

**INNOVATIVE APPROACHES TO TEACHING AND DEVELOPING PRESCHOOL
CHILDREN IN THE CONTEXT OF UZBEKISTAN'S EDUCATION SYSTEM
TRANSFORMATION**

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Abstract

This paper provides a conceptual and practice-oriented justification of innovative approaches to teaching and developing preschool children within the ongoing transformation of Uzbekistan's education system. Innovation is interpreted as a systemic shift affecting educational aims, the integration of learning content, pedagogical formats, learning environment design, and assessment culture. The study formulates an integrated model that combines competency-oriented learning outcomes, activity-centered pedagogy, STEAM/STEAMS-based interdisciplinarity, play and inquiry-based learning, modeling and constructive practices, inclusive differentiation, and purposeful digital support. To operationalize these principles in everyday preschool practice, the paper proposes a structured "map" of activity centers that enables teachers to plan differentiated tasks and inquiry scenarios within daily routines. In addition, an indicator-based monitoring framework is offered to support formative assessment and evidence-informed pedagogical decision-making. The results provide a coherent foundation for redesigning preschool learning environments and strengthening teachers' methodological readiness during educational reforms.

Keywords

education system transformation; preschool education; innovative pedagogy; activity centers; STEAM/STEAMS; play-based learning; inquiry-based learning; modeling; digital support; inclusion; formative assessment; monitoring indicators.

1. Introduction. The transformation of Uzbekistan's education system has intensified attention to preschool education as a foundational stage for children's holistic development, well-being, and readiness for subsequent learning. This shift is anchored in national strategic and regulatory frameworks that increasingly emphasize quality assurance, updated learning standards, and improved educational environments (Decree of the President of the Republic of Uzbekistan No. PF-60, 2022; Cabinet of Ministers of the Republic of Uzbekistan Resolution No. 802, 2020; Law of the Republic of Uzbekistan "On Education," 2020). In parallel, curriculum modernization and international policy dialogue have reinforced the importance of developmentally appropriate pedagogy, teacher professional learning, and effective early childhood governance (UNICEF, 2017; UNICEF Uzbekistan, 2022).

Within this reform context, innovation in preschool education should be understood not as the occasional use of new tools or isolated "modern methods," but as a coherent redesign of the educational ecosystem—goals and outcomes, content organization, teaching formats, learning environment design, and assessment practices—aligned with children's developmental characteristics and system-level expectations (Cabinet of Ministers of the Republic of Uzbekistan Resolution No. 802, 2020; Decree No. PF-60, 2022). Preschool learning is fundamentally activity-driven: children develop through play, exploration, construction, communication, and guided imitation. Therefore, innovative approaches must leverage age-

appropriate developmental mechanisms while responding to contemporary priorities such as interdisciplinary learning, children's initiative, problem orientation, collaboration, foundational digital literacy, and inclusive participation.

A particularly productive infrastructure for implementing innovation in daily practice is the organization of **activity centers** (learning corners/areas). When designed as functional micro-environments with purposeful materials and task sets, activity centers enable teachers to embed inquiry scenarios, STEAM/STEAMS mini-projects, modeling tasks, and differentiated support into everyday routines rather than treating innovation as an episodic event.

Purpose of the study. To conceptualize and structurally describe innovative approaches to preschool teaching and development under Uzbekistan's education system transformation, and to propose practical implementation tools:

- (a) a model of innovative approaches;
- (b) an activity-center map;
- (c) a monitoring indicator framework for formative assessment.

Research questions

1. Which components constitute a systemic model of innovation in preschool education during educational transformation?
2. How can activity centers be structured to operationalize these components in everyday practice?
3. Which indicators can support formative monitoring of children's progress and teachers' professional actions?

2. Methods

The study follows a conceptual-analytical and design-based logic aimed at producing practice-oriented pedagogical tools (McKenney & Reeves, 2012). Developmental appropriateness is ensured by integrating established views on children's cognitive development, the gradual internalization of actions, and the mediating role of adult-guided activity (Halperin, 1992; Elkonin, 1978; Wenger, 1988). Modeling is treated as a core mechanism for bridging sensory experience and emerging abstract relations through external representations and transformations—consistent with research on children's exploratory activity and cognitive growth (Poddyakov, 1996; Davidchuk, 2003). The paper also incorporates heuristic problem-solving perspectives (including TRIZ/TIPS-inspired micro-tools) as a means of stimulating multi-solution thinking and initiative in early childhood settings (Altshuller, 1999). Practical resources that support spatial reasoning and early mathematical thinking are used as complementary evidence for feasible classroom design and differentiation (Aromshtam & Baranova, 2005; Beloshistaya, 2003; Arkhipova, 2004; Kumon Publishing, 2008a, 2008b).

2.1. Research design

- **Conceptual synthesis:** Integrating competency orientation, activity-based learning, and developmental education with contemporary innovation vectors (STEAM/STEAMS integration, inquiry-based learning, modeling, inclusive differentiation, and digitally supported pedagogy).
- **Functional modeling:** Constructing a structured model describing conditions, pedagogical processes, and expected developmental outcomes.
- **Tool design:** Developing an activity-center map and a monitoring indicator matrix to support preschool practice and methodological guidance.

2.2. Analytical procedure

The analysis proceeded through four steps:

1. Identifying innovation domains relevant to preschool education transformation (goals/outcomes, content integration, methods, environment, assessment).

2. Defining developmentally appropriate pedagogical mechanisms (play, inquiry, modeling, collaborative action).
3. Linking innovation domains to operational practice units (activity centers).
4. Specifying observable indicators suitable for formative monitoring.

2.3. Validity considerations

To strengthen conceptual validity, each proposed element meets three criteria:

- **Developmental appropriateness:** consistent with preschool cognitive and socio-emotional characteristics;
- **Operational feasibility:** implementable within daily routines, not only during special events;
- **Monitorability:** progress can be documented through observable behavior, products, and interaction patterns.

3. Results

The resulting framework conceptualizes innovation as an interrelated system: competency-based outcomes, activity-centered pedagogy, STEAM/STEAMS integration, play and inquiry-based learning, modeling and constructive practices, inclusive differentiation, purposeful digital support, and formative monitoring (McKenney & Reeves, 2012). Activity centers function as operational infrastructure for daily implementation: they enable children to explore, construct, compare, and explain outcomes through guided discovery and age-appropriate tasks (Wenger, 1988; Poddyakov, 1996). Modeling tasks—both planar and spatial—are highlighted as especially productive for developing part-whole relations, combinatorial flexibility, and spatial imagination (Davidchuk, 2003; Aromshtam & Baranova, 2005; Beloshistaya, 2003). Heuristic methods and TRIZ/TIPS-inspired micro-tools are incorporated to stimulate multi-solution thinking and child initiative within structured play scenarios (Altshuller, 1999). Finally, monitoring indicators focus on observable progress in inquiry, reasoning, communication, creativity, and self-regulation—key targets aligned with modern preschool standards and reform priorities (Cabinet of Ministers Resolution No. 802, 2020; UNICEF, 2017).

3.1. A systemic model of innovative approaches

Innovation is conceptualized as an integrated configuration of six mutually reinforcing components:

1. competency-oriented outcomes;
2. activity-centered pedagogy;
3. STEAM/STEAMS integration;
4. play and inquiry-based learning;
5. modeling and constructive tasks;
6. inclusion and digital support paired with formative monitoring.

Table 1. Model of innovative approaches in preschool education (author’s model)

Model component	Meaning in preschool context	Typical mechanisms	Expected outcomes
Competency-based orientation	Outcomes defined as abilities to act, communicate, explore, and self-regulate	real-life tasks, collaborative routines, child-language reflection	independence, communication, early problem-solving
Activity-centered pedagogy	Activity-centered pedagogy	hands-on tasks, mini-projects, center-based learning	initiative, persistence, purposeful engagement
STEAM/STEAMS	Interdisciplinary learning	experiments, building,	integrated thinking,

integration	organized around meaningful problems	artistic representation, contextual counting/measuring	curiosity, early scientific literacy
Play + inquiry-based learning	Play is structured; inquiry follows “question–test–conclude”	role-play problems, guided discovery, observation/comparison	reasoning, language growth, collaboration
Modeling and constructive practices	Simplified representations support understanding of relationsrelations	tangram-type tasks, spatial construction, origami/flexagons, action mapping	spatial imagination, part–whole reasoning, logical operations
Inclusion + digital support + formative monitoring	Accessibility and differentiation; technology supports learning and documentation	layered tasks, assistive formats, digital portfolios, observation checklists	participation for all, individualized progress, evidence-based teaching

3.2. Activity centers as an operational mechanism

A practical “map” of activity centers translates the model into everyday preschool practice. Each center is linked to target competencies, typical innovative tasks, and evidence of learning. The map supports planning, differentiation, and monitoring.

Table 2. Activity-center map for implementing innovative approaches

Activity center	Innovation focus	Examples of innovative tasks	Learning evidence
STEM/Discovery center	inquiry + early science	“What sinks/float?”, “How do plants absorb water?”, “Which material is stronger?”	observation drawings, cause–effect explanations
Construction/Engineering center	modeling + design	build bridges/towers with constraints; “make it stable using fewer blocks”	prototypes, testing notes, role distribution
Math & Logic center	reasoning + combinatorics	classification/seriation; “build a whole from parts”; symmetry games	completed patterns, self-correction, explanations
Art/STEAMS center	integration via creativity	represent findings through collage/model; “draw a map of the experiment”	visual models, storyboards, expressive vocabulary
Language & Communication center	dialogic learning	“research talk” cards; peer interviews; evidence-based story reconstruction	visual models, storyboards, expressive vocabulary
Digital corner (limited, purposeful)	digital as support	photo “before–after”; digital storytelling; interactive sorting tasks	e-portfolios, audio reflections, documented progress

Socio-emotional & role-play center	self-regulation + cooperation	role-play problem situations; “help the team plan”	empathy markers, rule-following, conflict-resolution attempts
Embedded inclusive support zone	differentiation	multi-sensory materials, flexible outputs, alternative task formats	participation logs, individualized achievements

3.3. Monitoring indicators for formative assessment

The indicator framework is aligned with the model and center-based practice. It supports formative assessment by documenting progress, guiding feedback, and enabling evidence-informed pedagogical decisions.

Table 3. Monitoring indicators (child outcomes and teacher actions)

Domain	Child indicators (observable)	Teacher indicators (observable)	Documentation tools
Cognitive inquiry	asks “why/how”; tests simple hypotheses; compares outcomes	prompts inquiry without over-directing; scaffolds inquiry steps	observation sheet; photo evidence; child comments
Logical–mathematical reasoning	classifies/seriates; recognizes part–whole; uses simple measures	provides layered tasks; encourages multiple strategies	task cards; checklists; product analysis
Modeling & construction	uses schemes/symbols; revises designs; builds stable structures	introduces modeling language; guides reflection (“what changed/why”)	model portfolios; rubrics; peer feedback notes
Communication	explains actions; listens; negotiates roles	facilitates dialogue; uses open questions; supports vocabulary	audio notes; dialog maps; narrative samples
Creativity	generates alternatives; combines materials; proposes original solutions	provides open-ended materials; values diverse outcomes	product gallery; process notes
Self-regulation & cooperation	follows rules; persists; manages frustration	scaffolds routines; reinforces constructive interaction	behavior markers; short rating scales
Inclusion/participation	participates with support; shows baseline-to-progress growth	adapts environment; differentiates requirements; removes barriers	individualized cards; participation logs
Digital literacy foundations	uses tools purposefully with adult guidance	limits screen time; uses tech for documentation/feedback	e-portfolio templates; parent communication logs

4. Discussion

The proposed framework supports the view that innovation becomes sustainable when it is embedded into everyday routines through well-designed activity centers rather than implemented as isolated “innovation events” (McKenney & Reeves, 2012). Regulatory frameworks and strategic documents emphasize modernization, quality improvement, and standard-based development, strengthening the relevance of integrated models and evidence-informed monitoring in preschool organizations (Decree No. PF-60, 2022; Law “On Education,” 2020). International policy reviews also underscore the importance of curriculum renewal, teacher development, and system-level support for early childhood education—factors that align with the tools proposed in this paper (UNICEF, 2017; UNICEF Uzbekistan, 2022).

From a psychological-pedagogical perspective, activity-centered learning and mediated guidance correspond to established theories of child development and the staged formation of mental actions through structured activity (Halperin, 1992; Elkonin, 1978). Modeling and construction are particularly valuable because they connect sensory experience with emerging abstraction, enabling children to operate with relations such as quantity, order, symmetry, and part-whole structures (Wenger, 1988; Poddyakov, 1996; Davidchuk, 2003). At the same time, heuristic micro-tools inspired by TRIZ/TIPS can productively stimulate children’s initiative and multi-solution thinking when embedded in developmentally appropriate play scenarios (Altshuller, 1999).

Finally, practical resources and structured workbooks may serve as auxiliary supports for differentiation and family engagement—provided they are used purposefully, with attention to age-appropriate workload and meaningful activity (Arkhipova, 2004; Aromshtam & Baranova, 2005; Beloshistaya, 2003; Kumon Publishing, 2008a, 2008b). Digital tools should function as “smart support”: documenting progress, facilitating communication with families, and enabling short interactive tasks that complement—not replace—hands-on exploration.

5. Conclusion

Innovative approaches to preschool teaching and development under Uzbekistan’s education system transformation require systemic alignment of standards, curriculum goals, pedagogy, learning environments, and formative monitoring (Cabinet of Ministers Resolution No. 802, 2020; Decree No. PF-60, 2022). This paper offers an integrated model of innovation, an operational map of activity centers, and an indicator-based monitoring framework for formative assessment. Together, these tools strengthen methodological support for teachers, improve the quality of center-based learning, and help ensure that innovation becomes a stable feature of everyday preschool practice rather than a fragmented initiative (McKenney & Reeves, 2012; UNICEF Uzbekistan, 2022).

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