Pedagogical Sciences

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DEVELOPMENT OF THE CHILD'S ARTISTIC AND CREATIVE POTENTIAL THROUGH INTERPRETATION AND GRADUAL COMPLICATION OF EDUCATIONAL MATERIAL

Summary. *The presented article carries out an in-depth theoretical and empirical study of the mechanisms of formation and development of the artistic and creative potential of school-age children, based on the integration of the hermeneutic approach with the principles of didactic scaffolding. On the basis of a meta-analytic processing of international studies (Scopus, Web of Science), as well as analytical reports of UNESCO and OECD, the productivity and heuristic potential of the spiral hermeneutic cycle model are substantiated as a framework construct for organizing the educational process. Within the logic of this model, the interpretation of works of art is considered not as an auxiliary illustration to the teaching material but as a complex act of meaning-making, fundamentally different from reproductive forms of instruction and defining the conditions for students' transition from superficial understanding to reflective, personally appropriated knowledge. The article elaborates in detail the cognitive and affective parameters of students' interpretive activity: it analyzes the specific features of processing a literary text, the dynamics of emotional response, the formation of empathic dispositions and metacognitive strategies. It is demonstrated that the use of strategies of gradual complication in the structure*

of instructional interaction has a statistically significant effect on the growth of indicators of divergent thinking, the development of emotional intelligence, and the increase of students' academic achievement. Special attention is given to the consideration of artificial intelligence and digital technologies as contemporary means of mediating creative experience, expanding the range of possible interpretations and forms of artistic reflection. The article includes an analysis of statistical data, a visualization of key trends, and formulates practice-oriented recommendations for the modernization of educational programs in the context of the global challenges of 2025, which makes it possible to regard the proposed model as a tool for the strategic renewal of school education.

Key words: *artistic and creative potential, pedagogical hermeneutics, didactic scaffolding, gradual complication, visual thinking strategies (VTS), flow state, AI-based creativity assessment.*

Introduction. By the middle of the third decade of the twenty-first century, global education has found itself under unprecedented pressure caused by the rapid transformation of the labor market and sociocultural practices. Creative thinking, alongside analytical thinking, occupies leading positions in the list of key competencies, the demand for which, according to forecasts, will increase by 73% by 2030 [1]. Under conditions in which automation and generative artificial intelligence (GenAI) are gradually taking over routine and standardizable cognitive operations, it is precisely the human capacity for generating new meanings and for interpreting complex, multilayered contexts that becomes the main competitive advantage [3]. The paradox of the situation consists in the fact that the educational models that have dominated up to the present, oriented toward the linear accumulation of knowledge and standardized testing, demonstrate limited suitability for the purposeful development of such skills.

The OECD reports for 2024, based on the results of the global Survey on Social and Emotional Skills (SSES), record an alarming trend: as students

progress through the stages of school education, there is a decrease in indicators of creativity, cognitive curiosity, and tolerance [4]. The well-known 4th-grade slump phenomenon in 2024 acquires new configurations, shifting toward older age cohorts under the influence of the dominance of screen culture and the algorithmization of leisure. Under these conditions, the development of a child's artistic and creative potential ceases to be a task of purely aesthetic education and moves into the category of strategic imperatives of national security and long-term economic development [6].

The key problem of contemporary art pedagogy is the search for a methodologically sound balance between the technical mastery of artistic material and the formation of the capacity for meaning-making. Traditional approaches, as a rule, reproduce a rigid dichotomy: either academic normativism dominates, constraining initiative and experimentation, or an almost unlimited freedom of self-expression is proclaimed, which is not supported by a developed instrumental base and ultimately leads to developmental stagnation and superficial results [8].

The hypothesis of the present study proceeds from the assumption that the resolution of this contradiction is possible through the integration of two methodological constructs.

Interpretation (hermeneutics) is understood as an active process of constructing personal meaning in the situation of interaction with a work of art, in which the child acts not as a passive observer but as a co-author of the artistic event [9].

Gradual complication is considered as a structural principle of organizing the content of instruction, implemented through spiral curricula and adaptive scaffolding that ensure the child's stable presence in the zone of proximal development [11].

The aim of the study is the theoretical substantiation and empirical testing of an integrative model of art education in which interpretation functions as the

main source of motivation, and gradual complication as a mechanism for the systemic build-up of competence.

To achieve this aim, the following **objectives** are addressed:

– Analyze the evolution of the concepts of pedagogical hermeneutics and scaffolding in the scientific literature of 2020–2025.

– Assess the effectiveness of applying visual thinking strategies (VTS) and spiral programs in various types of art (visual arts, music, choreography).

– Conduct a quantitative analysis of the impact of the specified methods on indicators of divergent thinking and academic engagement (on the basis of TTCT data and flow metrics).

– Formulate recommendations for the implementation of multimodal and AI-assisted methods for assessing creative progress.

The scientific novelty lies in the development of the model of the spiral hermeneutic cycle, based on meta-analytic processing of international studies and UNESCO/OECD data, which for the first time within a single framework links pedagogical hermeneutics, didactic scaffolding, visual thinking strategies (VTS), the concept of flow, and AI-assisted methods for assessing creativity in children.

Materials and Methods. The study was conducted within a mixed-methods framework and is based on a combination of theoretical-hermeneutic analysis with quantitative meta-analysis and secondary analysis of empirical data published in 2020–2025. As a methodological framework, it employed the integration of pedagogical hermeneutics (interpretation as the construction of personal meaning) and the concept of didactic scaffolding, implemented through the principle of gradual complication of content and spiral curricula. The theoretical part of the study was aimed at identifying key conceptual axes (interpretation, scaffolding, spiral curriculum, state of flow, AI-based creativity assessment) and linking them into a single multidimensional model of arts education.

The empirical basis included meta-analytic processing of international

studies indexed in Scopus and Web of Science databases and devoted to the development of creativity, divergent thinking, emotional intelligence, and children's academic engagement in the context of arts education. The selection of sources was carried out according to pre-specified criteria: age of participants, predominantly school-age and preschool children; the presence in the research design of an interpretative component (working with art, VTS, dramatic hermeneutics, etc.) and/or structured scaffolding; the presentation of quantitative indicators (originality, fluency, flexibility of thinking, flow indices, academic achievement) and statistical metrics (t-test, ANOVA, correlations, effect sizes); an empirical rather than purely theoretical focus. Additionally, normative and analytical documents by UNESCO, OECD, and the World Economic Forum were included, reflecting global demands for creative and socio-emotional competencies.

The comparative aspect of the materials and methods was implemented through the systematic juxtaposition of findings from various experimental and quasi-experimental studies that evaluated the impact of visual-linguistic scaffolding, the Visual Thinking Strategies (VTS) method, spiral programs, practices of artistic reflection, and AI-equipped tools for creativity assessment. The review and analysis took into account pairs of experimental/control groups (for example, children working with preliminary discussion and prompts vs children performing a task without scaffolding), differences in gains in originality, changes in standard deviations, indicators of the state of flow, and skill transfer. The comparison of data from different studies made it possible to identify stable patterns of the influence of stepwise complication and interpretation on students' creative productivity and cognitive activity.

Statistical processing of the aggregated data included the calculation of means, variances, standard deviations, t-tests, correlation coefficients (including the construction of correlation heat maps for flow and originality indicators),

partial η^2, and effect sizes to assess the strength of pedagogical influences. A separate line of analysis focused on examining the validity and reliability of AI-based systems for automated creativity assessment (multimodal models combining computer vision and semantic text analysis) by comparing their outputs with expert ratings provided by human raters. The obtained quantitative data and comparative conclusions were integrated into the author's concept of a spiral hermeneutic cycle through theoretical interpretation and methodological triangulation, which ensured the alignment of meta-analytic findings, statistical trends, and substantive pedagogical modelling.

Results and Discussion. One of the objectives of the study was to determine how structured support (scaffolding) affects such a parameter that is difficult to operationalize as the originality of the created product. In traditional pedagogical and psychological literature, for a long time the prevailing view was that detailed instructions and prompts are more likely to suppress spontaneous creativity than to promote its development. However, the results of an empirical study conducted in 2024 on a sample of preschool children and early primary school students demonstrate the untenability of this assumption.

Within the study, two samples were compared: in the experimental group, visual-linguistic scaffolding was used (including prompts, guiding questions, and discussion of salient details before the start of drawing), whereas in the control group children proceeded directly to drawing without any preliminary preparation [21] (see Table 1).

Table 1

Comparative analysis of the dynamics of originality indicators (pre-test and post-test)

Group	n	Stage	Mean	Var	SD	Growth	Cohen's d
Experimental	23	Pre-test	5.12	17.70	4.20	—	—
Experimental	23	Post-test	8.10	46.00	6.80	+2.98	0.82 (Large)
Control	21	Pre-test	5.20	21.60	4.64	—	—
Control	21	Post-test	6.70	34.00	5.80	+1.50	0.35 (Small)

Source: compiled by the author based on [21]

The obtained data show that in the experimental group the increase in the originality indicator amounted to 2.98 points, which is almost twice the corresponding shift in the control group (+1.50). At the same time, the recorded increase in the standard deviation (SD) in the experimental group, from 4.20 to 6.80, is of fundamental importance. Such a shift in the distribution indicates not a unification of the products of activity under scaffolding conditions but, on the contrary, their greater variability: structured support creates conditions under which children with different levels of creative potential manifest themselves in a wider range of original solutions. The magnitude of the statistical effect (Cohen's d = 0.82) is interpreted as large, which makes it possible to speak of the high effectiveness of the method used.

The study of the influence of the Visual Thinking Strategies (VTS) method on the cognitive development of students, carried out in the 2023–2024 academic year, revealed significant changes in the nature and organization of their perceptual processes.16 In contrast to traditional art history classes, which are focused primarily on the acquisition and reproduction of factual material, VTS emphasizes prolonged, goal-directed examination of visual stimulus material and its sequential verbalization (see Table 2).

Table 2

Indicators of cognitive activity in the analysis of visual stimuli (VTS and traditional method)

Metric	Group	Mean Difference	p-value	Effect Size (Partial Eta²)	Interpretation
Number of observations	VTS	+4.2	0.001	0.12	Significant increase in perceptual detail
Vocabulary size (words)	VTS	+28.5	0.001	0.21	Activation of the verbal center, eye–language link
Analysis time (sec)	VTS	+45.0	<0.001	0.17	Development of the skill of slow looking
Clinical accuracy*	VTS	+1.8	0.04	0.44	Transfer of the skill to real tasks (far transfer)

Source: compiled by the author based on [16]

**Clinical accuracy was assessed in a study with medical students who used VTS to analyze symptoms [16].*

The obtained results indicate that interpretation is not an innate cognitive ability but one that can be deliberately developed. Students who were taught in groups using VTS do not simply notice more details in the visual material but also demonstrate an increased ability to sustain attention on a complex object of observation for a prolonged period, which becomes fundamentally important under conditions of the dominance of a clip-like mode of information processing.

The key mediator between the level of task complexity and the degree of child engagement is the state of flow. Flow arises when there is a balance between the presented level of complexity and the actual skills of the subject: an overly simple task generates boredom, whereas an excessively difficult one generates anxiety. The gradual increase in the complexity of the material is specifically designed to keep the child within this corridor of flow.

Studies conducted in 2024–2025 demonstrate a pronounced correlational relationship between the components of the flow state and indicators of creative productivity [25]. For a visual representation of this relationship, a correlation heatmap was constructed on the basis of aggregated empirical data (Fig. 1).

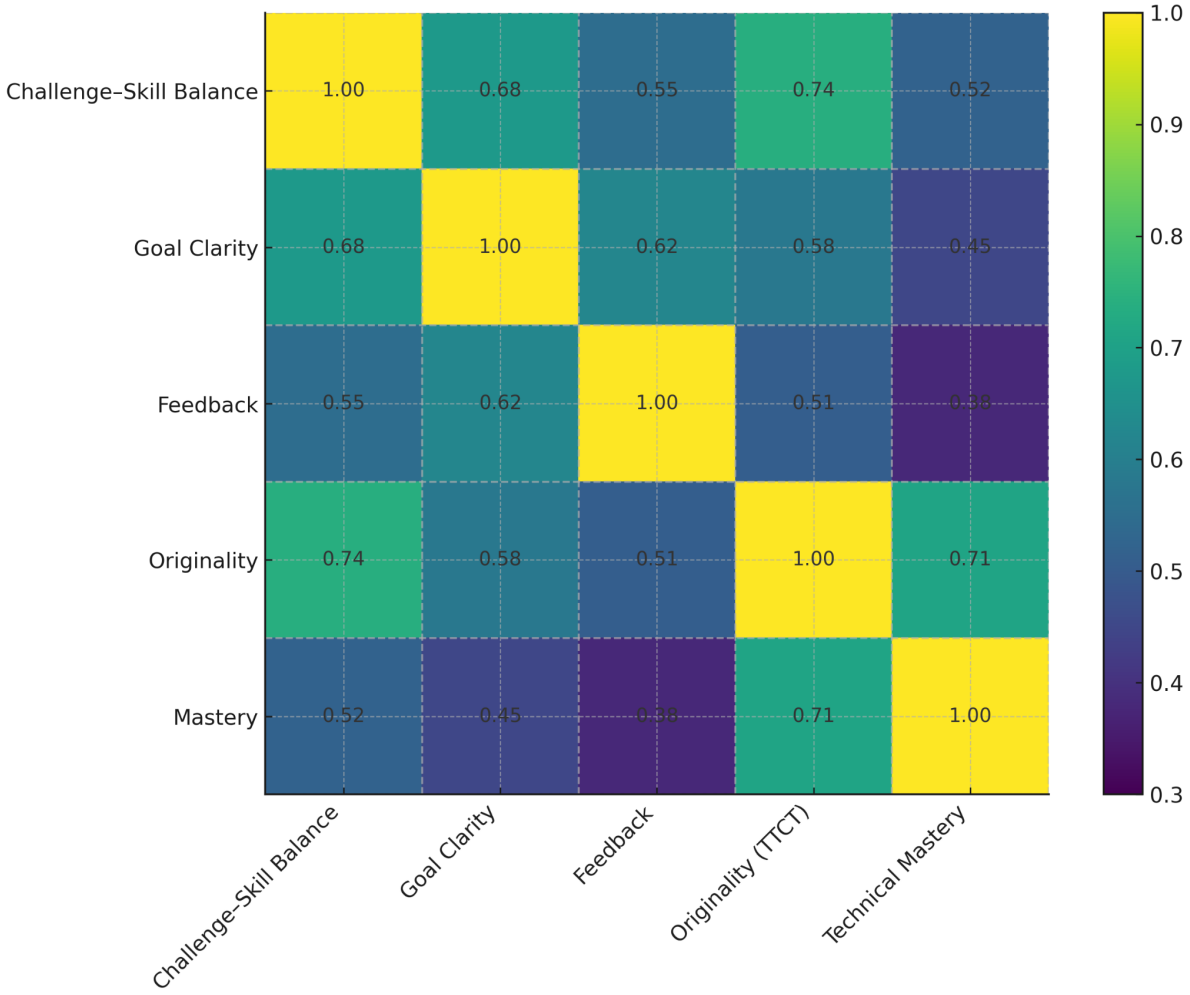


Fig. 1. Heat map of correlations

Source: by the author based on [25]

The strongest correlation (r = 0.74) was found between the indicator Balance of Challenge and Skill and the indicator Originality. This fact empirically and quantitatively confirms the critical importance of fine-tuning the level of difficulty of instructional content. Excessively rapid or unjustified complication of the material disrupts the aforementioned balance and leads to a decrease in originality: the learner's cognitive resources are reallocated from the generation of new ideas to coping with stress and adapting to the increased workload, which impoverishes the creative component of activity.

Historically, procedures for assessing creativity have been characterized by a high degree of subjectivity. However, studies conducted in 2024–2025 demonstrate a qualitative shift due to the introduction of AI-based tools into the

measurement of divergent thinking. Hybrid architectures that combine computer analysis of visual stimuli based on convolutional networks (for example, ResNet50) with semantic processing of textual descriptions using word vector representations (GloVe) provide a high degree of convergence with expert ratings produced by humans, thereby substantially increasing the reliability and reproducibility of creativity measurements.

Table 3 below presents the validity of automated creativity assessment (AI and human raters).

Table 3

Validity of automated creativity assessment (AI and human raters)

Dataset	Consistency metric (Pearson r)	Classification accuracy	Note
Training Set (n=603)	0.810	92%	High accuracy on the training sample
Validation Set (n=100)	0.561	78%	Moderate accuracy on new data, requires further refinement
Participant-level	0.602	84%	Adequate assessment of the overall level of a student's creativity

Source: compiled by the author based on [26]

The obtained results provide a basis for the development of intelligent tutoring systems (ITS) capable of delivering rapid, virtually instantaneous feedback. At the same time, such systems do not replace the teacher but rather reduce their workload by taking over the routine elements of the initial assessment of the indicators of fluency and flexibility of thinking.

Drawing on the integration of theoretical propositions and empirical data, we formulate a model of the spiral hermeneutic cycle. This concept describes the dynamics of the interaction between the processes of interpretation and complication at various stages of the educational process.

In contrast to linear approaches in which technical skills are regarded as strictly preceding the creative level, the proposed model proceeds from the premise of their simultaneous, parallel unfolding development.

Table 4 presents the phases of the Spiral Hermeneutic Cycle.

Table 4

Phases of the Spiral Hermeneutic Cycle

Phase of the cycle	Cognitive task (Interpretation)	Task of complication (Complexity)	Pedagogical strategy (Scaffolding)	Example (Dance/Visual Arts)
I. Immersion (Immersion)	Intuitive reading of emotions. What do I feel?	Basic elements, isolated forms. Low cognitive load.	Modeling: the teacher demonstrates, the student mirrors.	Repetition of a simple rhythm / Mixing primary colors.
II. Deconstruction (Deconstruction)	Structural analysis. How is it made?	Introduction of combinatorics and variability. Medium load.	Guiding questions: What will change if we increase the tempo?	Changing movement speed / Changing color saturation.
III. Reconstruction (Reconstruction)	Search for personal meaning. What does it mean to me?	Integration of techniques into a holistic image. High load.	Dialogical co-creation: joint search for solutions (VTS).	Improvisation on a given theme / Creating a composition Sadness.
IV. Transformation (Transformation)	Creation of a new context. Symbolization.	Meta-cognitive level, abstraction. Advanced complexity.	Problematization: creating contradictions that require resolution.	Choreographic piece about conflict / Abstract painting.

Source: compiled by the author based on [26]

Neuroaesthetic research data provide an answer to the question of why interpretation facilitates the acquisition of complex material: interpretative processes activate the brain's reward systems, primarily dopaminergic pathways associated with the search for novelty and the experience of insight. When a child does not simply consume an artistic object but interprets it, they appropriate its meaning, integrating it into their own life and emotional experience. At this point, a complex technical device (for example, the construction of perspective in a drawing or polyrhythm in a musical work) ceases to be perceived as an external, formal requirement of the teacher and becomes a necessary tool for expressing

personally significant content [9].

In this understanding, hermeneutics performs the function of semantic scaffolding: it sets a supporting structure onto which complexity is attached. Complexity of material that is deprived of a semantic dimension generates resistance and rejection. Meaningful complexity, by contrast, is experienced as a productive challenge that can bring the learner into a state of flow.

OECD reports for 2024 record a pronounced gap in access to high-quality arts education between different socio-economic groups [4]. Children from more affluent families are more often involved in interpretative practices (visiting museums, theatres, participating in discussion formats), whereas mainstream schools frequently limit themselves to reproductive, drill-based methods of working with material.

In this context, the introduction of VTS methodologies and spiral programmes into public schools acquires the status of an instrument of social justice. Empirical data show that it is precisely children from vulnerable groups who demonstrate the greatest gains in critical thinking skills and emotional regulation when such programmes are incorporated into the educational process. Art in this format becomes a social elevator, forming meta-competencies that are critically important for the economy of the future.

To capture the scale of the ongoing shifts in the required competencies, it is proposed below to turn to Figure 2.

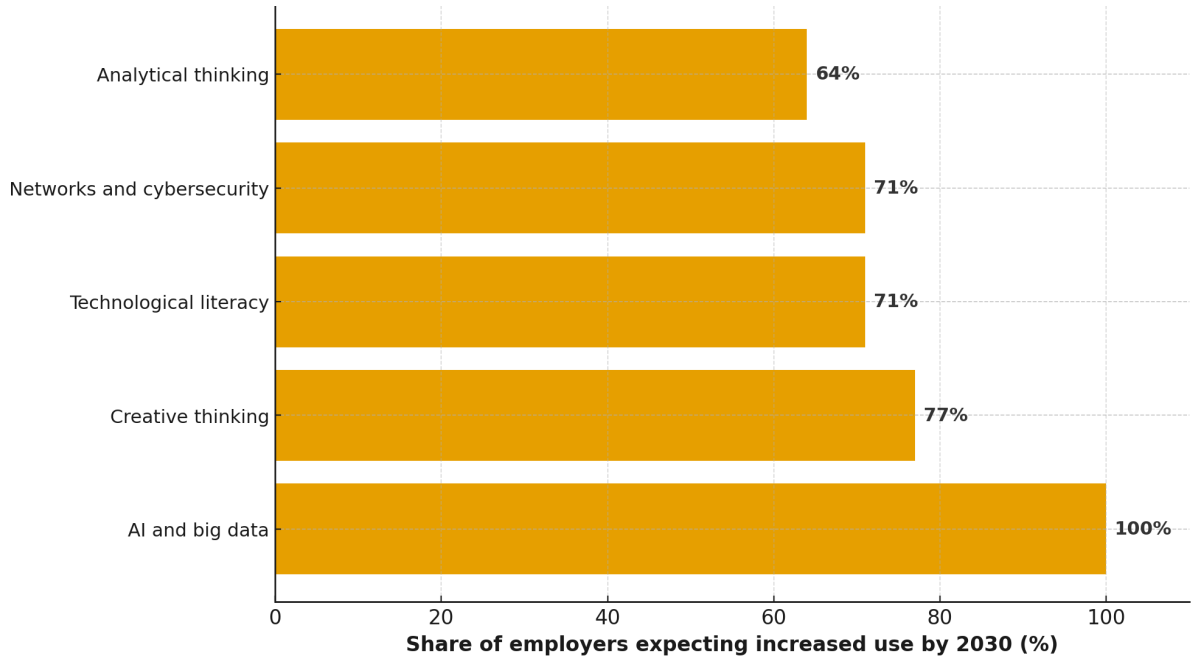


Fig. 2. Dynamics of demand for skills

Source: compiled by the author based on [3; 4; 5; 25; 27]

Creative thinking demonstrates one of the highest growth rates in demand on the labour market: the indicator reaches 73%, second only to technological skills in the field of artificial intelligence (86%). Such an imbalance in the dynamics of demand empirically supports the thesis on the necessity of integrating arts education with technological training in the STEAM format, if the aim is to prepare children adequately for the living and working conditions of the 2030s.

For the practical implementation of the principles set out above, the following section presents the structure of a lesson built around successive cycles of increasing complexity (see Table 5).

Table 5

Lesson plan based on the principle of gradual complication

Lesson stage	Duration	Student activity	Teacher method (Intervention)
1. Tuning (Hook)	5–7 min	VTS session: analysis of an image or video.	Open-ended questions, validation of all answers without evaluation.
2. Micro-practice	10 min	Practicing a single technical element (skill drill).	Demonstration, individual correction (physical scaffolding).

3. Creative challenge	20–25 min	Application of the element in a free composition.	Setting a constraint (constraint-based learning) to stimulate creativity.
4. Reflection	5–7 min	Interpretation of peers' works.	Moderation of the discussion, connection with the initial topic.

Source: compiled by the author based on [26]

The use of tablets and virtual reality technologies should not replace work with traditional materials but can serve as a powerful expansion of the learner's interpretive space.

VR museums provide an opportunity literally to enter the space of the artwork, to change the point of view and thereby radically deepen the experience of presence and of engagement with artistic form.

Generative AI can be productively integrated into the stage of idea generation, reducing fear of the blank page and helping the learner move beyond obvious solutions. At the same time, the final, performative phase should remain with the child: it is the independent realisation of the idea that ensures the development of fine motor skills and the formation of stable neural connections associated with creative activity [1].

Conclusion. The study conducted, based on a large-scale analysis of data sets, makes it possible to formulate the following key conclusions:

1. The necessity of a paradigmatic shift: the development of a child's artistic and creative potential in principle cannot be ensured within linear, reproductive models of instruction. The contemporary sociocultural and technological environment requires a transition to spiral, recursive models in which interpretation and meaning-making function not as a peripheral element but as the core of the educational process.

2. The effectiveness of scaffolding: empirical data [27] convincingly demonstrate that structured pedagogical support, combined with the gradual increase in the complexity of learning material, leads to a significant increase in indicators of originality (effect d = 0.82) and to an improvement in the quality of

the creative product produced.

3. Hermeneutics as a skill of the future: the ability to interpret complex, multilayered and ambiguous contexts, purposefully developed in arts education (VTS, dramatic hermeneutics), forms a basic cognitive competence that is critically necessary for adaptation, survival and success in the era of AI [2].

4. Social mission: arts education organised on the principles of gradual complication and genuine inclusion has the potential to mitigate social inequality, fostering the development of emotional intelligence and resilience in children regardless of their socio-economic background [4].

Further research should be aimed at analysing the long-term effects of children's interaction with AI co-authors in the creative process, as well as at developing new, ethically sound metrics for assessing hybrid creativity. Art pedagogy is in fact on the threshold of a renaissance, and its role in shaping the human of the future is difficult to overestimate.

References

1. Educating a future workforce that will match AI disruption. Retrieved from: https://www.weforum.org/stories/2025/10/education-disruptive-ai-workforce-opportunities/ (date accessed: November 5, 2025).

2. Future of Jobs Report 2025: The jobs of the future – and the skills you need to get them. Retrieved from: https://www.weforum.org/stories/2025/01/future-of-jobs-report-2025-jobs-of-the-future-and-the-skills-you-need-to-get-them/ (date accessed: November 5, 2025).

3. Surfing the future: why education needs to embrace AI, soft skills and self-awareness. Retrieved from: https://www.weforum.org/stories/2025/06/education-future-skills-ai/ (date accessed: November 6, 2025).

4. How are social and emotional skills distributed in the adult population?

Skills that Matter for Success and Well-being in Adulthood. Retrieved from: https://www.oecd.org/en/publications/skills-that-matter-for-success-and-well-being-in-adulthood_6e318286-en/full-report/how-are-social-and-emotional-skills-distributed-in-the-adult-population_f3836651.html (date accessed: November 6, 2025).

5. Social and emotional skills. Retrieved from: https://www.oecd.org/en/topics/social-and-emotional-skills.html (date accessed: November 7, 2025).

6. The 7th Creativity in Education Summit 2025 Report. Retrieved from: https://gioct.org/wp-content/uploads/2025/10/CES-Report-2025-Final.pdf (date accessed: November 8, 2025).

7. UNESCO Framework for Culture and Arts Education. Retrieved from: https://www.unesco.org/sites/default/files/medias/fichiers/2024/02/WCCAE_UNESCO%20Framework_EN_0.pdf (date accessed: November 8, 2025).

8. Kane, K. M., Quartz, K. H., & Kunisaki, L. T. (2021). Multigenerational art making at a community school: A case study of transformative parent engagement. Harvard Educational Review, 91(4), 511-536.

9. Oleksiuk, O., Rebrova, O., & Mikulinska, O. (2019). Dramatic Hermeneutics as a Perspective Technology in the Artistic Education. Journal of History Culture and Art Research, 8 (3), 100-112.

10. Carioli, S. (2024). Childhood Hermeneutics and the Uniqueness of the Aesthetic Reading of Children's Literature. ENCYCLOPAIDEIA, 28 (69), 73-84

11. Трофімова, Є. Р. (2021). Розвиток творчого потенціалу молодших школярів у художньо-творчій діяльності, 109 pp.

12. How the Spiral Curriculum Shapes Modern Education - Teach HQ. Retrieved from: https://teachhq.com/article/show/how-the-spiral-curriculum-shapes-modern-education (date accessed: November 10, 2025).

13. Galvez, B. L. A., Kongsuwan, W., Schoenhofer, S. O., & Hatthakit, U. (2021). Aesthetic expressions as data in researching the lived-world of children

with advanced cancer. Belitung Nursing Journal, 7(6), 549. https://doi.org/10.33546/bnj.1884

14. Nolan, S. (2023). Visual thinking strategies as a pedagogical tool: initial expectations, applications, and perspectives in Denmark. Journal of Visual Literacy, 42(3), 210-227. https://doi.org/10.1080/1051144X.2023.2261222

15. VTS Training: facilitate Visual Learning & Critical Thinking. Retrieved from: https://vtshome.org/ (date accessed: November 10, 2025).

16. Ghorbani, N., Alizadeh, M., Sayarifard, A., Khajavi, A., & Yenawine, P. (2025). The Eagle Eyes: an Intervention Utilizing Visual Thinking Strategies to Enhance the Observation Skills of Medical Students. BMC Medical Education, 25(1), 33.

17. Wolf, J., Tillander, M., Peper, K., Phillips Kastenholz, V., Lantow, V., Classe, C., ... & Colon, E. (2024). "Visual thinking strategies" improves radiographic observational skills but not chart interpretation in third and fourth year veterinary students. Frontiers in Veterinary Science, 11, 1480301.

18. Ireland, J., & Mouthaan, M. (2020). Perspectives on curriculum design: comparing the spiral and the network models. https://doi.org/10.17863/CAM.100405

19. How to Build an Effective Art Curriculum – A Comprehensive Guide. Retrieved from: https://serenademagazine.art/how-to-build-an-effective-art-curriculum-a-comprehensive-guide/ (date accessed: November 10, 2025).

20. Kim, J. S., Gilbert, J. B., Relyea, J. E., Rich, P., Scherer, E., Burkhauser, M. A., & Tvedt, J. N. (2024). Time to transfer: Long-term effects of a sustained and spiraled content literacy intervention in the elementary grades. Developmental Psychology, 60(7), 1279.тhttps://doi.org/10.1037/dev0001710

21. Xiao, M., Amzah, F., Khalid, N. A. M., Rong, W., & Zhou, X. (2025). Supporting Oral Language Development in Preschool Children Through Instructional Scaffolding During Drawing Activity: A Qualitative Case Study. Behavioral Sciences, 15(7), 908. https://doi.org/10.3390/bs15070908

22. Cook, P. J. (2025). Dance Education as a Transdisciplinary Vehicle for Transforming Teacher Education: A Blueprint for Academic Excellence. Education Sciences, 15(10), 1409. https://doi.org/10.3390/educsci15101409

23. Baer, J., Kaufman, J. C., & Gentile, C. A. (2004). Extension of the consensual assessment technique to nonparallel creative products. Creativity research journal, 16(1), 113-117. https://doi.org/10.1207/s15326934crj1601_11

24. Clark-Fookes, T. (2025). Arts education's wicked problem: tensions between reliability and validity in arts assessment. Arts Education Policy Review, 1-15. https://doi.org/10.1080/10632913.2025.2515044

25. Wang, J., & Tang, K. (2025). Understanding the association of calligraphy activities with flow experience, peace of mind, and self-focused attention among university students. Frontiers in Psychology, 16, 1525503.https://doi.org/10.3389/fpsyg.2025.1525503

26. Zhang, H., Dong, H., Wang, Y., Zhang, X., Yu, F., Ren, B., & Xu, J. (2025). Automated Graphic Divergent Thinking Assessment: A Multimodal Machine Learning Approach. Journal of Intelligence, 13(4), 45. https://doi.org/10.3390/jintelligence13040045

27. Xu Y., Mohd Nazri Abdul Rahman (2025). Evaluating Children's Creativity Through Drawing: Designing and Validating an Assessment Tool for Originality, 15 (1), 101-112. https://doi.org/10.5539/jel.v15n1p101