary condition for improving the quality of art education (Bilan et al., 2024). This necessitates a thorough study of the effectiveness of interactive technologies, determining their impact on the results of educational activities and students' creative development.

Despite the large number of studies confirming the effectiveness of interactive methods in various fields of education, the specifics of their application in teaching arts remain poorly studied. The peculiarities of the organization of creative activity, the variability of the content of art programmes and the diversity of forms of artistic expression require the development of adapted approaches to interactive learning in this area. This creates a need for a detailed study of how interactive methods affect the development of creative competencies and artistic thinking.

A comprehensive analysis of the effectiveness of interactive technologies in art education was carried out to identify optimal methodological solutions, contribute to the improvement of educational programmes, and improve the

EDITORIAL
UNIVERSO SUR

quality of training specialists for activities in the modern cultural space. The aim of the study is to determine the effectiveness of the use of interactive methods in teaching arts in HEIs. The aim involved the fulfilment of the following research objectives:

1. Identify the level of students' creative competencies before and after the introduction of interactive methods.

2. Assess the impact of interactive technologies on the development of artistic and analytical thinking and creative activity skills.

3. Investigate the dynamics of students' learning motivation in the process of using interactive forms of work.

4. Establish the effectiveness of individual interactive methods (project activities, workshops, discussions) in improving the quality of learning of art subjects.

Literature Review

The features of the development of creative competencies in teaching arts have been studied by researchers from different countries, who identified effective approaches to integrating interactive methods into learning. Tomljenović (2020) studied the cognitive aspects of interactive learning in visual arts. He found that active interaction contributes to the development of students' imaginative thinking and creative self-realization. This is understandable, because interactive activities activate analytical processes. However, this approach does not take into account adaptability to changes in the educational environment.

In contrast, Li, et al. (2021) considered a hybrid model of art education that combines online and offline interaction. They found that interactive methods help to maintain learning motivation even in crisis conditions. This model is more effective than the Tomljenović approach, as it ensures the sustainability of the educational process.

Kim & Song (2021) analysed the impact of interactive cooperation on student satisfaction with learning. They proved that high-quality interactive methods stabilize the learning process across formats. This makes their approach more flexible than the Tomljenović model, which works only in the classroom format. However, Kim and Song's methodology does not take into account working with visual models.

In this aspect, the approach of He (2020), who studied interactive visualization schemes in art education, seems more effective. He proved that schemes help to analyse artistic phenomena and develop artistic thinking. However, this method is inferior to Li's hybrid learning, as it focuses on visual structures only.

González-Zamar & Abad-Segura (2020) studied the role of virtual reality (VR) in art education. They found that digital environments expand the possibilities of artistic experimentation and professional training. This method is more effective than He's model, as it provides deeper interaction. However, its implementation depends on access to technology.

Sajnani et al. (2020) analysed aesthetic presence in the training of art therapists. They proved that the integration of artistic practices enhances students' emotional involvement. This approach is broader than the Tomljenović model, as it affects not only the cognitive level, but also personal development. At the same time, it is less technological than the González-Zamar method.

Comparative analysis confirmed the different effectiveness of interactive methods. The Tomljenović approach develops imaginative thinking, but is less adaptive than the Li model. The Kim and Song method ensures the stability of learning, but does not take into account visual perception. The schemes developed by He G. help to analyse art, but are inferior to Li's hybrid learning. González-Zamar's VR creates new educational opportunities, but depends on technical resources. The Sajnani's approach enhances emotional immersion, although it is less effective in the technological aspect.

Wu et al. (2023) studied the impact of self-regulation strategies in learning using spherical video in VR in the study of art history. They found that the combination of an interactive environment and self-organization of learning increases students' academic performance. This method also contributes to better mastery of complex historical and art concepts. This is consistent with the findings of Liu et al. (2021), who studied the integration of multimedia tools into art education. They emphasized that digital technologies enhance student interest and create conditions for active work with art materials. Liu's method is broader than Wu's approach, as it includes not only VR but also multimedia tools. However, Wu's method is more effective in developing self-regulation, which is critical for creative activity.

Szubielska et al. (2021) investigated the influence of physical context and awareness of artworks on the aesthetic experience of interacting with interactive installations. They proved that knowledge about the artwork and the way it is presented affects the emotional perception of art. This confirms the role of cognitive factors in the artistic experience. However, this approach does not take into account the possibilities of interactive methods to compensate for the lack of prior knowledge. The difference between their study and the work of Wu and Liu is that it focuses more on the influence of context, rather than on interactive technologies.

Li (2024) developed an ML-based interactive assessment system for teacher education. He proved that such a system increases the objectivity of assessment and stimulates student activity. Compared to the studies of Wu and Liu, which focus on the learning process, Li's approach is more focused on the automation of assessment. This method has advantages for accurately measuring knowledge, but the subjective aspect of assessment is decisive in art education. Because of this, the Li system is less effective in assessing creative outputs, which require qualitative analysis rather than just an algorithmic approach.

The analysis of earlier studies related to building of students' creative competencies through interactive methods in art education revealed a number of contradictions and unexplored aspects. In particular, some authors emphasize the advantages of using digital technologies and VR to increase the effectiveness of learning. The results regarding the influence of different types of interactive methods on the level of students' independence and reflection also remain ambiguous, which requires further clarification.

The issues of adapting interactive technologies to the specifics of art subjects remain poorly studied. There is also a lack of empirical research into the long-term impact of interactive methods on the professional development of future specialists in the field. These contradictions and gaps in studies confirm the appropriateness of conducting a comprehensive research of the effectiveness of interactive methods in the context of teaching arts.

MATERIALS AND METHODS

Research Design

The first stage involved sampling of participants from among art students who were engaged in research activities at their HEIs. The second stage provided for an initial diagnostics of the level of artistic and analytical thinking, creative skills and learning motivation to determine the initial level of creative competencies of the study participants. At the third stage, a set of interactive teaching methods was introduced, which included project activities, discussion platforms, role-playing games, workshops, and integrated classes. They were implemented during one academic semester in accordance with a previously developed programme. The fourth stage was a final diagnostic to record changes in the indicators of the development of creative competencies, as well as to analyse the effectiveness of the interactive technologies used. At the fifth stage, mathematical processing of the obtained results was carried out using statistical methods to assess the impact of interactive methods on the quality of training of art students.

Sample

The study was conducted from September 2023 to June 2024 at HEIs that train specialists in the field of art education (Table 1). The total number of participants was 212 people, including 178 women and 34 men aged 18 to 23. This gender distribution is determined by the specifics of the selected majors, which are characterized by a predominance of female audiences. This is due to the high interest in art subjects among women, which is historically observed in professions related to pedagogy, music, fine arts, as well as decorative and applied arts. The sample was formed by random selection from among students studying in art educational programmes and who voluntarily agreed to participate in the study. The sample was formed by the research team in agreement with representatives of the administration of HEis, as well as coordinators of academic groups.

Table 1: Distribution of study participants by HEIs.

Item No.	HEI	Structural unit	Share of participants from the total number, %
1	Berdyansk State Pedagogical University	Department of Theory and Methods of Teaching Arts	24 %
2	Pavlo Tychyna Uman State Pedagogical University	Instrumental Performance Department	26 %
3	Volodymyr Vynnychenko Central Ukrainian State University	Art Education Department	25 %
4	Vasyl Stefanyk Precarpathian National University	Department of Primary Education and Educational Innovations	25 %

Source: developed by the authors

The inclusion criteria for the sample were studying in art majors, lack of experience in the systematic application of interactive methods in previous educational practice. The age limits of the selected group are justified by the fact that this period of training is key for the formation of professional identity and active development of creative competencies. The total sample size was determined taking into account the need to ensure the representativeness of the results and the possibility of conducting statistical analysis with due reliability.

All study participants provided written voluntary consent to participate in research procedures after detailed familiarization with the purpose, objectives, research methodology and conditions for personal data processing. Diagnostic activities were carried out in the presence of a practical psychologist, who monitored compliance with ethical standards. The psychologist also provided psychological support and assistance to participants in case of emotional difficulties or increased stress during testing.

Research Methods

The study employed a set of empirical methods that provided a multi-level analysis of the effectiveness of interactive methods in teaching arts. The methods included standardized questionnaires, a pedagogical experiment, an observation method, as well as quantitative and qualitative data processing methods. The use of these methods ensured high validity and reliability of the obtained results to reasonably assess the impact of interactive technologies on the development of students' creative competencies.

The following standardized questionnaires were used to collect primary data:

1. Creative Self-Efficacy Scale — to assess students' confidence in their own creative abilities and readiness to implement creative solutions in the educational process (Karwowski, 2011).

2. Academic Motivation Scale – College Version (AMS-C 28) – to determine the level of intrinsic and extrinsic learning motivation, which gave grounds to analyse the leading motivational factors in learning art subjects (Vallerand et al., 1992).

3. Kaufman Domains of Creativity Scale (K-DOCS) – to study the effectiveness of group interaction during creative tasks and assess the contribution of each participant to the collective result (Kaufman, 2012).

4. Art Judgment Test – to study the level of development of artistic and analytical thinking, which involved the analysis of works of art, the formation of interpretations and the justification of aesthetic judgments (Silvia, 2013).

4. Art Judgment Test – to study the level of development of artistic and analytical thinking, which involved the analysis of works of art, the interpretations and the substantiation of aesthetic judgments (Silvia, 2013).

The method of the pedagogical experiment was used for testing the effectiveness of interactive technologies in the educational process and included the summative and formative stages. At the summative stage, the initial level of development of students' creative competencies was determined. At the formative stage, the purposeful implementation of interactive methods and further analysis of their impact were carried out.

Observation was used for systematic monitoring of the educational activities of participants during classes in art subjects. This made it possible to record the features of their behaviour, activity and level of involvement in group creative work.

Quantitative methods included the use of statistical procedures such as correlation analysis, ANOVA, and Mann-Whitney test (significance level $p < 0.05$). The Mann-Whitney test was applied to compare the indicators of the experimental group (EG) and the control group (CG) before and after the implementation of interactive methods, which provided the opportunity to assess statistically significant differences between independent samples. Qualitative methods provided an in-depth analysis of the dynamics of creative activity, as well as artistic and analytical thinking, revealing the features of the influence of interactive technologies on the development of professional competencies in the field of art education.

Instruments

The study used IBM SPSS Statistics software to perform statistical analysis, ANOVA, and Mann-Whitney test. Python (matplotlib, seaborn, and panda's libraries) was used to visualize data and create graphical representations of the results. This ensured the accuracy of statistical data processing and the convenience of their further analysis.

RESULTS

The level of students' creative competencies before and after the implementation of interactive methods was determined through diagnostics using the Creative Self-Efficacy Scale questionnaire. The Mann-Whitney test was used to check the statistical significance of the differences between the indicators before and after the experiment. The results are given in Table 2.

Table 2: Level of creative competencies before and after the implementation of interactive methods (according to the Creative Self-Efficacy Scale).

The Creative Self-Efficacy Scale items	Before implementation (M ± SD)	After implementation (M ± SD)	Mann-Whitney U-test	p-value
I think I am good at coming up with new ideas	3.1 ± 0.8	4.2 ± 0.6	1023.0	< 0.01
I have confidence in my ability to solve problems creatively	3.0 ± 0.9	4.3 ± 0.5	987.5	< 0.01
I am good at finding creative ways to overcome challenges	2.9 ± 0.7	4.1 ± 0.6	1008.0	< 0.01
I feel comfortable thinking outside the box	3.2 ± 0.8	4.4 ± 0.5	965.0	< 0.01
I believe I can generate innovative solutions	3.0 ± 0.9	4.3 ± 0.5	980.0	< 0.01
I am confident in applying creative skills in practice	3.1 ± 0.8	4.2 ± 0.6	990.5	< 0.01
I often suggest original approaches in group work	3.2 ± 0.7	4.4 ± 0.5	960.0	< 0.01
I can easily adapt my ideas to different tasks	3.0 ± 0.9	4.3 ± 0.5	975.5	< 0.01
I am persistent in developing creative projects	2.8 ± 0.8	4.1 ± 0.6	1005.0	< 0.01
I find inspiration in solving complex problems	3.1 ± 0.9	4.2 ± 0.5	995.0	< 0.01

Source: developed by the authors based on the obtained results

Analysis of the obtained results indicates significant positive changes in the level of students' creative competencies after the introduction of interactive methods into the educational process. An increase in the average values for all items of the questionnaire indicates a significant improvement in students' confidence in their own creative abilities, as well as the ability to think outside the box and apply creative solutions in practical activities.

The most significant changes are observed in the item "I feel comfortable thinking outside the box", where the average indicator before the experiment was 3.2 ± 0.8. It increased to 4.4 ± 0.5 (U = 965.0, p < 0.01) after the introduction of interactive methods. This indicates that interactive technologies contributed to the development of flexible thinking and overcoming students' barriers regarding the use of non-standard creative approaches. A similar trend is observed in the statement "I often suggest original approaches in group work" (M = 3.2 ± 0.7 → 4.4 ± 0.5, U = 960.0, p < 0.01). This indicates an increase in students' activity in generating new ideas in teamwork.

Positive changes were also recorded in the item "I am confident in applying creative skills in practice". The initial mean value of 3.1 ± 0.8 increased to 4.2 ± 0.6 after the experiment (U = 990.5, p < 0.01). This indicates that interactive methods contributed not only to the development of creative abilities, but also to the formation of students' confidence in their implementation in the professional sphere.

The assessment of the sustainability of creative skills in the long run showed a significant improvement in the item "I am persistent in developing creative projects". The mean value increased from 2.8 ± 0.8 to 4.1 ± 0.6 (U = 1005.0, p < 0.01). This indicates the development of students' persistence in implementing their own creative ideas. There is also a positive trend in the item "I find inspiration in solving complex problems" (M = 3.1 ± 0.9 → 4.2 ± 0.5, U = 995.0, p < 0.01). This may indicate an increase in students' motivation to solve complex creative tasks through the use of interactive methods.

In general, the Mann-Whitney test showed statistically significant differences between the groups before and after the experiment (p < 0.01 for all items). This confirms the effectiveness of interactive methods in the development of creative competencies. The results show not only an increase in students' confidence in their creative abilities, but also their more proactive position in the educational process.

So, the use of interactive methods in teaching arts provides a positive dynamic of creativity development, increases students' adaptability to non-standard tasks and contributes to the long-term learning motivation. The obtained results confirm the appropriateness of using such methods as a key element of the educational process for future specialists in the art field.

The impact of interactive technologies on the development of students' artistic and analytical thinking and their creative activity skills was assessed through diagnostics using the Art Judgment Test. The statistical significance of the differences between the indicators before and after the experiment was determined by applying the Mann-Whitney test. The generalized results are given in Table 3.

Table 3: The level of development of artistic and analytical thinking, as well as creative activity skills before and after the introduction of interactive methods (according to the Art Judgment Test).

Art Judgment Test items	Before implementation (M ± SD)	After implementation (M ± SD)	Mann-Whitney U-test	p-value
I can analyse the composition of artworks	3.0 ± 0.7	4.1 ± 0.6	1015.0	< 0.01
I can identify the artistic techniques used	3.1 ± 0.8	4.2 ± 0.5	980.0	< 0.01
I am able to interpret symbolic elements in art	2.9 ± 0.9	4.0 ± 0.6	995.5	< 0.01
I can compare different artistic styles	3.2 ± 0.7	4.3 ± 0.5	960.0	< 0.01
I can evaluate the emotional impact of an artwork	3.0 ± 0.8	4.1 ± 0.6	985.0	< 0.01
I can justify my assessment of artistic quality	3.1 ± 0.9	4.2 ± 0.5	970.5	< 0.01
I easily find connections between art and culture	2.8 ± 0.8	4.0 ± 0.6	1000.0	< 0.01
I can describe the historical context of artworks	3.0 ± 0.7	4.1 ± 0.5	990.5	< 0.01
I recognize innovative elements in artistic works	2.9 ± 0.9	4.2 ± 0.6	975.0	< 0.01
I critically assess the originality of artworks	3.1 ± 0.8	4.3 ± 0.5	965.5	< 0.01

Source: developed by the authors based on the obtained results

The analysis of the obtained results showed a significant increase in the level of students' artistic and analytical thinking after the introduction of interactive methods. Positive dynamics are observed for all test items, which confirms the complex influence of interactive technologies on the students' ability of analyse works of art, interpret their content and evaluate artistic value.

The greatest increase in mean values was recorded in the statement "I can compare different artistic styles", where the indicator increased from 3.2 ± 0.7 to 4.3 ± 0.5 ($U = 960.0$, $p < 0.01$). This indicates the improvement of skills in comparative analysis of artistic styles, which is the result of working with interactive tasks aimed at identifying stylistic features of different artistic directions.

A noticeable improvement was also recorded in the students' ability to justify their assessment of the artistic quality of works ("I can justify my assessment of artistic quality", $M = 3.1 \pm 0.9 \rightarrow 4.2 \pm 0.5$, $U = 970.5$, $p < 0.01$), as well as to critically analyse the originality of works of art ("I critically assess the originality of artworks", $M = 3.1 \pm 0.8$ 4.3 ± 0.5, $U = 965.5$, $p < 0.01$). This indicates the activation of reflective processes and the development of critical thinking in the process of performing creative tasks.

Significant progress is also observed in the ability to interpret symbolism in art ("I am able to interpret symbolic elements in art", $M = 2.9 \pm 0.9 \rightarrow 4.0 \pm 0.6$, $U = 995.5$, $p < 0.01$), as well as to establish relationships between art and cultural contexts ("I easily find connections between art and culture", $M = 2.8 \pm 0.8 \rightarrow 4.0 \pm 0.6$, $U = 1000.0$, $p < 0.01$). This demonstrates the strengthening of cognitive processes associated with the complex analysis of artistic phenomena, which became possible thanks to the active use of interactive forms of learning.

All the obtained differences between the indicators before and after the use of interactive technologies are statistically significant ($p < 0.01$). This confirms the effectiveness of such methods for the development of artistic and analytical thinking, as well as the development of sustainable creative activity skills. The systematic use of interactive technologies in the educational process contributes to a deeper understanding of artistic phenomena, increasing the ability to reasoned evaluation of works. The obtained results confirm that interactive methods are a powerful means of developing artistic and analytical competencies, ensuring the development of deeper reflective abilities.

The dynamics of students' academic motivation were studied through a comparative analysis using the Academic Motivation Scale – College Version (AMS-C 28). The mean values before and after the experiment were used to assess statistical changes, which are summarized in Figure 1.

Fig 1: Dynamics of students' learning motivation when using interactive forms of works
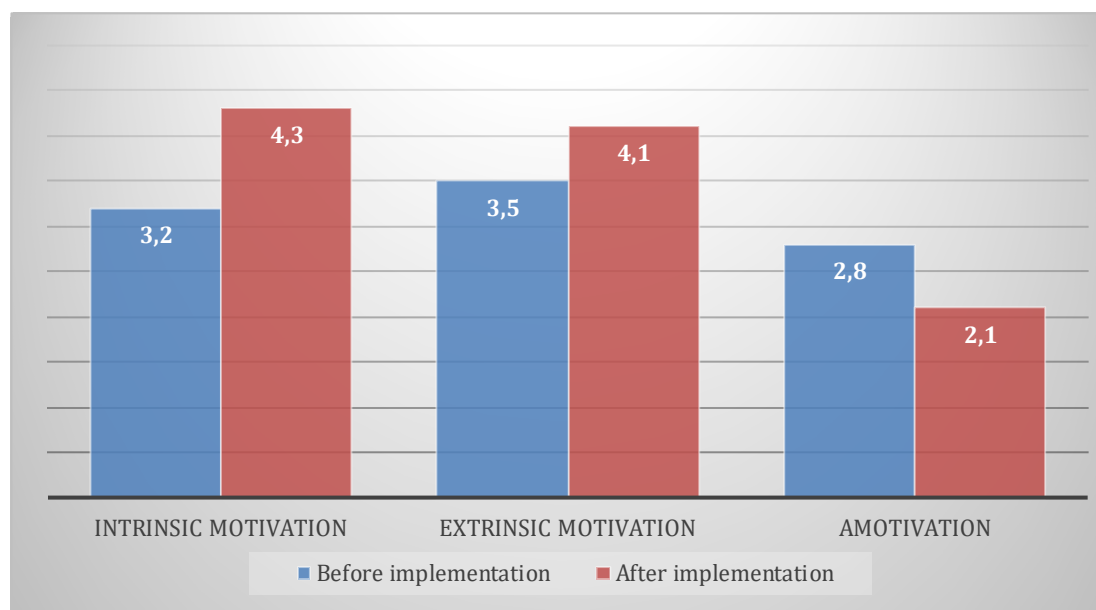
Source: developed by the authors based on the obtained results

The analysis of the presented results indicates a positive dynamics of the level of students' learning motivation after the introduction of interactive methods. The most pronounced changes are observed in the growth of the Intrinsic Motivation, the mean value of which increased from 3.2 to 4.3. This indicates enhanced students' interest in educational activities, the development of their independence, and the desire to deepen their knowledge of art subjects without focusing on external stimuli. This result is explained by the fact that interactive forms of work stimulate cognitive activity, creativity and make students to feel the value of their own ideas in collective work.

Significant positive changes were also recorded in the Extrinsic Motivation level, which increased from 3.5 to 4.1. This indicates that, along with intrinsic motivations, the orientation towards social and material incentives, such as grades, praise from teachers and achieving noticeable results in learning, is also maintained. The growth of extrinsic motivation may be associated with increased students' responsibility within collective tasks.

The tendency to decrease the Amotivation level, which fell from 2.8 to 2.1 is of particular importance. This indicates a decrease in indifference to the educational process, avoidance of situations of academic passivity and loss of interest in subjects. The use of interactive technologies made it possible to ensure the students' inclusion in the educational process through their active participation in discussions, group projects and creative tasks, which contributed to overcoming educational apathy.

In general, the results confirm the effectiveness of interactive forms of work as a tool for enhancing learning motivation. They maintain interest in art subjects, and also create conditions for the formation of deep intrinsic motivation. This ensures the sustainable development of students' professional competencies and promotes their active participation in the educational process.

The effectiveness of individual interactive methods in improving the quality of learning art subjects was determined by a comparative analysis of the results of students' knowledge of educational material. Final assessments of knowledge, skills and abilities were used after the implementation of each of the methods to record changes. A statistical analysis was also conducted using the Mann-Whitney test. The data are summarized in Figure 2.

Fig 2: The effectiveness of interactive methods in improving the quality of learning of art subjects\s
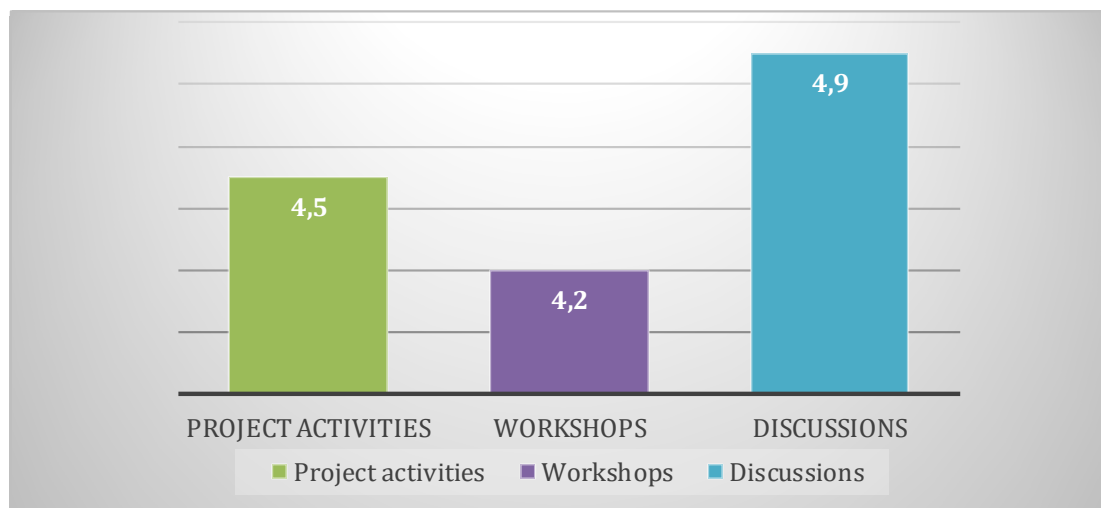
Source: developed by the authors based on the obtained results

The analysis of the results showed that all three interactive methods contributed to improving the quality of learning of the educational material, but their impact was expressed to varying degrees. The highest indicators were achieved through the use of project activities, the average result of which was 4.5 ± 0.4 points, which significantly exceeds the indicators of other methods. This confirms the effectiveness of the project form of organizing learning in the context of art education. It involves long-term creative work, independent search for solutions and the implementation of original ideas. This ensures deep assimilation of theoretical material and the development of practical skills.

The second most effective result was demonstrated by workshops with an average of 4.2 ± 0.5 points. This indicates the high effectiveness of practically oriented forms of work that enable students to directly interact with a master teacher.

Discussions, although they showed positive dynamics compared to traditional methods, had slightly lower results (3.9 ± 0.6 points). This is explained by their orientation mainly on the development of analytical and critical thinking, rather than on the development of practical skills. However, their contribution to the qualitative learning of the subjects turned out to be important in the context of the development of the ability to substantiate one's own point of view, analyse artistic phenomena, and conduct professional discussions.

The statistical analysis conducted using the Mann-Whitney test confirmed statistically significant differences between the results of applying different methods ($p < 0.01$). This gives grounds to state their effectiveness in improving the quality of learning the educational material. The highest level of success was provided by those forms of work that involved students' intensive creative activity, involvement in independent solving of practical tasks and interaction in the team. The obtained results demonstrate the appropriateness of systematic use of project activities, workshops and discussions in learning of art subjects.

DISCUSSION

The obtained results confirm the effectiveness of interactive methods in the development of creative competencies, artistic and analytical thinking, as well as enhancing learning motivation. The identified positive changes are consistent with the study of Cherevatiuk (2024). The author emphasizes the importance of integrating innovative technologies into art education to activate creative thinking. This coincides with the obtained data, where the use of project activities and workshops significantly increased students' creative indicators. Both approaches indicate the importance of combining technological and practice-oriented teaching methods.

Enhanced learning motivation also reflects the effectiveness of active interaction in the creative process. This is consistent with the findings of Havik & Westergård (2020), who emphasize the role of communication in shaping student engagement. This study confirms that discussions and group projects increase intrinsic motivation. This suggests that interaction between students is a key factor in effective learning in art subjects.

The organization of distance interaction also showed a positive impact. This correlates with the findings of Baber (2022), who proved that interactive methods ensure the effectiveness of learning regardless of the format of classes. In this study, students who worked in a mixed format demonstrated a higher level of knowledge of the material. Therefore, the obtained data confirm the universality of interactive methods in traditional and digital education.

Project activities in art education turned out to be one of the most effective methods. This is consistent with the study of Hawari & Noor (2020), who proved the effectiveness of project-based learning in STEAM education. The authors note that complex projects contribute to deep learning of the material. In this study, students involved in creative projects showed higher results, which confirms the superiority of this method in art education.

Student satisfaction with the learning process was also higher when interactive methods were used. This correlates with the study by Wong & Chapman (2023), who established a direct relationship between the level of satisfaction with learning and the quality of interaction. Our study recorded that interactive methods not only increase academic performance, but also create a positive learning atmosphere. This confirms the need for active communication and student involvement in art education.

Students' creative abilities increased significantly after working with integrated creative tasks. This is consistent with the study by Tsai et al. (2020). The authors proved that interdisciplinary projects contribute to the development of creative thinking and enhanced learning motivation. Our study recorded a similar trend: students who worked in the format of interdisciplinary interaction demonstrated a higher level of creative development.

Baraldi (2023) investigated variations in interactive classroom activities and their impact on the educational system. The author found that structural changes in communication between teachers and students improve learning. This is consistent with the data that we obtained, where active communication increased the level of learning motivation. However, Baraldi's study does not consider the specifics of art education, where interaction is more emotional and creative in nature.

Böheim et al. (2020) analysed the role of student hand raising as an indicator of motivation in the classroom. They proved that active participation in the learning process correlates with the overall level of engagement and academic performance. This is confirmed by our findings, where students who actively participated in group projects demonstrated higher levels of learning. At the same time, the study by Böheim et al. focused on traditional forms of learning, while practical activities and experimentation are more important in artistic subjects.

Kaur et al. (2020) investigated the use of augmented reality (AR) to enhance student motivation. They found that interactive technologies contribute to improving the learning experience and student engagement. This is consistent with our findings, where multimedia and digital techniques contributed to active learning of the material. However, in art education, not only the visual component is important, but also tactile interaction, which limits the effectiveness of AR technologies in certain contexts.

Liu et al. (2022) analysed the impact of virtual reality on academic performance and student motivation in natural sciences. They found that the VR environment reduces cognitive load and improves the assimilation of complex material. This is consistent our findings, where interactive digital technologies contributed to the development of creative thinking. However, the method of Liu et al. is more focused on exact sciences, while in art education emotional experience and personal perception are important.

The research hypothesis that interactive methods contribute to the improvement of creative competencies, the development of artistic and analytical thinking and the growth of educational motivation of art students was confirmed. The obtained results showed statistically significant changes in the levels of knowledge of the material, the students' active involvement in the creative process and the formation of their cognitive and emotional skills. The practical use of these results involves the introduction of interactive methods, such as project-based learning, workshops and digital technologies, into art education programmes. This will improve the quality of training of future specialists, make the educational process more flexible and effective, and also promote the development of students' innovative thinking

Research Limitations

A limitation of the study is that the sample of students covered only certain arts HEIs. This may affect the representativeness of the results for other majors or educational contexts. An additional limitation is the female predominance in the research group, which could have affected the general trends in the formation of creative competencies and learning motivation.

Recommendations

The results of the study confirm the appropriateness of systematically introducing interactive methods into art education. Project activities, workshops and discussions are effective. They contribute to the development of creative competencies, artistic and analytical thinking, as well

as enhance learning motivation. It is recommended to combine different interactive forms of work.

CONCLUSIONES

The need to improve teaching methods of art subjects determines the relevance of studying the impact of interactive technologies on the development of creative competencies, artistic and analytical thinking, as well as enhancing students' academic motivation. The obtained results showed statistically significant changes ($p < 0.01$) in all studied indicators. The average level of creative competencies increased. The indicator "I feel comfortable thinking outside the box" increased from 3.2 ± 0.8 to 4.4 ± 0.5. The value of "I am confident in applying creative skills in practice" increased from 3.1 ± 0.8 to 4.2 ± 0.6. The level of artistic and analytical thinking also improved. According to the Art Judgment Test, the ability to compare artistic styles increased from 3.2 ± 0.7 to 4.3 ± 0.5. The ability to assess the originality of works of art increased from 3.1 ± 0.8 to 4.3 ± 0.5. Learning motivation improved significantly. Intrinsic motivation increased from 3.2 to 4.3, extrinsic — from 3.5 to 4.1. The amotivation level decreased from 2.8 to 2.1. This confirms the effectiveness of interactive methods in art education.

Furthermore, the effectiveness of individual interactive methods was proven: project activities (4.5 ± 0.4), followed by master classes (4.2 ± 0.5) and discussions (3.9 ± 0.6) showed the highest results. So, interactive methods ensure not only an increase in the level of creative and analytical skills, but also form high learning motivation and improve the quality of learning art subjects.

The practical use of the results involves the introduction of interactive methods into art education. Project activities, workshops, and discussions are effective. They contribute to the development of students' creative competencies, artistic and analytical thinking, as well as learning motivation. Further research may focus on the analysis of the long-term impact of interactive methods on the development of students' creative competencies. It is appropriate to expand the sample to include other educational institutions and majors.

REFERENCES

Baber, H. (2022). Social interaction and effectiveness of the online learning–A moderating role of maintaining social distance during the pandemic COVID-19. *Asian Education and Development Studies, 11*(1), 159-171. https://doi.org/10.1108/AEDS-09-2020-0209

Baraldi, C. (2023). Structural variations of classroom interaction: Implications for the education system. *International Studies in Sociology of Education, 32*(3), 740-761. https://doi.org/10.1080/09620214.2021.1902371

Bilan, V. V., Hromadsky, R. A., & Yaloha, T. O. (2024). Stimulating critical thinking through innovative approaches in art education: a systematic review. *Pedagogical Academy: Scientific Notes, 7*. https://doi.org/10.57125/pedacademy.2024.06.29.08

Böheim, R., Knogler, M., Kosel, C., & Seidel, T. (2020). Exploring student hand-raising across two school subjects using mixed methods: An investigation of an everyday classroom behavior from a motivational perspective. *Learning and Instruction, 65*. https://doi.org/10.1016/j.learninstruc.2019.101250

Buehl, D. (2023). *Classroom strategies for interactive learning*. Routledge. https://doi.org/10.4324/9781032680842

Cherevatyuk, V. (2024). Using artificial intelligence tools in art education: problems and opportunities. *Bulletin of the National Academy of Fine Arts and Architecture, 1*, 89-94. https://doi.org/10.32782/naoma-bulletin-2024-1-13

Dewey, J. (2024). Art as experience. In G. Bakke & M. Peterson (editors). *Anthropology of the Arts* (pp. 37-45). Routledge. https://doi.org/10.4324/9781003578123

González-Zamar, M. D. & Abad-Segura, E. (2020). Implications of virtual reality in arts education: Research analysis in the context of higher education. *Education Sciences, 10*(9). https://doi.org/10.3390/educsci10090225

Havik, T. & Westergård, E. (2020). Do teachers matter? Students' perceptions of classroom interactions and student engagement. *Scandinavian journal of educational research, 64*(4), 488-507. https://doi.org/10.1080/00313831.2019.1577754

Hawari, A. D. M. & Noor, A. I. M. (2020). Project based learning pedagogical design in STEAM art education. *Asian Journal of University Education, 16*(3), 102-111. http://doi.org/10.24191/ajue.v16i3.11072

He, G. (2020). Schema interaction visual teaching based on smart classroom environment in art course. *International Journal of Emerging Technologies in Learning (IJET), 15*(17), 252-267. https://doi.org/10.3991/ijet.v15i17.16441

Hwang, G. J. & Chang, C. Y. (2023). A review of opportunities and challenges of chatbots in education. *Interactive Learning Environments, 31*(7), 4099-4112. https://doi.org/10.1080/10494820.2021.1952615

Karwowski, M. (2011). It doesn't hurt to ask ...But sometimes it hurts to believe: Polish students' creative self-efficacy and its predictors. *Psychology of Aesthetics, Creativity, and the Arts, 5*, 154-164. https://doi.org/10.1037/a0021427

Kaufman, J. C. (2012). Counting the muses: Development of the Kaufman Domains of Creativity Scale (K-DOCS). *Psychology of Aesthetics, Creativity, and the Arts, 6*(4), 298–308. https://doi.org/10.1037/a0029751

Kaur, D. P., Mantri, A. & Horan, B. (2020). Enhancing student motivation with use of augmented reality for interactive learning in engineering education. *Procedia Computer Science, 172*, 881-885. https://doi.org/10.1016/j.procs.2020.05.127

Kim, K. C. & Song, J. H. (2021). The Impact of Interaction of Art Education in the Era of Pandemic on Satisfaction and Behavioral Intent: Focusing on Online and Offline Comparisons. *Journal of the Korea Convergence Society, 12*(9), 99-111. https://doi.org/10.15207/JKCS.2021.12.9.099

Kolomiyets, V. A., Savastru, N. I., & Shevchenko, G. V. (2025). Art education as a tool for developing creative potential: modern approaches. *Pedagogical Academy: scientific notes, 14*. https://doi.org/10.5281/zenodo.14789424

Lai, A. (2021). Creating project-based learning for online art classrooms. *Journal of Effective Teaching in Higher Education, 4*(1), 94-108. https://doi.org/10.36021/jethe.v4i1.66

Li, D. (2024). An interactive teaching evaluation system for preschool education in universities based on machine learning algorithm. *Computers in Human behavior, 157*. https://doi.org/10.1016/j.chb.2024.108211

Li, Q., Li, Z., & Han, J. (2021). A hybrid learning pedagogy for surmounting the challenges of the COVID-19 pandemic in the performing arts education. *Education and Information Technologies, 26*(6), 7635-7655. https://doi.org/10.1007/s10639-021-10612-1

Liu, Q., Chen, H., & Crabbe, M. (2021). Interactive study of multimedia and virtual technology in art education. *International Journal of Emerging Technologies in Learning (iJET), 16*(1), 80-93. https://doi.org/10.3991/ijet.v16i01.18227

Liu, R., Wang, L., Koszalka, T. A., & Wan, K. (2022). Effects of immersive virtual reality classrooms on students' academic achievement, motivation and cognitive load in science lessons. *Journal of Computer Assisted Learning, 38*(5), 1422-1433. https://doi.org/10.1111/jcal.12688

Sajnani, N., Mayor, C., & Tillberg-Webb, H. (2020). Aesthetic presence: The role of the arts in the education of creative arts therapists in the classroom and online. *The Arts in psychotherapy, 69*. https://doi.org/10.1016/j.aip.2020.101668

Silvia, P. J. (2013). Art Expertise and the Knowledge Emotions. *Empirical Studies of the Arts, 31*(1), 21–37. https://doi.org/10.2190/EM.31.1.f

Simamora, R. M. (2020). The Challenges of online learning during the COVID-19 pandemic: An essay analysis of performing arts education students. *Studies in Learning and Teaching, 1*(2), 86-103. https://doi.org/10.46627/silet.v1i2.38

Szubielska, M., Imbir, K., & Szymańska, A. (2021). The influence of the physical context and knowledge of artworks on the aesthetic experience of interactive installations. *Current Psychology, 40*(8), 3702-3715. https://doi.org/10.1007/s12144-019-00322-w

Tomljenović, Z. (2020). The cognitive aspect of interactive learning and teaching in visual arts education. *Journal of elementary education, 13*(2), 131-152. https://doi.org/10.18690/rei.13.2.131-152.2020

Tsai, M. N., Liao, Y. F., Chang, Y. L., & Chen, H. C. (2020). A brainstorming flipped classroom approach for improving students' learning performance, motivation, teacher-student interaction and creativity in a civics education class. *Thinking Skills and Creativity, 38*. https://doi.org/10.1016/j.tsc.2020.100747

Vallerand, R. J., Pelletier, L. G., Blais, M. R., Brière, N. M., Senécal, C., & Vallières, É. F. (1992). The Academic Motivation Scale: A measure of intrinsic, extrinsic, and amotivation in education. *Educational and Psychological Measurement, 52*(4), 1003–1017. https://doi.org/10.1177/0013164492052004025

Winner, E., Hetland, L., Veenema, S., Sheridan, K., & Palmer, P. (2020). Studio thinking: How visual arts teaching can promote disciplined habits of mind. In P. Locher, C. Martindale, & L. Dorfman. *New directions in aesthetics, creativity and the arts* (pp. 189-206). Routledge. https://doi.org/10.4324/9781315224084

Wong, W. H. & Chapman, E. (2023). Student satisfaction and interaction in higher education. *Higher education, 85*(5), 957-978. https://doi.org/10.1007/s10734-022-00874-0

Wu, W. L., Hsu, Y., Yang, Q. F., Chen, J. J., & Jong, M. S. Y. (2023). Effects of the self-regulated strategy within the context of spherical video-based virtual reality on students' learning performances in an art history class. *Interactive Learning Environments, 31*(4), 2244-2267. https://doi.org/10.1080/10494820.2021.1878231

Zhai, C. & Wibowo, S. (2023). A systematic review on artificial intelligence dialogue systems for enhancing English as foreign language students' interactional competence in the university. *Computers and Education: Artificial Intelligence, 4*, 1-26. https://doi.org/10.1016/j.caeai.2023.100134