

Integration Of Innovative Methods And Digital Tools In Developing The Art-Pedagogical Abilities Of Pre-Service Primary School Teachers

Roziya Xasan qizi Bo'ltakova

Independent Researcher, Jizzakh State Pedagogical University, Uzbekistan
bultakovar@mail.com

ABSTRACT

This article examines the scientific and methodological foundations of integrating innovative teaching methods and digital tools to develop the art-pedagogical abilities of pre-service primary school teachers. It analyzes the functions, implementation sequences, and distinctive features of problem-based learning, project-based learning, visualization, modeling, collaborative learning, experiential-practical activities, and reflective analysis. The relationships among pedagogical objectives, creative assignments, digital tools, art-pedagogical components, and reflective assessment are explained as an integrated methodological mechanism. The distinction between the six-component structure, the adaptive, reproductive, constructive, and creative developmental stages, and the three-stage process of organizing instruction is clarified. An interdisciplinary assignment based on traditional ornamental patterns and geometric shapes is considered as a methodological example. The article is grounded in theoretical and methodological analysis.

Keywords: art-pedagogical abilities; pre-service primary school teachers; digital education; innovative methods; project-based learning; digital storytelling; integrative model; aesthetic perception; reflective assessment.

Introduction

Preparing pre-service primary school teachers for digital learning environments involves more than acquiring technical proficiency with software. Teachers must be able to transform artistic materials into learning experiences appropriate to children's developmental characteristics, select expressive means in accordance with pedagogical objectives, organize collaboration, and evaluate the didactic quality of creative work. Art-pedagogical preparation therefore develops at the intersection of aesthetic perception, creative design, communication, technological competence, and pedagogical reflection. The central task is not merely to add new applications to arts-related activities, but to establish a theoretically grounded relationship among educational objectives, teaching methods, digital resources, and the abilities being developed.

Artistic experience has been interpreted not as a decorative element of education but as a distinctive form of meaning-making. J. Dewey [1] emphasized the significance of experience in artistic activity, while E. W. Eisner [2] examined the role of the arts in developing perception and thinking. H. Gardner's theory of multiple intelligences [3] helps explain the diversity of modes of expression. In teacher education, these perspectives call for an approach based on observation, interpretation, design, and expression rather than the reproduction of ready-made models. Research on preparing primary teachers through arts education in online environments [4] likewise highlights the

importance of preserving the distinctive nature of art-pedagogical activity in digital settings.

The purpose of this article is to distinguish the pedagogical functions of seven innovative methods in developing pre-service primary school teachers' art-pedagogical abilities, to substantiate a mechanism for their purposeful integration with digital tools, and to clarify the relationship between this mechanism, the six-component structure of these abilities, and their developmental stages. The focus is not the effectiveness of individual platforms, but the coherence of methods, tools, artistic-pedagogical assignments, and assessment.

MAIN BODY

1. Methodological Foundations for Integrating Innovative Methods and Digital Tools

The integration of teaching methods and digital tools cannot be equated with simply expanding technological capabilities. A method is a way of organizing the joint activity of teachers and students toward an educational objective, whereas a tool provides the material, technical, or communicative support for that activity. A graphic editor acquires pedagogical value when it helps students investigate color, symmetry, and composition or create age-appropriate teaching materials. A shared digital board is useful when it enables the exchange of ideas, constructive feedback, and revision. Using a platform without a clearly defined educational purpose does not, in itself, demonstrate the development of art-pedagogical abilities.

This methodological approach combines systemic, integrative, competency-based, activity-based, learner-centered, axiological, and art-pedagogical perspectives. The systemic approach ensures coherence among objectives, activities, resources, and assessment. Integration connects the visual arts, school-subject content, and digital practice. Competency-based and activity-based approaches prioritize future teachers' ability to create, explain, and apply learning materials independently. Learner-centered adaptation considers differences in students' prior experience, while the axiological approach preserves the cultural and aesthetic value of artistic materials. Thus, an innovative technology should be assessed not by its novelty, but by its contribution to a coherent pedagogical process [5].

The Technological Pedagogical Content Knowledge (TPACK) framework further supports this argument: educational decisions become more grounded when technological affordances are considered together with pedagogical strategies and subject content [6]. Here, content comprises artistic concepts and the primary curriculum; pedagogy encompasses creative projects, communication, scaffolding, and assessment; and technology includes graphic, multimedia, and collaboration tools. A digital tool is selected only after the intended aesthetic, creative, and didactic outcomes have been identified. The relationship between pedagogical content and methods of teaching is also central to scholarship on teacher knowledge [12].

2. A System of Innovative Methods for Developing Art-Pedagogical Abilities

2.1. Problem-Based Learning

Problem-based learning begins with an artistic-pedagogical problem rather than a prescribed sequence of operations. Students may be asked to represent an abstract mathematical concept visually, communicate a historical topic to young learners in an accessible way, or adapt an artistic composition for children with different learning needs. They compare alternative solutions, justify their aesthetic choices, and examine the educational suitability of the resulting resource. Assessment must therefore consider not only visual appearance but also the quality and appropriateness of the proposed solution.

2.2. Project-Based Learning

Project-based learning organizes the process from an initial idea to an educational product. Students identify the learning objective, investigate artistic or cultural material, develop a concept, select suitable means of expression, create a resource, and explain how it can be used in a primary classroom. An important advantage of this method is that both the artistic coherence and didactic suitability of the final product can be evaluated. Creative assignments should

therefore be accompanied by criteria for originality, content accuracy, visual consistency, usability, and age appropriateness. This approach is consistent with scholarship on creativity and interactive pedagogy [7].

2.3. Visualization

Visualization is directed toward the visual perception, comparison, and interpretation of artistic images, forms, colors, rhythm, and composition. Its principal pedagogical function is to transform an understanding of the aesthetic characteristics of an image into a visual expression aligned with a learning objective. First, a visual resource is selected; its composition, color relationships, and expressive devices are then analyzed; finally, students create their own visual material and justify their design choices. Digital presentations, infographics, animations, and virtual exhibitions can support this process. Visualization differs from modeling because it primarily concerns seeing and expressing artistic content, whereas modeling involves designing the structure and sequence of a pedagogical process or product in advance [2; 10].

2.4. Modeling

Modeling enables students to plan an artistic-pedagogical idea in advance and represent the relationships among its constituent elements. They first define the pedagogical task, then outline the content of the lesson, the actions expected of children, the artistic materials, and the intended learning product in a diagram or scenario. The model is subsequently checked for age appropriateness, logical consistency, and practical feasibility. For example, a lesson on color harmony may be modeled as a sequence comprising an introductory question, a visual example, a creative task, and a concluding discussion. Digital diagramming and design tools facilitate revision, but the methodological value of the model depends on its pedagogical logic. This method particularly activates the creative-design and integrative-methodological components [6; 12].

2.5. Collaborative Learning

Collaborative learning organizes the joint creation of an artistic-pedagogical product. Students agree on a shared objective and distribute responsibilities for generating ideas, selecting materials, developing visual solutions, and preparing a presentation. Reconciling different artistic perspectives, justifying individual contributions, and ensuring the coherence of the final product are essential to group work. For example, when developing a virtual exhibition for primary pupils, one student may select artworks, another prepare explanatory texts, and a third formulate questions for children. Platforms such as Padlet or Miro can help consolidate ideas. The principal function of this method is to develop collective creativity and communicative-expressive abilities; criterion-based evaluation of the finished work belongs to the separate stage of reflective analysis [5].

2.6. Experiential and Practical Method

The experiential-practical method enables students to apply theoretical knowledge directly in artistic and digital activities. While working with images, colors, and compositions and creating multimedia products or interactive educational resources, students make independent decisions. In digital storytelling, important steps include selecting a topic, preparing a script and storyboard, combining visual and audio elements, presenting the product, and evaluating its pedagogical relevance. STEAM–arts integration and digital art-gallery assignments also provide opportunities to connect artistic content with interdisciplinary learning tasks.

2.7. Reflective Analysis

Reflective analysis encourages students to understand their own creative activity, evaluate outcomes against criteria, identify shortcomings, and improve subsequent work. Electronic portfolios, self-assessment forms, video analysis, and expert feedback may support this process. Peer assessment considers content accuracy, artistic and aesthetic coherence, technical quality, age appropriateness, and alignment with pedagogical objectives. Reflection contributes to the diagnostic-reflective component and generates feedback for adapting subsequent creative assignments.

3. Integration of Innovative Methods with Digital Tools

Digital tools do not replace teaching methods; rather, they provide specific didactic opportunities for implementing the selected method. Graphic editors such as Canva and Adobe Express may be recommended for creating visual teaching materials and exploring color and composition; audio and video editors for digital storytelling; and virtual galleries for organizing thematic presentations of creative products. These tools are cited as examples: no claim is made that all were used in a particular practical lesson or that their independent effectiveness has been established. Tool selection should consider students' technical preparation, the didactic objective, available resources, and academic integrity requirements [8; 9].

Collaboration platforms such as Padlet and Miro can support idea collection, task coordination, and joint editing. Electronic portfolios and assessment forms allow students to preserve completed work, document its development, and engage in self-assessment. The same tool may serve different functions in different methods: a shared digital board may be used for planning in project-based learning, group communication in collaborative learning, or gathering feedback during reflective analysis. Therefore, it is academically important to describe a tool by its pedagogical function rather than merely by its name.

The expected learning action should be defined before a tool is chosen. A graphic editor is appropriate for experimenting with visual composition; a shared board for negotiating ideas; multimedia software for producing a narrated story; and a portfolio for documenting evidence of development. The DigCompEdu framework [8] emphasizes purposeful and responsible digital competence among educators. The methodological approach considered here likewise requires that resource selection remain subordinate to pedagogical objectives.

Method	Didactic function of digital tools	Priority component
Problem-based learning	Presenting situations and comparing alternatives	Creative-design
Project-based learning	Planning and developing creative products	Creative-design; integrative-methodological
Visualization	Visually representing images, colors, and compositions	Aesthetic-perceptual
Modeling	Designing lesson structures and scenarios	Integrative-methodological
Collaborative learning	Coordinating group ideas and responsibilities	Communicative-expressive
Experiential-practical method	Creating and revising digital artistic products	Technological-instrumental
Reflective analysis	Portfolios and criteria-based feedback	Diagnostic-reflective

Table 1. Priority Relationships among Innovative Methods, Digital Tools, and Art-Pedagogical Components

4. Relationships between Teaching Methods and the Components of Art-Pedagogical Abilities

Art-pedagogical abilities are described through six interrelated components: aesthetic-perceptual—the ability to perceive and evaluate artistic content; creative-design—the ability to plan original artistic-pedagogical solutions; communicative-expressive—the ability to express artistic ideas and collaborate; technological-instrumental—the purposeful use of conventional and digital tools; diagnostic-reflective—the ability to analyze outcomes against criteria; and integrative-methodological—the ability to combine the arts, subject content, and teaching methods into a coherent whole. These components are not

isolated skills: one assignment may activate several simultaneously. The relationship between a method and a component is identified by its priority function rather than a rigid one-to-one correspondence.

It would be incorrect to equate individual components mechanically with particular applications. Creating a visual resource, for example, simultaneously requires aesthetic-perceptual judgment, creative-design decisions, and technological skills. When students explain the role of the resource in a mathematics or language lesson, the integrative-methodological dimension becomes apparent. Presenting the work activates communicative-expressive abilities, while revising it against criteria engages diagnostic-reflective abilities. These interrelationships justify an integrated methodology rather than the isolated teaching of software applications.

5. Methodological Coherence of the Pedagogical Model and Developmental Stages

The refined pedagogical model is explained through the interaction of goal-oriented, theoretical-methodological, content-related, and assessment-criteria blocks. The goal-oriented block defines the task of developing art-pedagogical abilities; the theoretical-methodological block selects systemic, integrative, competency-based, activity-based, and learner-centered approaches; the content block combines artistic-creative assignments, methods, and digital resources; and the assessment-criteria block analyzes the resulting product and the student's reflective activity. Thus, the model does not merely repeat a list of methods: it organizes when, why, and toward which outcomes they are applied.

The adaptive, reproductive, constructive, and creative developmental stages reflect increasing task complexity and student autonomy. At the adaptive stage, students recognize the aesthetic features of visual examples, become familiar with instructions, and perform simple digital operations. At the reproductive stage, they recreate a model and explain prescribed color or composition choices. At the constructive stage, they combine several sources and independently design an artistic-pedagogical product for a specific lesson objective. At the creative stage, they develop an original solution, justify alternatives, and refine the result. Visualization, for instance, may support understanding a ready-made image at the adaptive stage, independently creating visual materials at the constructive stage, and developing an unconventional pedagogical image at the creative stage.

The diagnostic-motivational, content-activity, and reflective-corrective stages of organizing methodological activity should not be confused with the four developmental levels described above. The former constitute the organizational sequence of instruction and pedagogical support; the latter indicate the degree of autonomy and creative complexity in students' art-pedagogical activity. At the diagnostic-motivational stage, interests, initial preparation, and needs are identified; at the content-activity stage, problem-based, project, and practical assignments are completed; and at the reflective-corrective stage, the product is analyzed and directions for improvement are established. This distinction ensures the internal coherence of the methodological system.

6. A Methodological Assignment Example and Approaches to Assessment

The practical orientation of the methodological system is illustrated by an assignment integrating geometric shapes and traditional ornamental patterns. Mathematical content from primary education is connected with artistic composition: students identify a learning objective, select elements of traditional patterns, analyze their geometric properties, develop a visual solution, and explain how it could be used in a lesson. This assignment exemplifies the project activity described in the research methodology; it does not demonstrate that a particular digital application was used in an experiment or establish that application's independent effectiveness. Digital storytelling and virtual art galleries are described as activity formats envisaged within the methodological system.

When assessing an art-pedagogical product, its aesthetic content, the justification of its creative solution, alignment with

pedagogical objectives, appropriate use of digital tools, and clarity of reflective explanation should be considered together. Motivational, creative, activity-based, and personal-development dimensions relate to students' attitudes toward activity, originality of ideas, practical implementation, and analysis of their own outcomes. These dimensions should not be presented as identical to the six components: the components describe the structure of abilities, whereas assessment dimensions help observe their manifestations. The novelty of an idea and its suitability for the task should be considered jointly when assessing creativity [11].

From a methodological standpoint, a product's visual appeal does not automatically establish its pedagogical value. A technically sophisticated animation may still require revision if it is unsuitable for children's age or obscures the lesson objective. Conversely, a simple visual resource can be appropriate when it clearly serves an educational purpose. During reflective analysis, students provide evidence-based answers to questions such as "Which aesthetic solution was selected?", "What learning objective does it serve?", and "Which part should be revised?" This approach does not separate assessment from creative activity; instead, it makes assessment a means of subsequent improvement [4; 7].

CONCLUSION

The integration of innovative methods and digital tools does not mean increasing the number of technologies used; it means ensuring coherence among pedagogical objectives, artistic-creative activity, digital resources, and reflective assessment. Problem-based learning initiates inquiry; visualization strengthens the understanding of artistic content; modeling plans pedagogical structures; project-based and experiential-practical methods guide the creation of products; collaborative learning organizes collective creativity; and reflective analysis supports the revision of outcomes. This sequence is not strictly linear: methods complement one another according to the objectives of the assignment.

The central feature of the methodological approach is the functional alignment of seven methods with the six components of art-pedagogical abilities and the progressive increase in assignment complexity across the adaptive, reproductive, constructive, and creative stages. The four blocks of the pedagogical model systematize these relationships, while the three organizational stages support planning, implementation, and improvement through feedback. As a result, the selection of digital tools is not treated as an end in itself, but as a didactic means of transforming artistic-aesthetic content into pedagogical solutions.

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