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Innovative Technologies for Developing Innovation Activities in Classroom Lessons Based on a Value-Based Approach

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Abstract: As elements of the pedagogical system for developing students' innovation activities based on a value-based approach, the following were proposed: goals and tasks; stages of developing value-based innovation activities among architecture students; content, forms, methods, and tools, as well as result-evaluation components. The study focuses on the integration of traditional applied arts, design thinking, problem-based and project-based learning, interactive methods, and digital technologies into architecture and design education. The practical implementation of the proposed approaches indicates that combining value-based education with innovative pedagogical technologies can contribute to the development of students' spatial, creative, problem-solving, and innovative thinking skills, while strengthening their ability to connect theoretical knowledge with practical design activities. The discussion shows that digital technologies such as augmented reality (AR), 3D modeling, and digital sketching are most effective when used as supporting tools within clearly defined pedagogical objectives rather than as independent learning goals. Furthermore, integrating Karakalpak applied-art patterns and cultural heritage into contemporary design activities provides an additional value-based dimension, enabling students to combine national identity with modern architectural and digital solutions. Overall, the proposed pedagogical approach creates a more active, practice-oriented, culturally relevant, and innovation-focused learning environment for architecture students.

Keywords: Traditional, pedagogical system, innovation, goals, tasks.

1. Introduction

The traditional approach to the educational process in developing students' innovation activities based on value-based approaches is directed toward forming knowledge, skills, and abilities. While this often allows students to become highly knowledgeable specialists and select a profession matching their interests and inclinations, many of them are unable to effectively utilize these skills and abilities in their own innovative activities [1].

The primary strategic goals for developing students' innovation activities based on value-based approaches, primarily through applied arts, include:

- Modernizing architectural education based on labor market demands and ensuring sustainable socio-economic development;
- Enabling architecture students to apply the knowledge, skills, and abilities gained regarding technical objects and operations performed during technological processes within independent practical activities;
- Fostering career selection, establishing social relationships based on national and universal human values, and shaping the innovation activities required in the labor market;

- Creating the necessary conditions for developing technological literacy, critical, creative, and systemic thinking, independent decision-making, demonstrating intellectual capabilities, and evolving as a spiritually mature individual, all of which depend directly on innovative technologies.[2]

Innovative educational technology represents the overall content of achieving educational goals that is, implementing a pre-designed educational process step-by-step as an integrated system, developing a system of specific methods, techniques, and tools to achieve a precise goal, using them productively, and demonstrating high-level management of the learning process.

Teaching method is a joint activity mode of the teacher and students aimed at solving complex educational tasks.

Unlike methodical developments that merely encourage students toward effective activity, innovative educational technology is directly oriented toward student activity. It considers both individual and joint activities with the teacher, creating the necessary conditions for mastering educational material through an innovative approach. The core problem of innovative educational technology is ensuring the achievement of educational goals by developing the student's personality.

Using the **design thinking** method when working on ideas yields excellent results in developing students' innovation activities. The design thinking method is a continuous process that accompanies an idea along its entire implementation path: from an initial concept, testing, and approval, to prototyping and practical implementation.

The design thinking methodology teaches how to introduce innovations to solve social problems, test the viability of ideas, and check their relevance and demand among potential target audiences. Design thinking consists of five main principles:

- Empathy
- Radical collaboration
- Ideation
- Prototyping
- Iteration

Design thinking helps make the human environment better and more comfortable, or solves user problems. To win their hearts, one must step into their shoes, think from their position, implement technological capabilities based on the results obtained, and keep their interests clearly in mind.[3]

2. Methodology

This study employed a qualitative pedagogical research approach to examine the development of students' innovation activities through value-based education and innovative teaching technologies in architecture and design education. The study focused on the integration of traditional applied arts, design thinking, problem-based learning, project-based learning, interactive methods, and digital technologies into classroom activities.

The methodological framework was based on the analysis and practical application of innovative teaching methods in architecture-related educational activities. The selected methods included design thinking, projecting and cluster-based learning, problem-based situations, the "Did You Know?" method, the "Theory and Practice" didactic game, the Pinboard method, Problem-Based Learning (PBL), Project-Based Learning, interactive methods, online and digital resources, and coaching and mentorship.

The learning activities were organized around the integration of theoretical knowledge and practical creative tasks. Students were encouraged to analyze architectural and applied-art objects, develop design concepts, work with national artistic patterns and motifs, create visual and digital representations, and apply acquired knowledge to practical design situations. Particular attention was given to the development of spatial thinking, creative thinking, problem-solving abilities, architectural composition skills, aesthetic awareness, and innovative thinking.

Practical classroom activities included lessons in architectural composition, still-life analysis, applied arts, national patterns, digital sketching, and AR/3D-based creative projects. The activities described in the study incorporated tools and materials such as geometric models, examples of Karakalpak patterns, drawing materials, computers and projectors, smartphones and tablets, and AR applications including Adobe Aero, Artivive, and Sketchfab.

The learning outcomes were assessed through the practical tasks and presentation activities described in the lessons. The assessment criteria included the stability and quality of geometric compositions, correct application of patterns, harmony between national identity and modernity, innovative approach, aesthetic solution, creative interpretation, preservation of cultural identity, technical execution, and students' ability to integrate traditional artistic elements with contemporary digital technologies.

3. Results

Projecting (designing) is a method of constructing a future activity model, selecting paths and means within a given timeframe under existing conditions, dividing steps to achieve the goal, formulating separate tasks for them, and determining the channels and methods for delivering educational information. Projecting technology implements a comprehensive learning method that involves the practical application, analysis, and evaluation of knowledge and skills. Applying the **cluster method** in education serves as a branching-of-thought technique and a pedagogical strategy. It helps future architects study a subject deeply, teaching students to branch out concepts or specific ideas related to the topic freely, openly, and in a logically connected sequence. This method serves to accelerate and expand students' thinking before an in-depth study of any applied art piece. It encourages students to consolidate, master, and generalize topics covered in class, creatively expressing their concepts through drawings, which helps determine their level of knowledge, comprehension, and imagination.[4]

The **problem-based situation method** leads to contrasting opinions among students and helps develop skills in finding solutions to complex problems. It encourages studying issues comprehensively, examining them from various positions, comparing, analyzing, generalizing, and drawing conclusions.[5]

The **"Did You Know?" method**: The educator prepares a small poster featuring several similar works of applied art. If assignments are individual to each group, the sheet circulates around the group. Students must discuss and find answers to the given definitions. For example, definitions of various types of applied art are given, and students read each to identify which type of applied art it belongs to.[6]

"Theory and Practice" Didactic Game.

- *Game goal*: To enable students to state their interests and thoughts clearly and fully, forming a meaningful, stable interest based on this.
- *Expected outcome*: To develop the logic of students' internal motives in educational activity, alongside their ability to ask precise questions and provide equivalent answers [7].

Students are divided into two groups:

1. **Group 1 – Theorists**: Scientists developing the theoretical foundation of the subject.
2. **Group 2 – Practitioners**: Specialists developing the practical application of the subject.

The educator introduces both groups to information on creating a plan for selecting applied art works for classroom implementation. The first group develops the theoretical framework for the plan, while the second group represents practitioners applying theoretical knowledge to practice.[8]

Each group conducts a Q&A session based on their chosen plan. Theorists ask practitioners about practical implementation, while practitioners question theorists about theoretical foundations. The game facilitator acts as a panel of judges. The best question and answer from students are evaluated based on clarity, accuracy, personal insight, and reasoning.

The **Pinboard method** (*pin* – to attach; *board* – a display board): The main objective of this method in developing innovation activity is linking discussion or educational dialogue with several practical techniques. Its advantages lie in its developmental and educational functions: students form a culture of communication and debate, developing the ability to express thoughts both orally and in writing, as well as logical and systematic thinking. It helps review and consolidate knowledge. Students jointly discuss and evaluate assignments, writing optimal ideas on paper to discuss on the board. Other group members mark errors or repetitive ideas on the board, making additions where necessary.[9]

Analysis of these methods shows that they allow future architects to develop innovation activities and increase professional motivation. Applying these methods based on architectural education capabilities enables active work in both experimental and control groups, helping establish evaluation criteria for innovation development.[10]

Modern pedagogical technologies used in developing students' innovation activities:

- **Problem-Based Learning (PBL):** Directing students toward solving innovative problems, encouraging independent analysis and creativity.
- **Project-Based Learning:** Enhancing skills in structuring and executing innovative projects.
- **Interactive Methods:** Analyzing real-world scenarios through case studies, games, and simulations.
- **Online Platforms and Digital Resources:** Using distance learning tools for rapid mastery of innovative knowledge.
- **Coaching and Mentorship:** Unlocking student potential through individual assistance and guidance.

There are many effective forms and methods for developing students' innovation activities based on a value-based approach in higher education institutions. Each is aimed at consolidating theoretical knowledge, improving practical skills, and creating opportunities to introduce innovative ideas into the market. Therefore, educational institutions must carry out comprehensive, systematic work in this area.

Within the course "*Architectural Drawing, Painting, and Sculpture*" taught to 1st-year architecture students in semesters 1 and 2, we worked on developing students' innovation activities using applied art samples based on a value-based approach.[11]

Lesson Example (Topic 11): *Architectural Composition of Geometric Forms*. This composition uses 3 cubes and 3 quadrangular prisms. The lesson goals were set as follows:

- **Educational Goal:** Teach how to create architectural compositions from geometric shapes; apply patterns, ornaments, and rhythmic repetition concepts from Karakalpak applied arts to architectural forms; master shape-color-rhythm principles in composition.
- **Developmental Goals:** Develop 3D spatial thinking in students; form skills in harmonizing national patterns with modern architectural forms; expand innovative design, creativity, and constructive thinking.
- **Upbringing Goal:** Instill respect for Karakalpak applied art heritage; harmonize national identity with modernity; develop aesthetic taste.[12]

Required Equipment: 3 cubes and 3 quadrangular prisms made of cardboard or plastic, samples of Karakalpak patterns, ruler, pencil, markers, paints, glue, scissors, computer or projector, AR design app (Adobe Aero).

Lesson Procedure: Before starting, the teacher poses questions: "*What importance do the cube and prism hold for architecture? How is rhythm created in Karakalpak patterns? Can patterns be applied to building forms?*"

The teacher provides a brief introduction, explaining that modern architectural forms are built on simple geometric shapes like cubes, prisms, and parallelepipeds, while Karakalpak applied art relies heavily on repeated rhythms, geometric patterns, and ornament symmetry. Integrating both is a key direction in innovative design. The lesson is organized into four stages:

Stage 1 (15 min): To create a geometric composition, students build a model using 3 cubes and 3 quadrangular prisms under specific conditions:

All shapes must be stably positioned relative to each other;

Pay attention to balance, center of gravity, and volume ratio;

Choose one of three options presented by the teacher:

Option 1: Vertical tower composition

Option 2: Horizontal ensemble composition

Option 3: Dynamic, uneven-height composition

Stage 2 (10 min): The teacher gives a brief overview of Karakalpak patterns, showing examples: *Islimiy* (vegetal) patterns, geometric patterns (*otizburchek*, intersecting rhythms), Karakalpak kilim patterns, and applied item patterns (chests, woven cloth, belts, *takya* caps). Students analyze rhythm, symmetry, color harmony, and geometric structures.[13]

Stage 3 (20 min): Assignment on applying patterns to geometric shapes: place geometric patterns on the sides of cubes; apply *islmiy* or kilim patterns on prisms; calculate and draw rhythmic repetition; use a solid background color to unify the composition.

Rules: Do not break the shape's structure (cubes fit geometric patterns best; prisms fit linear rhythms; patterns evoke architectural facades).

Stage 4 (15 min): Innovation activity session (AR or creative interpretation) based on the chosen option:

Option 1 (AR Integration): Open Adobe Aero via smartphone, place 3D AR models of cubes/prisms, upload patterns as virtual textures, view the 3D model on a real table, add interactive effects.

Option 2 (2D Futuristic Architecture Project): Draw facade design sketches combining geometric shapes + national patterns for a museum, art gallery, or modern towers.

Option 3 (Innovative Functional Design): Reimagine the composition as lighting fixture design, a modern pavilion, or a landscape element.[14]

At the end of the lesson (10 min), students present their work, evaluated on:

Stability of the geometric composition

Correct application of patterns

Harmony of national identity + modernity

Innovative approach

Aesthetic solution

As a result, students developed spatial thinking, architectural composition building skills, national pattern integration into design, and innovative thinking in AR/digital design.

Lesson Example (Topic 25): "Simple Still Life in Cool Tones. Types of Still Life and Their Characteristics."

Goal: Understand the still life genre; express emotion and mood through color, light, and composition; connect global art principles within local (Karakalpak) art; develop aesthetic thinking and art analysis abilities.

The teacher explains a national still life using the work "Qumghon" (Pitcher) by Karakalpak artist J. Izentaev.

Cool Tones: Blue, sky blue, gray, and delicate aerial shades impart a cool, quiet, modest mood. Using Karakalpak applied art items—copper pitchers (*mis qumghon*), wooden spoons (*ojau*), patterned belts used inside yurts, and white drapery fabric—the teacher provides broad concepts about applied art through compositional harmony.[15]

Figure 2.3.1. J. Izentaev's work "Qumghon"

The artist uses everyday items (containers, fruits, cloth) to give a simple, understandable, realistic feel. Light shadows and soft illumination add volume and depth, while cool colors highlight light-to-shadow transitions.

To foster innovative thinking, the teacher assigns tasks to reimagine the *Qumghon* image as modern design, AR, graphic branding, logo, 3D model, or interactive animation, asking:

- "If the pitcher came to life in AR, what would it look like?"
- "What functions could it have?"
- "Which brand would this pitcher fit in modern design?"

Students divide into two groups:

- **Group 1 (Graphic Innovation):** Create minimalist or futuristic logos, brand marks, or posters based on the pitcher shape using innovative color choices.
- **Group 2 (AR Concept):** Use Adobe Aero or Sketchfab models to place a 3D pitcher into AR with interactive elements (e.g., patterns appear upon hover, historical audio plays, colors change on touch, internal structure reveals upon rotation).

Students present their work for discussion, focusing on preserving national identity, novelty, harmony, idea strength, and technical execution. The teacher concludes with reflective questions, resulting in deep art analysis skills, national item design integration, and proficiency in AR/3D technologies.

Lesson Example (Topic 26): *"Depicting a Still Life of Household Items Using Warm Colors."*

The teacher presents a modern realism still life painted in 2021 by S. Allabergenov (Figure 2.3.2), depicting everyday household items to convey warmth and domestic comfort.

Figure 2.3.2. S. Allabergenov's Still Life in Modern Realism

Studying modern realism helps develop innovation activity. The lesson plan includes:

- **Educational Goal:** Analyze composition, color, light, and shadow; reveal decorative possibilities of applied art materials (ceramics, fabric, wood, plastic).
- **Developmental Goal:** Form innovative thinking, creative composition, and digital technology skills (digital sketch, AR, 3D).
- **Upbringing Goal:** Awaken interest in local art, form aesthetic taste, and foster diligence. **Equipment:** Projector, art paper, pencils, gouache/acrylic, 3D/AR apps (Artivive, Adobe Aero), tablets/phones, ceramic/wood/fabric paints.

After analyzing the work's composition, warm color palette, and light-shadow structures, students complete a three-stage practical task:

1. **Stage 1 (Digital Sketch):** Process main color masses on tablets/smartphones and extract 5 gradient shades from the warm color spectrum.
2. **Stage 2 (Working with Applied Materials - 15 min):**
 - *Group 1:* Paint decorative still life containers on ceramics.
 - *Group 2:* Burn national patterns onto wooden plates.
 - *Group 3:* Paint patterns on fabric.
3. **Stage 3 (3D/AR Innovation Project):** Create a new still life composition placing virtual vessels, fruits, or drapery in AR, adjusting lighting to master digital applied art.

AR Design refers to combining virtual 3D objects, animations, text, and effects with the real environment via tablet or smartphone cameras.

Students present their work compared to S. Allabergenov's original. Homework includes drawing an innovative still life in two versions: traditional applied art style and digital painting. This approach integrates traditional still life, applied arts, modern technology, and innovative thinking.

The practical implementation of the proposed approaches demonstrated that innovative teaching technologies can support the development of several important competencies among architecture and design students. The learning activities encouraged students to develop spatial thinking, creative and innovative thinking, problem-solving skills, architectural composition skills, and the ability to connect theoretical knowledge with practical design tasks. The integration of national applied-art elements into contemporary design activities also contributed to students' understanding of cultural values and their application in creative work.

The use of project-based and problem-based activities encouraged students to develop independent design solutions and participate actively in practical tasks. The application of AR and 3D technologies provided additional opportunities for visualizing design concepts and experimenting with digital representations. The lesson activities also demonstrated the possibility of combining traditional applied-art elements with contemporary digital tools. Overall, the described classroom activities indicate that combining value-based education, traditional artistic heritage, innovative pedagogical methods, and digital technologies can support a more active and practice-oriented learning environment.

4. Discussion

The findings suggest that the development of students' innovation activities requires more than the introduction of individual digital technologies. The effectiveness of innovative education depends on the combination of pedagogical methods, practical activities, cultural content, and opportunities for independent creative work.

The use of design thinking and problem-based learning shifts students from passive recipients of information toward active participants in the educational process.

These approaches require students to identify problems, analyze possible solutions, develop ideas, and transform theoretical knowledge into practical design outcomes. Such activities are particularly relevant to architecture and design education, where creativity, spatial thinking, visualization, and problem-solving are essential components of professional competence.

The integration of national applied arts provides an additional value-based dimension to innovative education. Working with traditional patterns, motifs, and artistic forms enables students to connect contemporary design solutions with cultural heritage. At the same time, the use of AR and 3D technologies creates opportunities to present traditional artistic elements in contemporary digital formats. The findings also indicate that technology should be regarded as a means of supporting pedagogical objectives rather than as an independent objective of innovation. Digital tools such as AR applications, digital sketching platforms, and 3D environments can enhance visualization and creative experimentation when they are integrated into clearly defined educational tasks.

The combination of traditional cultural content, active learning methods, project-based activities, and digital technologies can therefore contribute to a more practice-oriented and culturally relevant educational environment. This approach is particularly important in architecture education because professional creativity requires students to combine technical knowledge, aesthetic judgment, cultural awareness, and innovative thinking. However, the present study is primarily based on the pedagogical activities and learning outcomes described in the classroom examples. The available study does not provide a quantitative comparison of student performance before and after implementation of the proposed methods. Therefore, the effectiveness of these approaches should not be interpreted as a statistically established causal effect. Further empirical research using clearly defined participant groups, assessment instruments, pre- and post-intervention measurements, and quantitative indicators would strengthen the evidence for the proposed pedagogical model.

5. Conclusion

The integration of value-based approaches and modern educational technologies into higher architectural education creates a comprehensive, future-oriented system for student development. By synthesizing traditional elements of national applied arts such as Karakalpak patterns, traditional crafts, and historical artifacts with cutting-edge tools like Augmented Reality (AR), 3D modeling, design thinking, and digital sketching, students transition from passive recipients of information to active innovators. The practical classroom methodologies presented demonstrate that grounding architectural concepts in cultural heritage does not limit modern design; rather, it enriches it. Students gain a deeper understanding of volume, rhythm, lighting, and composition while simultaneously mastering digital platforms (e.g., Adobe Aero, Sketchfab) and interactive problem-solving techniques.

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