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SCIENTIFIC AND METHODOLOGICAL FOUNDATIONS FOR DEVELOPING DESIGN SKILLS BASED ON A CREATIVE APPROACH AMONG FUTURE TEACHERS

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Abstract
This article analyzes the scientific-theoretical and methodological foundations for developing design skills based on a creative approach among future teachers. In contemporary pedagogical education, fostering independent inquiry, creative problem-solving, and innovative instructional design is essential for effective pedagogical practice. From this perspective, this paper substantiates the structural interrelation between creative methodology and pedagogical design activities. A comprehensive methodological framework is proposed, encompassing motivational-value, cognitive-communicative, practical-creative, and reflective-evaluative components. Furthermore, the instructional potential of integrating problem-based learning, project-based learning, design thinking paradigms, collaborative pedagogical activities, and reflective analysis is thoroughly substantiated. The proposed approach equips future educators with practical competencies in diagnosing classroom contexts, constructing authentic instructional projects, and critically evaluating pedagogical outcomes.

Keywords: future teachers, creative approach, pedagogical design, design skills, professional competence, project-based learning, design thinking, educational reflection.



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Introduction

Today, one of the strategic priorities facing higher pedagogical education is training future educators as adaptive professionals capable of making autonomous decisions within dynamic educational environments, addressing instructional challenges creatively, and designing effective learning trajectories. The rapid renewal of curricular content, the pervasive integration of digital technologies, and increasing emphasis on individualized instruction require modern teachers to transcend routine, traditional instructional paradigms and actively devise innovative educational solutions.

Design skills occupy a central role in the professional preparation of future teachers. These competencies encompass establishing transparent educational objectives, selecting and systematizing instructional content, adopting appropriate pedagogical methodologies, orchestrating collaborative and individualized student activities, and continuously assessing targeted outcomes.

The creative approach, in turn, empowers educators to analyze pedagogical challenges multidimensionally, formulate divergent alternative strategies, and synthesize optimal instructional solutions. Integrating creativity into pedagogical design establishes a robust theoretical and empirical foundation for advancing teacher professionalism.

However, fostering divergent or creative thinking in isolation is insufficient for developing rigorous design competence. Creative intuition must be systematically aligned with explicit pedagogical objectives, structural planning, practical execution, and objective assessment metrics. Consequently, providing a rigorous scientific and methodological substantiation of the content, didactic conditions, and practical phases for developing design skills based on a creative approach among future teachers is of paramount relevance.

The primary aim of this study is to examine the theoretical foundations for developing design skills through a creative approach among prospective educators and to construct a structured methodological model for practical implementation.

Literature Review

In contemporary psychological and pedagogical literature, creativity is conceptualized as an individual's capacity to synthesize novel ideas, resolve non-standard problems, and productively transfer prior experience into novel contexts. In his foundational work on the structure of human intellect, Guilford (1967) identified fluency, flexibility, and originality as pivotal dimensions of creative cognition [1]. In pedagogical contexts, these dimensions underpin a teacher's ability to devise multifaceted solutions to complex instructional dilemmas, adapt curricula flexibly to shifting classroom dynamics, and generate original teaching strategies.

Dewey (1938) established the educational value of experiential learning, active inquiry, and authentic problem scenarios [2]. Applied to teacher training, Dewey's pragmatic perspective affirms that design competence cannot be cultivated through passive theoretical instruction alone; it demands immersive engagement in genuine pedagogical problem-solving, project construction, and empirical verification.

Schön (1983) advanced the paradigm of the reflective practitioner, emphasizing that professional expertise develops through continuous 'reflection-in-action' and 'reflection-on-action' [3]. In pedagogical design, reflective mechanisms allow prospective teachers to critically diagnose instructional blueprints, identify design flaws, and iteratively refine instructional materials.

Project-based learning (PBL) literature highlights learner agency, collaborative problem-solving, and the generation of tangible, authentic products. Thomas (2000) synthesized core criteria governing effective PBL implementation, demonstrating its efficacy in fostering applied problem-solving competencies [4]. Contemporary pedagogical studies increasingly investigate the synergy between project-based learning, design thinking frameworks, and digital learning environments in developing instructional design competencies (Rasulov, 2023; Isabekov & Sadyrova, 2018) [5, 6]. These findings underscore the necessity of a structured methodological framework that guides prospective teachers through the entire developmental trajectory—from creative ideation to rigorous pedagogical artifact production.

Research Methodology

To establish a rigorous theoretical and methodological framework, this investigation employs an integrative synthesis of systemic, competence-based, activity-oriented, and student-centered approaches:

- **Systemic approach:** Conceptualizes design competence as a multifaceted, coherent system of interrelated cognitive, motivational, practical, and reflective attributes.
- **Competence-based approach:** Directs the training trajectory toward cultivating practical problem-solving capabilities, professional autonomy, and authentic instructional decision-making.
- **Activity-oriented approach:** Immerses teacher candidates in end-to-end design activities, including problem formulation, contextual data gathering, iterative prototyping, and artifact defense.
- **Student-centered approach:** Accommodates individual cognitive trajectories, creative initiatives, and self-directed pedagogical inquiries.

The research design relies on theoretical analysis, conceptual modeling, comparative literature synthesis, and diagnostic evaluation criteria designed for empirical testing in teacher education programs.

Results and Discussion

To purposefully guide the development of design skills based on a creative approach, a four-component structural framework was conceptualized:

- **1. Motivational-Value Component:** Reflects intrinsic motivation toward creative pedagogical inquiry, professional initiative, proactive problem-solving, and openness to innovative didactic practices.
- **2. Cognitive-Communicative Component:** Comprises deep comprehension of instructional design principles, curriculum alignment, diagnostic awareness of learning needs, and the capacity to theoretically substantiate innovative pedagogical solutions.
- **3. Practical-Creative Component:** Involves practical proficiency in designing situational pedagogical solutions, formulating measurable learning objectives, selecting engaging methodologies and digital tools, and producing finished instructional artifacts (e.g., interactive modules, lesson plans).
- **4. Reflective-Evaluative Component:** Encompasses critical self-assessment, criterion-referenced evaluation of designed materials, identification of instructional bottlenecks, and iterative refinement of pedagogical projects.

Stages of Organizing Creative Design Activity

The instructional process of transforming creative ideas into verified educational solutions is structured across four progressive stages:

- **Stage 1: Problem Identification and Motivation.** Prospective teachers analyze authentic or simulated educational case studies, diagnose core pedagogical issues, and establish actionable rationales for intervention.
- **Stage 2: Ideation and Conceptual Planning.** Utilizing brainstorming, concept mapping, and design thinking sprints, students generate alternative instructional approaches, evaluate operational feasibility, and formulate clear project architectures.
- **Stage 3: Project Prototyping and Implementation.** Students collaboratively or individually develop concrete educational products, such as innovative lesson plans, gamified learning units, digital assessments, or interactive learning resources.
- **Stage 4: Presentation, Criterion Evaluation, and Reflection.** Developed instructional materials are demonstrated and peer-reviewed according to standardized criteria. Students defend their pedagogical rationales, engage in reflective dialogue, and implement refinements.

Pedagogical Conditions for Effective Implementation

The systematic realization of the proposed methodology requires several vital pedagogical conditions:

- Substantially expanding the proportion of authentic, open-ended pedagogical problems within the curriculum;
- Providing students with pedagogical autonomy to formulate divergent hypotheses and make independent design choices;
- Harmonizing collaborative team-based design sprints with individualized project tasks;
- Systematically embedding interactive technologies, digital educational platforms, and multimedia authoring tools;

- Establishing multi-tiered assessment mechanisms, including peer review, rubric-based evaluation, and systematic self-reflection;
- Grounding project assignments directly in authentic school classroom realities and pedagogical practicum experiences.

Evaluation Criteria and Proficiency Indicators

To measure the developmental trajectory of future teachers' design skills, a comprehensive evaluation matrix was formulated, as systematized in Table 1.

Table 1. Assessment Criteria and Structural Indicators for Design Skills

Criterion	Structural Component	Core Behavioral & Competence Indicators
Motivational	Motivational-Value	Demonstrates sustained enthusiasm for creative inquiry, proposes original instructional ideas, and shows professional autonomy during design tasks.
Cognitive	Cognitive-Communicative	Demonstrates mastery of instructional design frameworks, accurately diagnoses pedagogical needs, and articulates coherent theoretical justifications.
Practical	Practical-Creative	Effectively constructs functional instructional products, selects fitting didactic methods and digital tools, and adheres to pedagogical design standards.
Reflective	Reflective-Evaluative	Critically evaluates project efficacy against established rubrics, demonstrates receptive openness to feedback, and systematically remedies design flaws.



Conclusion

Developing design skills grounded in a creative methodology represents an essential requirement in contemporary teacher education. This pedagogical orientation establishes both a conceptual foundation and practical toolkit for preparing proactive, innovative educators capable of resolving complex instructional dilemmas.

The theoretical and methodological inquiry yielded several definitive conclusions:

- Creative cognition and pedagogical design form a synergistic continuum wherein divergent ideation is systematically channeled into structured, actionable instructional artifacts;
- Design competence develops effectively when organized across the holistic integration of motivational-value, cognitive-communicative, practical-creative, and reflective-evaluative components;
- The synchronized deployment of problem-based learning, design thinking paradigms, project activities, and structured reflective critique directly elevates future educators' design confidence and professional autonomy;
- Full empirical verification of the proposed model necessitates wide-scale implementation across university teacher training curricula, accompanied by quantitative tracking and statistical validation of diagnostic metrics.

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