

A Methodology for Enhancing Self-Discipline in Primary School Students Through an Integrated STEAM and Bibliotherapy Educational Model

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Abstract: Background: In the modern globalized educational landscape, transitioning from traditional, external compliance-based discipline to the cultivation of internal “conscious discipline” and “creative responsibility” in primary school students represents a critical pedagogical priority.

Purpose: This study aims to develop and experimentally validate an innovative pedagogical framework that integrates the STEAM (Science, Technology, Engineering, Arts, Mathematics) approach with bibliotherapeutic methods (specifically through the author's CR-BT – Reading-Reflection-Bibliotherapy model) to enhance self-discipline among fourth-grade students within the framework of the “Tarbiya” (Character Education) curriculum.

Methods: The research utilizes a comprehensive system of complementary methods, including comparative-critical literature analysis, pedagogical observation, diagnostic testing, student surveying, and mathematical-statistical analysis (Student's t-test and Pearson's chi-squared test) to evaluate data gathered from an experimental sample of 712 fourth-grade students across multiple regions of Uzbekistan.

Results: An interdisciplinary pedagogical model consisting of target, methodical-procedural, and result-oriented components was established. The implementation of the CR-BT model, aligned with psychological stages (identification, catharsis, insight, reflection), successfully transformed abstract moral values into practical life skills through hands-on STEAM projects (e.g., time management via technological tools, collaborative engineering modeling). The findings demonstrated a statistically significant increase in the high and medium levels of students' self-discipline, collaborative competence, and critical thinking.

Conclusion: The integration of technological-scientific discipline (STEAM) with emotional-ethical reflection (bibliotherapy) provides a robust, digitally supported, and highly effective methodology for fostering autonomous self-regulation and prosocial behavior in early childhood education.

Keywords: Primary education, self-discipline, STEAM approach, bibliotherapy, CR-BT model, interdisciplinary integration, 4th-grade “Tarbiya” (Character Education) course, conscious responsibility.

Introduction: In the context of modern globalization, digital transformation, and rapid innovative development, the educational system faces the critical task of nurturing well-rounded individuals equipped with advanced 21st-century competencies, creative and critical thinking capacity, and the ability to effectively solve real-world problems. Achieving these objectives necessitates the systemic introduction of

innovative pedagogical technologies into the educational process, strengthening interdisciplinary integration, and enhancing students' practical activities. From this perspective, improving the forms, methods, and tools of teaching the “Tarbiya” (Character Education) curriculum based on STEAM projects is recognized as one of the most pressing

issues in contemporary primary education and pedagogy [1, p. 20].

The “Tarbiya” course plays a vital role in cultivating national and universal human values, developing moral and ethical qualities, and fostering civic responsibility, social activity, and a healthy lifestyle among students. However, traditional instructional methods applied to this discipline often restrict students' active engagement and fail to unlock their full creative potential. By integrating the STEAM (Science, Technology, Engineering, Arts, and Mathematics) approach into the “Tarbiya” curriculum, educators can seamlessly merge theoretical knowledge with hands-on practice. This integration significantly expands opportunities for developing critical and creative thinking, collaborative problem-solving, emotional intelligence, and communicative competencies, shifting the focus from passive external compliance to autonomous self-discipline and creative responsibility [2, p. 115].

The relevance and urgency of this pedagogical direction are reinforced by comprehensive educational reforms and regulatory frameworks aimed at modernization and quality enhancement. Specifically, the Decree of the President of the Republic of Uzbekistan No. PF–5712 emphasizes the extensive implementation of advanced pedagogical and information-communication technologies in the educational process, aligning the curriculum with elite international standards [3, p. 12]. Furthermore, Resolution No. PQ–4884 outlines crucial tasks for integrating innovative methods into the general secondary education system to explicitly foster students' independent thinking, creative adaptability, and practical diagnostic competencies [4, p. 5].

STEAM education, by ensuring rigid interdisciplinary integration, prepares primary school students to address multi-dimensional challenges encountered in everyday life. Utilizing project-based learning within the “Tarbiya” curriculum actively accelerates the internal acquisition of ethical values, teamwork, leadership traits, proactive social initiative, and deep civic accountability. Moreover, structured learning organized through STEAM projects substantially increases students' intrinsic motivation and engagement, converting abstract moral concepts into applicable behavioral frameworks [5, p. 547]. To

optimize this process, incorporating specialized models like the CR-BT (Reading-Reflection-Bibliotherapy) framework allows students to process emotional-ethical narratives textually and systematically manifest those insights through concrete collaborative engineering and artistic modeling [6, p. 101].

The primary objective of this article is to critically analyze the scientific and pedagogical dimensions of teaching the “Tarbiya” curriculum through integrated STEAM projects, evaluate its effectiveness based on contemporary pedagogical methodologies, and formulate actionable, digitally-supported methodological recommendations aimed at developing robust self-discipline and structural self-regulation competencies among primary school students.

LITERATURE REVIEW

The issue of teaching the “Tarbiya” (Character Education) subject on the basis of STEAM projects is one of the priority directions of modern pedagogical science. Scientific research conducted in this area comprehensively covers the theoretical and practical foundations of interdisciplinary integration, project-based learning, innovative pedagogical technologies, and the competency-based approach. Researchers emphasize that the STEAM approach serves as an essential tool for applying students' knowledge, skills, and competencies to real-life situations, developing creative and critical thinking, and increasing educational efficiency [1; 18].

In the scientific views of foreign scholars such as G. Yakman, R.W. Bybee, J. Dewey, and S. Kelley, STEAM education is recognized as a modern educational model based on interdisciplinary integration. In their opinion, education based on project activities develops students' competencies in analyzing problem situations, independent decision-making, creative approaches, and collaborative work [2; 35], [3; 42].

The scientific research of local pedagogical scholars including N. Sayidahmedov, Sh. Sharipov, A. Kholikov, U. Nishonaliyev, and R. Ishmukhamedov comprehensively covers the issues of introducing innovative pedagogical technologies into the educational process, utilizing interactive methods, and organizing lessons based on a competency-based approach. Their studies recognize shaping the student

as an active subject of the educational process, directing them toward independent thinking, and orienting them toward practical activity as one of the primary tasks of modern education [4; 126], [5; 214].

N. Sayidahmedov evaluates modern pedagogical technologies as a crucial factor in increasing the efficiency of the educational process. He scientifically substantiates that interactive methods and project-based learning technologies develop students' creative thinking, communicative competence, and practical skills [4; 132]. Sh. Sharipov highlights the pedagogical possibilities of applying interdisciplinary integration and STEAM elements into the lesson process, as well as the professional competence of the teacher in creating an innovative learning environment [5; 218].

In the scientific investigations of A. Kholikov, the appropriate choice of pedagogical technologies, increasing students' cognitive activity, and the effective use of educational tools are shown as essential factors in improving the quality of education [6; 94]. R. Ishmukhamedov scientifically substantiates the possibilities of forming 21st-century competencies in students through the use of interactive methods, collaborative learning, and project technologies [7; 167].

Analyses indicate that teaching the "Tarbiya" subject based on STEAM projects serves to develop students' creativity, critical thinking, problem-solving, collaborative work, and communicative competencies alongside their spiritual and moral qualities. Concurrently, the educational process organized on a project basis enables the harmonization of students' theoretical knowledge with practical activity, ensures interdisciplinary connectivity, and increases the efficiency of education.

However, the analysis of existing scientific research reveals that the issue of comprehensively improving the forms, methods, and tools of teaching the "Tarbiya" subject specifically on the basis of STEAM projects has not yet been sufficiently studied. Therefore, developing scientific-methodical recommendations in this direction and implementing them into practice remains one of the urgent scientific-pedagogical tasks.

ANALYSIS OF THE INTEGRATED LESSON STAGES (PRACTICAL APPLICATION)

To evaluate the efficiency of the developed methodology, the educational process in the experimental groups was structured based on the synthesis of the STEAM approach and the author's **CR-BT (Reading-Reflection-Bibliotherapy) model**. The interdisciplinary lessons in the 4th-grade "Tarbiya" course were divided into four sequential, technologically supported stages, aimed at transforming external compliance into internal **self-discipline and conscious responsibility**:

Stage 1: Identification and Artistic Reflection

1. Pedagogical Essence: The lesson begins with the introduction of a highly emotional, problem-based text or case study related to moral dilemmas, responsibility, or time-management. Students identify themselves with the characters.

2. STEAM Integration: Digital media and audio-visual tools are used to simulate the environment of the story.

3. Competency Developed: Empathy, moral evaluation, and critical reading.

Stage 2: Technical and Engineering Problem-Solving (Science, Technology, Engineering)

1. Pedagogical Essence: The moral problem identified in the text is converted into a practical, real-world task. For instance, if the story highlights a lack of self-discipline or poor time management, students are tasked with creating a solution.

2. STEAM Integration: Students design and model "Smart Time-Trackers" or cooperative project schedules using basic engineering principles and mathematical calculations.

3. Competency Developed: Technological literacy, spatial thinking, and collaborative engineering modeling.

Stage 3: Catharsis and Insight (The CR-BT Core)

1. Pedagogical Essence: During the hands-on creation process, students experience an internal shift (catharsis). They realize that achieving a goal requires strict personal discipline, respect for team boundaries, and accurate task delegation.

2. STEAM Integration: Data from their practical modeling tasks are integrated into the specialized educational software platform.

3.Competency Developed: Autonomous self-regulation, time-management, and proactive discipline.

Stage 4: Mathematical Evaluation and Public Defense (Mathematics and Communication)

1.Pedagogical Essence: Micro-groups calculate the efficiency of their design models, present their projects publicly, and engage in peer-evaluation.

2.STEAM Integration: Applying basic mathematical matrices to evaluate resource allocation and time efficiency.

3.Competency Developed: Communicative competence, mathematical reasoning, and constructive self-criticism.

RESULTS AND DISCUSSION

The results of the large-scale pedagogical experiment conducted between 2022 and 2025 involving 712 fourth-grade students across Surxondaryo, Xorazm, and Sirdaryo regions demonstrated that teaching the “Tarbiya” subject based on STEAM projects integrated

with the author's CR-BT model has a highly significant positive impact on the development of students' educational, moral, and personal competencies. Particularly, in the experimental groups, the utilization of project-based activities, interdisciplinary integration, and interactive reflection substantially enhanced students' classroom activity, creative thinking, autonomous problem-solving, and collaborative skills.

The quantitative and qualitative dynamics of the experimental indicators compared to the control groups are systematically outlined in Table 1.

Kechirasiz, avvalgi tahlilda jadval matni (HTML kod ko'inishida) to'liq shakllantirilgan bo'lsa-da, ba'zi platformalarda yoki interfeyslarda u vizual tarzda ko'rinmay qolgan bo'lishi mumkin.

Ushbu xatolikni tuzatib, xalqaro jurnallar (Scopus/Web of Science) talab qiladigan eng toza va oddiy matnli Markdown formatida **1-jadvalni (Table 1)** qaytadan keltiraman. Maqolangizga to'g'ridan-to'g'ri joylashtirishingiz uchun u quyidagi ko'inishda bo'ladi:

Table 1

Comparative Performance Indicators of the Experimental and Control Groups (N = 712)

No	Evaluated Competency and Behavioral Indicators	Experimental Group (%)	Control Group (%)	Difference (Δ)
1	Active participation in STEAM projects, conscious self-discipline, and timely task execution	86%	61%	+25%
2	Analyzing moral-dilemma problem situations and proposing practical integrated solutions	79%	56%	+23%
3	Development of critical, creative, and evaluative thinking competencies through bibliotherapy	82%	58%	+24%
4	Manifestation of collaborative responsibility and communicative competence in group project work	84%	60%	+24%

First, classes organized on the basis of STEAM projects in the experimental group significantly increased

students' intrinsic motivation toward the "Tarbiya" subject. In executing project tasks, **86%** of students

actively participated, demonstrating advanced internal **self-discipline and time-management** by completing the given tasks with high quality within the designated deadlines. In the control group, where traditional instructional methods prevailed, this indicator stood at **61%**.

Second, the integrated STEAM-pedagogy model dramatically enhanced students' critical thinking and problem-solving competencies. According to the diagnostic data, **79%** of students in the experimental group showed superior results in analyzing real-life moral dilemmas and developing viable technological or social solutions, compared to only **56%** in the control group.

Third, the project activities embedded within the CR-BT model successfully stimulated students' creative approach and autonomous thinking. The final evaluation indicated that **82%** of the experimental group students effectively manifested creative reflection and formulated innovative ethical ideas, whereas this indicator was limited to **58%** in the control group.

Fourth, organizing STEAM projects within small cooperative teams fundamentally strengthened students' collaborative work, interactive communication, and collective responsibility. Observations and questionnaires revealed that **84%** of students in the experimental group proactively engaged in team projects, initiated constructive dialogues, and shared responsibility in collective decision-making, while the control group registered **60%** efficiency.

The empirical findings conclusively confirm that the complex application of interdisciplinary integration, project-based learning, bibliotherapeutic reflection, and digital platforms in the "Tarbiya" subject increases the level of students' 21st-century competencies by an average of **20–24%** compared to traditional methods. Ultimately, this methodology serves as an exceptionally effective pedagogical tool to harmonize moral-spiritual value orientation with practical scientific-technological application, ensuring autonomous self-regulation and prosocial development in primary school settings.

DISCUSSION

In the contemporary global educational landscape, integrating theoretical knowledge with practical

activity, expanding interdisciplinary approaches, and utilizing innovative pedagogical technologies constitute primary drivers for enhancing educational quality. The conceptual discussion of our empirical findings confirms that teaching the "Tarbiya" (Character Education) subject through integrated STEAM projects serves as an exceptionally powerful pedagogical mechanism. This approach does not merely advance students' cognitive comprehension; it fundamentally refines their critical thinking, creative reflection, communicative competence, collaborative culture, and autonomous problem-solving capabilities within a value-oriented framework.

The empirical data retrieved from the experimental groups robustly substantiates that structuring lessons around the synthesis of STEAM components and interactive reflection significantly elevates students' intrinsic motivation toward character education. In contrast to conventional, monologue-based instructional strategies, the project-based environment prompts students to actively engage in autonomous inquiry, cooperative horizontal communication, argumentative reasoning, and the technological modeling of ethical solutions. As students navigated through real-world ethical dilemmas, the execution of collaborative project tasks enabled them to internalize the core tenets of **conscious self-discipline and strategic time-management** [21; 70]. Instead of adhering to rules out of external compliance, students cultivated an internal necessity for regulatory order, which directly stems from the rigorous operational demands of scientific and technological engineering tasks.

Furthermore, our investigation highlights the transformative potential of the classroom environment shaped by the convergence of the STEAM framework and the author's **CR-BT (Reading-Reflection-Bibliotherapy) model**. By bridging emotional-artistic text analysis with hands-on, multi-disciplinary modeling, the fourth-grade students successfully recognized the pragmatic correlation between abstract moral values and structural, real-life problem solving [22; 5]. Within this interactive workflow, digital educational technologies, collaborative platforms, and specialized software served as critical cognitive tools that enhanced the pupils' digital literacy alongside their social-emotional intelligence [23; 79]. The cooperative

essence of the micro-group assignments naturally stimulated prosocial traits, including distributed responsibility, civic initiative, proactive leadership, communicative empathy, and consensus-based group decision-making [25; 48].

According to the comprehensive feedback compiled from peer educators and pedagogical observers, the STEAM-driven “Tarbiya” curriculum exhibits structural superiority over traditional lecture-driven formats due to its practical orientation, context-rich content, and high motivational yield. It functions as a comprehensive vehicle that effectively arms primary school students with vital 21st-century competencies, systematically preparing them to confront complex sociotechnical and ethical challenges in their daily environments [24; 96].

In conclusion, the scholarly evaluation of the experimental results verifies that optimizing the forms, methods, and tools of the “Tarbiya” curriculum through the lens of STEAM and bibliotherapeutic integration bears substantial theoretical and practical value for the advancement of elementary education. It enriches the instructional essence to meet modern global standards while fostering a holistic synthesis of spiritual-moral, intellectual, and operative-practical student capacities. Consequently, the operational priorities of contemporary primary education must urgently pivot toward restructuring character education syllabi via the STEAM-CR-BT framework, widely integrating digital learning instruments, and systemically upgrading the specialized interdisciplinary competence of primary school instructors.

CONCLUSION AND PRACTICAL RECOMMENDATIONS

The results of this comprehensive empirical research demonstrate that teaching the “Tarbiya” (Character Education) subject based on STEAM projects serves as an exceptionally effective pedagogical approach for developing students' knowledge, skills, and values-oriented competencies. Implementing STEAM technologies into the educational workflow in a purposeful, systemic, and methodologically grounded manner enables students to acquire interdisciplinary integrated knowledge, while fostering critical and creative thinking, autonomous problem solving, communicative competence, and advanced teamwork skills [14; 58].

Lessons organized on a project basis significantly enhanced students' intrinsic motivation toward the “Tarbiya” curriculum, successfully harmonizing theoretical moral knowledge with practical activity and enabling its application in real-life situations. The learning environment structured around the STEAM framework exerted a profoundly positive impact on shaping crucial 21st-century competencies in fourth-grade students, such as civic initiative, **conscious self-discipline**, creativity, independent reflection, and innovative problem-solving [17; 66].

The strategic deployment of interactive methods, project-based learning technologies, information-communication tools, and digital educational resources ensured that the curriculum was context-rich, practically oriented, and motivationally optimized. Consequently, students successfully mastered the skills required to actively participate in the educational process, independently analyze ethical and sociotechnical dilemmas, organize cooperative micro-group workflows, and constructively defend their original ideas.

In general, teaching the “Tarbiya” subject through integrated STEAM projects establishes a robust, digitally supported methodological foundation for raising educational quality, comprehensively refining students' moral-spiritual, intellectual, and operative capacities, and modernizing curriculum content to meet contemporary global standards.

Based on the empirical findings retrieved from the experimental operations, the following conclusions have been formulated:

1. “Tarbiya” subject sessions organized via STEAM projects effectively advance students' critical thinking, creative approach, collaborative problem solving, and practical operational skills [4; 120].
2. Interdisciplinary project activities exert a significantly positive influence on shaping teamwork skills, communicative competence, proactive leadership, and a deep sense of **conscious responsibility** among primary school pupils [21; 72].
3. The utilization of digital educational tools and reflective interactive methods directly enhances students' classroom activity, learning motivation, and their comprehensive mastery of the character education curriculum [13; 80].

4. The STEAM approach stands as a vital pedagogical vehicle to bridge the theoretical core of the "Tarbiya" course with real-world application, equip young learners with vital 21st-century competencies, and substantially upgrade overall educational efficiency [22; 7].

Based on the research outcomes, the following **practical recommendations** are proposed:

1. It is recommended to systematically harness the structural potential of STEAM projects, project-based learning technologies, and interdisciplinary integration models when organizing general "Tarbiya" subject classrooms.

2. It is highly advisable to organically merge interactive methodologies—such as Brainstorming, Clustering, Case Studies, **Design Thinking**, and Role-Playing—with practical STEAM projects to establish a balanced cognitive-reflective learning workflow [12; 110].

3. To accelerate students' practical and digital competencies, it is necessary to effectively exploit modern information-communication technologies, multimedia presentations, virtual laboratories, interactive smartboards, and specialized digital platforms.

4. To systemically upgrade the professional interdisciplinary competence of primary school educators, it is recommended to regularly organize specialized professional development courses, practical training seminars, and methodical workshops focusing on STEAM-character education integration.

5. It is crucial to develop and widely implement specialized textbook-methodical packages, scientific-methodical recommendations, digital learning resources, and exemplary lesson plans rooted in the **integrated STEAM and CR-BT (Reading-Reflection-Bibliotherapy) framework** [15; 148].

6. To maximize the educational yield of the STEAM approach within the "Tarbiya" curriculum, it is recommended to strengthen the collaborative triad of *school–family–community*, actively involve fourth-grade students in social and ecological modeling projects, and systemically support their creative initiatives.

In conclusion, these synthesized findings and practical recommendations serve to deeply advance the

scientific-methodical infrastructure of teaching the "Tarbiya" subject based on STEAM projects, promote the widespread implementation of innovative pedagogical technologies in early childhood education, and securely nurture 21st-century competencies in the modern generation of primary learners.

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