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DEVELOPING UNIVERSITY STUDENTS' COMPETENCE IN UNIVERSAL HUMAN VALUES: AN INTEGRATIVE REVIEW AND PROVISIONAL CONCEPTUAL FRAMEWORK

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ABSTRACT
Universities are expected to prepare graduates who can interpret and enact principles such as human dignity, justice, freedom, peace, tolerance, solidarity, and responsibility. Existing scholarship, however, often separates value knowledge, motivation, moral emotion, reflection, and conduct. This integrative review develops a provisional framework for university students' competence in universal human values and specifies the limits of the supporting evidence. Six criterion-selected works representing Uzbek pedagogical thought and established international theories were examined through directed qualitative content analysis. Meaning units were coded across cognitive, axiological-motivational, emotional-reflective, and activity-behavioral domains. The synthesis indicates consistent theoretical support for cognition, personal value commitment, and action, while emotional-reflective processes are less directly specified. The resulting framework defines four interdependent components, proposes observable indicators, and formulates propositions for empirical testing. The framework is a theory-building product rather than evidence of pedagogical effectiveness. Its construct validity, reliability, measurement invariance, and sensitivity to educational interventions require testing with student data before use in consequential assessment.

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Keywords: *universal human values; competence; pedagogical axiology; moral development; higher education; integrative review.*

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Introduction

Higher education has responsibilities that extend beyond disciplinary knowledge. Graduates must also judge how knowledge should be used when social interests, professional obligations, and moral claims conflict. This demand becomes especially visible in culturally plural settings and in digital environments where students encounter competing narratives, rapid communication, and ethical uncertainty. Knowing the definition of a value is therefore insufficient. Students need to explain why a principle matters, compare competing claims, recognize the dignity and interests of others, and translate reasoned judgments into conduct. Policy frameworks support this broader view of learning. Uzbekistan's Law on Education links education with intellectual, spiritual-moral, ethical, and cultural development (Republic of Uzbekistan, 2020). UNESCO's guidance on global citizenship education distinguishes cognitive, socio-emotional, and behavioral domains (UNESCO, 2015), while the Council of Europe (2018) organizes democratic competence around values, attitudes, skills, and knowledge and critical understanding. These frameworks

justify a multidimensional approach, although they do not establish a specific construct for university students in Uzbekistan.

In this study, universal human values are principles whose normative reference is the equal dignity and legitimate welfare of human beings, including humanism, justice, freedom, peace, tolerance, solidarity, responsibility, compassion, and mutual respect. Universality is not treated as cultural uniformity. National history, language, traditions, and moral experience shape how values are understood and practiced. The educational problem is thus to connect culturally situated meaning with standards of dignity and reciprocal respect rather than to oppose national and universal values.

The term competence also requires precision. A knowledge-only definition permits a student to describe justice or tolerance while behaving inconsistently. A behavior-only definition, by contrast, conceals the motives and reasoning behind an action. A defensible construct must connect understanding, personal endorsement, emotional and reflective mediation, and action. Relevant elements appear across pedagogical axiology, national education, psychological value theory, and character education, but they are rarely assembled into one transparent framework. The study therefore asks three questions: Which competence dimensions are explicit or implicit in the selected Uzbek and international theories? How do national-pedagogical and international psychological-moral perspectives complement one another? What provisional component structure, observable indicators, and empirical propositions can be derived without presenting conceptual synthesis as validated evidence?

Method

The study used a structured integrative review informed by Whittemore and Knafl's (2005) sequence of problem identification, focused literature search, data evaluation, analysis, and presentation. Directed qualitative content analysis was selected because the inquiry began with theoretically anticipated domains while allowing weakly represented or missing elements to remain visible (Hsieh & Shannon, 2005). The design is document-based conceptual research, not a systematic review of intervention effects, and no claim of PRISMA completeness is made.

Bibliographic discovery used Google Scholar and verification through publisher or catalogue records, including Uzbek catalogues where available. Searches were rechecked on September 8, 2026. English search terms included universal human values, value education, moral education, basic human values, value competence, moral knowing feeling action, and higher education. Uzbek terms included umuminsoniy qadriyatlar, qadriyatli kompetentlik, pedagogik aksiologiya, and milliy tarbiya va yoshlar. Backward citation checking was used to locate foundational works. A work entered the analytical corpus when it met five criteria: it conceptualized values or values education; explained at least one relation among knowledge, commitment, moral emotion, reflection, or behavior; offered concepts transferable to higher education; represented either Uzbek pedagogical thought or an established international theoretical tradition; and had traceable authorship, year, and publication source. Promotional texts, duplicate records, items without identifiable bibliographic data, and studies limited to one value without a transferable conceptual mechanism were excluded.

The final corpus was purposively selected for conceptual variation. Three Uzbek works addressed spiritual culture, pedagogical axiology, and national education (Mardonov et al., 2013; Musurmonova, 1996; Quronov et al., 2016). Three international works represented value hierarchy, cross-cultural value structure, and the relation among moral knowing, feeling, and action (Lickona, 1991; Rokeach, 1973; Schwartz, 1992). The six texts form an analytical sample of contrasting theoretical positions rather than a representative sample of the full literature. The unit of analysis was a proposition, definition, or explanatory passage connecting values with learning, motivation, emotion, reflection, or action. No students, teachers, institutions, intervention groups, personal records, or survey responses were included. Human-participant consent and ethics approval were therefore not applicable to this document study.

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Table 1

Selection logic and analytical contribution of the six-source corpus

Source	Reason for selection	Central proposition	Contribution and boundary
Musurmonova (1996)	Spiritual values and youth education	Values organize spiritual needs, cultural experience, and conduct.	Culturally situated internalization; no competence measurement model.
Mardonov et al. (2013)	Pedagogical axiology	Value knowledge, attitude, and value-oriented behavior function in unity.	Closest pedagogical architecture; emotion/reflection less differentiated.
Quronov et al. (2016)	National education and youth	Historical memory and national worldview guide socially responsible action.	Clarifies contextual meaning; limited operational criteria.
Rokeach (1973)	Value hierarchy	Enduring beliefs order preferred goals and modes of conduct.	Supports prioritization; ranking may simplify value conflict.
Schwartz (1992)	Cross-cultural value structure	Values form a motivational system with compatible and conflicting priorities.	Supports cross-cultural comparison; requires educational operationalization.
Lickona (1991)	Moral education	Moral knowing, moral feeling, and moral action are mutually necessary.	Strong pedagogical bridge; adult contexts need further specification.

A four-domain codebook was applied. Cognitive referred to understanding and reasoned use of value concepts. Axiological-motivational referred to personal acceptance, prioritization, and motives. Emotional-reflective covered empathy, perspective-taking, and self-evaluation. Activity-behavioral referred to observable enactment in interaction and social practice. Each source-domain relation was coded E when explicit, I when indirect, and 0 when not central.

Analysis proceeded through extraction of relevant meaning units, assignment of E/I/0 codes, comparison of Uzbek and international sources, identification of convergence and omission, and synthesis of component definitions and candidate indicators. A component was retained when at least three of the six sources supported it explicitly or indirectly and when it remained conceptually distinguishable from the other components. Coding was completed by one researcher; consequently, no intercoder reliability coefficient was calculated. The matrix and retention rule are reported to make the interpretive process open to scrutiny.

Results

The comparison showed complementarity rather than equivalence. Uzbek authors emphasize the cultural and pedagogical conditions through which values acquire personal meaning: spiritual needs, historical memory, national identity, educational relations, and social responsibility (Mardonov et al., 2013; Musurmonova, 1996; Quronov et al., 2016). International theories specify other mechanisms, notably value organization and prioritization (Rokeach, 1973; Schwartz, 1992) and the movement from moral knowledge and feeling to action (Lickona, 1991). The national works strengthen contextual interpretation, whereas the international works provide sharper structural distinctions for diagnosis and future measurement. No source contains the complete four-component model. The proposed framework is therefore an analytical synthesis produced through the stated coding and retention rules, not a quotation from any author and not a validated measurement model.

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Table 2

Cross-source coding of the four candidate components

Source	C	AM	ER	AB	Coding rationale
Musurmonova (1996)	I	E	0	E	Spiritual needs and conduct are central; empathy/reflection is not separated.
Mardonov et al. (2013)	E	E	I	E	Knowledge-attitude-behavior unity is explicit; reflection is indirect.
Quronov et al. (2016)	E	E	I	E	Historical awareness and responsibility are explicit; reflection is embedded in worldview.
Rokeach (1973)	E	E	I	E	Belief, preference, and conduct are linked; emotion is not a distinct domain.
Schwartz (1992)	E	E	I	I	Motivational goals are explicit; emotion and action are represented indirectly.
Lickona (1991)	E	E	E	E	Moral knowing, feeling, and action support all four domains.

Note. C = cognitive; AM = axiological-motivational; ER = emotional-reflective; AB = activity-behavioral; E = explicit; I = indirect; 0 = not central. Counts and codes describe this six-work corpus only.

Two patterns stand out. All six sources treat values as personally meaningful priorities or commitments, supporting the axiological-motivational component. Five explicitly connect values with both understanding and conduct. Emotional-reflective processes have the weakest direct representation: they are explicit in Lickona's (1991) moral-feeling domain and indirect in four other works. This component nevertheless satisfies the retention rule and addresses a theoretical mechanism by which learners register the human consequences of a choice and reconsider their conduct.

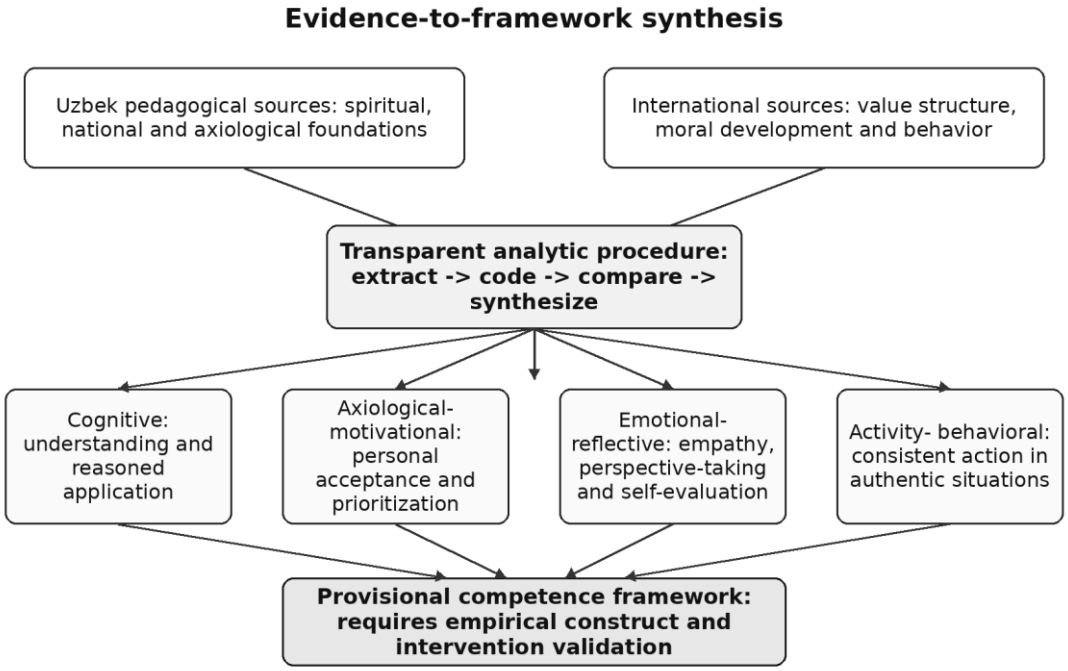
Competence in universal human values is therefore defined here as a student's integrated capacity to understand dignity-based principles, accept and prioritize them through autonomous reasons, experience and reflect on their implications for self and others, and enact them consistently in academic, interpersonal, civic, and emerging professional situations.

The four components are analytically distinct but reciprocal. Action creates consequences that become material for reflection; reflection may then revise motives and conceptual understanding. The model is cyclical rather than a fixed sequence.

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Figure 1

Evidence-to-framework synthesis and the empirical-validation boundary



Solid arrows denote theoretical derivation; the final framework is not evidence of pedagogical effectiveness.

Table 3

Operational definitions, candidate indicators, and testable propositions

Component	Operational definition	Candidate indicators	Proposition for validation
Cognitive	Understands, differentiates, and applies value concepts when reasons or principles conflict.	Concept discrimination; dilemma analysis; recognition of rights, duties, and consequences.	P1: Cognitive scores will relate positively, but not perfectly, to behavior.
Axiological-motivational	Accepts universal human values as personally significant priorities and can justify them beyond external compliance.	Value priorities; autonomous reasons; persistence when value-consistent choices have a cost.	P2: Autonomous value endorsement will mediate knowledge-action relations.
Emotional-reflective	Recognizes others' perspectives and emotions and evaluates personal choices against value-based criteria.	Empathic accuracy; perspective-taking; identification of bias; reflective revision.	P3: Reflection quality will predict correction of inconsistent conduct.
Activity-behavioral	Demonstrates values in communication, collaboration, decision-making, and social participation.	Respectful disagreement; fair role distribution; responsible follow-through; response to exclusion or injustice.	P4: Multi-source behavior ratings will relate more strongly to the full framework than to knowledge alone.

The propositions are falsifiable statements for future research, not findings of the present review. Their purpose is to convert a broad normative concept into a construct that can be tested, revised, or rejected with empirical evidence.

Discussion

The central theoretical contribution is the separation of personal value commitment from both value knowledge and observable conduct. A student may reproduce an accepted formulation because an

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instructor expects it while lacking autonomous endorsement. Conversely, a student may endorse a principle yet fail to enact it under peer pressure or personal cost. Treating these states as equivalent would obscure meaningful differences in competence. The emotional-reflective component warrants particular caution. Its weaker explicit representation in the six-source corpus does not establish it as an independent empirical dimension. Instead, the synthesis identifies a mechanism that value-hierarchy and national-education sources do not isolate consistently. Lickona's (1991) account of moral feeling, UNESCO's (2015) socio-emotional domain, and the Council of Europe's (2018) competence model provide reasons to test empathy, perspective-taking, and self-evaluation. Factor analysis may show one factor, multiple factors, or no stable independent factor; the conceptual model leaves this issue open.

The framework also clarifies the relation between national and universal values. National values provide narratives, symbols, practices, and obligations through which students encounter moral meaning. Universal values offer criteria for examining whether a culturally situated practice respects dignity, justice, and reciprocity. Pedagogical integration therefore depends on reasoned dialogue: students can investigate how traditions express broader principles and how competing interpretations should be assessed.

Instruction aligned with the framework would require varied learning conditions. Concept clarification and comparative reading address the cognitive component.

Moral dilemmas and justification tasks can reveal whether values function as personally endorsed reasons. Dialogue, perspective-taking, and structured reflection make emotional and reflective processes observable. Service learning, collaborative projects, and professionally authentic cases can provide opportunities for value-consistent action. Alignment with the model, however, does not demonstrate effectiveness; each method requires evaluation against appropriate outcomes and comparison conditions.

Assessment should likewise be multi-method. Self-report measures are vulnerable to socially desirable responding, whereas observation alone may confuse compliance with commitment. A diagnostic design could combine concept tests, value and motivation measures, scenario-based judgments, reflection rubrics, structured observation, and portfolio evidence. Schwartz et al. (2012) further show that value priorities can be differentiated with greater motivational precision than broad value labels alone, which is relevant when future instruments operationalize the axiological-motivational component. Until reliability, factorial validity, fairness, and measurement invariance are established, scores should be used for formative research rather than selection or certification. Earlier publications by the author discussed the social relevance, content, and pedagogical-cooperation factors associated with competence in universal human values (Abdug'aniyev, 2023, 2024a, 2024b). The present article has a different object and method. It uses a declared six-work document corpus, a predefined codebook, and explicit E/I/0 decision rules. Its output is a cross-source matrix, operational component definitions, and propositions for empirical testing; it does not re-report participant data or intervention outcomes from the earlier publications.

Limitations and Research Agenda

Four limitations constrain the claims. First, the purposive six-work corpus is small and non-exhaustive; it was chosen for theoretical contrast, not for estimating frequencies across the literature. Second, English summaries of Uzbek concepts may not preserve every semantic nuance of the original texts. Third, one researcher performed the coding, so intercoder agreement was not estimated. Fourth, the study includes no student sample, diagnostic administration, or pedagogical intervention. It therefore provides neither prevalence estimates nor causal evidence of effectiveness.

Empirical validation should begin with expert review of content validity, followed by cognitive interviews with students to identify ambiguous or socially desirable items. Pilot testing should examine item distributions and internal consistency.

A multi-institution sample determined through a priori power analysis could then support exploratory and confirmatory factor analyses comparing one-factor, four-factor, and higher-order models. Measurement invariance across relevant student groups should be established before mean comparisons.

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Finally, a preregistered quasi-experimental or randomized study could compare a specified values-education intervention with an appropriate control condition using pretest, post-test, and follow-up measures.

Conclusion

This integrative review offers a bounded conceptual synthesis of Uzbek pedagogical thought and established international theories of values and moral education. The proposed construct comprises cognitive, axiological-motivational, emotional-reflective, and activity-behavioral components. The evidence is strongest at the conceptual level for understanding, value commitment, and action, while emotional-reflective processes are less directly represented and therefore require especially careful testing. The framework should be treated as a research hypothesis and a guide for formative design. Its value lies in making assumptions, component definitions, candidate indicators, and validation propositions explicit. Claims about diagnostic accuracy or pedagogical effectiveness must await evidence from student samples, psychometric analysis, and intervention studies.

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PEDAGOGICAL MECHANISMS FOR DEVELOPING SELF-AWARENESS AND SELF-DIRECTED LEARNING AMONG GRADE 5–8 STUDENTS: A MULTI-REGIONAL QUASI-EXPERIMENTAL STUDY IN UZBEKISTAN

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ABSTRACT

Self-awareness and self-directed learning enable adolescents to evaluate their learning, regulate effort, and assume increasing responsibility for academic decisions. This study examined an integrated pedagogical model combining reflective learning, self-assessment, teacher mentoring, collaborative learning, and independent educational activity among Grade 5–8 students in three regions of Uzbekistan. A nonrandomized pretest–posttest design was implemented over five months during 2023–2025 with 852 students (426 experimental; 426 comparison). Outcomes were summarized using a 12-indicator, three-point criterion-referenced framework informed by surveys, observations, reflective journals, and teacher records. Because only group-level aggregate scores were available, analyses were descriptive. The experimental group increased from 54.2% to 66.1%, whereas the comparison group increased from 53.8% to 54.4%. The resulting descriptive difference-in-differences was 11.3 percentage points. The pattern supports further investigation of the integrated model but does not establish causality or statistical significance. Stronger evaluation requires participant-level data, validated measures, documented implementation fidelity, cluster-aware analysis, and follow-up assessment.

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Keywords: *self-awareness, self-directed learning, self-regulated learning, reflective practice, learner agency, quasi-experimental study.*

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Introduction

Contemporary education requires students not only to acquire curricular knowledge but also to judge what they understand, recognize ineffective strategies, seek appropriate support, and decide how to proceed. These capacities are particularly consequential in early adolescence, when habits of study and patterns of responsibility become more stable. Uzbekistan's Law on Education presents education as a continuous process directed toward intellectual, moral, and personal development (Republic of Uzbekistan, 2020). International frameworks likewise connect learner agency with anticipation, action, reflection, participation, and shared responsibility (OECD, 2019; UNESCO, 2021).

Several related constructs inform this study. Self-awareness concerns recognition of one's strengths, limitations, emotions, motives, values, and recurring responses. Metacognitive awareness is narrower, referring to knowledge and monitoring of cognition. Self-regulated learning concerns the cyclical management of goals, strategies, effort, and evaluation, whereas self-directed learning places

greater emphasis on learner initiative in identifying needs, locating resources, and judging outcomes. In Uzbek pedagogical usage, a term often translated as self-education can encompass both independent study and deliberate personal development. The present article uses self-directed learning as the operational English term while recognizing that the measured profile also contains relational and personal-development indicators.

The conceptual model draws on several traditions. Dewey (1933) treated reflection as disciplined reconsideration of experience. Bandura (1997) explained how perceived capability shapes persistence and choice. Vygotsky (1978) showed that autonomy can emerge through guided and collaborative activity rather than through isolation. Knowles (1975) emphasized learner initiative in identifying needs and evaluating progress, while Zimmerman (2002) described self-regulation as a cycle of forethought, performance, and self-reflection. Read together, these accounts indicate that learner autonomy depends on both internal processes—awareness, judgment, intention—and external supports such as feedback, modeling, dialogue, and progressively reduced scaffolding.

Research on self-regulation provides a basis for testing such an integrated approach. Meta-analytic evidence indicates that school-age learners benefit when cognitive and metacognitive strategies are taught explicitly, embedded in meaningful tasks, and paired with opportunities to monitor and evaluate performance (Dignath & Büttner, 2008; Dignath et al., 2008). Classroom observation studies distinguish direct strategy instruction from indirect activation through task design and teacher discourse (Dignath & Veenman, 2021). Across major models, planning, monitoring, control, and reflection recur, although the models differ in their treatment of motivation, emotion, and social regulation (Panadero, 2017).

Self-assessment and feedback are central to the proposed mechanism because they turn reflection into a comparison between current performance and explicit criteria. Student self-assessment has been associated with self-regulation and self-efficacy, but its usefulness depends on clear criteria, exemplars, practice, and feedback (Andrade, 2019; Panadero et al., 2017). Feedback is most productive when it clarifies the goal, the learner's present position, and an attainable next step (Hattie & Timperley, 2007). A journal or rubric, therefore, is not an instructional mechanism by itself; its educational value depends on the evidence, questions, dialogue, and subsequent action it prompts.

A recurring problem is fragmentation. Reflection journals may be assigned without feedback, independent tasks may precede instruction in planning, mentoring may remain teacher-controlled, and group work may divide labor without encouraging co-regulation. The source study addressed this problem by combining five mechanisms—reflective learning, self-assessment, teacher mentoring, collaborative learning, and independent educational activity—within a recurring instructional process in three regions of Uzbekistan. The aim was to examine descriptive change in a 12-indicator learning-development profile after a five-month intervention and to state clearly what can and cannot be inferred from the available evidence.

Method

Design and Participants

The study used a quasi-experimental, nonrandomized pretest–posttest design with an experimental group and a comparison group. Fieldwork was reported between 2023 and 2025 in general secondary schools in the Samarkand, Namangan, and Tashkent regions. The active intervention lasted five months and was incorporated into regular lessons and extracurricular activities. Purposive selection and matching, rather than random allocation, justify the quasi-experimental designation.

The reported analytic sample consisted of 852 students in Grades 5–8, with 426 students in each condition. Research documentation indicates that matching considered age, grade level, baseline academic records, gender composition, and socioeconomic background. The corresponding distributions and matching tolerances were not available, however. Baseline comparability can therefore be discussed only

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for the reported composite outcome, not for demographic or school-level characteristics. The number of schools, classes, and teachers was also unavailable, preventing reconstruction of clustering by site.

Table 1

Study Design and Evidence Available for Analysis

Element	Reported specification	Analytical boundary
Setting	Secondary schools in Samarkand, Namangan, and Tashkent regions	School and class counts not supplied
Period	Fieldwork during 2023–2025; five-month intervention	Exact dates and delayed follow-up not supplied
Participants	852 students in Grades 5–8	Age, gender, grade, and region distributions not supplied
Groups	Experimental n = 426; comparison n = 426	Nonrandom allocation; matching algorithm not documented
Outcome	12 indicators rated on a 1–3 scale; aggregate percentages reported	No item-level scores, variance estimates, or reliability coefficients
Evidence sources	Survey, observation, reflective journal, teacher rubric	Weighting and rater-assignment rules not documented

Intervention

The experimental condition combined five pedagogical mechanisms. Their integration was the defining feature: students were asked to notice a learning experience, judge it against criteria, discuss it or receive feedback, select a next step, act independently or with peers, and return to reflection. This sequence corresponds broadly to cyclical accounts of self-regulation while remaining adapted to ordinary middle-grade classroom practice.

Reflective learning used structured discussion and journal prompts to help students identify what occurred, why it occurred, and what should change. Self-assessment required learners to compare work or conduct with explicit criteria and justify a judgment rather than merely assign a mark. Teacher mentoring relied on questions, feedback, and graduated guidance intended to make planning and monitoring visible while retaining learner responsibility. Collaborative learning used peer dialogue and joint problem-solving to support explanation, strategy comparison, mutual feedback, and co-regulation. Independent educational activity required students to set goals, organize resources, make decisions, and review outcomes.

The comparison group continued the standard curriculum without the supplementary five-part package. Available documentation did not include a session-by-session manual, contact hours, teacher-training duration, adherence checklist, or contamination assessment. The intervention can therefore be described conceptually, but its fidelity cannot be verified from the available record.

Outcome Framework and Procedure

Student development was assessed through 12 criteria rated on a three-point scale (1 = low, 2 = moderate, 3 = high). Four diagnostic sources were named: structured student surveys, systematic observation, reflective journals, and teacher tracking rubrics. The record did not specify whether every source informed every criterion, how disagreements were resolved, or how the composite percentage was calculated. The reported percentages were therefore treated as supplied group-level composites rather than reconstructed scores.

The study proceeded through diagnostic, intervention, and evaluation stages. Both groups completed baseline procedures using the stated sources. During the intervention stage, the experimental group engaged in reflective discussions, personal journals, mentoring exchanges, collaborative problem-solving, independent projects, and self-checks, while the comparison group continued standard instruction. After five months, the same 12-criterion framework was administered. Using the same framework at both time points supports descriptive comparison, although the absence of documented rater training and blinding leaves measurement and expectancy effects unresolved.

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Table 2

Construct Map for the 12 Reported Indicators

Domain	Reported indicators	Interpretive caution
Reflective self-knowledge	Curiosity about self-discovery and growth; identification of strengths and weaknesses	Directly relevant to self-awareness, but self-report and teacher judgment may differ
Contextual and critical awareness	Situational awareness; extracting central ideas; evaluating behavior; connecting media with real contexts	Combines metacognitive, critical-thinking, and social-interpretive skills
Agency and self-directed learning	Expressing views; autonomous decisions; journal consistency; valuing continuous growth	Journal completion is behavioral evidence, not equivalent to reflection quality
Relational learning context	Family communication; home/parental engagement in learning	Partly contextual conditions rather than solely student competence

Data Analysis

Analysis was restricted to the aggregate percentages available in the research record. Absolute change was calculated as the postintervention score minus the preintervention score. A descriptive difference-in-differences (DiD) contrast was calculated as (Postexperimental − Preexperimental) − (Postcomparison − Precomparison). This contrast separates the experimental group's observed change from concurrent change in the comparison group.

The DiD estimate remains descriptive. Assumptions required for causal inference, including parallel preintervention trends, stable composition, and the absence of differential concurrent interventions, could not be tested. Participant-level observations, standard deviations, intraclass correlations, and missing-data records were unavailable. Consequently, no t test, confidence interval, p value, standardized effect size, internal-consistency coefficient, or interrater reliability statistic is reported.

Ethical Reporting

The participants were school-age students. The available documentation did not identify an ethics committee, approval number, guardian consent procedure, student assent procedure, or data-protection protocol. These details should be verified and inserted by the corresponding author before journal submission. No personally identifiable student information is reported in this manuscript.

Results

At baseline, the reported composite score was 54.2% for the experimental group and 53.8% for the comparison group, a difference of 0.4 percentage points. The small gap indicates similar starting values on this composite measure, but it does not establish equivalence on individual indicators or on unreported characteristics.

The experimental group's composite score rose from 54.2% to 66.1%, an absolute gain of 11.9 percentage points and a relative increase of approximately 22.0%. The comparison group rose from 53.8% to 54.4%, an absolute gain of 0.6 points and a relative increase of approximately 1.1%. The postintervention gap was 11.7 percentage points. The descriptive DiD was 11.3 percentage points: (66.1 − 54.2) − (54.4 − 53.8).

Table 3

Aggregate Preintervention and Postintervention Outcomes

Group	n	Pre (%)	Post (%)	Absolute change (pp)	Relative change (%)
Experimental	426	54.2	66.1	+11.9	+22.0
Comparison	426	53.8	54.4	+0.6	+1.1

Note. pp = percentage points. Relative change is calculated from the reported group-level composite percentages.

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Field documentation also described teacher-observed improvements in participation, accountability, ownership of assignments, reflective thinking, autonomous decision-making, study motivation, and self-assessment. These observations are consistent with the direction of the composite result. They are not treated as a separate qualitative dataset because observation frequencies, coded excerpts, assessor agreement, and criterion-level scores were not supplied.

Discussion

The central empirical result is an 11.3-percentage-point difference in change between the groups. The near-aligned baseline composite and the limited movement in the comparison group make the experimental pattern worthy of further testing. The available evidence nevertheless supports an association rather than a definitive causal claim. Nonrandom assignment, unknown clustering, teacher effects, unmeasured site differences, and the locally developed outcome instrument could each have contributed to the observed divergence.

The direction of change accords with research indicating that self-regulation can be strengthened when strategies are made explicit and practiced within subject learning rather than presented as detached advice (Dignath & Büttner, 2008; Dignath et al., 2008). It also fits Zimmerman's (2002) cyclical account. Reflection identifies a gap; self-assessment makes the standard visible; mentoring supports strategy selection; collaboration provides explanation and co-regulation; and independent activity tests whether regulatory control transfers to the learner. This interpretation explains how the components may work together, but the aggregate design does not identify the independent contribution of any single component.

The five mechanisms address different points at which self-directed learning can falter. A learner may recognize a weakness yet lack a suitable strategy. Another may know a strategy but have little confidence in using it, making self-efficacy and calibrated feedback relevant (Bandura, 1997). Planning can also fail at the point of persistence, where monitoring and social support matter. Successful performance, in turn, does not necessarily produce transferable learning unless the learner reviews why a strategy worked. A connected cycle therefore links awareness to action and action back to evaluation.

The social components do not contradict learner autonomy. Vygotsky's (1978) account of guided development suggests that regulatory language first encountered in dialogue can later be internalized. Mentoring may strengthen autonomy when teachers move from telling toward questioning and reduce support as students become ready to assume control. Collaborative learning has a similar condition: it is useful when students explain reasoning, compare approaches, exchange feedback, and remain accountable for decisions. Mere group placement does not constitute co-regulation.

The measurement framework raises a separate conceptual concern. Most indicators concern learner awareness, judgment, or behavior, but family communication and parental engagement are partly contextual. They may influence self-directed learning without being student competencies in the same sense as goal setting or self-assessment. A future instrument should either place these indicators in a contextual-support subscale or exclude them from the core competence score. Doing so would improve construct clarity and make changes in the learner outcome easier to interpret.

The study's contribution lies in organizing familiar practices into a recurring instructional sequence and linking that sequence to a locally used outcome framework. It also provides a transparent aggregate comparison rather than presenting only a conceptual model. The novelty is therefore limited and empirical: the study documents a multi-regional pretest–posttest pattern that can guide a stronger replication. Claims of effectiveness should await participant-level data and a design capable of addressing clustering, measurement quality, and alternative explanations.

Implications for Practice and Replication

For classroom use, the model is better understood as a repeated routine than as an occasional activity. Students clarify a goal, identify evidence of their current position, select an action, use teacher or peer feedback, and document the next step. Teachers retain responsibility for instructional quality and

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safeguarding while transferring decisions that students are prepared to manage. Curriculum designers can embed the cycle within subject tasks so that self-directed learning develops through disciplinary work rather than through a disconnected personal-development lesson.

Table 4

Recommended Fidelity Framework for a Confirmatory Replication

Mechanism	Observable classroom routine	Proximal learner evidence	Fidelity record
Reflective learning	Prompt linking an event, reason, evidence, and next step	Specific rather than generic reflection	Prompt used; dated student entry
Self-assessment	Comparison with criteria or exemplar before revision	Judgment supported by cited evidence	Completed rubric; revision trace
Teacher mentoring	Question-led conference with a learner-owned action point	Student states goal and selected strategy	Conference log; feedback sample
Collaborative learning	Peer explanation, strategy comparison, and reciprocal feedback	Each learner explains a decision	Observation checklist; task artifact
Independent activity	Student plans resources, milestones, and review	Timely action and justified adaptation	Plan; product; final reflection

A confirmatory study should specify intervention dosage in advance, train teachers to apply common criteria, and retain a small set of artifacts that permit fidelity checks. Recruitment and allocation should be documented by school and class. Where feasible, a cluster-randomized design would address allocation at the level at which instruction is delivered; otherwise, a carefully matched longitudinal design should include multiple preintervention measurements. Psychometric work should include expert content review, student cognitive interviews, pilot testing, internal-consistency and interrater estimates, and examination of factor structure. Multilevel analysis should account for students nested within classes and schools, and delayed assessment should test whether gains persist after structured support is reduced.

Limitations

Several limitations materially restrict interpretation. Sampling was purposive and allocation was not randomized. School, class, and teacher counts were not reported, so clustering and site heterogeneity could not be modeled. Only aggregate group means were available at each time point; standard deviations, item-level distributions, attrition records, and subgroup results were absent. The 12-indicator rubric has no reported content-validity index, internal-consistency estimate, factor structure, interrater reliability, or measurement-invariance evidence. Intervention dosage and adherence were not quantified, observers were not reported as blinded, and no delayed follow-up was conducted. The outcome may therefore reflect a mixture of learner change, rater expectations, familiarity with the rubric, contextual differences, and short-term implementation effects.

Conclusion

Across the reported five-month period, the experimental group’s aggregate competence score increased by 11.9 percentage points, compared with 0.6 points in the comparison group, producing a descriptive DiD of 11.3 points. The pattern is consistent with the proposition that reflection, self-assessment, mentoring, collaboration, and independent activity can function coherently as a learning cycle. It does not establish statistically proven effectiveness. The next stage of research should combine validated measurement, documented implementation fidelity, ethical reporting, participant-level data, cluster-aware analysis, and follow-up assessment. Such evidence would permit a more rigorous test of whether the model strengthens self-awareness and self-directed learning among secondary-school students.

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Declarations

Ethics approval and consent to participate. The available study documentation did not state the approving body, approval number, guardian consent process, or student assent process. Because participants were minors, the corresponding author should insert verified details before submission.

Data availability. This article reports the aggregate values available in the research record. De-identified participant-level data and the instrument manual were not available for reanalysis and should be archived subject to applicable consent and data-protection requirements.

Funding. No funding information was recorded in the available documentation. The author should confirm the final statement before submission.

Conflict of interest. No conflict-of-interest information was recorded in the available documentation. The author should confirm the final statement before submission.

Originality and prior publication. The corresponding author remains responsible for disclosing any earlier dissemination of the same dataset, intervention, tables, or findings.

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PEDAGOGICAL APPROACHES TO DEVELOPING BIOETHICS COMPETENCE IN PROSPECTIVE EDUCATORS

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ABSTRACT
Bioethics education is increasingly relevant to teacher preparation because educators encounter questions involving human dignity, health, environmental responsibility, digital privacy, inclusion, and the responsible use of emerging technologies. This conceptual paper examines pedagogical approaches for developing bioethics competence in prospective educators and proposes a coherent model for integrating ethical knowledge with reflective judgment and professional action. Drawing on established bioethics frameworks and research on ethics education, the paper argues that competence cannot be reduced to familiarity with principles or regulations. It requires ethical sensitivity, reasoned deliberation, contextual interpretation, and the capacity to act responsibly in educational settings. Six complementary approaches are examined: interdisciplinary integration, person-centered learning, reflective practice, case- and dilemma-based instruction, experiential learning, and digital ethics education. A three-stage developmental sequence—conceptual orientation, deliberative analysis, and practice-based consolidation—is proposed for teacher-education programs. Assessment should combine knowledge measures with reflective writing, case analysis, observation, and portfolio evidence. Bioethics is most effectively taught as a sustained dimension of professional formation rather than as an isolated theoretical unit.

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Keywords: *bioethics; teacher education; ethical competence; reflective practice; professional ethics; digital ethics.*

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Introduction

Teacher education has traditionally addressed professional ethics through codes of conduct, institutional rules, and general discussions of responsibility. That foundation remains necessary, but it is no longer sufficient. Prospective educators now work within environments in which questions about health, disability, environmental risk, personal data, artificial intelligence, research participation, and the boundaries of professional authority frequently overlap. These issues are bioethical because they concern the value of life, human dignity, vulnerability, benefit and harm, autonomy, justice, and responsibility toward other people and the living environment. UNESCO's Universal Declaration on Bioethics and Human Rights places these concerns within a human-rights framework and emphasizes dignity, equality, non-discrimination, social responsibility, protection of vulnerable persons, and respect for cultural diversity (UNESCO, 2005). Although the declaration was not written specifically for teacher education, its principles provide a defensible normative basis for considering bioethics within professional preparation.

The educational problem is not simply whether prospective teachers know ethical terminology. A student may reproduce definitions of autonomy, justice, privacy, or responsibility and still struggle to recognize an ethically significant situation in practice. Ethical competence involves noticing the moral dimensions of a situation, identifying relevant stakeholders and obligations, examining competing reasons, reaching a defensible judgment, and translating that judgment into action. Rest's (1986) account of moral functioning is useful here because it distinguishes moral sensitivity and judgment from motivation and implementation. In professional education, these dimensions are interdependent: knowledge without practical judgment can remain inert, whereas action without conceptual grounding can become inconsistent or merely intuitive.

This paper develops a pedagogical account of bioethics competence for prospective educators. It revises the earlier emphasis on isolated techniques by treating competence as a developmental outcome of curriculum design, reflective learning, structured deliberation, supervised practice, and ethically responsible participation in digital environments. Evidence from ethics education in health professions is used cautiously because teacher education differs in professional mandate and context. Nevertheless, systematic reviews show that ethics learning benefits from active, contextualized, and mixed pedagogies rather than exclusive reliance on lectures (Andersson et al., 2022; D'Souza et al., 2020; González-Blázquez et al., 2024). The central argument is that teacher-education programs should integrate bioethics across disciplinary content and professional practice, while assessment should examine how students reason and act, not only what they recall.

Conceptualizing Bioethics Competence in Teacher Education

Bioethics competence can be defined as the integrated capacity to recognize ethically salient features of issues involving life, health, human dignity, technology, and the environment; to interpret those issues through relevant ethical principles and contextual knowledge; to deliberate about competing values; and to choose and justify responsible professional action. This definition deliberately combines cognition, reflection, disposition, and behavior. It also avoids treating bioethics as a list of predetermined answers. The UNESCO Bioethics Core Curriculum was designed around principles that can be discussed across different cultural settings, and its educational model gives considerable attention to case analysis and reasoned application rather than memorization alone (UNESCO, 2008, 2011). For prospective educators, this orientation is particularly appropriate because classroom decisions are relational and context-dependent.

A teacher-education interpretation of bioethics should also be broader than clinical ethics. Questions of benefit and harm arise when schools address health information, psychological well-being, safety, or disability. Respect for autonomy appears in age-appropriate participation, informed communication, and recognition of learners as persons rather than passive recipients of instruction. Justice is relevant to access, accommodation, resource allocation, and discriminatory practices. Environmental responsibility becomes concrete through school practices concerning sanitation, resource use, ecological projects, and education for sustainable living. Digital systems add questions about surveillance, data collection, automated decision support, authorship, intellectual agency, and unequal access. UNESCO's AI competency framework for teachers accordingly includes an explicit ethics dimension and places human agency, rights, and sustainability within teachers' professional competence (Miao & Cukurova, 2024).

Competence develops when socially articulated norms become part of the learner's own professional reasoning. This process should not be understood as uncritical internalization. Professional formation requires students to examine why a norm deserves authority, how it applies under conflicting conditions, and what limitations accompany it. Reflective professional judgment is therefore central. Schön (1983) described professional practice as involving reflection in and on action when practitioners confront

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situations that cannot be solved through technical rules alone. In bioethics education, reflection creates a bridge between general principles and the particularities of an educational case.

Pedagogical Approaches

Interdisciplinary integration is the first requirement. Bioethical questions rarely belong to one subject area. A discussion of genetic information, for example, may require biological literacy, knowledge of privacy, an understanding of family and cultural contexts, and pedagogical judgment about age-appropriate communication. Environmental health may combine ecology, public health, civic responsibility, and school management. Digital ethics can involve information technology, law, psychology, and pedagogy. Consequently, bioethics should appear in several components of a teacher-education curriculum rather than being confined to a single lecture. Integration is strongest when the same ethical concepts recur in progressively more complex contexts, allowing students to see how a principle changes in practical meaning without losing its normative core.

A person-centered approach complements interdisciplinary work by recognizing that ethical learning engages the learner's prior commitments, experiences, and cultural assumptions. Ethical discussion becomes superficial when students are expected to repeat an instructor's conclusion. In contrast, a well-facilitated seminar requires students to state reasons, listen to competing interpretations, distinguish personal preference from professional obligation, and revise a position when warranted. Respect for cultural diversity is important, but it does not imply that every practice is ethically equivalent. UNESCO (2005) explicitly combines respect for cultural diversity with the protection of human dignity and fundamental freedoms. Teacher educators can use this tension productively by asking students to identify both culturally situated considerations and ethical limits.

Reflective practice provides a third approach. Structured reflection should be more demanding than a personal reaction such as "I agree" or "I felt uncomfortable." Students can be asked to reconstruct a situation, identify ethically relevant facts, separate observation from assumption, name affected parties, examine their own position of authority, and justify an alternative course of action. Reflective journals, brief analytic memos, and post-practicum conferences are useful when prompts require evidence and reasoning. Research in ethics education indicates that reflection is frequently used in assessment, although the quality and standardization of such assessment remain uneven (D'Souza et al., 2020). Rubrics should therefore specify criteria such as problem recognition, use of ethical concepts, consideration of perspectives, justification, and feasible action.

Case- and dilemma-based instruction is especially suitable for moving from abstract knowledge to deliberation. Cases should be realistic enough to contain uncertainty and competing obligations, yet sufficiently focused for disciplined analysis. A case might involve disclosure of a student's health information, pressure to exclude a learner with special needs from an activity, the use of facial recognition for attendance, or conflicting demands during an environmental health incident. Case-based seminars encourage students to define the moral problem rather than merely identify a rule, and they can reveal which aspects of a situation students initially overlook (Donaldson et al., 2010). Reviews of ethics education likewise identify case discussion among the most common active strategies (D'Souza et al., 2020). The instructor's task is not to manufacture controversy but to require explicit reasoning and attention to consequences, rights, duties, relationships, and institutional constraints.

Experiential learning extends this work into professional practice. Pedagogical placements, school-based projects, health-promotion activities, environmental initiatives, and supervised observation allow students to test ethical reasoning against institutional realities. The original manuscript's emphasis on sanitation, environmental assessment, and practical projects is retained here when these activities are connected explicitly to bioethical aims. A tree-planting project, for instance, is not bioethics education merely because it concerns nature; its ethical significance becomes educationally visible when students consider stewardship, collective responsibility, distribution of benefits, safety, and the relationship between

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environmental conditions and human well-being. Similarly, observing experienced teachers becomes ethically instructive when students analyze decisions rather than simply imitate routines.

Collaborative learning can strengthen deliberation because ethical decisions in schools are rarely made in complete isolation. Team-based discussion requires students to articulate reasons publicly, respond to objections, and negotiate a shared recommendation. Recent systematic evidence from medical ethics education reports positive effects of team-based learning on engagement, ethical reasoning, moral sensitivity, and application, while also noting resource and assessment challenges (Alizadeh et al., 2025). These findings cannot be transferred mechanically to teacher education, but they support the broader proposition that structured peer deliberation can make ethical reasoning visible and open to critique. Small-group work is most productive when individual preparation precedes discussion and when the final group position includes a written rationale.

Digital ethics now requires explicit curricular attention. Prospective educators need to understand that convenience does not settle whether a technology should be used. Questions should include what data are collected, who can access them, how long they are retained, whether meaningful consent is possible, what biases may be embedded in automated systems, and whether technology weakens human judgment or learner agency. UNESCO's Recommendation on the Ethics of Artificial Intelligence calls for AI ethics curricula and attention to privacy, human rights, inclusion, and responsible data use (UNESCO, 2021). The AI Competency Framework for Teachers further treats ethical use as a core professional dimension rather than an optional technical topic (Miao & Cukurova, 2024). Bioethics education can connect these digital concerns to established principles of dignity, autonomy, justice, non-maleficence, and responsibility.

A Developmental Model for Professional Preparation

A coherent program can organize bioethics competence across three developmental stages. The first, conceptual orientation, establishes vocabulary, normative frameworks, and basic legal-professional distinctions. Students examine concepts such as dignity, autonomy, benefit and harm, justice, vulnerability, privacy, responsibility, and environmental stewardship. At this stage, teaching should correct the misconception that ethics is reducible either to personal opinion or to compliance with law. Short cases can be used diagnostically, but the main objective is conceptual precision and recognition of ethical relevance.

The second stage, deliberative analysis, places students in situations where principles conflict or where relevant facts are incomplete. Learners compare options, identify assumptions, seek missing information, and justify a recommendation. The instructor can gradually reduce scaffolding: early cases may include guiding questions, whereas later cases may require students to formulate the ethical problem independently. Ethical competence is not demonstrated by reaching the instructor's preferred conclusion but by producing a coherent judgment that addresses relevant evidence, principles, stakeholders, foreseeable consequences, and professional responsibilities. Systematic reviews of ethics education suggest that programs use varied combinations of lectures, discussion, simulation, and other active methods, with no single method established as universally superior (Andersson et al., 2022; Moreira et al., 2021). A mixed design is therefore more defensible than reliance on one technique.

The third stage, practice-based consolidation, requires students to use ethical reasoning during field experience and then subject that reasoning to review. A practicum portfolio can include an anonymized ethical incident analysis, a reflective commentary on a professional decision, evidence from a school-based project, and a revised analysis produced after supervisory feedback. The purpose is not to collect private information about pupils but to demonstrate professional reasoning while protecting confidentiality. Students should also identify when an issue exceeds their authority and requires referral, consultation, or institutional action. Such boundary recognition is itself an ethical competence because responsible practice includes knowing when not to act independently.

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The proposed developmental sequence and its corresponding evidence of competence are summarized in Table 1.

Table 1

Developmental Framework for Bioethics Competence in Prospective Educators

Stage	Primary learning focus	Illustrative learning activities	Evidence of competence
Conceptual orientation	Ethical concepts, normative frameworks, and recognition of ethically significant issues	Focused readings, mini-lectures, concept mapping, and short diagnostic cases	Accurate use of concepts and identification of relevant ethical considerations
Deliberative analysis	Reasoned judgment when values, principles, or stakeholder interests conflict	Case analysis, structured discussion, ethical dilemmas, and collaborative deliberation	A justified decision addressing evidence, stakeholders, alternatives, and professional responsibilities
Practice-based consolidation	Transfer of ethical reasoning to supervised professional contexts	Practicum reflection, anonymized incident analysis, school-based projects, and portfolio revision	Context-sensitive action, protection of confidentiality, reflective justification, and recognition of professional boundaries

Note. The framework synthesizes the three developmental stages proposed in this paper. Activities and evidence are illustrative and should be adapted to institutional and practicum contexts.

Assessment and Quality Assurance

Assessment must correspond to the multidimensional nature of the construct. A written test can examine conceptual knowledge but cannot establish that a student will recognize or manage an ethical problem in practice. Conversely, a reflective essay may show thoughtful engagement while leaving factual misconceptions undetected. A balanced assessment system can therefore combine selected-response or short-answer items, structured case analyses, oral or team deliberation, reflective writing, and supervised practice evidence. González-Blázquez et al. (2024), reviewing bioethical knowledge among students and health professionals, found that targeted bioethics education generally improved knowledge, attitudes, and ethical values but also emphasized the difficulty of rigorous assessment. Earlier reviews similarly report substantial heterogeneity in teaching and evaluation (D'Souza et al., 2020; Moreira et al., 2021).

For teacher education, assessment criteria should be transparent and behaviorally interpretable. A case-analysis rubric might evaluate recognition of the ethical issue, accuracy of relevant concepts, use of contextual evidence, attention to affected persons, consideration of alternatives, justification of the proposed action, and awareness of implementation constraints. Reflective tasks should distinguish description from analysis. Field-based assessment should avoid claims about a student's character and instead document observable professional conduct and the quality of reasoning presented in supervision. Reliability can be improved through shared rubrics, assessor calibration, and the use of more than one task rather than a single high-stakes judgment.

Program-level evaluation should examine whether ethical learning is distributed coherently across the curriculum. Mapping can identify where each competence is introduced, practiced, assessed, and revisited. It can also reveal gaps—for example, a program that teaches environmental responsibility but never assesses it, or one that discusses digital privacy without addressing AI-mediated decision making. Quality assurance should include student feedback, but satisfaction alone is not evidence of competence. Stronger evidence comes from performance on structured tasks, improvement across stages, and the capacity to transfer reasoning to unfamiliar cases. Current reviews continue to call for more rigorous designs and longer-term evaluation of ethics education outcomes (Alizadeh et al., 2025; Andersson et al., 2022; Yin et al., 2026).

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Implications for Teacher-Education Institutions

Institutional implementation requires more than adding a course title. Faculty members need a shared understanding of the competencies being developed and sufficient preparation to facilitate disagreement without turning discussion into either moral relativism or doctrinal instruction. UNESCO's Ethics Education Programme emphasizes teacher training, locally responsive materials, and pedagogical methods for ethics education (UNESCO, 2026). A teacher-education institution can adapt this principle by developing a common case bank drawn from educational contexts, agreeing on core analytic questions, and using moderation sessions to improve consistency across instructors.

Local relevance is essential. In Uzbekistan, cases should be intelligible within the legal, cultural, ecological, and institutional conditions that prospective teachers are likely to encounter. Local adaptation, however, should be accompanied by accurate sourcing and a clear distinction between national regulation, institutional policy, professional norms, and broader ethical principles. The earlier manuscript sometimes moved from ecological or hygienic activities directly to claims about bioethics competence without explaining the ethical link. The revised framework resolves that inconsistency by requiring every practical activity to include an explicit ethical question, a reasoned decision, and reflection on responsibility. This makes the learning outcome assessable rather than assumed.

A final institutional consideration concerns the hidden curriculum. Students learn professional ethics not only from formal content but also from how faculty handle confidentiality, disagreement, assessment, authorship, inclusion, and power. A program that teaches respect for dignity while tolerating humiliating classroom practices sends contradictory messages. Bioethics competence therefore depends partly on institutional modeling. Faculty conduct, supervisory relationships, and assessment procedures should embody the same standards that students are expected to apply in schools.

Conclusion

Bioethics competence in prospective educators should be treated as a form of professional judgment that joins ethical knowledge to sensitivity, deliberation, and responsible action. Its scope includes familiar concerns about dignity, benefit and harm, justice, vulnerability, and responsibility, while extending to environmental conditions and the ethical use of digital technologies. The pedagogical consequence is clear: a stand-alone theoretical lecture cannot carry the full task. Students need repeated opportunities to interpret cases, examine assumptions, deliberate with peers, reflect on practice, and receive feedback on the quality of their reasoning.

A three-stage sequence of conceptual orientation, deliberative analysis, and practice-based consolidation offers a workable structure for teacher-education programs. Interdisciplinary integration, person-centered dialogue, reflective practice, case analysis, experiential learning, collaborative deliberation, and digital ethics are complementary rather than competing approaches. Assessment should likewise be plural, combining knowledge with evidence of reasoning and professional conduct. When these elements are aligned, bioethics becomes part of professional formation rather than an abstract addition to the curriculum. The aim is not to produce uniform answers to every ethical problem, but to prepare educators who can recognize ethically significant situations, justify decisions with intellectual discipline, respect the persons affected by those decisions, and act within the responsibilities of their profession.

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INNOVATIVE PEDAGOGICAL TECHNOLOGIES AS A MEANS OF DEVELOPING EMOTIONAL AND COMMUNICATIVE COMPETENCIES OF MEDICAL STUDENTS

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ABSTRACT
This article examines the pedagogical potential of modern educational technologies for developing the emotional and communicative competencies of medical students. The study is situated within the growing emphasis on patient-centered medical education, in which professional competence includes not only disciplinary and clinical knowledge but also empathy, emotional self-regulation, active listening, and effective interpersonal communication. The article considers problem-based learning (PBL), strength-based learning, simulation-based learning, project-based learning, and the case method, and describes their integration into pedagogical modules within medical education. Particular attention is given to the organization of learning activities, feedback, reflection, assessment criteria, and the expected development of communication-related behaviors. The reported results indicate improvements in students' empathy and emotional sensitivity, stress resilience, active-listening practices, constructive feedback skills, and metacognitive reflection. Taken together, these observations suggest that the integrated use of contemporary pedagogical technologies can provide a coherent framework for strengthening professional communication and emotional competence among future physicians.

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Keywords: *emotional and communicative competence, problem-based learning, simulation-based learning, project-based learning, case method, medical education, pedagogical technologies.*

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Introduction

The development of communicative competence has become an increasingly important component of contemporary higher education, particularly in fields in which professional practice depends on sustained interpersonal interaction. In medical education, communicative competence is closely connected with the physician's ability to establish professional relationships with patients, communicate with family members, collaborate with colleagues, and respond appropriately to emotionally complex situations. Accordingly, the preparation of future physicians requires systematic attention not only to the acquisition of medical knowledge but also to the development of emotional awareness, empathy, and professionally appropriate communication behaviors (Abieva & Djamaldinova, 2023a, 2023b; Djamaldinova, 2023a, 2023b; Drandrova et al., 2024).

Within higher medical education, disciplines such as pedagogy, psychology, professional pedagogy, educational technology, and the methodology of professional education provide an important theoretical and practical basis for the development of these competencies. Their integration creates opportunities to connect cognitive learning with observation, reflection, social interaction, and guided practice, all of which are relevant to the formation of professional behavior (Bandura, 1977; Bloom, 1956; Vygotsky, 1978). From this perspective, pedagogical effectiveness depends not only on the content that is taught but also on the learning conditions through which students analyze situations, interact with others, receive feedback, and revise their own actions.

Among the approaches used to organize such learning, problem-based learning (PBL) has been particularly influential in medical education. Although problem-oriented forms of instruction have a longer historical background, the systematic development of PBL in medical education is commonly associated with the curricular innovations introduced at McMaster University in Canada in the late 1960s (Barrows & Tamblyn, 1980, pp. 3-12). PBL was designed to place learners in situations that require them to engage with authentic or professionally relevant problems rather than to rely exclusively on the passive reception of information.

Barrows and Tamblyn conceptualized this approach around the analysis and resolution of problems encountered in everyday medical practice. In this model, the educational value of the problem lies not only in reaching a correct answer but also in stimulating clinical reasoning, ethical reflection, professional communication, and patient-care decision making. Subsequent scholarship has emphasized that PBL can support self-directed learning, collaborative inquiry, and the construction of knowledge through active engagement with complex situations, which helps explain its adoption across medicine and a range of other professional and academic fields (Hmelo-Silver, 2004).

In practical terms, PBL requires students to reflect on prior knowledge, organize relevant information, identify both conceptual and communication-related barriers, formulate possible explanations, and revise their strategies as new information becomes available. The process also encourages learners to establish explicit learning objectives and to engage in independent study before synthesizing possible solutions. These activities are especially relevant to professional communication because they require students to interpret a situation, consider alternative responses, justify their reasoning, and adjust their communication in relation to the demands of the problem. The principal competence areas associated with this process are summarized in Table 1 (Barrows & Tamblyn, 1980; Hmelo-Silver, 2004).

As Table 1 indicates, the potential contribution of PBL extends beyond the acquisition of factual knowledge. The approach supports critical and creative thinking, clinical and communication skills, openness to non-standard solutions, commitment to continued development, teamwork, empathy, and responsibility. In medical education, these competencies are interrelated: the ability to reason through a professional problem is strengthened when students can listen actively, communicate clearly, consider the perspective of others, and work productively within a team.

Table 1

Competencies Developed Through Problem-Based Learning

Competence	**Characteristics**
Critical and creative thinking	Ability to analyze situations and find non-standard solutions
Clinical and communication skills	Ability to solve professional and communication-related problems
Non-standard thinking	Openness to diverse solutions
Commitment to development	Motivation for continuous professional growth
Teamwork	Active listening and logical thinking skills
Empathy and responsibility	Ability to find solutions in complex communication situations

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The teacher's role in PBL is therefore primarily facilitative rather than exclusively transmissive. The teacher organizes the learning environment, supports the sequence of inquiry, uses questions to direct attention to important aspects of the problem, and helps students evaluate the quality of their reasoning and communication. Effective implementation begins with preparing students for the methodology and expectations of PBL, followed by the development of an appropriate competency framework and cooperation with relevant experts. The learning process then requires systematic planning, the design of problem-oriented educational materials, alignment between learning tasks and intended outcomes, regular analysis of students' progress, and the provision of resources that support independent work. This sequence makes PBL not simply a classroom technique but a structured pedagogical framework in which communication and reflection are embedded throughout the learning process.

Strength-Based Learning Technology

A further component of the proposed methodology is the strength-based approach, which organizes learning around the identification and purposeful development of students' individual resources. Within the study, attention was given to qualities such as empathy, communicative ability, leadership, analytical thinking, creativity, and metacognitive awareness. These strengths were identified through diagnostic activities, questionnaires, and observation, after which learning tasks and group roles were adapted so that students could demonstrate and further develop their strongest capacities.

The approach also emphasizes the pedagogical value of positive and individualized feedback. Rather than focusing only on deficits, feedback is directed toward the effective use of existing strengths while still identifying areas that require improvement. Group work is organized so that participants can assume roles that correspond to their abilities, such as leader, moderator, or communicator, while interaction with peers exposes them to complementary strengths and alternative ways of working. Reflection is incorporated after learning activities so that students can evaluate their achievements, recognize patterns in their own behavior, and identify realistic directions for further development.

From an instructional perspective, the strength-based sequence begins with an initial diagnostic stage in which several characteristic strengths are identified for each student. Planning then involves distributing tasks and responsibilities in ways that allow those strengths to be activated through exercises, role plays, simulations, and collaborative activities. The final stage is supported by individualized, constructive feedback that links observed performance with future learning goals. In this way, the strength-based approach functions as a continuous cycle of identification, application, reflection, and refinement rather than as a one-time assessment of personal qualities.

Simulation-Based Learning

Simulation-based learning provides a controlled means of connecting theoretical knowledge with the demands of professional practice. In the present context, simulation is understood as an intentionally constructed representation of a real system, process, or event that allows learners to experiment, practice, and receive feedback without creating risk for patients. Its pedagogical value lies in the opportunity to reproduce important features of authentic clinical interaction while maintaining a safe environment in which students can make errors, analyze their actions, and repeat difficult communication tasks (Issenberg et al., 2005).

The principal characteristics of simulation-based learning are summarized in Table 2. Realism and interactivity help learners experience the communicative demands of professional situations, while safety permits experimentation and correction without direct consequences for patients. Feedback is particularly important because it transforms simulated performance into an opportunity for deliberate reflection and behavioral adjustment. These features make simulation relevant not only to technical skill development but also to emotional regulation, self-awareness, and communication under conditions that resemble clinical practice.

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Table 2

Key Characteristics of Simulation-Based Learning

Characteristic	Description
Realism	Reproduction of important aspects of a real situation
Interactivity	Active participation in the simulation process
Safety	Opportunity to make mistakes without risk to patients
Feedback	Opportunity to analyze and correct errors

The empirical factors reported in the simulation literature are presented in Table 3. Within the synthesis used in this manuscript, feedback and deliberate practice appear most frequently among the identified features, followed by curriculum integration and a gradual increase in task complexity. These findings are consistent with the view that simulation is most educationally productive when it is embedded in a broader learning sequence rather than treated as an isolated exercise. For the development of emotional and communicative competence, repeated practice combined with feedback can provide students with opportunities to recognize ineffective interaction patterns, experiment with alternative responses, and develop greater confidence in challenging interpersonal situations.

Table 3

Empirical Findings on the Effectiveness of High-Fidelity Medical Simulation

Effectiveness factor	Percentage of studies	Significance for emotional and communicative development
Feedback	47%	Enhances self-awareness, empathy, and motivation
Deliberate practice	39%	Strengthens emotional stability and communication skills
Curriculum integration	25%	Ensures the development of integrated competence
Gradual increase in complexity	14%	Enhances the ability to manage communication
Adaptation to methods	10%	Enables individualized learning
Safe environment	9%	Creates conditions for free self-expression
Individualization	9%	Takes individual characteristics into account
Clear objectives	6%	Directs attention to specific competencies
Realism	3%	Elicits a genuine emotional response.

Note. Percentages in the second column are based on the synthesis reported by Issenberg et al. (2005).

Project-Based Learning

Project-based learning occupies a significant place within the proposed framework because it requires students to integrate knowledge, communication, planning, and reflection over an extended period of activity. Instead of completing isolated tasks, students work toward a defined outcome through a sequence of inquiry, collaboration, practical application, and presentation. This structure encourages an independent and analytical approach to learning while also requiring participants to negotiate responsibilities, explain their ideas, respond to feedback, and evaluate both the process and the final product.

As summarized in Table 4, the approach incorporates active learning, inductive reasoning, experiential activity, metacognitive strategies, peer learning, and visual thinking. These strategies support the development of emotional and communicative competence because students must move repeatedly between individual analysis and collaborative interaction. Simulations, role plays, communication with patients, concept maps, and peer mentoring can therefore function as complementary tools within a project rather than as separate instructional techniques.

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Table 4

Project-Based Learning Strategies

Strategy	Characteristics
Active learning	Direct performance of communication tasks
Inductive learning	Discovering principles through real examples
Experimental activity	Learning through simulations, role plays, and communication with patients
Metacognitive strategies	Self-awareness, planning, monitoring, and analysis
Peer learning	Equal peer mentoring among students
Visual thinking	Concept maps and communication models

The project "Development of Professional and Emotional-Communicative Competence in Medical Education" was organized as an 11-week sequence. The first week focused on goal setting and diagnostics, followed by theoretical and methodological analysis during weeks 2-3. Practical integration and case-based work were undertaken during weeks 4-6, while weeks 7-8 were devoted to analysis, discussion, and reflection. Innovative approaches were addressed during weeks 9-10, and the project concluded in week 11 with final analysis and presentation. This staged organization was intended to move students from initial diagnosis and conceptual preparation toward applied work, reflective evaluation, and the communication of results.

Practical Implementation of Technologies in the Course "Methodology of Professional Education"

As part of the study, a program for the discipline "Methodology of Professional Education" was developed for sixth-year students majoring in "Professional Education." The course was positioned as a logical continuation of "Professional Pedagogy" and was structured to connect theoretical preparation with methodologically organized practice. The lecture component addressed the foundations of the discipline, the teacher's methodological work, didactic principles of theoretical training, professional and pedagogical skills, pedagogical communication, and innovative educational technologies. The distribution of lecture topics, classroom hours, and independent work is presented in Table 5.

Table 5

Distribution of Topics and Hours for the Course "Methodology of Professional Education" (Lectures)

No.	Topic	Lectures	Independent work
1	Introduction to the discipline: history of development, subject, purpose, and objectives	2	4
2	Teacher's methodological work: teaching and methodological package	2	4
3	Didactic foundations of the theoretical training of specialists	2	4
4	Professional activity and teachers' pedagogical skills	2	4
5	Pedagogical skills, communication, and speech	2	4
6	Innovative technologies in preparing students for their profession	2	2
	Total	14	22

The practical component complemented the lecture material by focusing on the application of theoretical and methodological principles to professional situations. As shown in Table 6, the sequence included the foundations and content of professional education, the teacher's methodological work, theoretical training, pedagogical skills, professional dialogue and speech, innovative technologies, professional development, and pedagogical practice. This organization provided a curricular context in

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which the pedagogical technologies discussed above could be integrated with discipline-specific tasks rather than taught only as abstract concepts.

Table 6

Distribution of Topics for Practical Classes

No.	Topic
1	Theoretical and methodological foundations of the discipline
2	Content of professional education
3	Teacher's methodological work
4	Didactic foundations of theoretical training
5	Professional activity and pedagogical skills
6	Pedagogical dialogue and teacher's speech
7	Innovative technologies: case studies and projects
8	Retraining and professional development of teachers
9	Organization of qualification and pedagogical practice

Integration of Technologies Into the Educational Process

After completion of the first two topics, comprising eight hours of lectures and practical classes, students completed a questionnaire and a test intended to identify areas of insufficient knowledge. The 28 students enrolled in the course were then divided into five groups for work based on project-learning technology. Within this instructional design, the initial diagnostic activities served as a starting point for subsequent group work, while the project format created a structured setting for collaborative problem solving, communication, and reflection on professional tasks.

Results and Discussion

During project work and continuous observation, particular attention was given to several dimensions of creative thinking that were considered relevant to emotional and communicative development. Fluency was understood as the ability to generate ideas, connect knowledge logically, and express thoughts clearly. Flexibility referred to the capacity to modify strategies and identify alternative solutions when circumstances changed, whereas originality reflected an individual and innovative approach to a task. Elaboration and refinement involved the planning, development, and improvement of ideas. Considered together, these dimensions provided a qualitative framework for observing how students approached communication-related problems and adjusted their responses during collaborative activity.

The observations reported following implementation of the integrated methodology indicated several positive changes in students' emotional and communicative behavior. Students demonstrated greater empathy and emotional sensitivity and became more attentive to the emotional states of their interlocutors. They also showed increased resilience in stressful communication situations and a greater ability to maintain emotional stability. In addition, active-listening and patient-understanding skills improved, including the use of open-ended questions, while students developed greater confidence in giving and receiving constructive feedback in a professional context. The development of metacognitive skills was also noted, particularly in students' ability to analyze their own communicative actions and make adjustments when necessary. These findings are observational rather than inferential; nevertheless, they suggest that the combined use of structured practice, feedback, collaborative learning, and reflection can support multiple dimensions of communicative development.

Conclusion

The development of emotional and communicative competence in higher medical education requires a pedagogical environment in which students can practice professional interaction, reflect on their

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own behavior, and receive structured feedback. The technologies examined in this article provide different but complementary mechanisms for achieving this purpose. Problem-based learning supports analysis and collaborative reasoning; strength-based learning emphasizes individual resources and constructive feedback; simulation creates a safe environment for repeated practice; and project-based learning integrates inquiry, teamwork, application, and reflection over an extended period.

When these approaches are combined with case methods, interactive problem situations, communication exercises, and reflective practices, they can contribute to the development of professional communication, empathetic interaction with patients, and a constructive socio-psychological climate within the medical team. The value of the integrated model lies in its capacity to connect knowledge acquisition with the repeated performance and evaluation of communication behaviors that are central to clinical practice.

Overall, the manuscript supports the use of an integrated pedagogical approach to the development of emotional and communicative competencies among future physicians. The reported experience indicates that educational technologies are most meaningful when they are incorporated into a coherent course design with diagnostic activities, realistic practice, collaborative tasks, feedback, and reflection. Such an approach can strengthen the preparation of professionally competent graduates who are able to communicate effectively, respond sensitively to patients, and adapt their behavior to complex interpersonal situations in medical practice.

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THE HARMONY OF INTERDISCIPLINARY TEACHING: ITS ESSENCE, STRUCTURE, AND DIDACTIC POTENTIAL

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ABSTRACT
This article examines the concept of interdisciplinary teaching harmony as an integrative didactic quality and clarifies its structure and pedagogical potential. The study uses a theoretical literature review and conceptual analysis to distinguish multidisciplinary, interdisciplinary, transdisciplinary, cross-disciplinary, cross-curricular, integrated teaching, and integrated learning approaches. Particular attention is given to the conditions under which links among disciplines become pedagogically meaningful rather than remaining a simple combination of subject content. On the basis of the reviewed literature and the authors' conceptual synthesis, interdisciplinary teaching harmony is defined as the coordinated interaction of disciplinary content, concepts, methods of inquiry, learning activities, and assessment in pursuit of a common pedagogical goal or complex educational task. Seven interrelated features are identified: clarity and unity of purpose, conceptual connection, coherence of learning activities, complementarity of methods and evidence, agreement among participants about content, integrity of assessment and analysis, and situational application of knowledge. The analysis shows that effective interdisciplinary teaching requires preserving the disciplinary accuracy of each subject while organizing their contributions around a shared educational result. These features provide a theoretical basis for designing interdisciplinary instruction and for developing future teachers' professional-methodological competence. The proposed framework can also guide lesson planning, task design, and evaluation in teacher education.

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Keywords:
interdisciplinary teaching; interdisciplinary harmony; interdisciplinary integration; didactic potential; educational process; pedagogical approach; professional-methodological competence.



Introduction

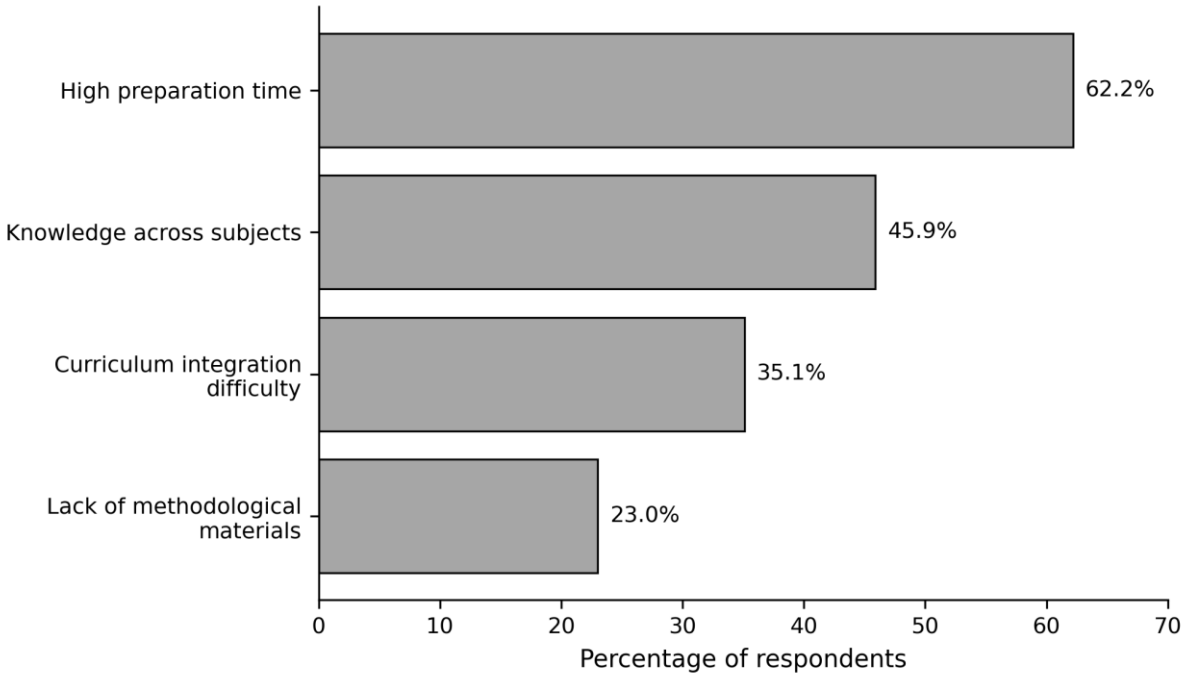
In recent years, the demand in the real situation requires a reasonable combination of its different aspects in the performance of a task. This in itself creates the need for the widespread application of interdisciplinary connections and integration concepts in education, as well as the practical implementation of its approaches and principles. In a simple case, a future teacher can include several subject titles in the lesson plan, choose a common topic, or share tasks with a colleague. However, if the main content that is relevant is not defined, if the methods of cognition do not complement each other, and if the result is not evaluated by a common criterion, the result becomes a sum consisting of fragments of activity. In this case,

the main contradiction is observed between the number of disciplines and their functional unity in the pedagogical task. At the same time, on the one hand, a complex phenomenon does not fit within the scope of a single discipline, and on the other hand, every additional point of view does not automatically unify the educational task. The educator must decide which knowledge to choose, in what sequence to use various cognitive methods, and by what fact to determine the integrative result. Therefore, the issue of developing professional-methodological competence based on ensuring the harmony of interdisciplinary teaching primarily requires identifying theoretical signs indicating the presence or absence of harmony.

Literature review and methodology. Scientists O.A. Likharyeva and D.Y. Pletneva studied the difficulties of interdisciplinary teaching through the practical experience of young educators. The work experience of the respondents participating in the study did not exceed five years. 74 educators from seven regions of Russia participated in the diagnostic survey. 46 respondents (62.2%) identified the high time required to prepare for an integrated lesson as an obstacle, 34 respondents (45.9%) - the need for knowledge in several subject areas, 26 respondents (35.1%) - the difficulty of including the lesson in the curriculum, and 17 respondents (23%) - the lack of methodological materials. An important aspect of this study is that it clarifies the difficulties in implementing interdisciplinary teaching by linking it to time, subject knowledge, curricula, and methodological resources. Additionally, Anoshina et al. (2024) examine readiness to implement mathematics–physics integration, while Narushevich (2022) examines subject-integrative methodological training in biology and chemistry. Although the pairs of disciplines and the scope of research differ, the intersection point of both works is expressed in the fact that the content interdisciplinary connection itself is insufficient, and the future teacher needs to be prepared to turn it into special methodological activity and design.

Figure 1

Reported Barriers to Implementing Interdisciplinary Teaching



Note. Percentages are based on the diagnostic survey data reported in the manuscript literature review (N = 74). The submitted manuscript does not provide complete bibliographic details for the Likharyeva and Pletneva source.

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Spelt et al. (2009) identify the balance between disciplinary depth and the integration of subject knowledge, together with reflection on one's own thinking, as important factors in interdisciplinary study.

Analysis and interpretation. The modern development of interdisciplinary educational terminology intensified in the second half of the 20th century alongside growing tensions between disciplinary specialization and complex social and scientific problems (Stember, 1991). Although the OECD discussions of 1970 were a pivotal point in introducing multidisciplinary, interdisciplinary, and transdisciplinary approaches into scientific discourse institutionally, subsequent typologies differed in purpose, object, and epistemological position. In scientific research, these terms served to express the organizational form of knowledge production and the change in the boundaries of science, and in education, the degree to which educational content, activity and result are combined. Klein (2017) shows that typologies vary depending on purpose, context, and epistemological position, while the UNESCO International Bureau of Education (2013) presents interdisciplinary terms as working units describing various curriculum practices. The general conclusion of both sources is that multidisciplinary, interdisciplinary and transdisciplinary cannot be applied as universal levels outside the context.

In the research work, it is required to clarify the boundaries of the analysis process and the relevant direction, to distinguish the didactic function of interdisciplinary relations and related terms from the point of view of caution. In particular, in multidisciplinarity, one topic or problem is considered from the point of view of several disciplines, and each discipline mainly expresses its own question, method and result separately, that is, it is not necessary to combine the scientific contributions into a single integrative result. Therefore, its leading task is to combine and place the disciplines side by side. The concepts, evidence, and methods relevant to interdisciplinarity, from problem-solving to result interpretation, actively interact and create a holistic explanation or solution that an individual science cannot provide. This involves integrating the content, theory, methodology, and perspectives of two or more disciplines to gain a deeper understanding of a common topic or problem. Transdisciplinarity, on the other hand, may precede the order of the sciences, involve non-academic stakeholders in the creation of knowledge, or build a new sphere of meaning beyond existing boundaries. Teaching is organized around a real-life problem or a holistic theme, rather than based on the traditional boundaries of subjects. This triad should be understood not as a mandatory scale from simple to complex, but as various logics of relationships that are selected depending on the goal and task. Sometimes a multidisciplinary scope may be sufficient for some task, while a transdisciplinary breadth may be excessive for the learning objective. Drake and Reid (2020) distinguish the multidisciplinary form in educational typology by the parallel preservation of the purpose and evaluation specific to the disciplines, the interdisciplinary form by the open integration of interdisciplinary relations, and the transdisciplinary form by becoming the starting point of a real problem. For the authors, the distinguishing criterion is the degree of integration between content, activity, and result, rather than the number of disciplines.

At the same time, the terms cross-disciplinary, cross-curricular, curriculum integration, integrated teaching, integrated learning, and interdisciplinary teaching are frequently used in foreign scientific literature and do not express the same content. A cross-disciplinary approach can be a general expression of the intersection of disciplines or a view of an object of one science from the perspective of another, meaning that the concepts or methods of one science are applied to the study of an object of another science. Consequently, the term itself does not independently determine the degree of interaction. The main object of the cross-curricular - cross-subject linkage approach shows the placement of a topic, skill, or value across several subjects in the curriculum. Such placement can make interdisciplinary connections visible to students, but it does not involuntarily create general activity and integrative assessment. Curriculum integration is the process of integrating the content of a curriculum, combining content and subjects to ensure holistic study, or establishing meaningful connections between them. It may represent a decision on the structure of the curriculum, the distribution of time, and the boundaries of content. Another is

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integrated teaching, a model of teaching organized by a teacher within the framework of a common topic or task, linking the content of several disciplines, primarily signifying the teacher's efforts to organize content and activities. Beane (1995) distinguishes curriculum integration from the partial adaptation of subject material under a general theme. In the context of foreign STEM research, the preference or prioritization of one of the disciplines may displace the contribution of the other disciplines. Although the objects of study are different, both analyses clarify the same boundary, that is, the status of integration does not by itself provide a reasonable balance of substantive interaction and scientific contributions. Integrated learning is the process of comprehensively understanding the complexity of a topic or problem by establishing connections between concepts, knowledge, and experiences. Integrated teaching emphasizes teacher activity, while integrated learning emphasizes the cognitive process occurring in the student. Integrated teaching and integrated learning refer to the manifestation of the aforementioned curriculum programs in teaching and learning, respectively; that is, the term itself does not indicate how deep the integration is. Recent work in primary education also emphasizes the movement from integrated planning toward coherent learning results (Avdiu & Gollopeni, 2026).

Interdisciplinary teaching - interdisciplinary teaching emphasizes the integration of relevant educational material, knowledge directly related to the lesson goal, conceptual apparatus, and cognitive methods into teaching activities around a general question, problem, or goal. Nikitina (2006) characterizes interdisciplinary teaching through three research strategies: contextualization, conceptualization, and problem-centered research. They are not strictly sequential steps, but are interpreted as different logics of linking the contributions of the sciences to the general question. This difference clarifies that the term "integrated teaching" itself refers only to the direction of teaching organization. Thus, the dynamics of the development of terms distinguish between organizational scale, semantic synthesis, and didactic execution. At this point, it becomes clear that the name of interdisciplinary teaching harmony does not replace a single ready-made term in international literature.

Results. Summarizing the research conducted above and the hypotheses put forward in the theme idea allowed for the development of the following author's definition: interdisciplinary teaching harmony is an integrative didactic quality characteristic of the interdisciplinary teaching process, arising from the mutual coordination of the content, concepts, and methods of cognition of various disciplines by educators and students in achieving a common pedagogical goal or a complex educational task. This quality is manifested through the preservation of the uniqueness of each subject, the complementarity of knowledge and methods, the compatibility of assessment with educational activities, and creates a basis for a holistic understanding of the phenomenon, the application of knowledge in a new situation, and the substantiated resolution of a complex problem.

The "integrative didactic quality" given in the definition refers to the holistic relationship that arises between the parts of learning. Therefore, harmony cannot be perceived as a separate method or a ready-made technology. The phrase "teachers and learners" means that this quality is manifested not only in the planned content but also in its study. What must be coordinated is not the entire content of the sciences, but the totality of concepts, facts, and methods necessary to perform a specific task. Their contribution to the overall conclusion in solving the problem should be substantiated. To characterize the integrative didactic quality, seven interrelated features are distinguished from each other. They consist of the unity and clarity of the goal, the connection of concepts, the compatibility of educational actions, the complementarity of scientific methods and evidence, the agreement of participants on the content, the integrity of assessment and analysis, and the orientation of knowledge application in accordance with the situation. Below, each feature is disclosed along with its content and professional-methodological significance. This division is the theoretical conclusion of this study and serves to characterize the quality of the educational process.

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Discussion. In ensuring the harmony of interdisciplinary learning, the unity and clarity of the goal guide the choice of interdisciplinary content. When the educator determines which phenomenon needs to be explained or which problem to solve, the reason for turning to another subject becomes clear. Content selected from various disciplines serves this purpose. For example, when studying the image of nature in the text, if biological information clarifies the meaning of the artistic expression, its inclusion is justified. However, additional information that is not related to the lesson's objective diverts attention elsewhere. For a future teacher, this feature allows for explaining the reason for selecting content and distinguishing between necessary and redundant material. An overly broad goal does not provide a sufficient basis for such a choice.

When a concept within one discipline is clarified with information from another discipline, a meaningful connection arises between the knowledge. This kind of connection helps the future teacher to build the content of the lesson on the basis of explanatory connections, rather than on the basis of a separate list of information. In this process, it is taken into account that the same term does not always mean the same thing. For example, in mathematics, "function" can refer to the relationship between one quantity and another, and in biology, it can refer to the function of an organ or structure. Linking the content also involves explaining this difference. If the teacher combines concepts based on similar sound or appearance, the student may generalize incorrectly. For this reason, the conceptual connection, that is, the meaningful relationship between concepts, is built based on the accuracy of the content of the science.

In ensuring the harmony of interdisciplinary learning, the consistency of learning activities is manifested through the application of selected knowledge in a common task. Observing the process, measuring, interpreting the text, and drawing conclusions can become interconnected parts of the same work. It is important that the results of the actions complement or verify each other. Then the student will understand why they are doing the measurement or what information they are looking for in the text. The didactic opportunity that opens up to the future teacher is also visible here; he learns to express the connection between subjects through the specific work performed by the student. Only the distribution of tasks does not yet ensure the interconnection of their results. This connection explains the consistency of educational activities. In a situation where one group calculates and another prepares a text, the overall result is not achieved by merely adding them together. The information obtained from the calculation can verify the conclusion in the text, and the content of the text can indicate which quantity should be selected for the calculation. The disclosure of this interaction is the didactic content of the task. In this case, the future teacher will have the opportunity to connect each student's action with the general learning goal, see the break between actions, and explain its cause.

Conclusion. This theoretical analysis provides grounds for interpreting the harmony of interdisciplinary teaching as an integrative didactic quality that expresses the correspondence between the general pedagogical goal, the substantive contribution of the disciplines, educational activity, and assessment. While interdisciplinary communication reveals the relationship between knowledge, integration unites them into a holistic explanation, and harmony describes how this unity is realized in the learning process. At the same time, the concepts and methods of argumentation of each science maintain their scientific accuracy while serving a common task. Thus, the transformation of semantic closeness into pedagogically grounded joint activity appears as a distinctive sign of harmony. The identified structural features demonstrate the interconnected aspects of this quality. The clarity of the goal guides the selection of the necessary content, and the connection of concepts and methods serves to transform the chosen knowledge into an educational action. The agreement of the participants on the content and the joint analysis of the result help to understand the basis of this action. Consequently, the integrity of harmony is expressed not in the mere existence of features, but in their mutual support. These relationships make it possible to see

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together how the student used various knowledge, what conclusions they came to based on them, and to what extent they were able to justify their conclusion.

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PROFESSIONAL AND PSYCHOLOGICAL DETERMINANTS OF STRESS RESILIENCE AMONG PUBLIC TRANSPORT DRIVERS: THE CONTEXT OF CONFLICT BEHAVIOR AND OCCUPATIONAL STATE

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ABSTRACT
This article examines the professional and psychological determinants of stress resilience among public transport drivers from the perspective of an integrated theoretical and empirical research framework. Professional driving is characterized by a high level of responsibility, time pressure, intensive information processing, rapidly changing traffic conditions, continuous interaction with passengers, and frequent exposure to potentially conflictual situations. Accordingly, stress resilience is conceptualized not merely as resistance to emotional strain, but as a psychological resource that enables drivers to maintain functional stability, regulate their behavioral responses, and perform professional duties safely under demanding occupational conditions. The study proposes an empirical model focusing on the relationships between stress resilience, behavioral strategies in conflict situations, and occupational psychological states. The study sample comprises 305 public transport drivers working in Tashkent, Samarkand, and Bukhara. The proposed framework provides a basis for examining drivers' stress resilience as a dynamic outcome of the interaction between psychological resources and occupational demands.

ACCEPTED

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Keywords: *public transport drivers, stress resilience, occupational stress, conflict behavior, coping strategies, emotional strain, occupational state, road safety.*

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Introduction

The sustainable functioning of modern urban public transport systems largely depends on the human factor. Although technically reliable vehicles and well-developed road infrastructure are essential prerequisites for safe passenger transportation, the functional and psychological state of the driver remains one of the most important components of the overall transport system. In public transport in particular, drivers are responsible not only for operating a vehicle but also for ensuring the safety of a large number of passengers.

The psychological complexity of professional driving is determined by the need to perform several tasks simultaneously. Drivers continuously monitor the road environment, anticipate the behavior of other road users, comply with time schedules, make rapid decisions, and manage passenger-related communication situations. Such multidimensional occupational activity requires the continuous mobilization of cognitive, emotional, and regulatory resources.

When occupational demands remain intensive over extended periods, psychological resources may become depleted, increasing the likelihood of emotional strain, fatigue, irritability, and reduced behavioral self-control. Therefore, interpreting stress resilience among public transport drivers merely as the ability to "withstand" stress considerably narrows the psychological meaning of this construct. Stress resilience also encompasses the capacity to maintain psychological equilibrium, adequately assess challenging situations, regulate emotional and behavioral responses, and continue performing professional duties safely under stressful conditions.

LITERATURE REVIEW AND THEORETICAL FRAMEWORK

Stress is regarded in contemporary psychology as a multidimensional phenomenon associated with an individual's adaptation to environments characterized by complex and demanding conditions. Selye (1976) conceptualized stress as a general adaptive response of the organism to various internal and external demands. Although this approach provides an important foundation for understanding the physiological mechanisms of stress, explaining stress in occupational settings also requires consideration of an individual's subjective appraisal of the situation and the strategies used to respond to it.

According to the transactional model developed by Lazarus and Folkman (1984), stress is not simply a direct consequence of an external stimulus; rather, it emerges from the interaction between the individual and the environment. The manner in which individuals evaluate situational demands in relation to their available resources influences the nature and intensity of their stress responses. The coping concept proposed by these authors refers to cognitive and behavioral efforts aimed at managing stressful demands (Lazarus & Folkman, 1984). This theoretical perspective is particularly relevant to public transport drivers because traffic congestion, time pressure, passenger conflicts, and hazardous road situations may be appraised differently by different drivers and consequently generate different psychological responses.

The Job Demands–Resources (JD–R) model, developed by Bakker and Demerouti (2007), also provides an important theoretical framework for understanding occupational stress. According to this model, high job demands continuously consume employees' physical and psychological resources, whereas adequate occupational and social resources can mitigate their adverse effects. In the occupational context of public transport drivers, intensive workload, strict adherence to timetables, complex traffic conditions, responsibility for passenger safety, and communication-related strain may function as significant job demands.

Previous research on occupational stress among public transport drivers demonstrates the distinctive stressogenic characteristics of this profession. Tse et al. (2006), in their review of several decades of research on bus driver well-being, identified work schedules, time pressure, traffic conditions, passenger interactions, and limited control over work activities as important factors influencing drivers' health and psychological well-being.

Machin and Hoare (2008) investigated workload and coping styles among bus drivers and found that higher workload was associated with a greater need for recovery and more negative psychological outcomes. Their findings indicate that the consequences of occupational stressors depend not only on external working conditions but also on the coping strategies employed by drivers (Machin & Hoare, 2008). This provides a rationale for examining stress resilience through the interaction between occupational demands and the driver's psychological capacity to manage them.

Useche et al. (2017) investigated the relationships among work-related psychosocial stress factors, fatigue, and risky driving behavior among public transport drivers. Their findings demonstrated that fatigue played an important mediating role in the relationship between occupational strain, social support, and risky driving behavior (Useche et al., 2017). These results suggest that drivers' psychological and functional states are closely related to road safety.

Yamada et al. (2008) examined the psychological conditions of bus drivers and their relationship with passenger-related accidents, reporting that stress reactions among drivers may be associated with

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disruptions in safe driving performance. The authors also highlighted recognition and social support from others as psychological resources capable of buffering the adverse effects of occupational stress (Yamada et al., 2008).

Nakai and Ogawa (2014) identified several important stressors among bus drivers, including anger toward unsafe road users, passenger complaints, time pressure, anxiety about possible accidents, and inappropriate passenger behavior. Strong stress reactions were also associated with adverse behavioral manifestations, including cognitive failures, abrupt acceleration or deceleration, and aggressive driving tendencies (Nakai & Ogawa, 2014). These findings underline the practical importance of developing emotional self-regulation skills among professional drivers.

The work of public transport drivers differs from many other forms of professional driving because it involves continuous interpersonal interaction with passengers. Passenger complaints, timetable delays, overcrowding, and other conflict situations arising during transportation may create additional emotional strain. Therefore, behavioral strategies adopted in conflict situations may constitute an important manifestation of drivers' stress resilience.

Thomas (1992) explains conflict behavior in terms of the extent to which individuals seek to satisfy their own interests and those of the other party. This framework distinguishes several principal conflict-handling strategies, including competing, collaborating, compromising, avoiding, and accommodating (Thomas, 1992). In the professional activities of public transport drivers, these strategies may be reflected in the ways conflicts with passengers, other drivers, or other participants in the occupational environment are managed. Importantly, a particular conflict strategy should not automatically be classified as universally "positive" or "negative"; rather, its appropriateness should be evaluated in relation to the specific situational context.

Prolonged exposure to occupational stress may also affect drivers' professional and emotional states. Maslach et al. (1996) conceptualize occupational burnout as a psychological syndrome associated with chronic interpersonal and occupational stressors. Emotional exhaustion, psychological distancing from recipients of one's work, and changes in perceived professional efficacy constitute important dimensions of this phenomenon (Maslach et al., 1996). Given the continuous communicative demands and high level of responsibility inherent in public transport driving, examining these indicators in relation to stress resilience has considerable scientific relevance.

Chen and Sih (2024) found that stressors such as workload, time pressure, and job insecurity were associated with emotional exhaustion among public transport drivers. Emotional exhaustion, in turn, was related to lower job satisfaction and increased risky driving behavior (Chen & Sih, 2024). These findings support the need to analyze occupational stress, psychological state, and driving behavior within an integrated conceptual framework.

Kompier (1996) identified high job demands, limited control over work activities, and insufficient social support as significant psychosocial risk factors among professional bus drivers. The author emphasized that occupational stress prevention should not be restricted to improving drivers' individual adaptation capacities; rather, interventions should also address work organization, work–rest schedules, the social work environment, and management practices (Kompier, 1996).

Taken together, the existing literature suggests that stress resilience among public transport drivers should not be viewed as an isolated or static psychological trait. Instead, it may be conceptualized as a complex psychological system integrating the appraisal of occupational stressors, regulation of emotional strain, selection of appropriate behavioral strategies in conflict situations, and maintenance of a functional occupational state (Lazarus & Folkman, 1984; Machin & Hoare, 2008; Nakai & Ogawa, 2014; Useche et al., 2017). From this perspective, an empirical examination of the relationships among stress resilience, conflict behavior strategies, and occupational state may provide an important basis for identifying psychological mechanisms that support the professional stability of public transport drivers.

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CONCEPTUAL MODEL OF THE STUDY

Based on the theoretical analysis presented above, stress resilience among public transport drivers may be examined at three interrelated levels.

The first level is stress resilience, which reflects the driver's capacity to maintain psychological equilibrium and functional readiness under demanding occupational conditions.

The second level comprises behavioral strategies in conflict situations. This dimension reflects the behavioral patterns selected by drivers when interpersonal tension arises. Within the proposed framework, conflict behavior may be regarded as one of the observable manifestations of stress regulation in actual communication situations.

The third level is the occupational psychological state, which reflects how prolonged exposure to work-related demands is manifested in the driver's emotional and professional functioning. Emotional exhaustion, psychological distancing from work, and changes in professional satisfaction or efficacy may provide information regarding the preservation or depletion of psychological resources.

Accordingly, the conceptual logic of the study can be represented as follows:

Occupational stressors → Stress resilience → Conflict behavior strategies → Occupational state → Safe professional performance.

This model should not be interpreted as establishing a strictly unidirectional causal sequence. Rather, it represents a system of potentially reciprocal psychological relationships that should be empirically examined.

RESEARCH METHODOLOGY

The purpose of the study is to empirically investigate the relationships among stress resilience, behavioral strategies in conflict situations, and occupational psychological states among public transport drivers.

The object of the study is the manifestation of stress resilience among public transport drivers. The study involved 305 public transport drivers: 115 drivers working in bus depots in Tashkent, 96 public transport drivers from Samarkand, and 94 public transport drivers from Bukhara.

Table 1

Distribution of the Study Sample by City

Location	***n***	**%**
Tashkent	115	37.7
Samarkand	96	31.5
Bukhara	94	30.8
Total	305	100.0

Note. Percentages were calculated from the reported sample size (N = 305).

The empirical study incorporates three principal diagnostic domains. The first is aimed at assessing drivers' levels of stress resilience. The second examines behavioral strategies in conflict situations on the basis of Thomas's (1992) conflict-handling framework. The third assesses indicators of occupational and emotional functioning using the conceptual framework developed by Maslach et al. (1996).

Descriptive statistics can be used to characterize the distribution of the principal study variables, while correlational analysis can determine the strength and direction of relationships among stress resilience, conflict behavior strategies, and occupational-state indicators. Where appropriate, between-group comparisons and regression analysis may also be applied to determine which variables demonstrate the strongest statistical associations with drivers' stress resilience.

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DISCUSSION

The proposed research framework moves beyond a simplified classification of public transport drivers according to “high” or “low” stress resilience. From an occupational psychology perspective, the more significant question is not whether drivers experience stress, but how their psychological and behavioral regulatory systems function when stress is present.

In this context, high stress resilience does not imply the complete absence of stress. A driver may experience emotional strain resulting from traffic congestion, time pressure, passenger dissatisfaction, or hazardous road situations while still maintaining the ability to regulate emotional responses, preserve attentional control, make appropriate decisions, and continue professional activities safely.

The inclusion of conflict behavior strategies in the research model is particularly important for this reason. In public transport settings, interpersonal conflict is not merely a phenomenon of social interaction. An intense conflict may divert the driver’s attention from traffic conditions, increase emotional arousal, and influence subsequent decision-making. Consequently, constructive conflict management may be regarded not only as a component of communicative competence but also as a psychological skill relevant to occupational safety.

Occupational psychological state represents a comparatively longer-term indicator of the consequences of repeated exposure to stress. When daily occupational demands consistently exceed opportunities for psychological recovery, emotional exhaustion and negative attitudes toward professional activity may gradually develop. Consequently, psychological interventions designed to strengthen stress resilience among public transport drivers should not be restricted to relaxation techniques. They should also incorporate emotional self-regulation, constructive conflict management, cognitive reappraisal of stressogenic situations, coping skills, and psychological recovery strategies.

CONCLUSION

Professional activity in public transport driving represents a complex occupational context in which high cognitive, emotional, communicative, and safety-related demands interact continuously. Therefore, stress resilience should be conceptualized not as a fixed individual characteristic but as a dynamic psychological and functional system activated under occupational demands and supported by available psychological resources.

The theoretical analysis indicates potential functional relationships among stress resilience, behavioral strategies in conflict situations, and occupational psychological states. Empirical investigation of these relationships in a sample of 305 public transport drivers may contribute to a more precise understanding of the psychological mechanisms underlying professional stability in this occupational group.

The practical significance of the study lies in the possibility of using the findings to develop psychologically grounded interventions aimed at strengthening stress resilience, improving constructive conflict management, reducing emotional strain, and facilitating occupational recovery among public transport drivers. Such interventions may contribute not only to drivers’ psychological well-being but also to the prevention of transport risks associated with the human factor.

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PSYCHOLOGICAL AND PEDAGOGICAL MECHANISMS OF EMOTIONAL INTELLIGENCE DEVELOPMENT IN PARENT-CHILD RELATIONSHIPS

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ABSTRACT

This conceptual review examines how parent-child relationships contribute to the development of children's emotional intelligence, with particular attention to mechanisms that can be addressed through family education. Emotional intelligence is treated as a set of abilities related to perceiving, understanding, using, and regulating emotion rather than as a fixed personal trait. It also relates these mechanisms to Central Asian pedagogical ideas on self-control, moral formation, compassion, and family upbringing in Ibn Sina, Al-Farabi, Navoi, and Avloni. Evidence from developmental psychology indicates that children learn emotional abilities through repeated interpersonal exchanges in which parents model emotional behavior, respond to children's feelings, discuss emotional causes and consequences, and provide regulatory support during distress. The review organizes this literature around six connected mechanisms: parental emotional modeling, contingent responsiveness, emotion language and explanation, co-regulation, emotional security, and parental meta-emotion philosophy. Recent systematic and meta-analytic work suggests that these processes are associated with children's emotional knowledge and regulation, although effects vary by method, developmental period, family context, and the specific parenting behavior examined. Pedagogically, the evidence supports emotional acceptance, clear behavioral limits, reflective dialogue, and gradual transfer of regulatory responsibility from adult to child.

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Keywords: *emotional intelligence; emotion socialization; parent-child relationships; emotion regulation; parental responsiveness; family education.*

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INTRODUCTION

Psychological and Pedagogical Mechanisms of Emotional Intelligence Development in Parent-Child Relationships

Emotional intelligence has become a useful framework for describing abilities that allow people to identify emotional information, interpret its meaning, integrate it into thinking, and regulate emotional responses. In the ability model developed by Mayer, Salovey, and Caruso (2004), these processes are related but distinct. For children, their development is not confined to formal instruction. It begins in ordinary exchanges with caregivers, where emotion is named, interpreted, displayed, accepted, redirected, and sometimes ignored. Parent-child interaction therefore provides an early setting in which emotional

knowledge and self-regulation are repeatedly practiced before children can manage difficult feelings independently.

The family context matters because emotional learning is embedded in relationships rather than delivered as isolated information. A child who hears that anger is acceptable but observes explosive or punitive adult behavior receives a different lesson from a child whose parent acknowledges anger while demonstrating controlled expression. Likewise, a parent who asks what caused a child's disappointment and helps distinguish disappointment from anger contributes to emotional understanding in a way that simple reassurance does not. Eisenberg, Cumberland, and Spinrad (1998) described parental emotion socialization through several channels, including parents' reactions to children's emotions, discussion of emotion, and emotional expressiveness. Later work has retained these channels while giving greater attention to parental self-regulation, family climate, developmental timing, and bidirectional influence (Edler & Valentino, 2024).

The educational significance of these processes is substantial because emotional competence supports the interpretation and management of affective information in social settings (Halberstadt et al., 2001). Such a claim does not mean that parenting determines later adjustment in a simple or unilateral manner. Children differ in temperament, parents respond to those differences, and family practices occur within cultural and socioeconomic settings that shape what emotional expression is considered appropriate. Research on emotion socialization is therefore better interpreted as evidence about recurring developmental processes than as a formula for producing a particular child outcome.

The purpose of this article is to synthesize psychological and pedagogical mechanisms through which parent-child relationships can support emotional intelligence. The discussion focuses on mechanisms with direct relevance to family education: modeling, emotional responsiveness, verbal guidance, co-regulation, emotional security, and parental beliefs about emotion. It also considers how these mechanisms interact and where the evidence requires caution. The central argument is that emotional intelligence develops through patterned relational experience: children learn not only from what parents tell them about feelings, but from how emotion is handled when it is actually present.

Historical-Pedagogical Foundations in Central Asian and Uzbek Thought

The modern vocabulary of emotional intelligence is recent, but several concerns now discussed under that heading have clear antecedents in the educational thought of Central Asia. Ibn Sina treated upbringing as a comprehensive process in which intellectual, moral, physical, and psychological formation cannot be separated. In his educational perspective, the child's development is shaped by the surrounding environment, the conduct of adults, gradual habituation, and the maintenance of balance in behavior and feeling (Ibn Sina, 1980). These ideas do not constitute an early theory of emotional intelligence in the contemporary psychometric sense. Their relevance lies instead in the attention given to adult example, disciplined self-management, and the educational environment—concerns that correspond closely to what current literature describes as emotional modeling and co-regulation.

Al-Farabi's account of the virtuous person likewise joins knowledge to character and conduct. In The Virtuous City, human flourishing is linked to the cultivation of dispositions that enable individuals to govern their actions and orient personal aims toward socially meaningful ends (Al-Farabi, 1993). Read pedagogically, this emphasis places self-control within an ethical and communal framework: regulation matters not only because it reduces emotional intensity but because it makes deliberate, socially responsible action possible. Contemporary models of emotional regulation are descriptive rather than moral-philosophical, yet the two traditions meet around the question of how internal states are translated into considered behavior.

Alisher Navoi approaches emotional and moral education through the language of interpersonal virtue. Mahbub ul-Qulub gives sustained attention to kindness, compassion, patience, modesty, generosity, loyalty, and respect for other people (Navoi, 1983). These qualities are not interchangeable with emotional

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intelligence abilities, but they identify the social purposes toward which emotional understanding may be directed. Recognizing another person's emotional state has limited educational value if it is detached from regard for that person's dignity. Navoi's ethical vocabulary therefore adds a relational dimension to the later discussion of empathy, emotion language, and affective social competence.

The connection between emotional formation and family education becomes especially explicit in the pedagogical heritage of Abdulla Avloni. Turkiy Guliston yoxud axloq presents moral upbringing as a practical educational responsibility rather than an abstract ideal, with the family occupying a central place in the formation of conduct and character (Avloni, 1992). This position is particularly relevant to the present review because it directs attention to repeated everyday influence. Children encounter values through routines, correction, adult example, expectations, and patterns of communication long before they meet formal psychological terminology. In contemporary terms, the family functions as the setting in which modeling, responsiveness, emotion talk, and behavioral limits acquire consistency over time.

Taken together, these sources give the article a culturally situated historical foundation. They should not be cited as empirical evidence for the modern ability model of emotional intelligence; that role belongs to contemporary developmental and psychological research. Their contribution is conceptual and pedagogical. They show that questions of self-command, emotional balance, compassion, moral conduct, and the educative power of close relationships were already central to regional discussions of human development. The contemporary mechanisms examined below can therefore be read not as a replacement for this intellectual heritage, but as a more operational account of processes that earlier thinkers approached through moral philosophy, literature, and pedagogy.

Conceptual Framework and Review Approach

This paper is a conceptual narrative review rather than an empirical investigation. It gives priority to foundational theory, peer-reviewed research on parental emotion socialization, and recent systematic reviews or meta-analyses that clarify the strength and limits of earlier claims. Emotional intelligence is used here in the ability-oriented sense articulated by Mayer et al. (2004), while emotional competence refers more broadly to the effective expression, understanding, and regulation of emotion in social contexts. Halberstadt, Denham, and Dunsmore's (2001) model of affective social competence is especially useful for linking these constructs because it treats the sending, receiving, and experiencing of affect as coordinated processes that depend on awareness, contextual interpretation, and regulation.

The review treats parenting as a developmental context rather than as a one-way cause. This distinction is necessary because much of the literature is correlational, measures of parenting differ across studies, and observed associations are often modest. A meta-analysis of preschool emotion-focused parenting practices, for example, found positive associations between parental modeling, responding, and instruction and children's emotion skills, but the average effects were small and became less consistent in adjusted analyses (Zinsser et al., 2021). The most defensible account is therefore mechanistic and probabilistic: certain forms of interaction provide children with more frequent opportunities to learn emotional distinctions and regulation strategies, but their effects depend on the child, the relationship, and the wider environment.

Mechanisms of Emotional Intelligence Development

Parental emotional modeling is one of the earliest mechanisms available to the child. Before children can explain why a person is frustrated or anxious, they can observe what adults do when such states arise. Parents model whether emotion is concealed, amplified, verbalized, tolerated, or acted out. They also model repair: apologizing after an angry exchange, slowing down before responding, or returning to a difficult conversation after calming. Morris et al. (2007) place observational learning and modeling within a broader family model of emotion regulation, alongside emotion-related parenting practices and the emotional climate of the household. From a pedagogical perspective, modeling matters because it turns abstract rules about self-control into visible procedures. A parent who says, “I am

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frustrated, so I need a minute before we decide," demonstrates both emotional identification and a regulatory sequence.

Modeling is not sufficient when children misread what they see or lack language for the experience. Contingent emotional responsiveness provides a second mechanism. Responsive parents notice the child's emotional signal and respond in a way that is proportionate to the child's state and the situation. Responsiveness is not identical to agreement or indulgence. A child's fear can be acknowledged while the parent still encourages approach; anger can be accepted as an emotion while aggression is prohibited. The distinction is educationally important because children need to learn that emotions carry information but do not automatically justify every action. Supportive parental reactions may help preserve communication during high arousal, whereas dismissive, punitive, or escalating reactions can shift the child's attention from understanding the emotion to avoiding the parent's response. Eisenberg et al. (1998) identified these reaction patterns as a central route of emotion socialization, and recent reviews continue to treat them as consequential components of the parent-child emotional environment (Edler & Valentino, 2024).

Emotion language and explanation form a third mechanism. Children need vocabulary to differentiate experiences that might otherwise be grouped under broad labels such as "bad," "sad," or "mad." Parent-child conversation can supply more precise terms and connect feelings with causes, intentions, bodily cues, and consequences. These exchanges are most instructive when adults do more than label the emotion for the child. Questions such as "What changed when your friend left?" or "Were you angry because you lost, or embarrassed because everyone saw?" invite comparison and reflection. Emotional dialogue also allows parents to distinguish internal experience from outward conduct. This distinction supports both emotional acceptance and behavioral responsibility. Zinsser et al. (2021) found that parental instruction about emotion was among the practices positively associated with preschoolers' emotion skills, though the overall literature remains heterogeneous.

The educational value of emotion talk extends beyond vocabulary. Discussing causes and alternative interpretations can change how children appraise events, while discussing consequences can connect emotion to social understanding. This is one route through which emotional development intersects with empathy. Halberstadt et al. (2001) argue that affective social competence involves accurately receiving emotional messages as well as managing one's own affective experience. A child who learns to attend to another person's facial expression, tone, and context is better positioned to respond appropriately. Yet adults should avoid overinterpreting for the child. If parents routinely announce what the child "really feels," they can replace reflection with compliance. Productive emotional guidance leaves room for correction, uncertainty, and mixed emotion.

Co-regulation is a fourth mechanism and is especially important when arousal exceeds the child's independent regulatory capacity. Young children often depend on adults to reduce stimulation, organize attention, provide language, and sequence behavior during distress. Through repeated experiences, strategies that are initially interpersonal can become increasingly self-directed. Morris et al. (2017) describe parenting as a major context for the development of emotion regulation across childhood and adolescence, while Brumariu (2015) links attachment relationships with the acquisition and use of regulatory strategies in middle childhood. Co-regulation therefore should not be confused with permanent adult control. Its developmental purpose is gradual transfer: the parent initially provides more structure, then withdraws support as the child becomes capable of selecting and using strategies independently.

This transfer can be seen in everyday routines. A preschool child who is overwhelmed after losing a game may first need an adult to reduce arousal and supply a simple script. An older child may be able to identify the feeling and choose between taking a break, asking for help, or trying again. In adolescence, direct intervention may become less effective than availability, perspective taking, and collaborative problem solving. The mechanism remains relational, but the form of assistance changes. A pedagogically

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sound approach therefore calibrates help to developmental capacity rather than using the same response at every age.

Emotional security, the fifth mechanism, provides the relational conditions under which modeling, dialogue, and co-regulation can be used. Security develops when caregivers are sufficiently predictable and available that children can seek support without expecting ridicule, rejection, or disproportionate punishment. Attachment research does not imply that securely attached children are continuously calm; rather, security concerns the organization of support-seeking and confidence in the relationship. Brumariu (2015) reviews evidence linking secure attachment with adaptive emotion-regulation strategies. More recent meta-analytic evidence suggests a nuanced association between parental emotion socialization and attachment security: supportive emotion socialization showed a very small positive relation with security, whereas parental elaboration had a stronger association (Rodrigues et al., 2025). This pattern cautions against treating “supportive parenting” as a single undifferentiated variable.

A sixth mechanism, parental meta-emotion philosophy, concerns how parents understand and evaluate emotions in themselves and their children. Gottman, Katz, and Hooven (1996) proposed that parents differ in organized beliefs and practices concerning emotion, including whether children's negative feelings are treated as opportunities for intimacy and teaching or as states that should be minimized or quickly eliminated. These orientations can influence what parents notice, the language they use, and how they respond when the child is dysregulated. Meta-emotion is therefore not merely an attitude; it can organize repeated instructional choices. If sadness is regarded as weakness, for example, a parent may discourage disclosure even when intending to build resilience. If sadness is accepted as informative but temporary, the same parent may be more willing to listen and then help the child re-engage with the problem.

Parental self-regulation connects all of the preceding mechanisms. Emotion coaching is difficult when the adult is also highly aroused. Hajal and Paley (2020) identify parents' own emotional experience and regulation as proximal influences on emotion-socialization behavior, while Edler and Valentino's (2024) systematic review shows that parental self-regulation is related to reactions, expressiveness, and emotion discussion. For family education, this shifts part of the intervention target from how to manage the child toward how the adult manages emotion while parenting.

Pedagogical Implications for Family Education

The psychological mechanisms above translate into several pedagogical principles. The first is to separate validation of emotion from approval of behavior. Statements that identify and accept the feeling can be paired with limits on harmful conduct: “You are angry that the game ended, and you may not hit.” This structure teaches two propositions at once: emotional experience is legitimate, and behavior remains subject to social rules. Such a distinction is particularly important because permissiveness and emotion coaching are sometimes treated as equivalent, although they are conceptually different. Effective guidance combines emotional access with behavioral boundaries.

A second principle is to use emotional incidents as brief episodes of guided learning rather than as lectures. During peak arousal, children may have limited capacity for explanation; immediate support should therefore focus on safety, reduction of arousal, and manageable choices. Reflection is often more productive after the child has regained enough control to think about causes and alternatives. This sequencing is consistent with the logic of co-regulation and with intervention programs that teach parents emotion-socialization practices. England-Mason and Gonzalez (2020) found that such parenting programs can improve parenting behaviors related to emotion coaching, while noting that evidence for direct improvement in children's regulation is less developed. The pedagogical implication is modest but practical: parent education can change adult practice, yet claims about downstream child outcomes should remain proportionate to the evidence.

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A third principle is to build a family language for emotion through ordinary routines. Conversations after school, shared reading, stories about past events, and discussion of conflicts provide opportunities to identify feelings and compare perspectives without waiting for a crisis. These practices can be adapted to family culture and language. Parents do not need to impose a specialized psychological vocabulary when familiar words carry clearer meaning for the child. What matters is increasing precision, linking emotion with context, and allowing children to revise their own interpretations. Emotional literacy develops through repeated use, not through memorizing a list of emotion terms.

A fourth principle concerns the adult's own behavior. Parents can make regulation visible without turning children into caretakers of adult emotion. Brief statements such as “I am getting impatient, so I am going to slow down” model self-monitoring, while detailed disclosures about adult problems may burden the child. Family education should therefore address both emotional openness and generational boundaries. Parents can acknowledge emotion, demonstrate coping, and repair mistakes while retaining responsibility for managing adult concerns.

Finally, pedagogical practice should be developmentally responsive. Preschool children often need direct labeling and external structure; school-age children can participate more actively in identifying causes and selecting strategies; adolescents generally require greater respect for privacy and autonomy. The same parent may therefore move from direct co-regulation to consultation as the child matures. A fixed script is less useful than a stable set of principles: attend to the emotional signal, regulate the adult response, help the child make meaning, set limits when needed, and return responsibility as competence grows.

Limitations and Directions for Research

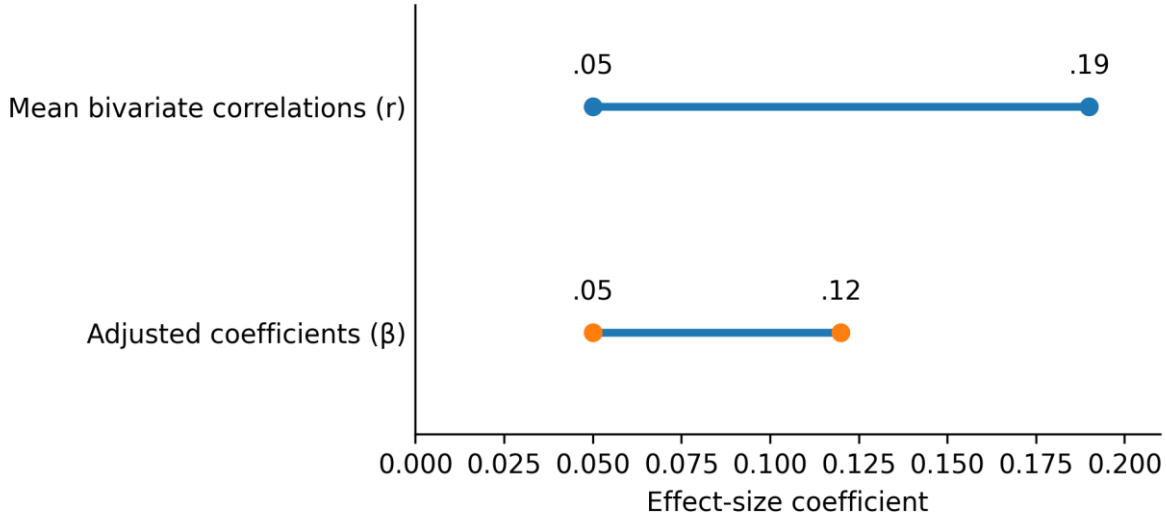
Several limitations qualify the conclusions of this review. First, the constructs of emotional intelligence, emotional competence, emotion regulation, and emotion socialization overlap but are not interchangeable. Studies also vary in whether parenting is measured by self-report, child report, observation, or experimental tasks. These differences can produce apparently inconsistent results even when studies address similar processes. Second, many associations in the literature are cross-sectional or correlational. Parents influence children, but children's temperament and behavior also influence parenting; family stress can affect both. Causal language should therefore be reserved for designs that can support it.

Third, effect sizes are not uniformly large. Zinsser et al. (2021) found mostly small associations between emotion-focused parenting practices and preschool emotion skills, and Rodrigues et al. (2025) reported that some links between emotion socialization and attachment security were small or nonsignificant. Such findings do not make family emotion socialization unimportant. They indicate that child development is multiply determined and that broad labels such as “supportive parenting” may conceal mechanisms with different strengths. Future work would benefit from longitudinal and culturally diverse designs that distinguish specific parental behaviors, test developmental timing, and examine how family stress or child characteristics moderate effects. Figure 1 summarizes the ranges reported by Zinsser et al. (2021), making clear that positive associations can remain modest in magnitude.

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Figure 1

Effect-Size Ranges Reported for Emotion-Focused Parenting Practices



Note. Horizontal segments show the range of mean bivariate correlations (r = .05-.19) and mean adjusted regression coefficients (β = .05-.12) reported across 24 studies by Zinsser et al. (2021). The figure summarizes values reported in the source; it does not present new data generated in this review.

Research also needs stronger links between parent-focused intervention and measured child outcomes. England-Mason and Gonzalez (2020) noted that emotion-socialization programs have evidence for changing parenting behavior, while evidence concerning children's regulation is less extensive. Evaluations should therefore assess whether changes in parental modeling, reactions, and discussion mediate changes in children's emotional knowledge or regulation. This would move the field from general recommendations toward more precise pedagogical mechanisms.

Conclusion

Parent-child relationships provide a recurring context in which emotional intelligence can develop through observation, dialogue, regulation, and relational experience. The literature supports six connected mechanisms: emotional modeling, responsive reactions to children's feelings, emotion language and explanation, co-regulation, emotional security, and parental meta-emotion philosophy. These mechanisms are strengthened or weakened by the parent's own capacity to regulate emotion during interaction. Their effects are neither automatic nor uniform; they operate alongside child characteristics, developmental stage, family climate, and culture. Read alongside Ibn Sina, Al-Farabi, Navoi, and Avloni, these findings also show continuity with a regional pedagogical tradition that places self-control, moral conduct, compassion, and family influence at the center of child formation.

For family education, the most defensible approach is not to teach parents to eliminate children's negative emotion. It is to help families make emotion understandable and manageable while maintaining behavioral expectations. Parents can model regulated expression, acknowledge feelings without surrendering limits, discuss causes and perspectives, provide support during high arousal, and reduce that support as the child's competence increases. In this sense, emotional intelligence is cultivated less by isolated instruction than by the quality and consistency of everyday emotional exchanges.

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CRITERIA AND INDICATORS FOR ASSESSING THE DEVELOPMENT OF SPIRITUAL VALUES IN UNIVERSITY STUDENTS

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ABSTRACT
This research analyzes the pedagogical criteria and indicators for developing moral and spiritual values in students of higher education institutions. It addresses these values as a complex educational phenomenon related to a person's ethical choices, social responsibility, understanding of national identity, academic integrity, and civic stance. The study employs theoretical analysis, comparative analysis, generalization, and pedagogical modeling methods. As a result, eight main criteria for assessing students' moral and spiritual values are identified: patriotism, tolerance, honesty, social responsibility, ethical responsibility, national self-awareness, civic stance, and academic ethics. Practical indicators have been developed for each criterion, along with a framework for evaluating them at high, medium, and low levels. The article also discusses the theoretical relationship between moral values and spiritual intelligence, the conceptual distinctiveness of closely related criteria, and the limitations of the proposed framework as a basis for future empirical validation.

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Keywords: *spiritual values, spiritual intelligence, student, criteria, indicators, ethical responsibility, academic ethics, civic stance.*

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Introduction

In today's higher education system, training specialists goes beyond forming professional knowledge and competencies. In modern society, it is important for a student to be capable of independent thinking, to carry social responsibility, make ethical decisions, and have a conscious attitude towards national and spiritual values. Values are widely recognized as a central element of education, influencing both teaching and learning processes. To foster these values, educational institutions often integrate them into their mission statements and organizational practices. Research suggests that such value-oriented approaches can play an important role in shaping students' character, personal values, and behavioural development (Hill et al., 2025). Therefore, in higher education, the development of moral and spiritual values is one of the urgent directions of pedagogy.

This article uses the terms "moral values" and "spiritual values" in a closely related but not identical sense. Moral values refer to a person's ethical standards and behavioral choices—honesty, responsibility, tolerance, and civic conduct. Spiritual intelligence, as conceptualized by Emmons and by King and DeCicco, refers to the underlying cognitive and reflective capacity—the ability for critical existential thinking, personal meaning-making, and self-awareness—that enables a person to form and act upon such moral values. In this framework, spiritual intelligence is treated as the psychological mechanism that supports the development of spiritual values, while spiritual values are its observable, assessable

expression in student behavior. The criteria and indicators proposed below assess this observable expression.

The Law of the Republic of Uzbekistan "On Education" stipulates that education should serve the intellectual, moral-ethical, cultural, and professional development of the individual (Republic of Uzbekistan, 2020). Similarly, the Concept for the Development of the Higher Education System of the Republic of Uzbekistan until 2030 identifies as a priority the training of highly qualified specialists who possess modern knowledge and high moral-ethical qualities and can think independently (Republic of Uzbekistan, 2019).

On the international education stage, the issue of values is also given special attention. For example, UNESCO emphasizes in its Global Citizenship Education framework the necessity of developing respect, responsibility, tolerance, acceptance of diversity, and active civic engagement among students (UNESCO, 2015). Thus, the development of moral values is closely linked with both national educational traditions and international educational standards.

However, although moral and spiritual values are widely discussed in educational theory, there remains a need for a clearer pedagogical framework that identifies measurable criteria and observable indicators for assessing students' value development in higher education. Existing studies often examine values, moral education, civic education, academic integrity, or spiritual intelligence separately. However, these concepts are not always systematized within one assessment framework for university students. Therefore, this article attempts to address this gap by proposing a criteria-indicator framework that can be used for pedagogical diagnostics and as a foundation for future empirical research.

The purpose of this article is to theoretically substantiate the criteria and indicators for developing moral values in students and to systematize them for pedagogical assessment.

Literature Review

Values are understood as internal criteria that influence a person's life goals, behavior, and decision-making. In Schwartz's theory of basic values, values are explained as universal directions related to human motivation (Schwartz, 2012). According to Schwartz (2012), values are concepts that regulate a person's behavior, manifest in social relations, and have cross-cultural significance.

Moral values are a deeper, ethical and meaningful part of the general value system. They affect how a student understands themselves, their attitude towards others, their role in society, and their sense of responsibility for their own actions. In this context, spiritual intelligence serves as an important factor. Emmons (2000) analyzes spirituality as the ability to solve life's problems, to achieve goals, and to make decisions connected with a higher sense of meaning. Rahmonova (2026) interprets value integration as a complex psychological system linked to a person's intrinsic motivations, social experience, and activity processes. This perspective serves as a theoretical foundation for understanding the mediating role of spiritual intelligence in the formation of spiritual values within the individual.

The model of spiritual intelligence developed by King and DeCicco (2009) is based on four main components: Critical Existential Thinking, Personal Meaning Production, Transcendental Awareness, and Consciousness Expansion. This approach indicates the necessity of reflection, self-awareness, defining life purpose, and forming ethical choices in the development of moral values in students. Izgar (2018) demonstrated that the development of students' values can be enhanced through intentionally designed pedagogical interventions. The study found that experiential learning activities, cooperative learning practices, and social responsibility projects contributed to the formation of responsibility, empathy, ethical behaviour, and respect for others. This evidence supports the argument that spiritual and moral values are not acquired automatically but can be systematically cultivated through appropriate pedagogical strategies implemented in higher education.

One of the important manifestations of moral values in the academic environment is academic integrity. Recent research also confirms the importance of considering students' own values in the

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educational process. Hill et al.'s (2025) scoping review on students' values in science education shows that when students' values are recognized, educational relationships, academic engagement, achievement, and student wellbeing may improve. Their review identified a wide range of values that students consider important in learning, including relevance, collaboration, interest, and meaningful learning experiences. Although this review focuses specifically on science education, its findings are relevant to value-based pedagogy because they demonstrate that learning becomes more effective when educational content is connected with what students consider meaningful. The International Center for Academic Integrity (n.d.) defines academic integrity as a system of values based on honesty, trust, fairness, respect, responsibility, and courage. This implies that a student should not only acquire knowledge but also be responsible, fair, and honest in their scientific and educational activities.

Methodology

The article has a theoretical-analytical character. The following methods were used:

- Theoretical analysis – studying scientific sources on moral values, spiritual intelligence, and value-based education.
- Comparative analysis – comparing national education requirements with international approaches.
- Generalization – isolating criteria and indicators manifested in students' behavior that reflect moral qualities.
- Pedagogical modeling – developing a system of criteria for assessing moral values.

The article does not present empirical survey results. Its main focus is on theoretical substantiation and forming a criteria-indicator system for pedagogical diagnostics. A detailed discussion of this limitation, and of the steps required for empirical validation, is provided in the Limitations section below.

Results and Discussion

To assess the development of moral values in students, clear criteria and indicators are needed. A criterion is a main direction of assessment, while an indicator shows how a criterion is manifested in practical behavior, attitude, or activity.

This article proposes the following eight criteria for the development of students' moral values:

Table 1

Criteria and Indicators for Students' Moral Values

No.	Criteria	Indicators
1.	Patriotism	Respect for the homeland, commitment to national interests, participation in socially beneficial activities
2.	Tolerance	Respect for people of different opinions and cultures, patience in communication, seeking compromise in conflicts
3.	Honesty	Truthfulness, loyalty to promises, refraining from lying for personal gain
4.	Social responsibility	Not being indifferent to social problems, participation in volunteer or community service activities
5.	Ethical responsibility	Ability to evaluate one's own actions, understanding consequences of wrongdoing, feeling of duty and accountability
6.	National self-awareness	Respect for national values, history, language and cultural heritage, striving to preserve them
7.	Civic stance	Respect for laws, active participation in social processes, supporting justice and public interest
8.	Academic ethics	Avoiding plagiarism, proper citation, independent completion of assignments, respect for intellectual property

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These criteria are interconnected. For example, academic ethics is directly related to honesty, and civic stance is closely linked with social responsibility and patriotism. Therefore, they should be viewed not in isolation, but as part of a comprehensive system of moral development.

Theoretical Bridge: Criteria and the Structure of Spiritual Intelligence

While the eight criteria above assess the observable, behavioral expression of value development, they are theoretically grounded in the four components of spiritual intelligence proposed by King and DeCicco (2009), although the correspondence is one of degree rather than a strict one-to-one mapping. Ethical responsibility and civic stance draw most heavily on Critical Existential Thinking— the capacity to reason critically about one's existence, purpose, and place within a larger moral order— which underlies judgments about duty, consequence, and justice. Patriotism and national self-awareness draw primarily on Personal Meaning Production— the capacity to derive a sense of purpose and identity from one's lived experience, culture, and history. Tolerance and honesty draw on Transcendental Awareness, understood here as the capacity to recognize a dimension of worth or dignity in others, and a standard of conduct, that extends beyond immediate self-interest. Social responsibility and academic ethics represent the practical, institutionally situated application of these reflective capacities—in the community and the classroom, respectively—rather than being anchored in a single distinct component such as Consciousness Expansion, whose primary referent (the capacity to enter altered or heightened states of awareness) has no direct behavioral analogue among the eight criteria and is therefore not force-mapped here. This correspondence is best read as illustrative of conceptual grounding rather than as a validated psychometric structure, and should itself be treated as a hypothesis for future empirical testing.

Theoretical Justification of Criteria Differentiation

Because several of the proposed criteria are conceptually close, it is necessary to justify why they are retained as separate categories rather than merged into broader clusters.

Patriotism, national self-awareness, civic stance, and social responsibility. Although related, each of these criteria is directed at a distinct object of attitude and is manifested in a distinct domain of student behavior. Patriotism reflects an emotional-motivational attachment to the homeland; national self-awareness reflects cognitive-cultural identification with language, history, and heritage; civic stance reflects a legal-political orientation toward laws, rights, and justice; and social responsibility reflects practical engagement with community needs. A student may show a high level in one of these dimensions while showing a lower level in another for example, strong knowledge of national history and language without active participation in volunteer work, or active civic and legal awareness without strong emotional attachment to national symbols. This independence of manifestation is consistent with the multi-domain structure proposed in UNESCO's Global Citizenship Education framework, which separates cognitive, socio-emotional, and behavioral dimensions of global and civic competence (UNESCO, 2015, 2023), and it justifies treating these four constructs as distinct, though interrelated, criteria.

Honesty and academic ethics. These two criteria stand in a general-to-specific, hierarchical relationship rather than a relationship of overlap. Honesty represents a general dispositional character trait manifested across all areas of a student's life—friendship, family, and community. Academic ethics represents the contextual operationalization of that trait within the institutional and scholarly environment, expressed through domain-specific behaviors such as proper citation and independent completion of assignments. A student may exhibit high honesty in personal relationships yet fail to observe academic ethics, for instance through unintentional or pressure-driven plagiarism; the reverse pattern—strict adherence to citation rules without genuine honesty in personal conduct—is also conceptually possible. This distinction is consistent with the International Center for Academic Integrity's framework, which treats academic integrity as the application of broader ethical values, including honesty, to the specific demands of academic work (International Center for Academic Integrity, n.d.). Honesty and academic

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ethics are therefore retained as separate but hierarchically related criteria: the former assesses a general disposition, the latter assesses its domain-specific behavioral expression.

Honesty and ethical responsibility. These two criteria differ in temporal and cognitive orientation rather than in moral content. Honesty is a dispositional trait concerned with truthfulness at the point of action—whether a student tells the truth, keeps a promise, or refrains from deceit in the moment. Ethical responsibility, by contrast, is a reflective capacity concerned with evaluating the consequences of one's actions after the fact and adjusting future conduct accordingly—admitting a mistake already made, understanding why it was wrong, and accepting accountability for it. A student may be honest in the moment yet fail to reflect critically on a past error (low ethical responsibility despite high honesty), or may reflect deeply on consequences while occasionally failing to disclose an inconvenient truth (the reverse pattern). This distinction follows the same general-dispositional-versus-context-specific logic applied above to honesty and academic ethics, but here the differentiating axis is temporal (in-the-moment vs. retrospective-reflective) rather than domain-specific (general life vs. academic context).

Patriotism Criterion. Patriotism reflects a student’s conscious attitude towards their homeland, nation, culture, and social progress. This criterion is not limited to slogans or abstract feelings. It is manifested in a student’s responsibility in their studies, striving for professional development, and desire to contribute to society. The main indicators of patriotism include respect for national interests, reverence for state symbols, awareness of one’s role in society, and linking one’s professional knowledge to the development of the country.

Tolerance Criterion. In higher education, students from different regions, nationalities, worldviews, and social backgrounds study together. Therefore, tolerance is an important aspect of moral values. UNESCO documents also emphasize that education should be organized in a spirit of respect for cultural diversity, tolerance, and recognition of human rights (UNESCO, 2015). The indicators of tolerance include: the ability to listen to different opinions, maintaining a culture of dialogue, giving up discriminatory attitudes, and striving for compromise in conflicts.

Honesty Criterion. Honesty reflects a person’s internal moral stability. An honest student builds trusting relationships in learning, friendship, group work, and personal life. Honesty is also directly related to academic ethics, as discussed above. The indicators of this criterion are: truthfulness, avoiding deceit, completing assignments independently, not claiming others’ work as one’s own, and being faithful to commitments.

Ethical Responsibility Criterion. Ethical responsibility is characterized by a student’s conscious control over their actions and understanding of their consequences. Such a student makes the right decisions not only due to external control, but based on inner conviction and conscience. The indicators of this criterion are: admitting one’s mistakes, refraining from causing harm to others, relying on principles of justice and conscience when making decisions, and fulfilling one’s duties to the community.

Social Responsibility Criterion. Social responsibility is associated with a student’s sense of involvement in social life. Such a student does not remain indifferent to surrounding problems, actively participates in community work, and connects their knowledge with socially beneficial purposes. Indicators: participation in volunteer activities, involvement in environmental or social projects, taking on roles in group activities, and being attentive to those in need.

National Self-Awareness Criterion. National self-awareness means a student’s conscious attitude towards their nation’s history, language, culture, and values. This criterion does not imply narrow nationalism, but rather respect for national heritage along with openness to other cultures. Indicators: respect for one’s native language, knowledge of national customs and traditions, valuing historical memory, and striving to preserve cultural heritage.

Civic Stance Criterion. Civic stance means a student’s understanding of their rights and duties in society, respect for laws, and responsible participation in social processes. UNESCO’s global citizenship

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education emphasizes forming students as active, responsible individuals oriented toward justice (UNESCO, 2015, 2023). Indicators: respect for laws, consideration of public interest, supporting fair decisions, and expressing an active stance on social issues.

Academic Ethics Criterion. Academic ethics reflects the contextual application of honesty and responsibility within the scholarly environment. It concerns a student's conduct in relation to authorship, originality, and the academic community's shared standards of trust (International Center for Academic Integrity, n.d.). Indicators: avoiding plagiarism, proper citation, independent completion of assignments, and respect for intellectual property.

Existing empirical research supports the relevance and necessity of the eight criteria proposed in this framework. Izgar (2018) conducted an action research study with 39 university students enrolled in a social responsibility and healthy living course in Turkey. Post-intervention interviews revealed meaningful growth across multiple value dimensions: responsibility was the most frequently cited value (f=19), followed by ethics (f=15), being useful (f=14), cooperation–solidarity (f=7), and empathy (f=6). A total of 56 out of 93 student responses emphasized values directly aligned with the criteria proposed in this framework, including social responsibility, ethical responsibility, and tolerance.

Hill et al. (2025) conducted a scoping review of 91 publications and identified 55 distinct student values across the science education literature. The review demonstrated that when students' values are recognized in educational settings, academic relationships are strengthened, engagement improves, and student wellbeing is enhanced. Notably, over 70% of surveyed Australian students reported disinterest in STEM subjects, while over 72% of British students desired more personally relevant and meaningful learning experiences—findings that underscore the critical importance of value-aligned pedagogy in higher education contexts. These results collectively confirm that the eight criteria proposed in this framework address documented and empirically validated gaps in students' moral and spiritual development.

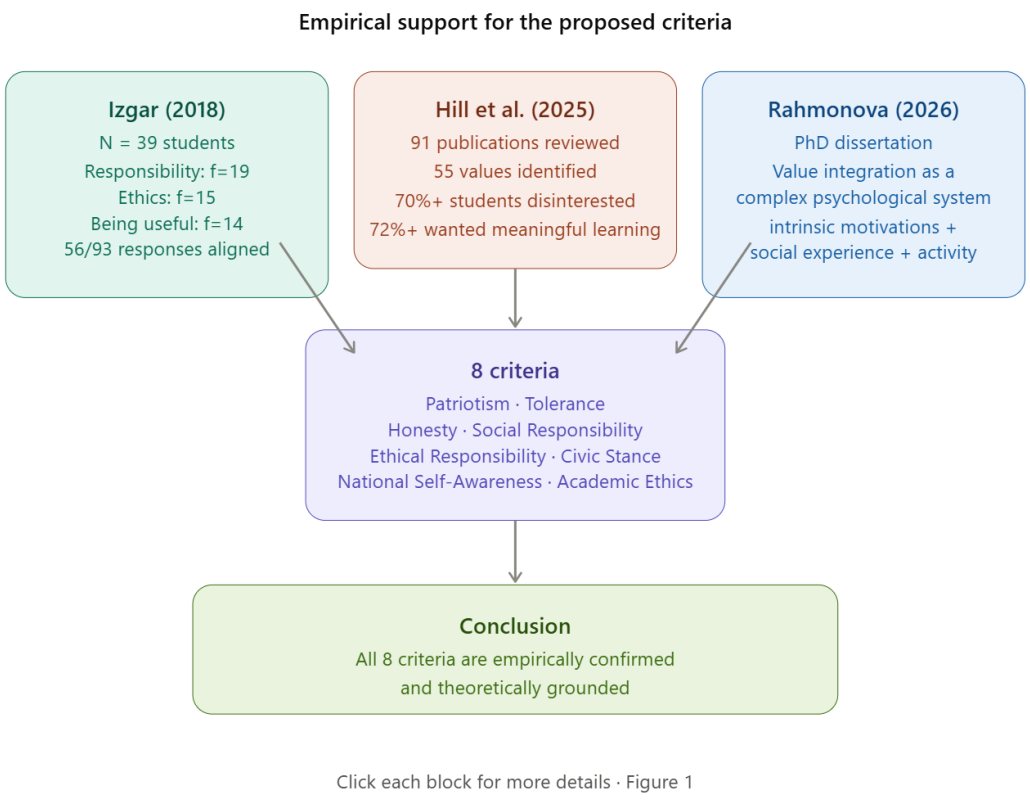
Empirical evidence from the Uzbek higher education context further substantiates the relevance of these criteria. Batiraliyeva (2026) reports that among surveyed university students, 78% demonstrated patriotism and attachment to the homeland, while 83% showed career-oriented moral-ethical formation. Notably, only 71% of respondents supported the need for further enrichment of moral-ethical content in university curricula—a finding that directly corroborates the gap identified in the Introduction of this article: despite documented value formation among students, there remains an unmet demand for a more systematic, criteria-based pedagogical approach. Similarly, indicators related to civic awareness (77% regarding rights allocation, 67% regarding respect for human rights) align closely with the Civic Stance criterion proposed in this framework, providing preliminary, context-specific support for its practical relevance in the Uzbek educational setting. Moreover, Rahmonova (2026) conceptualizes value integration as a complex psychological system linked to intrinsic motivations, social experience, and activity processes, providing theoretical grounding for why criteria such as national self-awareness, civic stance, and patriotism must be assessed not in isolation but as interconnected dimensions of a unified moral development framework.

These results collectively confirm that the eight criteria proposed in this framework address documented and empirically validated gaps in students' moral and spiritual development, and—together with the conceptualization of value integration as a unified psychological system discussed above (Rahmonova, 2026)—support treating criteria such as national self-awareness, civic stance, and patriotism not in isolation, but as mutually reinforcing components of the same developmental process.

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Figure 1

Empirical Support for the Proposed Criteria



Assessment Levels

The development of students' moral values can be assessed at three levels:

Table 2

Assessment Levels for Students' Moral Values

Level	Description	Observable indicators
High level	The student consciously understands spiritual values and consistently applies them in academic and social life.	Makes ethical decisions independently, respects others, avoids plagiarism, participates in socially useful activities, demonstrates civic responsibility, and connects personal development with social benefit.
Medium level	The student understands the importance of spiritual values but does not always apply them consistently.	Shows positive behavior in familiar situations, follows moral norms when guided by teachers or peers, participates in group activities, but sometimes needs external control or encouragement.
Low level	The student's conscious attitude toward moral values is insufficiently formed; ethical responsibility and social activity are weakly manifested.	Shows weak responsibility, passive civic position, low respect for academic ethics, limited participation in social activities, and insufficient awareness of moral consequences.

These levels allow educators to determine students' moral development status, plan educational activities, and implement individualized approaches. In particular, pedagogical strategies based on spiritual

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intelligence—such as reflective dialogue, problem-solving analysis, social projects, essay writing, service learning, and group discussions—can have a positive impact on the development of these criteria.

Toward a Scoring Rubric

To reduce the subjectivity of the High/Medium/Low descriptors above and to support future empirical use, each indicator can additionally be rated on a 1–5 scale across four observable sub-indicators, illustrated below. This rubric is offered as a starting point for instrument development rather than as a validated tool.

Table 3

Scoring Rubric for Observable Sub-Indicators

Sub-indicator	Score 1 (Low)	Score 2–3 (Medium)	Score 4–5 (High)
Consistency of application	Rarely or never applies the value in practice (1)	Applies inconsistently, often needs reminders (2–3)	Applies consistently and independently (4–5)
Self-initiation	Acts only under direct instruction	Acts when prompted by peers or context	Acts on own initiative without prompting
Reflective awareness	Cannot explain the reasoning behind own actions	Partially explains reasoning, with help	Clearly articulates ethical reasoning behind actions
Behavioral evidence	No observable instances in the academic term	Occasional, isolated instances	Repeated, documented instances (e.g., portfolio, peer/teacher observation)

Under this scheme, a student's overall level for a given criterion (Low: 4–9, Medium: 10–15, High: 16–20) is obtained by summing scores across the four sub-indicators, observed through teacher rating, peer assessment, self-report, or portfolio evidence. This scoring logic is proposed for testing in future empirical work and should be piloted and refined before use in formal assessment.

Limitations

This study has several limitations that should be acknowledged. First, the article is theoretical-analytical in nature and does not include empirical data collection; the criteria and indicators have not yet been tested on a student sample, and their reliability and validity remain unverified. Second, the proposed High/Medium/Low levels, and the supplementary rubric introduced above, are conceptual proposals rather than psychometrically validated instruments; they require piloting, expert review, and statistical testing (e.g., for inter-rater reliability and internal consistency) before they can be used for formal assessment or research purposes. Third, the framework was developed primarily through theoretical and comparative analysis of national and international sources; it has not been cross-checked against the perspectives of students or educators through interviews or surveys, which may reveal additional or alternative dimensions of moral and spiritual value development. Fourth, because the framework draws substantially on the Uzbek national educational context, its applicability to other cultural or educational systems should be tested rather than assumed. These limitations define the agenda for the empirical research outlined in the conclusion.

Conclusion

The development of moral values in students is an essential educational task of higher education. The criteria and indicators system developed in this article enables a comprehensive assessment of a student's personal, ethical, academic, and civic development. As a result of the study, patriotism, tolerance, honesty, social responsibility, ethical responsibility, national self-awareness, civic stance, and academic ethics were identified as the main criteria for assessing moral values. These criteria, connected with spiritual intelligence, serve to develop students' conscious ethical choices, life purpose, responsibility, and social engagement.

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Future research should proceed in three stages. First, a diagnostic questionnaire and observation rubric should be developed from the proposed indicators, building on the scoring scheme outlined above, and reviewed by a panel of pedagogy experts for content validity. Second, the instrument should be piloted with a sample of university students using a combination of Likert-scale self-report items, teacher and peer observation ratings, and document-based evidence (e.g., participation records, academic-integrity records), allowing inter-rater reliability and internal consistency to be assessed statistically. Third, the refined instrument should be used in experimental or quasi-experimental studies to empirically test the effectiveness of the pedagogical strategies proposed above—reflective dialogue, service learning, and social responsibility projects—in developing students' moral and spiritual values, comparing outcomes before and after intervention and, where feasible, against a control group.

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EDUCATIONAL TECHNOLOGIES FOR DEVELOPING CRITICAL THINKING IN SCHOOL STUDENTS AS A MEANS OF PERSONAL SELF-DEVELOPMENT

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ABSTRACT

This article examines the use of interactive methods and educational technologies to develop critical thinking in school students as a means of personal self-development. Critical thinking is treated as purposeful, reflective, and self-regulated judgment that enables learners to analyze information, evaluate evidence, formulate questions, compare perspectives, and make reasoned decisions. The article discusses classroom conditions that support these abilities and emphasizes the teacher's role as a facilitator of inquiry rather than only a transmitter of information. Practical techniques are presented for use in reading, history, environmental studies, and other text-based lessons, including the "Basket of Ideas," cluster mapping, learning logs, short reflective essays, the margin-annotation technique, and cinquain writing. Each technique is described in relation to activating prior knowledge, organizing information, monitoring comprehension, encouraging dialogue, and supporting reflection. The discussion also highlights the value of problem-based tasks, questioning, argumentation, and collaborative learning for strengthening learner independence and engagement. When applied systematically, these approaches can help students connect prior experience with new knowledge, identify problems, justify conclusions, consider alternative viewpoints, and transfer learning to authentic situations. The article concludes that critical-thinking instruction can contribute simultaneously to students' intellectual autonomy, creative potential, and capacity for continued self-development.

ACCEPTED

04.10.26

Keywords: *critical thinking, interactive methods, educational technology, self-development, primary education, student engagement.*

CC BY

Introduction

Contemporary education is expected to prepare learners to participate productively in a rapidly changing world. This goal requires more than the accumulation of information. Students need to learn how to identify relevant knowledge, analyze claims, evaluate evidence, communicate ideas, and make reasoned decisions. Critical thinking is commonly understood as purposeful and self-regulated judgment involving interpretation, analysis, evaluation, inference, and explanation (Facione, 1990). It can also be viewed as a metacognitive process that supports reflective judgment, problem solving, and decision making (Dwyer et al., 2014).

For school students, the development of critical thinking is closely connected with increasing intellectual independence. Two recurring classroom challenges are particularly important: students may become overly dependent on teacher direction, and they may quickly lose interest when learning is reduced to passive reception of information. A developmental perspective is therefore essential because the capacity to think critically grows as learners become increasingly able to reflect on what they know, how they know it, and which strategies are appropriate for a given problem (Kuhn, 1999).

In this context, the technology for the development of critical thinking (TDCT) can be treated as a pedagogical framework that places the learner's reasoning at the center of instruction. The teacher acts as a facilitator, organizer of independent learning, and partner in the search for solutions. Critical thinking begins with meaningful questions and clearly defined problems; it develops when students are expected to justify claims, compare alternatives, and revise conclusions in light of evidence. Research on critical-thinking instruction has found that dialogue, authentic or situated problems, and guided support are among the instructional features associated with stronger critical-thinking outcomes (Abrami et al., 2015).

Text-rich subjects such as literary reading, environmental studies, social studies, and history provide particularly useful opportunities for this work because students must interpret information, distinguish main ideas from supporting details, compare perspectives, and explain their reasoning. A recent systematic review of primary education likewise identifies textual, dialogic, digital, and practical classroom approaches as important ways of supporting critical thinking, while emphasizing the need for deliberate theoretical grounding and purposeful classroom dialogue (Jegstad et al., 2025).

Classroom Strategies for Developing Critical Thinking

A problem can stimulate thought, but independent critical thinking depends on a foundation of prior knowledge and experience. Students must be able to connect new information with what they already know, analyze and reorganize information, evaluate its reliability, and use it to reach conclusions. Interactive methods can support these processes when they are used systematically and when students are given sufficient time to explain, question, compare, and reflect.

Basket of Ideas

The "Basket of Ideas" is used at the beginning of a lesson to activate prior knowledge and organize individual or group contributions. Students record what they already know, believe, or assume about the topic. Their responses are then collected and discussed. The technique allows the teacher to identify existing knowledge and misconceptions while giving students an immediate role in constructing the lesson. It is most effective when initial ideas are revisited later so that students can compare their first assumptions with what they learned.

Cluster Mapping

Cluster mapping is a visual technique for organizing knowledge around a central concept. Students write a key word or idea in the center of the page and connect it with related concepts through branching lines. Additional branches can be added as relationships become clearer. The technique may be used before instruction to stimulate thinking, during instruction to structure new material, or after instruction to summarize learning. It can support both individual and collaborative work and helps students see connections that may be less visible in linear notes.

Learning Log

A learning log, referred to in the original approach as a "Board Log," is a structured writing activity in which students record their thinking while studying a topic. A simple two-column format can be organized around two questions: "What do I already know about this topic?" and "What new information have I learned?" The first column is completed before or at the beginning of reading, and the second column is developed as students encounter new information. During reflection, students compare the two columns, summarize what changed in their understanding, and identify points that require further discussion.

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The log may be completed individually and then discussed in pairs or groups. This sequence encourages students to formulate an initial position before hearing others' views. The final reflection can also become the starting point for a new task, such as a short investigation, discussion, or written response.

Reflective Essay Writing

Short essay writing can be used to help students clarify their own thinking. The central principle is simple: students write in order to discover and explain what they think. A brief essay on a clearly defined question values independence, originality, argumentation, and personal interpretation. After a class discussion, students may be given approximately 15 minutes to state a position, support it with reasons or evidence, and reflect on possible alternatives. The emphasis should be on the quality and coherence of reasoning rather than on reproducing a teacher-provided answer.

Margin-Annotation Technique

The margin-annotation technique helps students monitor comprehension while reading. Students use simple symbols in the margins of a prepared text to indicate how new information relates to their existing understanding. The method transforms reading from a passive activity into an explicit process of comparison, questioning, and self-monitoring.

The symbols can be introduced as follows: "V" indicates information that the student already knew; "+" marks new information; "–" marks information that differs from the student's previous understanding; and "?" identifies information that is unclear or requires further investigation.

Table 1

Margin-Annotation Symbols and Meanings

V	+	–	?
Already knew	New information	Thought differently	Question / unclear

The method requires active and attentive reading. Students who would otherwise pass over an unfamiliar idea are prompted by the question mark to recognize a gap in understanding. The teacher should select an appropriate text or passage, explain the symbols, define the time available, and establish a clear procedure for checking and discussing the annotations. Oral discussion after reading is especially useful because students can point to specific passages when explaining what was familiar, new, surprising, or confusing.

Cinquain Writing

Cinquain writing is a five-line synthesis activity that helps students condense their understanding of a topic. In a common classroom version, the first line contains one noun naming the topic; the second line contains two adjectives describing it; the third line contains three verbs associated with it; the fourth line is a short phrase or sentence expressing an idea or attitude about the topic; and the fifth line is a concluding word that summarizes the student's response. Because students must select and organize a small number of words, the activity encourages synthesis, reflection, and concise expression.

Table 2 summarizes how the six classroom techniques described above support distinct but complementary components of critical thinking.

Table 2

Critical-Thinking Techniques and Their Instructional Functions

Technique	**Primary purpose**	**Typical student action**	**Critical-thinking function**
Basket of Ideas	Activate prior knowledge	State what is already known, believed, or assumed about the topic	Surfaces prior conceptions and generates questions for inquiry
Cluster Mapping	Organize relationships among ideas	Connect a central concept with related concepts and subideas	Supports comparison, classification, synthesis, and conceptual organization

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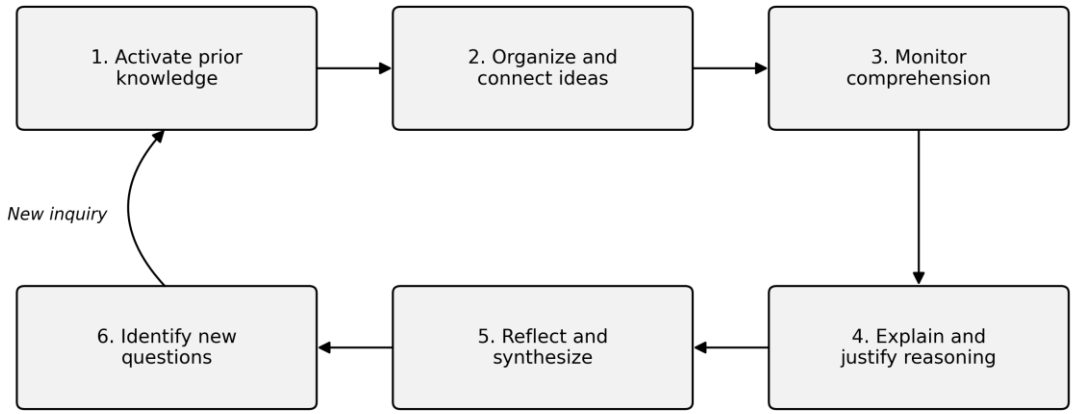
Learning Log	Monitor changes in understanding	Record prior knowledge and new learning, then compare the two	Strengthens metacognition, reflection, and revision of understanding
Reflective Essay Writing	Articulate and defend a position	Write a brief response that explains a view and gives reasons	Develops clarity, argumentation, independence, and evidence-based reasoning
Margin-Annotation Technique	Monitor comprehension while reading	Mark information as known, new, different, or unclear	Promotes active reading, evaluation of information, and question generation
Cinquain Writing	Synthesize learning concisely	Condense a topic into a structured five-line summary	Encourages prioritization, generalization, reflection, and concise expression

Note. The table synthesizes the instructional purposes and student actions described in the manuscript; it does not report measured effect sizes or experimental results.

Figure 1 presents the same strategies as a recursive instructional cycle in which reflection generates new questions for subsequent learning.

Figure 1

Instructional Cycle for Developing Critical Thinking



Note. This author-created figure is a conceptual synthesis of the classroom sequence described in the manuscript; it is not a tested causal model.

Implications for Students and Teachers

The techniques described above do not represent an exhaustive list of critical-thinking strategies. Their value lies in the way they reposition students as active participants in learning. In the primary and lower-secondary years, learners may not yet possess enough knowledge to produce fully developed arguments independently; nevertheless, carefully structured questioning, annotation, discussion, mapping, and reflective writing can help them practice the intellectual habits on which more advanced reasoning depends.

The use of critical-thinking strategies can also support teachers' professional growth. When teachers observe how students explain, question, compare, and revise ideas, they gain evidence about students' understanding that is not visible in recall-based tasks. This information can be used to adjust instruction, select more appropriate prompts, and create a classroom climate in which uncertainty and reasoned disagreement are treated as productive parts of learning.

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Across these activities, the development of critical thinking can be recognized in a set of recurring behaviors:

- posing questions and clarifying the problem that needs to be solved;
- seeking convincing reasons and evidence for a conclusion;
- thinking independently while participating constructively in social learning;
- connecting new ideas with previously acquired knowledge and experience;
- expressing an appropriate degree of confidence based on available facts;
- comparing and contrasting ideas or positions;
- applying knowledge in authentic situations;
- considering counterarguments and alternative points of view;
- evaluating the reliability and validity of information;
- generalizing from specific ideas while recognizing limitations; and
- identifying problems or unanswered questions within a text or information source.

Conclusion

Critical thinking develops when students are expected to do more than remember information. They need repeated opportunities to identify problems, ask questions, compare perspectives, evaluate evidence, explain reasoning, and apply prior knowledge to new situations. Interactive methods such as the Basket of Ideas, cluster mapping, learning logs, reflective essays, margin annotation, and cinquain writing provide practical structures for these processes. Used consistently, they can make classroom learning more active and reflective while supporting students' intellectual independence, creativity, and personal self-development. The teacher's role is central: effective implementation requires purposeful task selection, clear expectations, supportive dialogue, and reflection on both the learning process and its outcomes.

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METHODOLOGY FOR EDUCATING STUDENTS OF SPECIALIZED BOARDING SCHOOLS IN THE SPIRIT OF NATIONAL AND UNIVERSAL HUMAN VALUES

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ABSTRACT

This conceptual-methodological article examines pedagogical opportunities for educating students of specialized boarding schools in the spirit of national and universal human values. It considers values education as a means of developing moral culture, historical memory, national self-awareness, civic responsibility, patriotism, and respect for cultural heritage while maintaining openness to universal human ideals. The discussion situates these aims within contemporary educational reforms in Uzbekistan and broader international tendencies toward civic and values-based education. Particular attention is given to learner-centered and collaborative pedagogies, including problem-based inquiry, dialogue, group work, role play, case study, reflective activities, and methods designed to connect historical figures with students' lived experience. The article also discusses humanistic and free-education approaches that emphasize dignity, choice, self-development, independent thinking, and teacher–student partnership. Examples from history and patriotism education illustrate how the lives of Jalaliddin Manguberdi, Zahiriddin Muhammad Babur, and other cultural figures may be used to cultivate national pride alongside universal virtues. The article concludes that the effectiveness of values-oriented education depends on integrating culturally grounded content with active, reflective, and collaborative methods across classroom and extracurricular settings. Such integration can help students interpret inherited traditions critically, relate them to contemporary social responsibilities, and develop value-based decision-making in diverse educational contexts.

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Keywords: *national values, universal human values, moral education, specialized boarding schools, pedagogical technology, patriotism.*

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Introduction

In the global education system, the globalization of ideological processes, socio-political development, and the education of students in the spirit of national and universal human values are increasingly being incorporated into educational practice. In Anglo-Saxon countries (England, Canada, Ireland, New Zealand, Australia, and others), subjects related to civic education have been introduced into educational curricula to foster students in the spirit of national and universal human values. Systematic efforts are also being undertaken to ensure cooperation between educational systems and various social organizations in promoting education based on national and universal human values.

Educational and research institutions around the world are conducting studies aimed at defining clear development strategies in all spheres of social life, strengthening the role of commemorative dates in fostering military-patriotic sentiment, enhancing the role of public and community organizations in education based on national and universal human values, ensuring broad youth participation in community affairs, and incorporating subjects related to civic education into the educational process. Particular attention is also being paid to increasing students' participation in state events and to educating young people in the spirit of national and universal human values. Through respect for national values, efforts are made to cultivate collectivism, responsibility, determination, knowledge of the history and culture of one's country, and commitment to national and universal human values.

In recent years, pedagogical conditions have been developed in our country for educating students of specialized schools in the spirit of national and universal human values, fostering historical memory and national self-awareness, nurturing high moral and spiritual qualities, and cultivating respect for the rich historical traditions and cultural heritage of the Uzbek people on the basis of socio-cultural and educational norms. Among the principal priorities identified in the Development Strategy of New Uzbekistan for 2022–2026, adopted on January 28, 2022, is the education of young people who are spiritually mature, intellectually developed, independently minded, tolerant, civically engaged, and devoted to the Motherland (President of the Republic of Uzbekistan, 2022). As a result, the pedagogical opportunities for educating students of specialized schools in the spirit of national and universal human values have been expanded.

The principal objective of the reforms being implemented within the education system of the Republic of Uzbekistan is, above all, to raise a spiritually mature and well-rounded generation. In his January 24, 2020 Address to the Oliy Majlis, Mirziyoyev (2020a) emphasized that the healthy and harmonious development of the younger generation is decisive for the future of society and that further reforms depend on young people who are comprehensively developed, knowledgeable, professionally skilled, determined, courageous, and enterprising. Accordingly, within the educational process and the principles of humanism, justice, and democracy, particular attention is being paid to the spiritual and psychological development of young people and to their awareness of their national and spiritual identity. The national idea and national self-awareness, nourished by the foundations of national heritage, play an important role in educating the younger generation.

Thus, throughout the historical development of society, the pride and dignity of a nation and a country are measured by the spiritual heritage, historical monuments, arts and creative achievements produced by its people, as well as by the scholars and thinkers who have contributed to the development of world science. These material and spiritual riches embody the distinctive mentality, way of life, aspirations, and ideals of the nation. National self-awareness is an objective process for every people. Like all social phenomena, neither a nation nor its culture can develop in isolation from the outside world. National cultures develop through mutual influence and interaction. In this process, competition may arise among nations. Such relationships can create an environment in which questions of who is "superior" emerge, thereby intensifying the striving of nations toward self-awareness.

In educating the younger generation in our country, higher education institutions play an important role in developing competencies related to national self-awareness by forming the knowledge, skills, competencies, and practical experience of future teachers. In his Address to the Oliy Majlis on December 29, 2020, Mirziyoyev (2020b) emphasized the importance of raising young people who possess modern knowledge and experience, think independently and logically on the basis of national and universal human values, and embody noble virtues. In this context, one of the most important tasks facing educators in higher education is to develop future teachers as spiritually mature individuals characterized by national pride and self-awareness.

Given that the foundation of the Third Renaissance lies in education, contemporary pedagogy increasingly emphasizes learner engagement and active learning. Singapore's Teach Less, Learn More

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(TLLM) initiative, introduced in 2005, exemplifies an approach that prioritizes meaningful learning, student engagement, and character development rather than the mere coverage of content (Ministry of Education, Singapore, 2013).

Pedagogical Approaches to Values Education

For this reason, the use of educational methods and technologies occupies an important place in the teaching and upbringing process. In educating students in the spirit of national and universal human values, the source framework presents the following illustrative pedagogical proportions (Agency for Presidential Educational Institutions, 2022, p. 17):

1. Traditional classroom instruction – 10%
2. Independent reading of the textbook by the student – 20%
3. Explanation of the lesson using ICT and handout materials – 30%
4. Collaborative learning in groups – 50%
5. Practical activities using workbooks, maps, examples, and problem-solving tasks – 70%
6. Teaching others – 90%: at this level, the student is considered to acquire knowledge, skills, and competencies most effectively.

The student should not be forced to adapt rigidly to educational requirements. Rather, the learner's individual characteristics should be taken into account and conditions should be created for development, self-development, independent learning, personal self-expression, conscious awareness, observation, verification through practical activity, freedom to express new ideas and opinions, the search for effective solutions to existing problems, and the development of creative and critical thinking.

In the educational process, the teacher (including the class teacher and subject teacher) should employ methods that foster students' thinking, such as problem-based inquiry, investigation, dialogue, heuristic conversation, discussion, and group work. As a result, an object that was initially neutral for the learner should acquire personal and subjective significance (Agency for Presidential Educational Institutions, 2022, p. 17).

In educating students of specialized boarding schools in the spirit of national and universal human values, it is important that learners be able to construct a set of values consistent with the value system of the society in which they live, both for their own well-being and for the integrity and prosperity of society. This requires distinguishing between values regarded as "right" and "wrong." Accordingly, values education should develop students' ability to make the most appropriate decisions among the alternatives they encounter in everyday life, taking into account the conditions of the society in which they live. Only when an individual understands the norms of the society in which they live can individualism, the ego, and the superego be integrated into a healthy mode of thinking within a relatively short period of time. National and universal human values education therefore performs an integrative function as well as a behavior-regulating function, and it can facilitate an individual's ability to find an appropriate place in society through shared values. Although such values may change over time, this is also why they continue to be transmitted to subsequent generations through education.

When constructing an instructional system based on pedagogical technology, the requirements for educating students in the spirit of national and universal human values, teachers' methodological objectives, the content of instructional material, and the forms of relationships between administrators and teachers should be organized in such a way that they constitute the core content of education and transform the teacher into an active subject of the methodological process. This approach involves setting goals and developing content. Education in the spirit of national and universal human values, grounded in humanistic motivation, is particularly relevant; it requires an approach oriented toward learners' interests and emotions and toward the cultivation of national and universal human values. In other words, both the student and the teacher are regarded as unique individuals. This approach also strengthens the teacher's capacity to express personal views, pursue professional interests, engage in reflection, develop an individual

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pedagogical position, and construct an authorial pedagogical system encompassing methodological and didactic dimensions. In this regard, the following educational technologies are particularly important:

1. Tasks aimed at the collaborative development of students ("We Create Together"):

- creative group work using various technologies and formats, including brainstorming, role-playing, group work, the project method, and other approaches;
- simple creative tasks designed for joint completion, such as writing an essay collectively or in pairs and preparing laboratory work in groups;
- joint creative tasks in which the teacher (class teacher or educator-teacher) works together with students and assigns responsibilities such as group leader, designer, expert leader, and other roles;
- the organization of creative role-playing activities through the distribution of roles, with assigned roles being interconnected, allowing for creative self-expression, and directed toward achieving both individual and shared positive outcomes;
- tasks aimed at coordinating the participants in joint work, for example, interviewing one another in a foreign language on a given topic;
- joint analysis of both the process and the outcomes of an activity, for example, discussing each group member's mastery of a topic and evaluating the group's work;
- mutual assistance in developing individual goals and plans for learning activities, such as jointly preparing a plan for completing laboratory work or collaboratively developing an individual plan for test preparation.

2. Tasks aimed at methods of self-transformation, self-development, and collaborative work ("Change Yourself for Yourself"):

- tasks involving learning activities conducted without formal assessment, for example, completing various questions and assignments or receiving instructions for practical and creative work to be carried out at home;
- analysis of the outcomes of activities undertaken by the student voluntarily and on the basis of personal choice;
- tasks aimed at identifying personal educational prospects, including planning the form, duration, and expected outcomes of educational activities;
- subjectively challenging actions and situations directed toward self-development, for example, writing a history report that is not formally graded but is compared with previous reports and analyzed in terms of progress and outcomes;
- tasks requiring the demonstration of various qualities, including patience, creativity, interaction, and others;
- tasks that provide an opportunity to choose activities in accordance with the learner's professional interests.

3. Humanistic-Approach Technology

This technology differs from other approaches primarily in its humanistic and psychotherapeutic orientation toward the individual. It rejects coercion and instead advances the principles of full respect for the child, care and affection, and optimistic confidence in the child's creative potential. Within this technology, human relations are primary, while an individual approach, democratic management, and explicitly humanistic perspectives take precedence over other considerations. These principles are consistent with person-centered humanistic education, which emphasizes learner autonomy, dignity, and facilitative teacher–student relationships (Rogers, 1969).

4. Collaborative Learning Technology

Collaborative technology promotes equality between teacher and student, democracy, and interaction between participants as active subjects of the educational process. The teacher and the learner

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work as partners and co-creators, jointly determining the content and objectives of learning and jointly evaluating the results.

5. Free Education Technology

Free education technology places primary emphasis on the independence of the child's thinking and on freedom of choice throughout life. A learner who possesses the right to choose seeks to complete an academic task not under external pressure but on the basis of internal motivation and therefore strives to perform it thoroughly; this emphasis is consistent with humanistic approaches to self-directed learning (Rogers, 1969). In learner-centered education, explanation should be complemented by understanding and mutual understanding. Bibler (1997) distinguishes monologic explanation from dialogic understanding, arguing that genuine understanding emerges through interaction between subjects rather than through one-way transmission.

Historical and Values-Based Teaching Methods

Broad and well-developed knowledge plays a particular role in educating students in the spirit of national and universal human values. In constructing such a "pyramid of knowledge," various methods may be used across all forms of instruction to help students understand the consequences of their actions, develop techniques of perception and comprehension, independently interpret historical figures through multimedia resources, and express their own views on the courage inherited from previous generations. In every form of lesson, a national or universal human virtue should serve as a conceptual foundation for revealing the essence of the topic under study; its educational value is determined through this central idea. For example, in the topic "Jalaliddin Manguberdi – a Skilled Commander," students should develop a profound understanding of patriotism, the value of the homeland, bravery, and courage. For the great thinker Abu Ali ibn Sina, the most important universal human value in life was spiritual and physical health; for Imam al-Bukhari and Isa al-Termizi, faith, belief, compassion, generosity, and purity of spirit; for Zahiriddin Muhammad Babur, patriotism; for the Jadid representatives A. Avloniy, Behbudiy, H. Hamza, A. Fitrat, A. Qodiriy, and A. Cholpon, national pride, self-awareness, and commitment to truth; and for Muqimiy, Furqat, and Zavqiy, enlightenment and love of the Motherland. These qualities appear as central national and universal human virtues. Through the use of various innovative tools, students become acquainted with a range of national values on the basis of the central idea advanced in a topic, and in this process they are progressively educated in the spirit of the national and universal human values that our people have honored since ancient times. Numerous stories and narratives published in the textbooks Tarbiya (Upbringing) and Mother Tongue and Reading Literacy provide examples of national virtues and help reveal the distinctive humanism, contentment, and generosity of the Uzbek people, thereby facilitating the internalization of these qualities by students. In specialized boarding schools, various methods can similarly be used to cultivate human and national virtues traditionally esteemed by our people. For example, topics in the Tarbiya textbook and specialized subjects such as Fundamentals of Patriotism may be used to instill in students such qualities as humanism, contentment, and patriotism. To reveal the content of national virtues effectively, the following methods are recommended:

- Posing discussion and debate questions
- Case study
- A brief characterization of great historical figures (the definition method), in which students should be able to identify and describe prominent figures in a manner appropriate to their age and cognitive abilities. First, a concise description of the historical figure should be provided. For example, Jalaliddin Manguberdi was a skilled medieval military commander who defended his homeland against the Mongols during his relatively short life, thereby exemplifying fortitude. He was the last sultan of the Khwarazmshahs and was exceptionally determined and strong-willed; in complex situations and severe trials of fate, he did not lose his composure and displayed extraordinary courage and bravery as a commander (al-Nasawi, 1996).

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- Second, the figure's biography should be described in chronological sequence.
- Third, students should discuss the figure's victorious battles, contributions to the history of military art, and heroic struggles, thereby highlighting such qualities as national pride and dignity.
- Fourth, attention should be given to contemporary attitudes toward the great ancestor and to efforts aimed at perpetuating his memory.
- Fifth, the student should present a conclusion enriched by a sense of national identity and spirit. By analyzing the image of each historical figure and the courage demonstrated by that figure, it is possible to foster broader historical thinking in students.
- Assigning a title to a short text
- Reflecting on the central idea advanced in each short text, thereby educating the student in the spirit of national and universal human values.

The "Living History" method is particularly appropriate for use during the reflection stage of a lesson. To interpret historical figures and connect history with lived experience, students receive cards bearing the names of historical personalities and begin to reenact or reconstruct aspects of their life paths. This method differs from conventional role-playing. When textbook passages written in the third person are brought to life, the student represents the historical figure through the first-person pronoun "I." This method significantly supports the development of students' historical imagination and helps them internalize national and universal human virtues by learning from historical figures.

The "10-Second" method belongs to the category of rapid-response methods. At the teacher's instruction, one student from each group comes to the board. The source manuscript ends the procedural description at this point, so no additional steps are supplied here.

In addition, I recommend the following methods within the subject Fundamentals of Patriotism:

Within the topic "The Great Commander Zahiriddin Muhammad Babur":

The "Black Box" method may be used to attract students' attention. Before the new topic begins, a case-based question is presented: "This box contains items that our great ancestor associated with longing for the homeland." Grapes and melon are used as the key objects. Babur's memoir records his strong emotional attachment to the melons and grapes of his homeland, including an episode in which tasting a melon moved him to tears (Babur, 1996, pp. 433–434). Students offer their predictions, and the box is opened at the end of the lesson. This activity is intended to develop students' ability to analyze information, protect themselves from information attacks, focus attention on the topic, and cultivate national and universal human virtues.

Conclusion

In conclusion, it is necessary to strengthen the national and humanistic orientation of the system of continuous education, to improve the content, forms, and methods of education in accordance with new requirements such as quality education, creativity, critical analysis, and logical thinking, and to enhance its practical significance. The effectiveness of extracurricular educational and upbringing activities organized on the basis of national values depends on clearly identifying their defining characteristics and appropriately determining their content, forms, and methods.

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IMPROVING THE METHODOLOGY FOR DEVELOPING STUDENTS' ENVIRONMENTAL ATTITUDES BASED ON THE PROTECTION AND APPRECIATION OF NATURE

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ABSTRACT

This study examines a methodology for developing secondary school students' environmental attitudes through the protection and appreciation of nature. The study argues that environmental education should extend beyond the acquisition of ecological knowledge to include values, responsibility, practical action, and reflection. The methodological framework integrates person-centered, activity-based, axiological, and reflective approaches and employs pedagogical observation, interviews, questionnaires, diagnostics, analysis of environmental situations, practical assignments, experimental testing, and quantitative and qualitative analysis. The proposed methodology consists of five interconnected stages: understanding environmental situations, forming environmental values, participating in practical environmental activities, engaging in collaborative environmental work, and conducting reflective self-assessment. The empirical component involved 950 students, including 476 in the experimental group and 474 in the control group. Initial diagnostics showed broadly comparable baseline distributions: 18.1% of the experimental group and 16.9% of the control group demonstrated a high level of environmental education, while 47.5% and 50.0%, respectively, demonstrated a low level. These baseline findings provide a foundation for subsequent comparison of methodological outcomes. Practical tasks are designed around local environmental problems such as water use, waste sorting, and care for school green spaces. The study proposes a knowledge–values–action–reflection sequence intended to support the transformation of environmental knowledge into responsible environmental behavior.

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Introduction

The increasing complexity of environmental issues necessitates that the shaping of students' attitudes toward nature within the general secondary education system go beyond the mere acquisition of environmental knowledge. The effectiveness of environmental education is determined not only by students' knowledge of nature but also by how that knowledge is expressed in their values, daily behavior, and practical actions. From this perspective, the protection and appreciation of nature can be viewed as a substantive foundation of environmental education. Protecting nature entails acting in accordance with ecological safety and conservation requirements, while appreciating nature involves recognizing it as a

vital value for human life and adopting a responsible attitude toward it. Current UNESCO guidance emphasizes that climate and sustainability education should be action-oriented, holistic, and connected to learners' social-emotional development and practical engagement (UNESCO, 2024a, 2024b). Within Uzbekistan, national education policy and the Uzbekistan–2030 Strategy provide a broader policy context for strengthening education, sustainable development, and environmental awareness (President of the Republic of Uzbekistan, 2023; Republic of Uzbekistan, 2020). Consequently, the core problem of this research is to identify methodological opportunities for environmental education grounded in the protection and appreciation of nature and to strengthen these approaches through a coherent system linked to students' actual environmental activities.

Literature Review

Environmental education and upbringing constitute a scientific field situated at the intersection of pedagogy, ecology, psychology, and education for sustainable development. Research in this area has addressed the relationship between nature and humanity, the integration of environmental knowledge with practical activity, the formation of environmental values, and the development of environmental responsibility. Foundational Uzbek literature has treated environmental education and upbringing as an integrated pedagogical task (Ismoilov & Axadov, 1997). More recent studies have examined the improvement of environmental education in general education schools (Xamrokulova, 2021) and the moral and ethical principles that shape ecological attitudes toward nature (O'rinboyeva, 2020). International scholarship on sustainable education likewise emphasizes the need to reorient learning toward sustainability rather than treat environmental concerns as isolated content (Sterling, 2001).

Modern concepts of environmental education place special emphasis on the student's role as an active participant. In this process, the student is not limited to memorizing established environmental rules; instead, the student observes environmental situations, identifies problems, analyzes causes and consequences, participates in activities aimed at resolving issues, and evaluates personal actions. This orientation is consistent with action-focused approaches to climate and sustainability education (UNESCO, 2024b). For the present study, it supports an integrated framework of knowledge, attitude, activity, and reflection. Recent dissertation activity in Uzbekistan within specialty 13.00.02 also demonstrates continuing attention to methodological improvement and reflective competence in education (Higher Attestation Commission of the Republic of Uzbekistan, n.d.). The scientific focus of this research therefore lies in integrating environmental knowledge, values, practical action, and reflection with the protection and appreciation of nature in general secondary education.

Method

The methodological framework of the study is based on the integration of person-centered, activity-based, axiological, and reflective approaches. The methods employed were (a) pedagogical observation, (b) interviews, (c) questionnaire survey, (d) pedagogical diagnostics, (e) analysis of environmental situations, (f) practical assignments, (g) pedagogical experimental testing, (h) analysis of the results of students' activities, and (i) quantitative and qualitative analysis.

Stage 1: Understanding an Environmental Situation

Students were presented with real-life situations related to the protection of water, air, soil, flora, and fauna. For example: "You have observed inefficient use of water on the school premises. What environmental consequences could this have?" Such an assignment encourages students not to provide a ready-made answer, but rather to identify and understand the problem.

Stage 2: Formation of Environmental Values

After understanding the consequences of an environmental problem, students develop their personal attitudes toward nature. For example: "If every person considers protecting nature to be their personal responsibility, what changes would occur in the environment?" At this stage, particular attention

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is paid to ensuring that environmental protection is not merely perceived as something that is necessary, but is internalized as a personal value.

Stage 3: Practical Environmental Activities

Students carry out practical assignments with an environmental focus, including environmental observations of the school grounds, waste sorting, development of proposals for rational water use, care of trees and plants, preparation of environmental awareness materials, and small-scale projects addressing local environmental problems. This stage is central to the methodology because it enables students to transform knowledge into action.

Stage 4: Collaborative Environmental Activities

Students engage in activities individually, in pairs, in small groups, and as a whole class. Examples include projects such as "Our School's Environmental Map," "One Week for Nature," "Let's Save Water," and "Green Area." Through such activities, students develop responsibility, cooperation, initiative, and the ability to address environmental problems collectively.

Stage 5: Reflective Assessment

At the end of the activities, students are asked to consider questions such as: What did I learn? What environmental problem did I come to understand? What changed in my attitude toward nature? What practical activity did I carry out? What should I improve in my future activities? Thus, in addition to external assessment of their activities, students are given an opportunity for self-analysis and reflection.

Results

A total of 950 students participated in the empirical part of the study. Of these, 476 students constituted the experimental group and 474 students constituted the control group.

Table 1

Distribution of Study Participants by Group

Group	Number of Students	Percentage of Total
Experimental group	476	50.1%
Control group	474	49.9%
Total	950	100%

The results of the initial diagnostic assessment were as follows.

Table 2

Initial Levels of Environmental Education Among Students

Level	Experimental Group	%	Control Group	%
High	86	18.1	80	16.9
Medium	164	34.5	157	33.1
Low	226	47.5	237	50.0
Total	476	100	474	100

Note. Percentages may not total 100 because of rounding.

The initial results indicate that, in the experimental group, 86 students (18.1%) demonstrated a high level, 164 students (34.5%) demonstrated a medium level, and 226 students (47.5%) demonstrated a low level. In the control group, 80 students (16.9%) demonstrated a high level, 157 students (33.1%) demonstrated a medium level, and 237 students (50.0%) demonstrated a low level. These indicators show that the baseline levels of environmental education in the two groups were generally similar. It would not be methodologically appropriate to draw a final conclusion regarding the effectiveness of the methodology at this stage; a comparative analysis with final diagnostic results is required.

Discussion

The theoretical analysis of the research findings demonstrates that assessing the effectiveness of environmental education solely through students' knowledge of environmental terminology is insufficient. For example, a student may know that water should be conserved; however, if the student wastes water in everyday life, this knowledge has not been transformed into behavior. Conversely, when a student values water resources, engages in practical conservation actions, and evaluates personal activity, the substantive components of environmental education become interconnected. Therefore, the developed methodological

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approach is based on the sequence: environmental knowledge → environmental values → environmental action → reflective assessment → environmental behavior.

The distinctive feature of this mechanism is that the outcome of environmental education is explained not merely by the acquisition of knowledge, but by the transformation of knowledge into behavior through values and practical activity. From a methodological perspective, each stage provides the foundation for the subsequent stage.

Table 3

Methodological Stages, Main Content, and Expected Outcomes

Methodological Stage	Main Content	Expected Outcome
Awareness	Identifying an environmental problem	Attention to the problem
Valuing	Understanding the importance of nature in human life	Responsible attitude
Activity	Practical environmental activities	Environmental behavior
Cooperation	Collective environmental activities	Social responsibility
Reflection	Analyzing one's own activities	Self-assessment

This approach makes it possible to organize environmental education not as a separate topic or a one-time activity, but as a systematic methodological process integrated into students' educational and developmental activities.

Conclusion

Based on the theoretical and empirical analyses conducted, improving the methodology of environmental education through students' respect for and care of nature should not be limited to the formation of environmental knowledge alone. The methodological process should connect students' understanding of environmental problems, acceptance of nature as a value, participation in practical environmental activities, and analysis of their own activities. The initial diagnostic results of the 950 participating students provide an empirical basis for determining baseline levels of environmental education and for conducting a comparative assessment during the subsequent experimental stage.

The findings support systematically incorporating local environmental problems into environmental education, involving students in the analysis of real-life environmental situations, increasing practical nature-conservation assignments, combining individual and collaborative environmental projects, concluding activities with reflective questions and self-assessment, and assessing outcomes in terms of changes in knowledge, attitudes, activities, and behavior. Thus, environmental education based on the protection and appreciation of nature can be organized as a consistent pedagogical mechanism leading students from environmental knowledge toward practical activity and responsible behavior.

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THEORETICAL AND PEDAGOGICAL FOUNDATIONS FOR DEVELOPING STUDENTS' AESTHETIC-CULTURAL COMPETENCE

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ABSTRACT

This theoretical article examines the development of aesthetic-cultural competence among university students and clarifies its role within holistic professional preparation. Drawing on competence-based, person-centered, experiential, artistic-educational, and caring pedagogical perspectives, the paper conceptualizes aesthetic-cultural competence as an integrated capacity to perceive and evaluate beauty, understand national and world cultural values, apply aesthetic knowledge in creative and professional activity, and reflect on one's own aesthetic development. The analysis organizes the construct into four interdependent components: cognitive, emotional-evaluative, activity-creative, and reflexive. It further proposes three developmental levels—high, medium, and low—and identifies pedagogical conditions that can support competence formation, including curriculum integration, creative tasks, supportive teacher-student relationships, engagement with cultural institutions, and systematic reflection. The revised framework emphasizes that aesthetic development should not be treated as an extracurricular supplement but as a dimension of students' intellectual, emotional, creative, and professional formation. Because the study is conceptual rather than empirical, the proposed components and indicators should be understood as a theoretically grounded framework requiring subsequent validation through diagnostic instruments and experimental research. Implications for higher education practice and directions for future research are discussed.

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Keywords: *aesthetic education, aesthetic-cultural competence, cultural competence, higher education, aesthetic taste, creative activity, pedagogical conditions.*

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Introduction

Higher education is responsible not only for transmitting specialized knowledge but also for supporting the broader intellectual, ethical, cultural, and creative development of future professionals. Within this broader mission, aesthetic education has particular importance because it concerns how individuals perceive, interpret, value, and create forms of beauty in art, culture, everyday life, and professional practice. An aesthetically developed student is better positioned to approach cultural phenomena thoughtfully, distinguish meaningful artistic and cultural values, organize environments with sensitivity, and express ideas creatively. These capacities contribute to personal culture and may enrich professional judgment in fields where communication, design, human relationships, and cultural awareness are important.

The need to develop aesthetic-cultural competence is especially relevant when higher education becomes narrowly centered on technical outcomes. Professional knowledge and practical skills are

indispensable, yet a curriculum that gives insufficient attention to cultural experience, aesthetic judgment, creativity, and reflection can limit the formation of a well-rounded specialist. The challenge, therefore, is not to place aesthetic education in competition with professional preparation, but to integrate it into the educational process so that students learn to connect knowledge, feeling, judgment, creativity, and self-development.

Classical and contemporary pedagogical perspectives provide a foundation for such integration. Dewey (1934/1991) treated aesthetic experience as closely connected with active experience rather than as a passive encounter with art. Read (1943) argued for education through art as a means of developing the whole person. In a complementary relational perspective, Noddings (2021) emphasized care, attentiveness, and supportive educational relationships. Together, these perspectives suggest that aesthetic development is strengthened when students encounter culture actively, experience emotionally meaningful learning, create rather than merely reproduce, and reflect within a respectful educational environment.

This article aims to systematize the theoretical and pedagogical foundations of students' aesthetic-cultural competence in higher education. Specifically, it clarifies the concept, describes its structural components and developmental levels, identifies pedagogical conditions for its formation, and outlines implications for curriculum and future empirical research. The central argument is that aesthetic-cultural competence should be understood as an integrated educational outcome rather than as a collection of isolated artistic interests.

Theoretical Background

Aesthetic Education and Holistic Development

Aesthetic education has historically been associated with the development of perception, taste, imagination, and the capacity to respond to artistic and cultural forms. Dewey's (1934/1991) experiential perspective is particularly useful for higher education because it shifts attention from simply knowing about art to having meaningful experiences through observation, interpretation, participation, and creation. From this standpoint, aesthetic learning is not complete when students memorize concepts; it becomes educationally significant when knowledge is connected to lived experience and purposeful activity.

Read (1943) likewise positioned art as a formative educational force. His approach supports the idea that artistic engagement can contribute to integrated personal development by connecting perception, emotion, expression, and creativity. For university students, this principle can be extended beyond formal arts courses. Aesthetic sensitivity may be cultivated through the design of learning environments, analysis of cultural artifacts, project work, public presentations, creative problem solving, and encounters with museums, theaters, exhibitions, architecture, literature, music, and other forms of cultural expression.

A relational dimension is also necessary. Noddings (2021) emphasized the importance of caring educational relationships in supporting learners' emotional and personal development. Aesthetic response is partly affective: students need opportunities to express interpretations, preferences, uncertainty, and personal reactions without reducing aesthetic judgment to a single predetermined answer. A respectful teacher-student relationship can create the psychological conditions in which students are willing to explore unfamiliar cultural forms, discuss competing interpretations, and develop confidence in creative activity.

Aesthetic-Cultural Competence as a Pedagogical Construct

In the present framework, aesthetic-cultural competence is defined as an integrated capacity to perceive beauty, make reasoned aesthetic evaluations, understand national and world cultural values, apply aesthetic knowledge and sensitivity in practical and creative activity, and reflect on one's own aesthetic experience and development. This definition combines knowledge, affect, action, and self-regulation. It therefore moves beyond an understanding of aesthetic education as simple exposure to works of art.

The competence-based approach is useful because competence implies the mobilization of knowledge, attitudes, skills, and judgment in meaningful contexts. Pedagogical technology literature

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similarly emphasizes purposeful organization of learning activities and outcomes (Tolipov & Usmonboyeva, 2006), while general pedagogical and psychological perspectives highlight the importance of considering the learner as a developing person rather than only as a recipient of information (Karimova, 2017; Munavvarov, 2019). Accordingly, aesthetic-cultural competence can be treated as a multidimensional outcome that develops through coordinated educational experiences.

Method

This study uses a theoretical-conceptual methodology. The analysis is based on the study and generalization of pedagogical literature, comparative analysis, abstraction, and a systemic-structural approach. The competence-based approach and person-centered educational principles serve as organizing perspectives for distinguishing the internal structure of aesthetic-cultural competence. The purpose is not to estimate prevalence, test causal relationships, or report statistical differences among students. Instead, the study develops a conceptual model that can guide subsequent curriculum design, observation, assessment, and empirical validation.

The analytical procedure consisted of three related tasks. First, the concept of aesthetic-cultural competence was clarified by identifying the capacities that recur across experiential, artistic-educational, relational, and competence-oriented perspectives. Second, these capacities were organized into components that represent distinguishable but interconnected dimensions of development. Third, observable indicators and broad developmental levels were formulated to make the conceptual model pedagogically usable. The resulting framework should therefore be interpreted as a theoretically derived structure rather than as a validated measurement scale.

Analysis and Results

Structural Components of Aesthetic-Cultural Competence

The analysis identifies four interdependent components: cognitive, emotional-evaluative, activity-creative, and reflexive. The cognitive component concerns knowledge of aesthetic concepts, art forms, and national and world culture, together with the ability to interpret aesthetic phenomena. The emotional-evaluative component concerns sensitivity to beauty, aesthetic taste, emotional responsiveness, and the ability to form and justify aesthetic evaluations. The activity-creative component concerns the practical use of aesthetic knowledge in creative, professional, and social contexts. Finally, the reflexive component concerns awareness of one's own aesthetic experience, self-evaluation, and an orientation toward continuing aesthetic self-development. Table 1 summarizes the core content and illustrative indicators associated with each component.

Table 1

Structural Components and Indicators of Students' Aesthetic-Cultural Competence

Component	Core content	Illustrative indicators
Cognitive	Knowledge of aesthetic theory, forms of art, and national and world culture	Knowledge of concepts; analysis of cultural/artistic material; interpretation of aesthetic phenomena
Emotional-evaluative	Sensitivity to beauty, aesthetic taste, and emotional response to art and culture	Reasoned aesthetic evaluation; discrimination among aesthetic qualities; articulated emotional response
Activity-creative	Application of aesthetic knowledge in practical, professional, and social activity	Creative assignments; aesthetic organization of surroundings; participation in cultural or creative activity
Reflexive	Awareness of personal aesthetic experience, self-evaluation, and self-improvement	Analysis of personal taste and activity; recognition of developmental needs; pursuit of aesthetic self-development

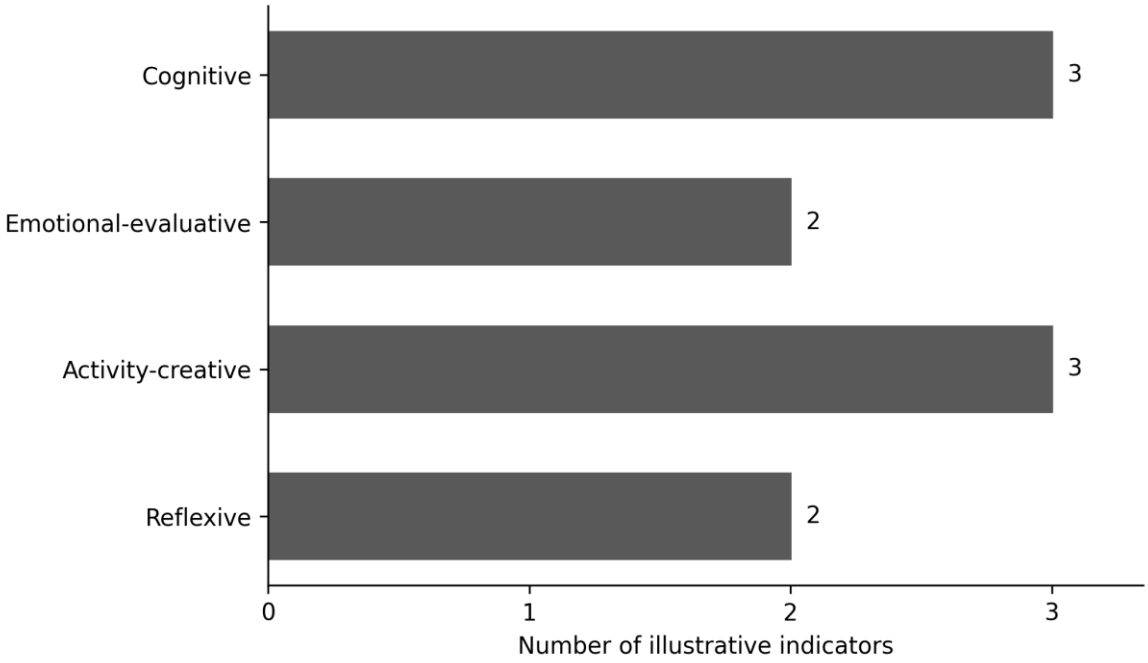
Note. The indicators are conceptual descriptors for pedagogical observation and future instrument development; they are not validated scale items.

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The four components should not be treated as independent compartments. Knowledge can inform aesthetic judgment, but knowledge without emotional engagement may remain abstract. Emotional response can motivate participation, but response without conceptual understanding may be difficult to articulate or evaluate. Creative activity gives visible form to knowledge and feeling, while reflection enables students to examine the quality of their choices and establish goals for further development. The activity-creative component is especially important because it makes competence observable in practice; however, the model assumes that sustained competence depends on interaction among all four dimensions. Figure 1 displays the number of illustrative indicators specified for each component; the counts are descriptive and do not imply differential importance.

Figure 1

Distribution of Illustrative Indicators Across the Four-Component Conceptual Framework



Note. Counts represent the number of illustrative indicators explicitly specified for each component in the conceptual framework (3, 2, 3, and 2, respectively). The chart does not represent empirical scores, weights, or relative importance.

Levels of Formation

For pedagogical purposes, the framework distinguishes high, medium, and low levels of formation. These levels are intended to summarize patterns across the four components rather than to assign students fixed labels. At a high level, aesthetic knowledge is systematic, interpretation is relatively independent, creative participation is active, and reflection guides self-improvement. At a medium level, students demonstrate basic conceptual knowledge and interest but require support in analysis, creative application, or reflective evaluation. At a low level, knowledge is fragmentary, interest and participation are unstable, and students have difficulty using aesthetic concepts or reflecting on their own development. Table 2 summarizes these conceptual levels.

Table 2

Conceptual Levels of Aesthetic-Cultural Competence

Level	Conceptual description
High	Systematic aesthetic knowledge; independent interpretation and evaluation; active creative participation; purposeful reflection and self-development.
Medium	Basic aesthetic knowledge and interest; partial analytical independence; creative participation with guidance; emerging reflection.
Low	Fragmentary knowledge; limited or unstable engagement; passive creative participation; weak capacity for aesthetic analysis and reflection.

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Note. The levels are proposed for formative pedagogical use and require empirical validation before use as a standardized assessment classification.

Pedagogical Conditions for Development

The effective development of aesthetic-cultural competence requires a coherent system of pedagogical conditions. The first condition is curricular integration. Aesthetic and cultural content should be connected with disciplinary learning through interpretive tasks, case analysis, design choices, presentations, creative projects, and independent work. Integration is preferable to occasional isolated events because competence develops through repeated opportunities to connect concepts with judgment and action.

The second condition is active and creative learning. Dewey's (1934/1991) emphasis on experience and Read's (1943) educational use of art both support learning environments in which students observe, discuss, produce, revise, and present. Creative assignments may include visual or verbal interpretation, exhibition projects, reflective portfolios, culturally informed design, performance, or the aesthetic organization of educational spaces. The specific form should correspond to the academic discipline while preserving opportunities for choice, imagination, and meaningful production.

The third condition is a caring and dialogic pedagogical relationship. Noddings (2021) provides a basis for viewing attentiveness and respect as educational conditions rather than merely interpersonal preferences. Teachers can support aesthetic development by inviting multiple interpretations, asking students to justify judgments, responding constructively to creative risk, and creating space for individual cultural experience. Such practices are particularly important when aesthetic preferences differ or when students encounter unfamiliar cultural traditions.

The fourth condition is sustained engagement with cultural environments. Museums, theaters, exhibitions, libraries, cultural centers, public architecture, and community events can extend aesthetic learning beyond the classroom. These experiences are most educationally valuable when they include preparation and follow-up: students can investigate context before a visit, document observations during the experience, and analyze or create responses afterward. In this way, cultural participation becomes part of a learning cycle rather than an isolated excursion.

The fifth condition is systematic reflection and formative observation. Students should be encouraged to examine how their aesthetic preferences change, how they justify evaluations, what cultural forms they understand well or poorly, and how aesthetic considerations influence their creative and professional choices. Teachers can use journals, portfolios, self-assessment prompts, peer discussion, and observation rubrics to document development. Because the present framework is conceptual, these tools should initially be used formatively and refined through research rather than treated as standardized diagnostic measures.

Discussion

The proposed framework contributes to the conceptualization of aesthetic education in higher education by linking four domains that are sometimes addressed separately. Its principal implication is that aesthetic-cultural competence cannot be reduced to factual cultural knowledge or participation in artistic events. A student may know terminology without demonstrating aesthetic judgment, or may enjoy cultural activities without being able to interpret them critically. Competence requires coordination among knowing, feeling and evaluating, creating and acting, and reflecting.

This integrated view also has implications for professional education. Aesthetic-cultural competence need not be limited to students specializing in the arts. In many professions, practitioners communicate ideas, design materials or environments, interact with culturally diverse people, and make judgments about form, appropriateness, expression, and meaning. Embedding aesthetic-cultural tasks within disciplinary contexts may therefore strengthen the humanistic dimension of professional preparation while preserving relevance to students' fields of study.

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At the same time, the framework has clear limitations. The proposed components, indicators, and levels are derived from theoretical analysis and have not been tested for reliability, validity, developmental sequence, or sensitivity to cultural and disciplinary differences. The number of indicators displayed in Figure 1 reflects only the descriptive structure of the framework and must not be interpreted as evidence that some components are more important than others. Future research should operationalize each component carefully, seek expert review, pilot diagnostic instruments, and examine whether the four-component structure is supported by empirical data.

Implications for Practice and Future Research

For practice, universities can begin by auditing where aesthetic-cultural development already occurs in curricula and where it is absent. Programs can then identify discipline-appropriate opportunities for cultural interpretation, creative production, reflection, and engagement with cultural institutions. Faculty development may also be necessary so that instructors can facilitate aesthetic dialogue and assess creative work without relying solely on subjective preference. Assessment should emphasize transparent criteria, evidence of reasoning, growth over time, and reflective explanation.

Future empirical research should proceed in stages. First, the conceptual indicators can be refined through expert review and student interviews. Second, researchers can develop observable descriptors or questionnaire items for each component and test their clarity. Third, pilot studies can examine internal consistency and relationships among components, while qualitative work can investigate how students experience aesthetic-cultural development in different disciplines. Finally, intervention studies can compare pedagogical strategies such as project-based creative work, museum-based learning, reflective portfolios, and culturally responsive discussion. Such research would move the framework from theoretical systematization toward evidence-based pedagogical technology.

Conclusion

Aesthetic-cultural competence is an important dimension of the holistic preparation of university students. The theoretical analysis presented here defines it as an integrated capacity involving cultural and aesthetic knowledge, emotional-evaluative sensitivity, creative application, and reflective self-development. These dimensions are mutually reinforcing and should be cultivated through coordinated educational experiences rather than isolated activities.

The proposed pedagogical conditions include curricular integration of aesthetic content, active creative tasks, caring and dialogic teacher-student relationships, engagement with cultural institutions, and systematic reflection. Together, these conditions provide a practical direction for universities seeking to strengthen students' aesthetic and cultural development. However, the framework remains conceptual. Its components, indicators, and developmental levels should next be subjected to empirical validation and adapted carefully to disciplinary and cultural contexts. Such work can help establish aesthetic-cultural competence as a measurable, teachable, and professionally relevant outcome of higher education.

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THEORETICAL AND PEDAGOGICAL FOUNDATIONS FOR DEVELOPING STUDENTS' AESTHETIC-CULTURAL COMPETENCE

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ABSTRACT

This article proposes a strengthened methodological framework for developing students' intellectual and prognostic potential in chemistry education. Intellectual-prognostic potential is defined as an integrated capacity to analyze chemical phenomena, identify causal and periodic patterns, formulate evidence-based predictions, justify assumptions, and revise forecasts in response to experimental or theoretical evidence. The framework builds on competency-based chemistry teaching and combines problem-based learning, inquiry, laboratory work, modeling, scientific argumentation, and structured forecasting tasks. Particular attention is given to the transition among macroscopic observations, submicroscopic explanations, and symbolic representations, because meaningful prediction in chemistry depends on coordinating these levels. A classroom application based on halogen chemistry illustrates how students can predict trends in reactivity, anticipate consequences of chemical use, and explain the exothermic formation of hydrogen chloride using bond-energy reasoning. The paper also proposes assessment indicators for evaluating the quality of students' predictions, including conceptual accuracy, use of evidence, causal reasoning, and reflection on uncertainty. The approach is intended to move learners beyond reproduction of factual knowledge toward scientifically justified anticipation and decision-making. It can be integrated into introductory, reinforcement, laboratory, and assessment stages of chemistry lessons and provides a basis for future empirical evaluation in secondary and pre-university chemistry education.

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Keywords: *chemistry education; prognostic thinking; intellectual potential; inquiry-based learning; problem-based learning; scientific reasoning.*

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1. Introduction

Contemporary chemistry education is expected to develop more than knowledge of facts, formulas, and reaction equations. Students must learn to interpret evidence, recognize relationships, solve unfamiliar problems, and make reasoned judgments about what may occur under specified conditions. The original methodological position of this paper is that pedagogical forecasting should be treated not only as a teacher's activity for anticipating educational outcomes, but also as a student competence that can be intentionally developed through chemistry learning (Atabayeva, 2024; Baydulloev, 2010). In this sense, prediction becomes an intellectual operation through which learners connect prior knowledge with observable conditions and justify an expected result.

Chemistry is particularly suitable for developing such competence. Chemical reasoning requires students to move between observable phenomena, particle-level mechanisms, and symbolic

representations. The chemistry triplet framework helps explain why students often struggle when macroscopic, submicroscopic, and symbolic levels are presented without explicit connections (Taber, 2013). Predictive tasks can provide those connections: a learner observes or is given a chemical situation, identifies relevant structural or periodic principles, represents the process symbolically, and predicts a plausible outcome.

This orientation is consistent with broader science-education frameworks that emphasize scientific practices, explanation, modeling, argument from evidence, and the integration of knowledge with practice (National Research Council, 2012). It is also compatible with research on problem-based and inductive teaching, which positions learners as active interpreters and problem solvers rather than passive recipients of information (Hmelo-Silver, 2004; Prince & Felder, 2006). Accordingly, the purpose of this paper is to refine a methodological framework for developing students' intellectual-prognostic potential in chemistry lessons, clarify the competencies involved, and demonstrate how the framework can be applied through forecasting questions, laboratory reasoning, and the topic of halogens.

2. Conceptual Basis of Intellectual-Prognostic Potential

In this paper, intellectual potential refers to the learner's capacity to perform purposeful mental activity: to compare, classify, analyze, generalize, solve problems, create explanations, and understand relationships. Prognostic potential is the capacity to anticipate future states or outcomes on the basis of available evidence, established regularities, and scientifically defensible assumptions. Their integration produces intellectual-prognostic potential: the ability to construct a justified forecast rather than merely guess what will happen.

Four interrelated processes are central to this construct. First, students must diagnose the present situation by identifying relevant variables and chemical conditions. Second, they must select a principle or model capable of explaining those variables. Third, they must project the likely direction of change and formulate a prediction. Fourth, they must evaluate the prediction against evidence, alternative explanations, or experimental results. Prediction and explanation therefore should not be treated as identical. As Gil and Paiva (2010) note, a successful prediction is not by itself a complete explanation; students should also understand why a model supports the predicted outcome.

This distinction has important pedagogical consequences. A question such as 'What happens to halogen reactivity down Group 17?' assesses more than recall when students are required to connect atomic radius, electron shielding, attraction for an incoming electron, and oxidizing ability. Similarly, asking students to predict the thermal effect of a reaction becomes intellectually productive only when the forecast is linked to bond breaking and bond formation. Such tasks integrate chemical content with causal reasoning.

The development of this potential should be continuous rather than episodic. It requires instructional programs that repeatedly expose learners to situations in which they must anticipate, justify, test, and revise ideas. The original article identified improvement of teaching technologies, systematic attention to students' interests, development of independent learning, and interactive methods as important factors (Atabayeva, 2024; Baydulloev, 2010; Rogozhin, 2006; Tolipov & Usmonboeva, 2006). These factors can be strengthened by current research emphasizing inquiry cycles, problem solving, laboratory reasoning, modeling, and scientific argumentation (Hmelo-Silver, 2004; Hofstein & Lunetta, 2004; Osborne, 2010; Pedaste et al., 2015).

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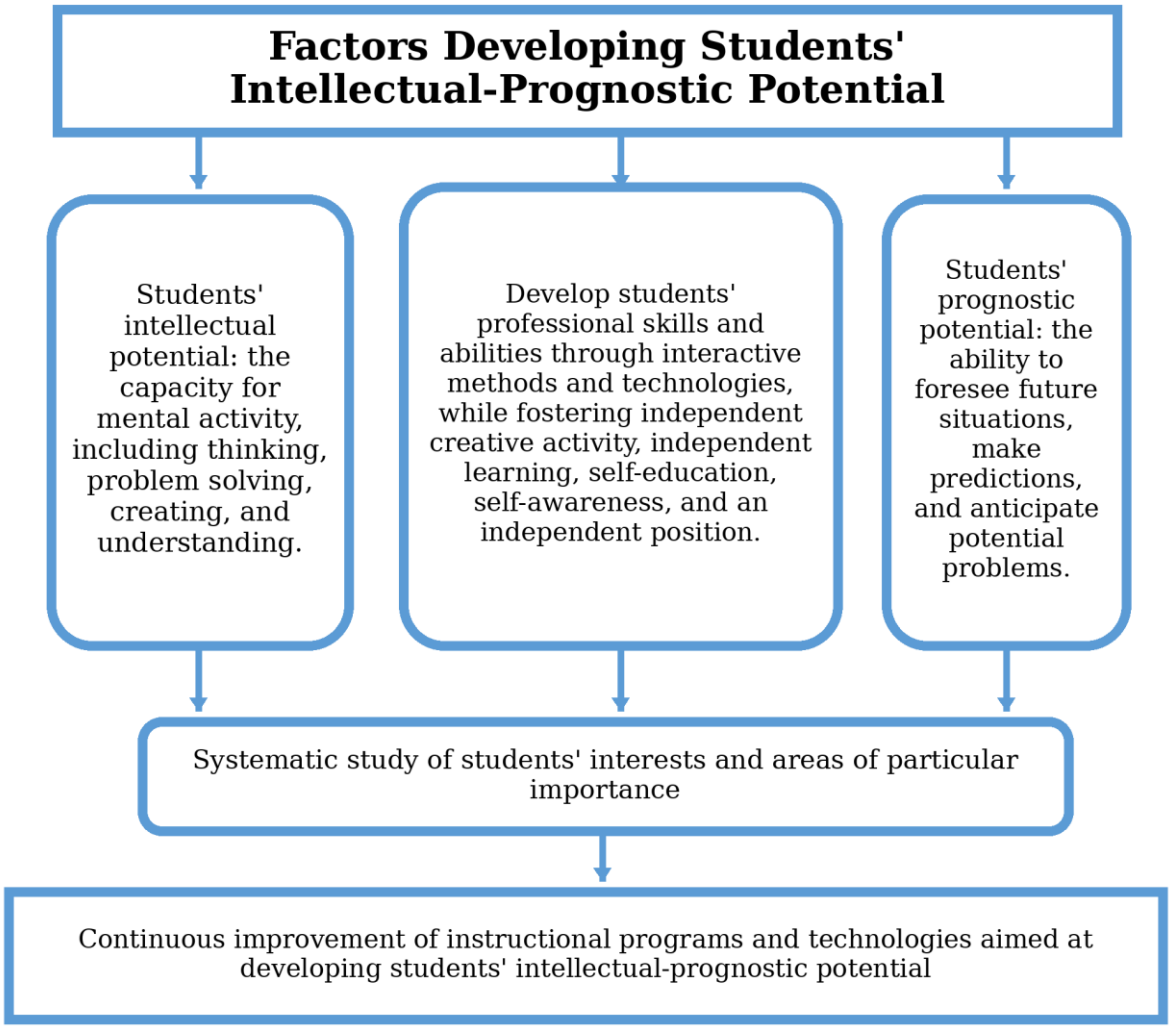


Figure 1. Factors developing students' intellectual-prognostic potential

3. Methodological Framework and Target Competencies

The proposed framework organizes chemistry learning around five competency domains derived from the original paper: observing chemical processes and phenomena; understanding and explaining them; expressing elements, formulas, and processes in chemical language; working with substances and equipment and conducting experiments; and applying chemical knowledge in practical contexts. Each domain can be redesigned to include a prognostic component.

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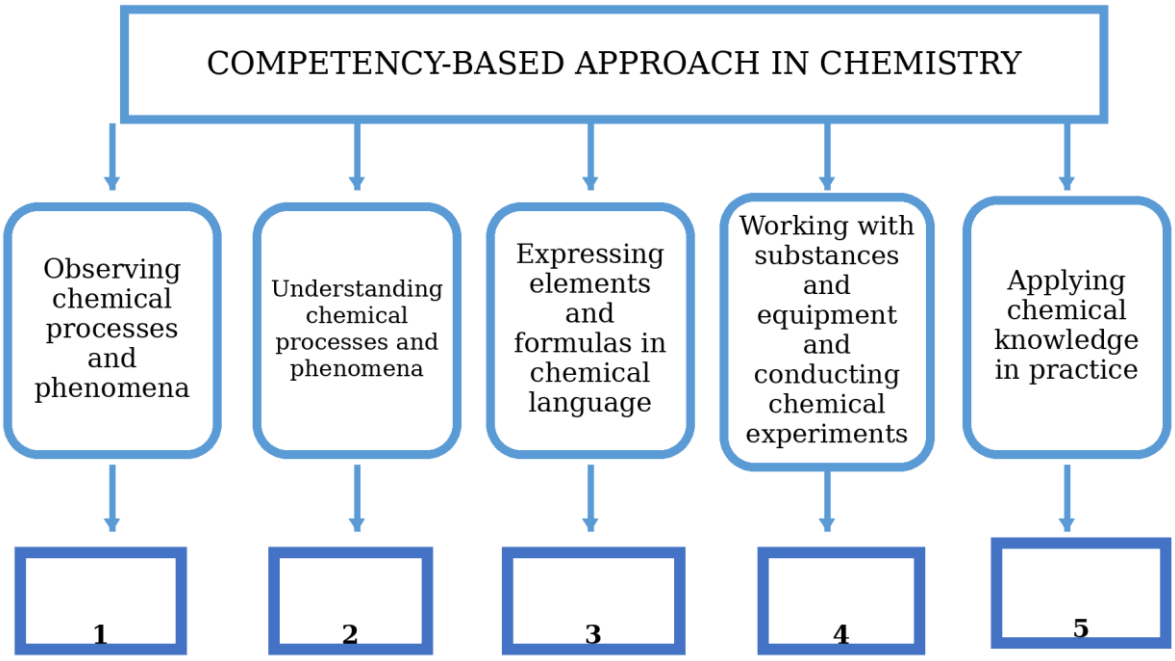


Figure 2. Competencies developed through the study of chemistry topics

Observation should move from description to anticipation. Before a demonstration, students may predict changes in color, state, temperature, gas evolution, or precipitate formation and identify the evidence that would confirm or challenge the forecast. Explanation should require students to state causal links and distinguish observation from inference. Symbolic competence should include predicting formulas, products, stoichiometric relationships, or trends before completing calculations. Experimental competence should include planning, selecting appropriate evidence, anticipating sources of error, and comparing expected and observed results. Practical application should require learners to evaluate likely consequences of chemical processes in health, environmental, industrial, and everyday contexts.

Table 1. Competency-based framework for developing prognostic reasoning

Competency domain	Prognostic expression	Illustrative prompt
Observation	Anticipates observable evidence before a process or demonstration	What change should be observed, and which observation would contradict your prediction?
Explanation	Uses causal relationships and chemical models to justify an expected outcome	Why should the predicted change occur at the particle level?
Chemical language	Uses formulas, equations, symbols, and quantities to project an outcome	Which product, coefficient, trend, or quantitative result is expected?
Experimentation	Plans evidence collection and compares expected with observed results	What should the data show if the hypothesis is correct?
Practical application	Evaluates likely consequences in realistic contexts	What chemical consequences may follow if this condition or practice changes?

This framework is consistent with inquiry-based learning, in which orientation and conceptualization lead to investigation, conclusion, and discussion (Pedaste et al., 2015). It also reflects the value of laboratory work when practical activity is connected to conceptual questions rather than

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reduced to following procedures (Hofstein & Lunetta, 2004). Because chemistry knowledge is represented at several levels, forecasting tasks should deliberately connect the macroscopic, submicroscopic, and symbolic domains (Taber, 2013). For example, students may predict a visible change, explain it through particle interactions, and represent it with an equation.

The content of these competencies may be operationalized through the kinds of tasks identified in the original paper. Observation can include changes of state, combustion, dissolution, diffusion, evaporation, recrystallization, sublimation, boiling, solidification, separation, purification, and filtration. Conceptual understanding includes the law of conservation of mass, constant composition, equivalents, periodicity, and dissociation. Symbolic work includes reaction equations, coefficients, valency, molecular and structural formulas, units, and quantitative problem solving. Practical competence includes purposeful selection and use of laboratory glassware and measuring instruments, recording observations, and drawing conclusions. Everyday application includes interpreting chemical knowledge in water treatment, cleaning, food-related contexts, and safe handling of substances. When these familiar curriculum elements are paired with 'what do you expect and why?' questions, routine content becomes a vehicle for higher-order reasoning. The learner is required to move from recognition to projection: from identifying a law to using it to anticipate an outcome, from naming equipment to justifying its selection, and from performing a procedure to predicting the consequences of changing a variable.

The approach is methodological rather than experimental. It synthesizes the conceptual positions and teaching examples of the original article with established literature on active, inquiry-oriented chemistry education. No new student sample, intervention data, or statistical results are claimed. Consequently, the framework should be regarded as a theoretically grounded instructional model that requires subsequent classroom validation through pre/post measures, observation, student work, and teacher reflection.

4. Instructional Strategies for Developing Prognostic Thinking

Several teaching strategies can make prediction a routine part of chemistry learning. Problem-based learning is useful because it begins with a meaningful problem that cannot be solved by simple reproduction of a memorized statement. Students identify what they know, determine what additional information is required, propose solutions, and reflect on the reasoning used (Hmelo-Silver, 2004). In chemistry, a problem may ask students to anticipate which conditions will increase reaction rate, how a change in equilibrium conditions will affect composition, or what chemical risks may follow from an inappropriate use of a substance.

Inquiry-based instruction strengthens this process by placing predictions before investigation. Students formulate a hypothesis or expected result, collect evidence, and then compare the observation with the original forecast. The value of the laboratory is therefore not merely manipulative; it lies in coordinating action, evidence, interpretation, and explanation (Hofstein & Lunetta, 2004). Research on guided inquiry with writing and reflection also indicates that structured inquiry can support critical-thinking performance in chemistry students (Gupta et al., 2015).

Modeling is equally important. Students should be encouraged to use particle diagrams, energy profiles, structural formulas, periodic trends, and mathematical relationships as tools for forecasting. A model is educationally productive when students can state what it predicts, identify the assumptions on which the prediction depends, and recognize conditions under which the model may be insufficient. This approach reduces the risk of treating formulas as isolated symbols and helps create coherence across chemistry topics (Taber, 2013).

Scientific argumentation adds a further quality criterion. A forecast should be presented as a claim supported by evidence and reasoning. Collaborative discussion allows students to compare alternative forecasts and evaluate which is better supported. Osborne (2010) emphasizes the role of critical discourse in learning science, while Walker and Sampson (2013) show that sustained engagement with claims and

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evidence in argument-driven chemistry inquiry can improve the quality of students' written and oral arguments.

The 'Mass Brainstorming' method described in the original article can be retained as a structured collaborative technique. Small groups receive a problem or forecasting task, generate possible outcomes within a limited period, select the most defensible forecast, and present their justification. The teacher then guides comparison among groups. Used at the beginning of a lesson, the method reveals prior conceptions; used during transition to a new topic, it activates transfer; used after instruction, it supports consolidation and application. Its educational value increases when students are required not only to produce many ideas but also to rank them according to chemical evidence and explain uncertainty.

Digital tools can support the same objective when they are used to make reasoning visible rather than to replace it. Interactive simulations, molecular visualizations, and graphing environments allow students to vary one condition, record a forecast, observe the modeled response, and explain discrepancies. A useful sequence is predict-observe-explain-revise: students commit to an initial expectation, encounter evidence, construct an explanation, and then refine the original model. This sequence is especially valuable for processes that are too rapid, microscopic, hazardous, or experimentally inaccessible in an ordinary classroom. The teacher's role is to ensure that technological visualization remains connected to chemical principles and that students distinguish a model-generated result from direct empirical observation.

5. Application to Halogen Chemistry

The halogens provide a productive context for intellectual-prognostic tasks because their properties display recognizable periodic trends and their compounds have important practical consequences. Instead of presenting fluorine, chlorine, bromine, iodine, and astatine as a list of facts, the teacher can organize learning around questions that require students to infer trends and anticipate outcomes.

A first task may ask: 'As atomic radius increases down Group 17, how should the chemical reactivity of the halogens change, and why?' Students can be guided to connect increasing electron-shell number and shielding with a weaker attraction for an incoming electron. From this reasoning, they predict that the oxidizing reactivity of the elemental halogens generally decreases down the group. A second task may ask learners to anticipate the consequences of omitting a disinfection step in drinking-water treatment. The purpose is not to memorize a single response but to identify a chain of cause and effect: altered control of microorganisms may change public-health risk, while treatment decisions must also consider chemical dose, by-products, and local standards. Similar questions can address prolonged iodine deficiency, environmental consequences of misuse of halogen-containing substances, or changes in physical state and color down the group. In each case, the teacher should require students to identify the evidence or principle underlying the forecast.

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Figure 3. Selected nonmetals in different physical forms (adapted from the original manuscript).

A second example concerns the reaction shown below. The original article uses this reaction to teach students to predict an exothermic outcome. Using approximate bond energies, breaking H-H and Cl-Cl bonds requires about 436 + 243 = 679 kJ mol-1, whereas forming two H-Cl bonds releases about 862 kJ mol-1. The estimated enthalpy change is therefore approximately -183 kJ mol-1.

$$Cl_2 + H_2 \rightarrow 2HCl$$

Estimated enthalpy change: $\Delta H \approx 679 - 862 = -183$ kJ mol^{-1}

The negative value supports the prediction that the reaction releases heat. The intellectual objective is not the numerical result alone. Students should articulate the causal structure: energy is required to break reactant bonds; energy is released when product bonds form; because the energy released is greater than the energy absorbed, the overall reaction is exothermic. This example also illustrates the difference between prediction and explanation emphasized in chemistry-education literature (Gil & Paiva, 2010).

For classroom use, the reaction should be treated through calculation, simulation, teacher-managed demonstration, or appropriately controlled resources rather than unsupervised mixing of reactive gases. Students can then extend the reasoning by asking how bond energies, light initiation, concentration, or reaction conditions might affect what is observed. Such extensions turn a familiar equation into a platform for forecasting, evidence-based explanation, and transfer.

6. Assessment and Pedagogical Implications

Assessment should measure the quality of reasoning, not only whether a forecast happens to be correct. Four indicators are especially useful: conceptual accuracy, relevance of evidence, explicit causal reasoning, and reflective evaluation of uncertainty. A high-quality response identifies the governing chemical principle, uses appropriate data or representations, explains the mechanism linking cause to outcome, and states the limits of the prediction. This approach prevents lucky guesses from being rewarded as equivalent to scientific reasoning.

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Table 2. Suggested criteria for assessing prognostic reasoning

Criterion	What to look for	High-quality performance
Conceptual accuracy	Correct chemistry principle or model	Uses the appropriate law, trend, structure, or energy concept without contradiction.
Evidence	Relevant observations, data, or representations	Selects evidence that directly supports the forecast and distinguishes evidence from assertion.
Causal reasoning	Explicit link from condition to outcome	Explains how and why the identified factor produces the predicted change.
Uncertainty and revision	Awareness of assumptions and alternatives	States limits, considers competing outcomes, and revises the forecast when evidence requires it.

Teachers can collect evidence through short prediction prompts, laboratory pre-questions, concept maps, written claim-evidence-reasoning responses, group discussions, and reflective comparisons between predicted and observed results. Inductive teaching research suggests that students benefit when problems or observations create a need for the concepts that follow (Prince & Felder, 2006). The National Research Council (2012) similarly emphasizes integrating disciplinary knowledge with scientific practices rather than teaching them separately.

For implementation, forecasting tasks should increase gradually in complexity. Early tasks may involve a single trend or variable; later tasks can involve competing factors, incomplete evidence, or several plausible outcomes. Feedback should address not only the final answer but also the reasoning path. In this way, prognostic competence becomes part of normal chemistry learning rather than an occasional enrichment activity.

7. Conclusion

Developing intellectual-prognostic potential gives chemistry education a forward-looking and reasoning-centered orientation. Students learn not only to state what is known, but also to use chemical principles to anticipate what is likely to occur, justify that anticipation, test it against evidence, and revise it when necessary. Problem-based learning, inquiry, laboratory activity, modeling, brainstorming, and scientific argumentation can all contribute when prediction is explicitly built into the task structure.

The proposed framework preserves the competency-based emphasis of the original study while strengthening its theoretical grounding and assessment logic. Its principal limitation is that it remains a methodological model rather than a tested intervention. Future research should examine its effects on students' prediction accuracy, causal reasoning, argument quality, transfer of knowledge, and independent decision-making across different chemistry topics and educational levels.

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A TECHNOLOGY FOR ORGANIZING TEACHERS' CONTINUOUS PROFESSIONAL DEVELOPMENT THROUGH THE USTOZQANOT PLATFORM

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ABSTRACT
This study examines the pedagogical potential, methodological structure, and implementation of the UstozQanot digital platform for supporting teachers' continuous professional development through professional learning networks. The platform was designed to connect teachers' identified professional needs with collaborative learning, resource development, classroom application, reflection, and outcome monitoring. Its content structure was informed by a needs survey of 370 teachers, which identified demand for lesson plans and teaching resources, visual materials, tests, interactive tasks, and platform features such as gamification, test creation, and methodological support. Based on these findings, the authors propose a six-stage professional development cycle: identifying professional needs, selecting needs-based methodological materials, engaging in network collaboration, conducting practical testing, reflecting on professional practice, and monitoring outcomes. Within this cycle, teachers collaboratively develop and peer-review instructional resources, test them in authentic classroom settings, collect evidence of their effectiveness, and refine them in response to results and collegial feedback. Outcome monitoring then informs a new needs assessment, allowing professional learning to continue as a recurring process. The proposed technology positions the platform as an integrated environment for collaborative, practice-oriented, evidence-based professional growth across schools and subject areas. This cyclical design is intended to sustain professional learning while keeping development closely connected to teachers' classroom needs.

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Keywords: *continuous professional development, professional learning networks, UstozQanot, digital platform, network collaboration, instructional resources.*

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Introduction

Frequent updates to educational content, the introduction of innovations in education—including digital and artificial intelligence tools—the increasingly individualized needs of learners, and requirements related to performance in international assessment programs necessitate moving teachers' continuous professional development beyond periodic training courses and organizing everyday professional practice

as an ongoing process of professional growth. Across the global educational landscape, particular emphasis is placed on integrating various forms of learning, developing professional learning communities and professional learning networks, using open educational resources, exchanging experiences, and supporting reflective practice to ensure teachers' continuous professional development. Research on teacher professional development indicates that, alongside the effective use of digital educational tools, developing technologies that enable teachers to become active participants who collaboratively create, test, evaluate, and disseminate professional knowledge is a pressing international research priority in education.

International experience, particularly in the education systems of developed countries, demonstrates that models such as professional learning communities (PLCs) and professional learning networks (PLNs) provide an effective environment for teachers to collaborate beyond institutional and geographical boundaries, jointly address methodological challenges, adapt best practices to local contexts, and reflectively evaluate their professional practice.

Method

In recent years, researchers and practitioners have increasingly focused on interschool professional learning networks and communities (PLNs and PLCs). These networks support teachers' professional development and contribute to the improvement of schools and education systems (Poortman & Brown, 2018). Ensuring teachers' continuous professional development requires models that incorporate modern, flexible, and innovative approaches. Professional development organized through professional learning networks is proposed as one such model. To establish a scientific foundation for the concept of a professional learning network in our research, we first clarify the meanings of "association" and "network." The Explanatory Dictionary of the Uzbek Language (2020) defines an association as a group of people or organizations united to act together toward a common goal, a union, or an organization. This definition suggests that shared goals, cooperation, alignment of interests, and collective action underpin the concept of an association. From a pedagogical perspective, an association is both an organizational entity and a social environment in which learning, communication, the exchange of experience, and professional change take place. An association is a group of people who actively communicate with one another. Dewey (1916) similarly described a community as a group of people who communicate with one another. According to Dewey, people live in a community because they share something in common, and communication is the means through which that commonality is established. Interconnections among community members constitute an essential condition for its existence (Patarakin, 2006a). The educational community model represents a way of organizing the exchange of experience among teachers who use shared educational resources to implement various projects. This approach makes it possible to understand professional communities as spaces for collaborative learning and professional development.

The concept of a network refers to a system of interconnected participants, resources, activities, and communication links. In pedagogical practice, the network approach was initially interpreted as a means of planning, cooperation, and resource coordination. In a digital society, however, it has emerged as a complex social and pedagogical system that enables teachers to connect within an open information environment, exchange experiences, create teaching resources, and pursue professional growth.

Etienne Wenger's concept of communities of practice provides an essential methodological foundation for explaining professional learning networks. This concept established that learning and practice become more effective through shared experience. Learning involves more than individual knowledge acquisition; it is also a process of participating in practice, collaborating with others, and developing a professional identity (Wenger, 1998). Wenger's approach helps clarify the nature of professional learning networks. Within such a network, a teacher becomes an active participant who shares personal experience, analyzes and discusses the experiences of others, and adapts them to their own professional practice. In this process, professional development occurs through collaborative activity,

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reflection, and the reconstruction of experience, as well as through knowledge acquired from external sources.

The exchange of experience and learning from that experience are of methodological and practical significance to the functioning of any professional learning network. The development of these networks supports teachers' professional activity between formal professional development courses. Gololobova (2010) specifically highlights the potential of teachers' network communities to enhance participants' professional competence during these intervals. This perspective substantiates the role of professional learning networks as a mechanism for ensuring continuity in professional development. In the scholarly literature, the concept of network collaboration has developed in response to teachers' needs within the professional development system. Bugrova (2009) analyzes network collaboration as a means of using resources, expanding professional connections, and disseminating innovative practices within the system of teacher professional development. From this perspective, a professional learning network organizes teachers' interactions as purposeful, regular, and productive professional collaboration.

The idea of innovative centers proposed by Adamsky (2003) also substantiates the need to support teachers' professional development through open networks, sites for experimentation, and creative groups. This perspective calls for teachers to be regarded as equal partners and agents of professional initiative, moving beyond the traditional professional development model based on hierarchical management. According to Patarakin (2006b), a network community is a group of people who communicate and engage in joint activities through computer networks. This definition indicates that professional learning networks serve as both a means of communication and a new form of collaborative learning and professional activity.

Results

The foundational approach underlying UstozQanot is to connect teachers' professional learning with their practical tasks. A digital resource provides information; a methodological task encourages teachers to adapt that information to their own lessons; and feedback from colleagues provides a basis for reconsidering the chosen solution. Accordingly, each learning unit on the platform should be designed to integrate content, activities, and an assessable product. Research on effective professional development identifies active learning, collaboration, expert support, feedback, and reflection as key factors. Applying these factors to the use of materials on the UstozQanot platform requires each topic to begin with a specific professional problem, engage teachers in developing a tangible product, and provide opportunities to discuss it. This application is proposed in the article as the authors' methodological solution. Viewing a school as a learning organization places particular emphasis on collaborative learning, knowledge sharing, and cooperation with the external environment (Kools & Stoll, 2016). A professional learning network enables these connections to be organized across schools. The transfer of experience gained through the platform back to the school community should also be planned: teachers explain the teaching resources they have refined to their colleagues and prepare recommendations for their use in other classroom contexts. The Technological Pedagogical Content Knowledge (TPACK) framework explains how digital tools can be selected in alignment with subject content and teaching methods. For UstozQanot, this approach means that the learning objective a resource serves is more important than the digital service used to create it. When selecting a teaching resource, teachers justify the alignment among the learner's task, the expected outcome, and the evidence used for assessment.

The content of the technology developed in our research was informed by teachers' professional needs. In a survey involving 370 teachers, 30% of respondents expressed a need for lesson plans and teaching resources, 20% for visual materials, 18% for tests, 17% for interactive tasks, and 15% for other types of resources. The priority features of the platform and network environment were identified as gamification (24%), test creation (21%), methodological support (20%), courses and training (15%), support with pedagogical technologies (12%), and other features (8%). These findings indicate that providing teachers with a database of subject-related information alone is insufficient. Teachers also need

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plans, visual materials, and interactive tasks to support their continuous professional development. Therefore, the core content of the technology was organized around three activities:

- • Identifying professional needs.
- • Developing teaching resources through network collaboration.
- • Testing and refining these resources in practice.

The survey findings also informed the content structure of the UstozQanot platform. Its sections support a range of professional tasks. Their shared developmental purpose is to enable teachers to assess their knowledge, design lessons, and present their experience in scholarly and methodological forms. Figure 1 presents a schematic overview of the UstozQanot platform.

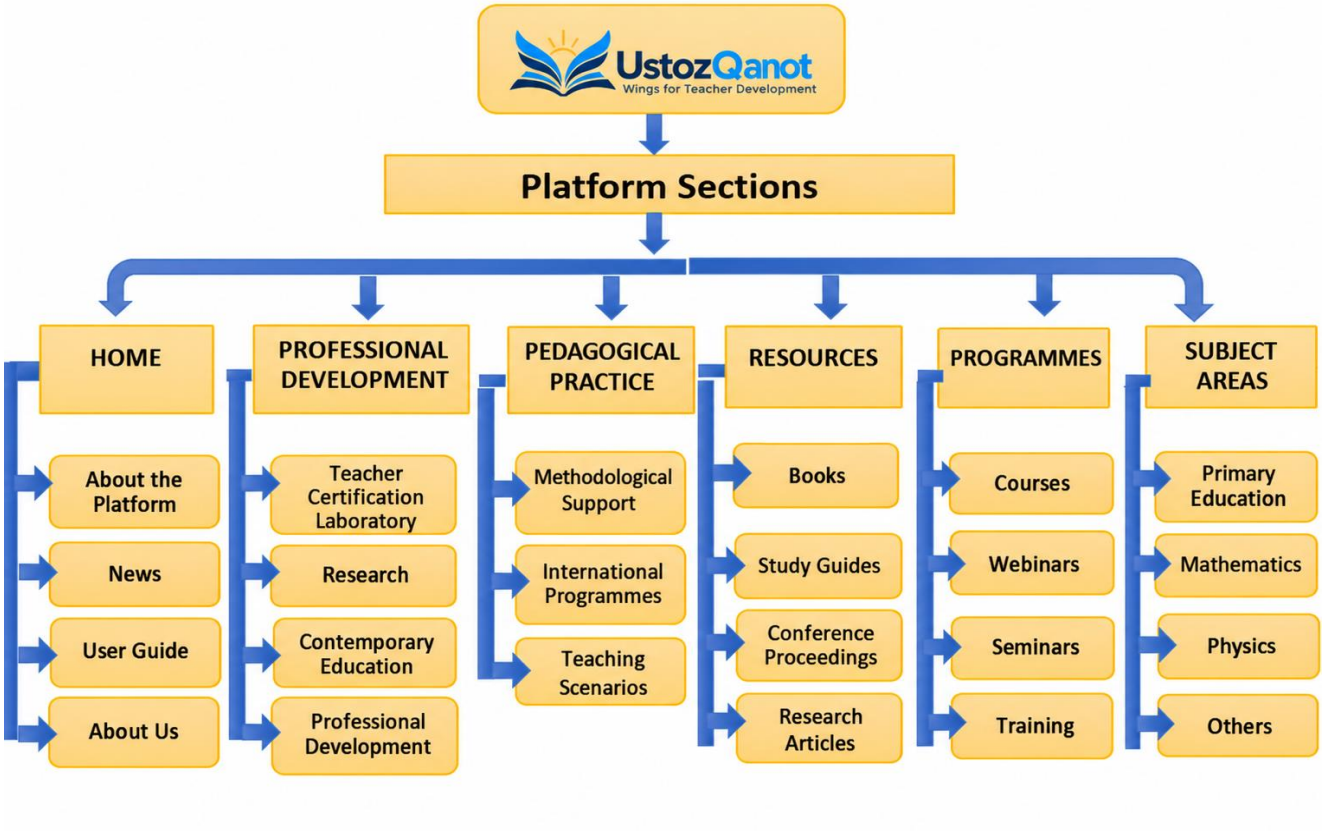


Figure 1

Schematic Overview of the UstozQanot Platform

The Six-Stage Cycle for Using the UstozQanot Platform

The use of the UstozQanot platform is organized around a six-stage cycle comprising the identification of professional needs, the selection of methodological materials tailored to those needs, network collaboration, practical testing, reflection on one's own practice, and outcome monitoring. These stages support the exploration of professional needs, the development of teaching resources, their testing in practice, and the identification of new professional development goals based on the results.

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Stage	Teacher Activity	Practical Outcome
Identification of Professional Needs	Identifying professional needs	Problem and goal
Needs-Based Methodological Materials	Selecting content aligned with professional needs	Learning plan and individual project
Network Collaboration	Developing teaching resources and conducting peer review	Teaching resource ready for testing
Practical Testing	Testing the teaching resource in one's own professional practice	Records of practical testing
Reflection on One's Own Practice	Analysing outcomes and making improvements	Refined teaching resource
Outcome Monitoring	Comparing initial and final outcomes	Conclusion and a newly identified need

Identification of Professional Needs. Teachers' professional needs are identified through questionnaires, tests, self-assessment, and analysis of existing teaching resources. Teachers' views on their professional needs and the challenges they face are collected to select a priority topic or methodological problem to be addressed through the development of a teaching resource.

Needs-Based Methodological Materials. Based on the identified professional needs, instructional materials and practical tasks are developed in accordance with teachers' levels of preparation and areas of professional activity. The content is uploaded to the platform to enable teachers to study independently, adapt it to their own practice, discuss it with colleagues, and refine it based on the suggestions received.

Network Collaboration. Teachers collaboratively discuss the initial draft, add missing elements, refine its content, and conduct peer review. The review considers alignment with the intended objectives, methodological accuracy, responsiveness to learners' needs, and feasibility of implementation. The author revises and refines the resource based on the accepted suggestions. This process produces a teaching resource ready for practical testing.

Practical Testing. The teaching resource that has undergone peer review is implemented in an actual classroom to examine its alignment with the specified learning objectives and its practical applicability. During testing, learners' task completion, the outcomes achieved, and the difficulties encountered are recorded. The primary purpose of this stage is to assess the resource's practical effectiveness and collect evidence for its refinement in the subsequent stage.

Reflection on One's Own Practice. Teachers examine the evidence collected during implementation in relation to the outcomes, explaining which components worked, which failed to produce the intended results, and why revisions are necessary. Feedback from colleagues helps clarify this analysis. Reflection leads to the revision of the resource and documentation of the reasons for the changes. At this stage, personal impressions are translated into evidence-based professional decisions.

Outcome Monitoring. Initial and final outcomes are compared using the same criteria. The criterion of acquiring professional knowledge and applying it in methodological practice assesses the justification of professional decisions. The criterion of collaborative work and teaching resource development assesses contributions to collaboration and peer review. The criterion of analyzing and improving one's own professional practice assesses evidence-based revisions. At the end of monitoring, the outcomes achieved and any unmet needs are identified. These findings inform the next diagnostic stage, initiating a new cycle.

The pedagogical potential of the UstozQanot platform lies in connecting several areas of professional activity within a shared environment. The Professional Development Core is the platform's

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central strategic section, designed to support teachers' continuous professional growth in a systematic and scientifically grounded manner. This section integrates the assessment of teachers' competencies, the consolidation of theoretical knowledge, and its application in professional practice.

The Pedagogical Practice section focuses on developing teachers' practical competencies and enriching their teaching practice. It enables teachers to apply theoretical knowledge, strengthen methodological skills, and implement interactive teaching methods. The Resource Bank serves as a center for theoretical knowledge and methodological resources. This section enables teachers to enrich their professional practice and quickly and efficiently locate ready-to-use teaching materials. The Programs section provides interactive and structured professional development opportunities aimed at continuously developing teachers' professional competencies. The Subject Areas section covers all subjects. Teachers registered on the platform join groups corresponding to their subject specializations, where they discuss their teaching resources with colleagues. Organizing teachers' continuous professional development through professional learning networks requires close integration among the identification of professional needs, collaborative learning, and the application of acquired knowledge in practice.

Conclusion

The UstozQanot platform described in this article is designed to connect these processes within a unified digital environment. Its pedagogical significance lies in creating opportunities for teachers to use methodological materials, develop teaching resources, discuss them with colleagues, test them in practice, and refine them. The proposed six-stage cycle establishes a sequence from professional needs to methodological solutions, from methodological solutions to practical testing, and from testing outcomes to well-founded professional decisions. Reflection and outcome monitoring support the refinement of teaching resources and the identification of unmet needs. Feeding monitoring findings into a new diagnostic stage enables the professional development process to continue.

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A TECHNOLOGY FOR ORGANIZING TEACHERS' CONTINUOUS PROFESSIONAL DEVELOPMENT THROUGH THE USTOZQANOT PLATFORM

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ABSTRACT

This study examines the pedagogical potential, methodological structure, and implementation of the UstozQanot digital platform for supporting teachers' continuous professional development through professional learning networks. The platform was designed to connect teachers' identified professional needs with collaborative learning, resource development, classroom application, reflection, and outcome monitoring. Its content structure was informed by a needs survey of 370 teachers, which identified demand for lesson plans and teaching resources, visual materials, tests, interactive tasks, and platform features such as gamification, test creation, and methodological support. Based on these findings, the authors propose a six-stage professional development cycle: identifying professional needs, selecting needs-based methodological materials, engaging in network collaboration, conducting practical testing, reflecting on professional practice, and monitoring outcomes. Within this cycle, teachers collaboratively develop and peer-review instructional resources, test them in authentic classroom settings, collect evidence of their effectiveness, and refine them in response to results and collegial feedback. Outcome monitoring then informs a new needs assessment, allowing professional learning to continue as a recurring process. The proposed technology positions the platform as an integrated environment for collaborative, practice-oriented, evidence-based professional growth across schools and subject areas. This cyclical design is intended to sustain professional learning while keeping development closely connected to teachers' classroom needs.

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Keywords: *continuous professional development, professional learning networks, UstozQanot, digital platform, network collaboration, instructional resources.*

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Introduction

The system of continuing education, which constitutes one of the fundamental components of society, is developing rapidly in a variety of directions. Accordingly, the requirements imposed on educational outcomes are also being refined and acquiring a more contemporary character. In particular, mechanisms for teaching learners not only to acquire intellectual knowledge but also to apply that knowledge creatively are being reconsidered. Through its creative influence, intellect activates the educational process. Modern education is therefore tasked with creating learning conditions that contribute to the formation of an intellectually and creatively developed personality. In continuing education, an intellectually capable and creatively thinking teacher is regarded as one of the most important indicators of the successful functioning of an educational institution. The dynamics of socio-economic relations and

the aspiration to build a stable and developing society place new demands on higher education institutions. The modernization of higher education defines new goals and new directions (Qodirov, 2020).

Under conditions of digitalization, one of the urgent tasks is to train intellectually and creatively developed specialists who are able to make independent decisions within a given system, analyze problems, assume responsibility for their decisions, and act autonomously. Clarifying the nature and content of intellectual-creative competence requires clarification of the concepts of intellectual competence and creative competence. In dictionaries, the concept of 'competence' is interpreted as the aggregate of powers, rights, and duties assigned to a particular body or official by law, by the charter of that body, or by other regulations. Analysis of scientific literature and dictionaries indicates that the term competence derives from the Latin competere, meaning 'to be capable' or 'to be suitable,' and denotes a person's level of awareness and knowledge in a particular field.

Literature review and methodology

Under conditions of digitalization, the training of intellectually and creatively developed specialists who can make independent decisions, analyze problems, accept responsibility for the decisions they make, and function autonomously is among the pressing issues of contemporary education. Defining intellectual-creative competence and clarifying its essential content require a more precise understanding of both intellectual competence and creative competence. The concept of 'competence' is commonly interpreted as a set of legally or institutionally defined powers, rights, and duties. In scientific and lexicographic sources, the word competence, derived from the Latin competere ('to be capable, suitable'), is also used to denote a person's degree of knowledge or awareness in a particular field.

In the research of N. A. Muslimov, competence is understood as the ability to apply knowledge, skills, and personal qualities successfully in a particular sphere of activity. He defines professional competence as 'the ability of a person to successfully apply in professional activity the knowledge, abilities, and skills acquired in a particular field of education or specialty, together with developed personal qualities' (Raven & Stephenson, 2001). O. A. Qo'ysinov emphasizes that competence should not be opposed to knowledge, skills, or abilities. In his view, competence is a broader concept: it includes knowledge, skills, and abilities as educational outcomes, but it is not merely their mechanical sum. J. E. Usarov defines competence as the manifestation of experience and knowledge in a specific field or direction, readiness to carry out activity, and the ability of an individual to act successfully in various non-standard situations.

Table 1

Scholars Who Have Conducted Research on the Development of Intellectual and Creative Competence

Researchers from Uzbekistan	Researchers from the CIS / related scholarship	International researchers
G. A. Asilova; N. A. Muslimov; O. A. Qo'ysinov; J. E. Usarov; U. A. Usmanova; B. X. Xodjaev; D. I. Yunusova	I. E. Bryakova; V. N. Vvedenskiy; S. G. Molchanov; O. M. Bobiyenko; N. F. Radionova; S. G. Vorovshikov; O. E. Lomakina; A. I. Subetto; A. B. Xutorskoy	K. Keen; J. Raven; Susan Moore Johnson; Hannele Niemi; Rute Gomes Lopes; E. P. Torrance; M. Ford

According to G. A. Asilova, competencies are intended to teach individuals to act effectively in the various situations encountered in personal, professional, and social life. Particular attention is given to the ability to employ relevant knowledge, skills, and abilities when unexpected or problematic situations arise. Consequently, in teaching each subject, the competencies associated with that subject should be developed in accordance with its content and distinctive characteristics.

According to B. X. Xodjaev, competence serves to integrate a learner's self-development activities related to acquiring new personal experience. It is manifested through concrete activity in a particular situation and cannot be reduced solely to knowledge and skills. Rather, it is a new formation that integrates

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cognition, skills, practical experience, and experience of value-based relationships. Consequently, competence is a more complex socio-didactic construct than isolated knowledge, skills, and abilities: it is grounded in values, orientation, knowledge, and experience acquired both within and beyond the educational process and is expressed in the mobilization of acquired knowledge, experience, and attitudes in actual activity (Lopes, 2017).

Taking V. N. Vvedenskiy's position into account, competence may be understood as a set of specific functional characteristics of a particular profession—that is, the sphere in which a person applies knowledge, skills, and abilities. Generalizing the research literature, competence is therefore commonly considered an integral capacity. S. G. Molchanov interprets competence as the range of issues in relation to which a person possesses knowledge. He treats professional competence as a systemic concept and competence as one of its structural components; competence is expressed in behavior, while professional competence characterizes the degree to which an individual meets the relevant requirements and therefore represents the ultimate result of demonstrating competence. Developing the professional competence of higher-education teaching staff requires a high level of professional preparation, established pedagogical mastery, confident use of modern pedagogical and information-and-communication technologies, and sustained motivation toward an acmeological and creative approach to professional activity (N. Sultonova, 2021).

O. M. Bobiyenko, while not denying the importance of knowledge, skills, and abilities, explains the distinction between these concepts and competence as follows: unlike knowledge, competence exists in the form of activity rather than merely as information about it; unlike a narrowly defined skill, competence can be transferred and modified when solving different types of tasks and dealing with different objects; and unlike automated abilities, competent action remains conscious and enables a person to function not only in familiar conditions but also in new and unusual environments. N. F. Radionova emphasizes the relationship between the nature of competence and a person's convictions. K. Keen argues that competence is not simply a collection of knowledge or skills but a combination of complex cognitive abilities, higher-order knowledge structures, social and emotional skills and capacities, as well as attitudes and values. J. Raven characterizes competence as the knowledge and skills required for effective activity in different spheres and views it as a strategic resource for the sustainable development of society. In his view, it is a key factor in successful social, professional, and personal life.

A. R. Xodjaboev considers the competency-based approach to be a means of achieving a new quality of education. He argues that this view is not accidental: it concerns a new unit for measuring a person's level of education, because knowledge, skills, and abilities alone no longer permit a complete assessment of educational quality. O. E. Lomakina holds that a person may be professionally competent within a limited sphere of work; when an individual realizes his or her individuality and creative potential across several spheres, the discussion concerns not only professional competence but broader giftedness that enables successful action in different fields of science, culture, and other domains. I. E. Bryakova emphasizes that because competence is connected with personal development, creative activity, motives, and professionally significant qualities, it is appropriate to prepare specialists comprehensively while taking their value orientations into account.

Thus, in the literature, competence is interpreted as readiness to mobilize all available knowledge, skills, abilities, and capacities for the performance of integrated activity. It is also regarded as a combination of personal qualities, ability and readiness, and a system of knowledge, skills, and capacities. In addition, competence is associated with established motives, independent decision-making, the level of professional development, openness to innovation, interrelated knowledge that enables high-quality and effective action, and the capacity to carry out activity creatively (U. N. Sultonova, 2020).

Given the purpose of the present study, it is also necessary to consider the competence of teachers specifically. From the perspective of a number of researchers, a teacher's professional competence is

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determined not only by fundamental knowledge and skills, but also by the specialist's value orientations, motives for activity, understanding of self and the surrounding world, style of interaction with other people, general culture, and capacity to develop his or her own creative potential.

A. I. Subetto defines competence as a set of potential properties or a system of potential qualities of a future specialist. From this perspective, competence is associated with the graduate's capacity for self-activation in the relevant types of activity within the system of professional education. According to V. A. Slastenin, the quality of education is a major outcome of modernization, while a specialist's competence serves as an integral indicator of quality from the standpoint of educational modernization.

RESULTS

Intellectual development is a direction in the development of a future teacher's readiness for creative pedagogical work, reflecting the degree of its objective necessity in the process of teacher education. As a means of knowing and explaining the world through intellectual activity, it equips human theoretical thinking with the necessary knowledge, methods, and operations. By mastering the theoretical and practical logic of intellectual activity, a future teacher analyzes, synthesizes, classifies, and otherwise processes pedagogical situations and problems while searching for solutions. The essence of intellectual development lies in enriching the thinking of the future teacher-student with standardized operations of cognition and in processing information at a level that ensures the objective grounding of knowledge and understanding. In the process of teacher education, the intellectual development of the future teacher results from the algorithmization of processes for mastering pedagogical theory and practice, as well as from reflection on one's own educational-creative and pedagogical activity (U. N. Sultonova, 2019). The content of learners' intellectual competence is presented on the basis of an analysis of the works of educational scholars.

DISCUSSION

Competence should be formed as a product of individual creativity and autonomous self-development. Implementing a competency-based approach in education raises a number of questions. Although the competency-based approach strengthens the practice-oriented dimension of education, it does not reject knowledge-based education.

According to the scientific literature, the principal orientation of the competency-based approach is to enrich education with practical applicability. In contrast to a purely activity-based approach, the competency-based approach changes in accordance with the values and motivations of future teachers. It integrates methodological approaches that play distinct roles in education. Competence is manifested directly in activity and is connected with identifying, formulating, and solving numerous problems and tasks; thus, it is closely related to the activity-based approach. The acmeological approach also has integrative links with the competency-based approach, because it focuses on the individual's needs and opportunities, orientation toward pedagogical activity, goals and values, and the formation of spiritual and moral qualities (U. N. Sultonova & S. N. Sultonov, 2022b). The strategic objective of education is the formation and development of learners' intellectual capacities. In the present study, this objective is considered within the goals established by the State Educational Standard and the curriculum and is linked to understanding the purpose and means of implementing the competency-based approach in relation to students' knowledge, skills, and abilities.

Table 2

Vector Representation of Student Competence

Knowledge	Skills	Abilities	Competence	Personal characteristics

The educational goal is understood as the learner—the future specialist—acquiring knowledge that embodies his or her intellectual, spiritual, moral, and professional essence. The student's personal

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engagement in mastering professional activity as part of human culture ensures not merely the reproduction of a certain body of social experience but its expanded reproduction and enrichment, thereby supporting the creative development of the future teacher's personality. Intellectual qualities are manifested under organized educational conditions that create an atmosphere of cooperation and creativity.

Intellect (from the Latin intellectus—knowing, understanding, perceiving) is the human capacity for mental activity: the ability to reflect and transform life and the surrounding environment in consciousness; to think, study, learn about the world, and assimilate social experience; to solve diverse problems, make decisions, act rationally, and anticipate events and phenomena. Intellect includes such psychological processes as perception, memory, reasoning, speech, and others. Its development depends on innate ability, the capacities of the brain, active engagement, life experience, and other social factors.

Intellectual development reflects the objective necessity, within teacher education, of preparing a future teacher for creative pedagogical work. As a method of knowing and explaining the world through intellectual activity, it equips theoretical thinking with the necessary knowledge, methods, and operations. By mastering the theoretical and practical logic of intellectual activity, future teachers analyze, synthesize, classify, and otherwise process pedagogical situations and problems in the course of seeking solutions. Intellectual development enriches the thinking of future teacher-students through structured cognitive operations and through the processing of information at a level that enables the objective grounding of knowledge and understanding. Within teacher education, intellectual development emerges through the algorithmization of processes for learning pedagogical theory and practice and through reflection on one's own educational-creative and pedagogical activities.

The content of intellectual competence can be characterized in several dimensions. First, it concerns the relationship between reality and knowledge: sources of information—including objects of scientific cognition, technical sources, information media, and similar resources—activity in interaction with those sources, and the value of knowledge itself. Second, its social and personal significance lies in the learner's success in acquiring knowledge and readiness to continue study in professional educational institutions. Third, intellectual competence reflects the integrity of reality and knowledge through fundamental general-cultural knowledge represented in the basic sciences and other spheres of human activity and expressed in academic subjects through concepts, laws, principles, theories, materials, and related content. It also includes organizational processes of cognition, such as logical methods and modeling, as well as fundamental meanings and viewpoints.

Implementing planned pathways for developing the creative competence of future teachers enables their optimal intellectual development. By general intellectual development, researchers mean the development of the future teacher's thinking in a way that ensures the best results in educational and creative activity through the rational use of time and effort. Such development is based on the rational satisfaction of cognitive needs and the active selection of an optimal form of intellectual activity—dialectical thinking. A key factor determining the optimality of the future teacher's intellectual development is the organization of the educational process around active intellectual engagement and the formation of a scientific logic of thought. Physical, social, intellectual, spiritual, and individual development are inseparable components that form the system of personal development. The intellectual activity of future teachers should mobilize freedom of thought and creativity rather than restrict them within narrow educational-assessment frameworks. In light of contemporary social trends, an educational practice focused primarily on mastering the maximum possible volume of knowledge has lost much of its relevance; it must be replaced by the formation of a creative personality who can manage knowledge optimally, apply it effectively, and respond to the needs of society (U. N. Sultonova & S. N. Sultonov, 2022a).

The concept of creativity has been classified in various ways. I. A. Sharshov expanded such classifications into ten groups: (1) approaches that use novelty as a criterion of creativity; (2) unconscious

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creativity; (3) approaches examining the distinctive qualities of the creative personality; (4) creativity as a process; (5) result-oriented approaches focusing on the 'final product' of creativity; (6) creativity as activity; (7) identification of levels of creativity; (8) theories related to different directions of creative activity; (9) creativity from the perspective of intellectual abilities; and (10) creativity as an integral phenomenon. The source text also contains a repeated, contextually unrelated statement that life is impossible without water for humans, animals, birds, plants, and other living organisms; because its relationship to the surrounding argument is unclear, it is retained here only as a faithful reflection of the original text.

Such activity is manifested together with qualities such as responsibility, enterprise, determination, initiative, goal orientation, willpower, independent thinking, self-analysis, and self-control. In the course of the study, particular attention was given to comparatively clarifying the qualities of a creative personality. The principal source and subject of creativity is the creative individual. A creative personality is characterized primarily by the dominant role of cognitive motivation, research-oriented creative activity, the capacity to discover novelty, and originality in problem solving. This includes, for example, the ability to find original solutions, anticipate possible developments, and demonstrate aesthetic, moral, and intellectual capacities that support high-quality outcomes. Comparative analysis suggests that the qualities of a creative personality are expressed through motivational attitudes, alignment of personal development with core values, cognitive activity, innovativeness, stability of self-activation, objectivity in relation to reality, and a balanced relationship between reproductive and creative activity. A major distinction between creativity and other forms of intellectual labor is its continuous character (O. N. Sultonova et al., 2020).

The personal qualities of the creator play an important role in this process. A teacher's professional competence is broader than creative competence, while creative competence stands in a complex dialectical relationship with professional competence. A student's creative competence contributes to the effectiveness of professional competence. The foregoing analysis also highlights the important role of autonomous self-development in the socialization of a creative personality. Such an individual is capable of self-determination not only in relation to the goals of professional activity but also in relation to universal human values.

As can be seen, certain elements in definitions of creativity and creative capability—such as flexibility of thinking and the desire to seek new things—overlap, indicating the common nature of these phenomena. Following E. P. Torrance, many authors interpret creativity as a particular ability, property, or quality of the individual. Within conceptual approaches to the phenomenon, creativity is understood as a set of psychological and personal characteristics, including the capacity to be creative, to accept and generate new and non-standard modes of thought, and to produce numerous original and useful ideas. Researchers also define creativity as a personal quality expressed in creative productivity—that is, the generation of original ideas, the ability to depart from conventional patterns of thinking, and the capacity to resolve problem situations rapidly. Comparison of definitions of creativity reveals common elements, including flexibility of thinking, the desire to seek novelty, and the ability to overcome established patterns, which points to a shared underlying nature.

To distinguish the concepts of creative activity and creativity, researchers employ two characteristics: the process-result dimension, used to characterize creative activity, and the subjective-conditional dimension, used to characterize creativity as a personal quality. An important aspect of the present study is the integrative consideration of intellectual competence and creative competence. Some studies have treated students' readiness to master a combination of intellectual-creative pedagogical skills, personal qualities, and an individual style of activity as the subject of research. Analysis of the scientific literature shows that research into the problem of intellectual development in education and possible ways of addressing it has been conducted extensively. The study of teacher education from the perspective of the competency-based approach is grounded in the concept of developing professional-pedagogical

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competence. From this standpoint, an important indicator of the quality of the modern teacher is not only professional knowledge and acquired instructional and educational skills, but also intellectual-creative competence, which supports professional and personal development. Addressing the development of intellectual-creative competence therefore requires not only the assimilation of pedagogical heritage but also the active inclusion of future teachers in innovative pedagogical activity. Researchers note that human intelligence differs qualitatively from purely theoretical-academic reasoning: it involves a holistic understanding of a situation, the ability to identify the task within it, rapidly analyze influencing factors, and find solutions appropriate to the conditions of the specific situation.

Researchers identify several directions in the study of creativity. In the first, creative abilities are equated with the highest level of development of intellectual abilities. In the second, creativity is understood as a set of specific creative abilities grounded in divergent thinking. In the third, creativity is characterized as a general capacity to transform prior experience; here creativity is contrasted with routine activity, and particular emphasis is placed on the activation of unconscious processes. Its mechanism is described as the interaction of an active, dominant unconscious component with a passive, subdominant conscious component. In the fourth direction, creative abilities are understood as an integral personal quality that combines cognitive and personal domains (U. Sultonova et al., 2023).

In the contemporary world, educational processes are developing rapidly, accompanied by the emergence of new scientific approaches and innovative methods. Under such dynamic conditions, teachers and pedagogical communities face several distinctive tasks simultaneously: preparing young people for future professional activity, developing their capacity for independent thinking, supporting collaborative work, and cultivating critical thinking. The development of creative competence in education may therefore be implemented through contemporary approaches that support these aims.

Figure 1

Development of Creative Competence in Education

- Independent thinking
- Critical thinking
- Creative professional-pedagogical competence
- Development of personal qualities and skills
- Success in knowledge acquisition
- Concepts, laws, principles, theories, and materials
- Objects of scientific cognition, technical sources, and information resources

Conclusion

The effectiveness of developing the intellectual and creative competence of future primary school teachers depends on grounding the process in appropriate approaches and principles and on adequately examining the factors that influence it. Analysis of the scientific literature indicates that a synergetic approach is of particular importance in developing the intellectual and creative competence of future teachers. Accordingly, the present study is based on a synergetic approach to the development of future teachers' intellectual and creative competence.

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PROJECT-BASED LEARNING AS A TOOL FOR DEVELOPING INTELLECTUAL COMPETENCE IN SIGNAL PROCESSING COURSES

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ABSTRACT
Signal processing courses require students to connect mathematical representations with computational procedures and real-world data. This study examines Project-Based Learning (PjBL) as a pedagogical tool for developing intellectual competence in undergraduate signal processing education. Intellectual competence is operationalized as an integrated capacity for problem decomposition, analytical reasoning, conceptual transfer, evidence-based decision making, solution design, and metacognitive reflection. A quasi-experimental course model is proposed in which students work in small teams on authentic signal-processing problems involving signal acquisition, preprocessing, spectral analysis, filtering, algorithm validation, and technical communication. The intervention combines scaffolded project milestones, programming-based investigation, formative feedback, peer collaboration, and rubric-based assessment. To illustrate the intended analytical procedure prior to insertion of institutional data, a synthetic pilot dataset representing 64 students was analyzed. The simulated pattern showed comparable pre-test scores for the conventional and PjBL groups, followed by a larger mean gain for the PjBL group. The difference in gain scores was statistically significant in the illustrative analysis and corresponded to a large standardized effect. The pedagogical interpretation is that PjBL can create repeated opportunities for students to transform theoretical signal-processing knowledge into justified engineering decisions. The article proposes an assessment framework, a project workflow, and measurable indicators that can be adapted for empirical implementation in engineering higher education.

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Keywords: *Project-based learning; intellectual competence; signal processing education; digital signal processing; engineering education; higher-order thinking; active learning.*

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Introduction

Signal processing is a foundational area in electrical engineering, computer engineering, telecommunications, biomedical engineering, robotics, and data-intensive technologies. Yet it is also a cognitively demanding subject because students must simultaneously reason about continuous and discrete representations, time- and frequency-domain behavior, mathematical transforms, systems, sampling, filtering, noise, and implementation constraints. When instruction is dominated by derivations and routine calculations, students may successfully reproduce procedures without developing the capacity to select, justify, and adapt signal-processing methods for unfamiliar problems.

Contemporary approaches to signal-processing education therefore emphasize active engagement,

visualization, programming, design, and authentic applications. Parhi (2021) argues that digital signal processing instruction benefits when theoretical exposition is integrated with applications, programming, visualization, and collaborative in-class activity. Aboutanios et al. (2021) similarly describe a long-running design-based approach in undergraduate signal-processing curricula in which frequent and diverse design tasks are used to connect theory with practical problem solving. In a DSP-specific implementation, Deshpande (2022) reported that project-based learning increased learners' engagement, interest, self-learning, and awareness of practical applications. Earlier project-oriented work in signal processing also demonstrated gains in engagement, attendance, and course success when authentic artifacts were used to organize learning (Iriondo et al., 2019).

The broader engineering-education literature supports the relevance of PjBL while also cautioning against simplistic claims. A meta-analysis by Zhang and Ma (2023) synthesized 66 experimental or quasi-experimental studies and found a positive overall effect of project-based learning, with particularly strong applicability in engineering and technology contexts and in experimental courses. Hidayat et al. (2024) likewise reported a positive association between PjBL and higher-order thinking skills in engineering education. Recent systematic reviews emphasize that project-based approaches can develop technical and non-technical competences when projects are purposefully designed, assessed, and integrated into the curriculum (Lavado-Anguera et al., 2024; Ramírez de Dampierre et al., 2024). A 2026 umbrella review found a consistently positive direction across meta-analyses but also noted substantial methodological limitations in the existing evidence base, reinforcing the need for transparent designs and cautious interpretation of effect magnitude (Farshad & Fortin, 2026).

In this article, intellectual competence refers to the learner's integrated ability to analyze complex information, decompose problems, connect abstract concepts with observable signals, select and justify methods, generate and test solutions, evaluate evidence, and reflect on the quality of reasoning. This operational definition overlaps with higher-order thinking, critical thinking, problem solving, conceptual transfer, and metacognition, but it is organized specifically around the intellectual actions required in signal-processing practice.

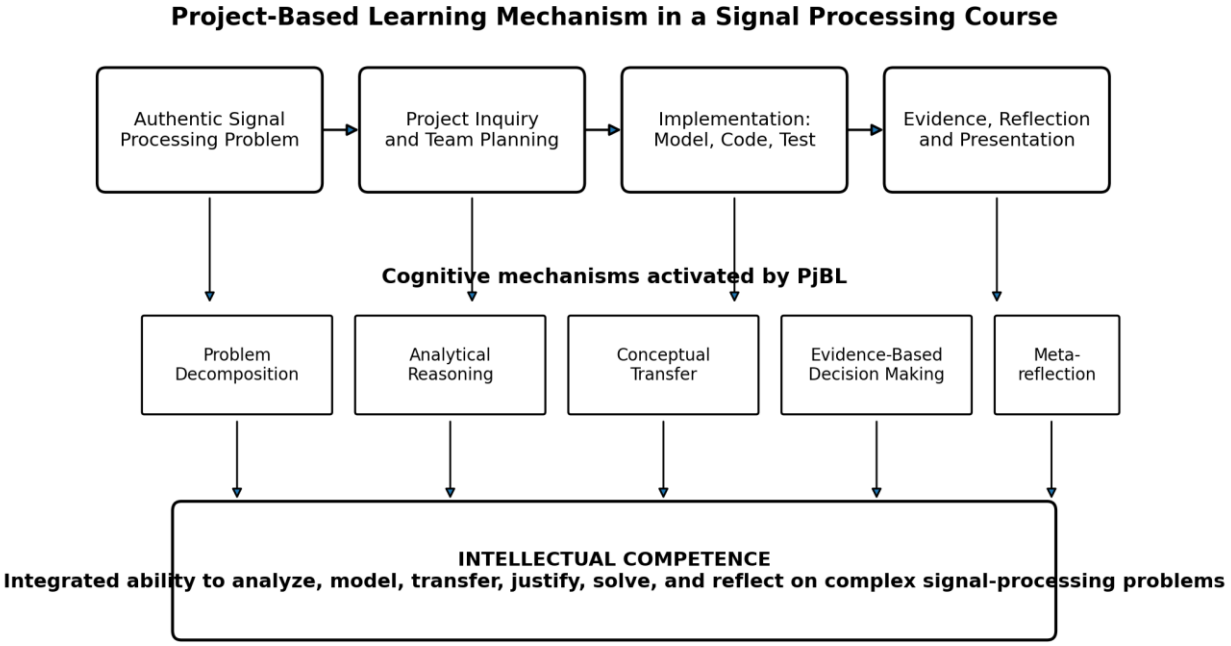


Fig 1. *Conceptual framework linking PjBL activity to intellectual competence in signal processing*

The purpose of the study is to develop and illustrate an IMRAD-compatible research model for investigating whether PjBL can support intellectual competence in an undergraduate signal-processing course. Three research questions guide the design: (RQ1) How can project activities be aligned with measurable dimensions of intellectual competence? (RQ2) What change in intellectual competence should be tested when PjBL is compared with conventional instruction? (RQ3) Which project and assessment

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features are most likely to explain observed changes? Because no institutional dataset was supplied for the present draft, the Results section uses clearly labeled synthetic pilot data only to demonstrate the statistical and graphical reporting format.

Materials and Methods

The proposed empirical study uses a quasi-experimental pre-test/post-test design with two intact undergraduate classes enrolled in a Signals and Systems or Digital Signal Processing course. One class receives conventional instruction built around lectures, worked examples, laboratory exercises, and individual problem sets. The second class receives the same core content but completes a structured PjBL intervention. A practical implementation may use approximately 60–80 students distributed across the two conditions; group equivalence should be examined using pre-test scores and relevant background variables.

The illustrative dataset in this draft contains 64 synthetic student records (32 per condition). These values were generated solely to demonstrate reporting conventions and must not be interpreted as observations from real students. In a real study, ethical approval, informed consent procedures, anonymization, and institutional data-protection rules should be documented according to the host university's requirements.

The PjBL intervention is designed for an 8–12 week period and uses teams of four to five students, consistent with evidence that small collaborative groups can be effective in project-based settings. Each team selects or receives an authentic signal-processing problem, such as denoising a sensor signal, extracting features from an audio signal, designing a digital filter, detecting events in a biomedical waveform, or classifying signal segments. The lecturer acts as a facilitator who provides milestone feedback, mini-lectures when conceptual gaps appear, and methodological constraints that preserve disciplinary rigor. Intellectual competence is assessed using a performance-based test and a project rubric.

Table 1.

Suggested project sequence and its intellectual-competence targets

Project phase	Typical signal-processing task	Intellectual action	Evidence produced
Problem definition	Identify signal source, noise, objective, and constraints	Problem decomposition; hypothesis formation	Problem statement; initial assumptions
Data acquisition / selection	Collect or select real/simulated signals	Validity judgment; contextual reasoning	Dataset description; sampling rationale
Analysis and modeling	Visualize waveform; compute spectrum/features	Analytical reasoning; concept integration	Plots; equations; exploratory code
Algorithm design	Choose filter, transform, detector, or feature method	Conceptual transfer; solution design	Algorithm specification; parameter justification
Implementation	Develop MATLAB/Python code and test cases	Computational reasoning; debugging	Executable code; test logs
Validation	Compare alternatives with quantitative metrics	Evidence-based decision making	Performance metrics; error analysis
Reflection and defense	Explain limitations and alternative solutions	Metacognition; argumentation	Technical report; oral defense; reflection

The performance-based test should contain unfamiliar problems requiring interpretation, method selection, justification, transfer, and evaluation rather than only routine calculation. The project rubric

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provides complementary evidence from authentic performance. To reduce construct contamination, teamwork and presentation quality should be scored separately from intellectual competence when the primary outcome is analyzed.

Table 2. *Operational indicators of intellectual competence*

Dimension	Observable indicator	Example assessment prompt	Suggested weight
Problem decomposition	Separates a complex task into relevant variables, constraints, and sub-problems	Identify what must be known before designing a filter for a noisy sensor stream	20%
Analytical reasoning	Uses mathematical and computational evidence to explain signal behavior	Explain why aliasing occurs and support the explanation with spectral evidence	20%
Conceptual transfer	Applies principles to a novel signal, domain, or constraint	Adapt a method learned for audio to a biomedical waveform and justify changes	20%
Evidence-based decision making	Compares methods using explicit metrics and limitations	Select between two filters using SNR, phase, complexity, and application constraints	20%
Metacognitive reflection	Evaluates assumptions, errors, and alternative approaches	Describe which assumptions failed and how the design would be improved	20%

A signal-processing project should require students to produce inspectable technical artifacts rather than only a final presentation. Figure 2 illustrates a simple example in which a noisy measured waveform is processed using a frequency-selective method. In an actual student project, the artifact would be accompanied by a sampling rationale, spectral analysis, filter specification, quantitative quality metrics, code, tests, and a written interpretation of trade-offs.

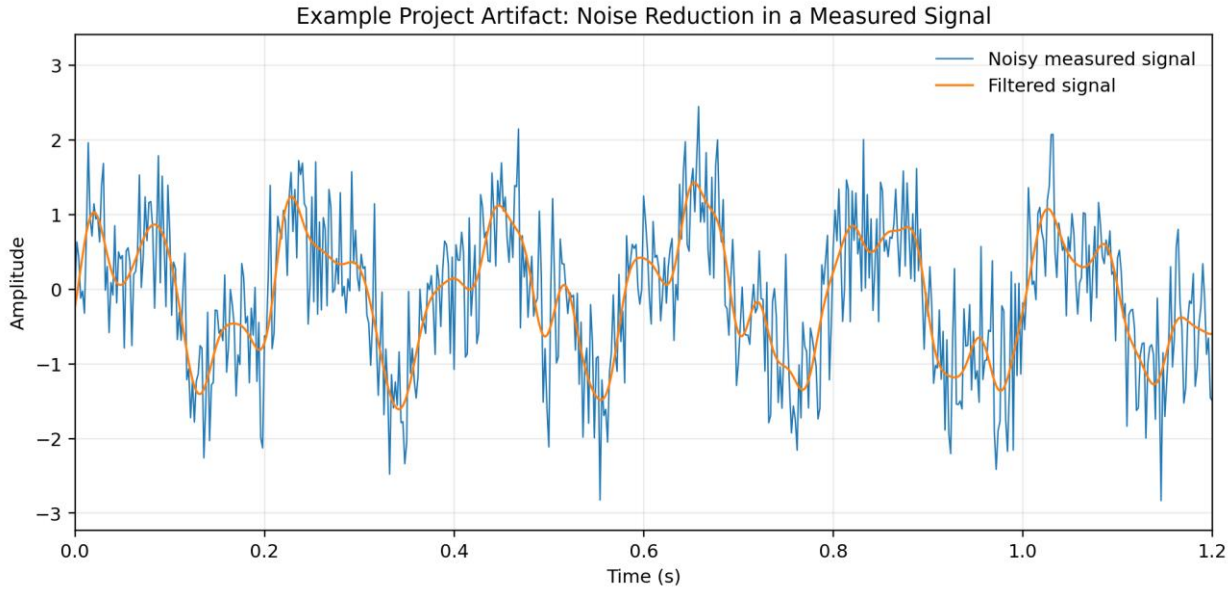


Fig 2. *Example technical artifact that can be used as evidence in a signal-processing project.*

The primary analysis should compare pre-to-post change in intellectual competence across conditions. Descriptive statistics are reported as mean and standard deviation. Baseline equivalence is checked with an independent-samples test or, preferably, through a regression/ANCOVA model that controls for pre-test scores. Gain scores may be used as a transparent supplementary analysis. Effect sizes and confidence intervals should accompany p-values. Dimension-level results are interpreted as secondary

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outcomes. Qualitative reflections may be coded to identify recurring reasoning processes, misconceptions, and metacognitive changes. Reliability of multi-item instruments should be assessed before composite scores are calculated.

Results

The following results are an illustrative analysis of synthetic pilot data and are included only to show how a completed empirical article could report findings. They do not constitute evidence collected from real participants.

Table 3. Illustrative pre-test, post-test, and gain scores (synthetic data).

Group	n	Pre-test M (SD)	Post-test M (SD)	Gain M (SD)
Conventional instruction	32	62.25 (5.49)	69.37 (5.60)	7.12 (3.18)
PjBL	32	62.18 (4.69)	73.22 (6.32)	11.04 (4.63)

The two synthetic groups showed nearly identical baseline performance (conventional M = 62.25, SD = 5.49; PjBL M = 62.18, SD = 4.69). After the instructional period, the conventional group reached M = 69.37 (SD = 5.60), whereas the PjBL group reached M = 73.22 (SD = 6.32). The corresponding mean gains were 7.12 and 11.04 points.

An illustrative Welch independent-samples t test on gain scores produced $t = 3.94$, $p < .001$, with a standardized mean difference of approximately $d = 0.99$. In a real dataset, the preferred inferential model should be selected based on design assumptions, baseline balance, clustering, missing data, and the measurement properties of the competence instrument. The large effect shown here is not a claim about the true magnitude of PjBL; it is a demonstration of the reporting format.

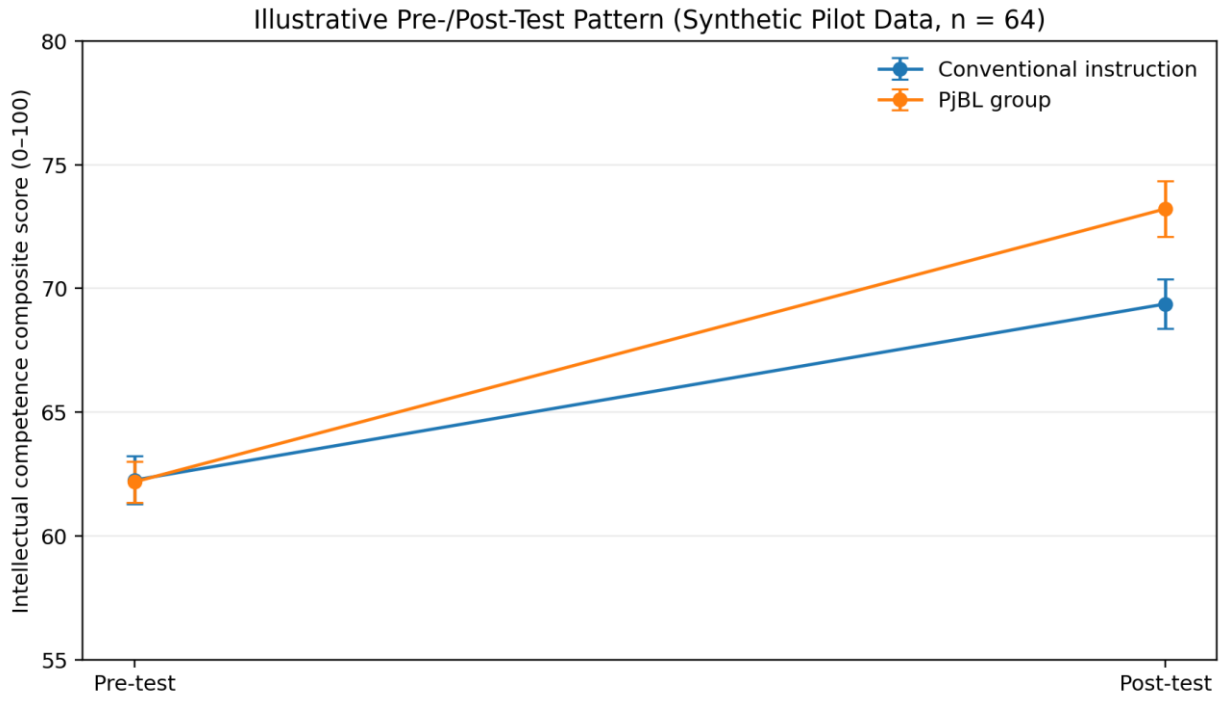


Fig 3. *Illustrative pre-/post-test pattern for the conventional and PjBL groups. Error bars represent standard errors; all values are synthetic*

The hypothetical pattern is consistent with the proposed mechanism: students in a project environment repeatedly encounter situations in which formulas are insufficient by themselves. They must identify what information matters, inspect real signal behavior, choose representations, compare alternative algorithms, interpret quantitative metrics, justify parameter choices, and explain limitations. These actions map directly onto the operational dimensions of intellectual competence.

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Table 4.

Illustrative dimension-level post-test profile (synthetic summary values).

Dimension	Conventional M	PjBL M	Interpretive focus
Problem decomposition	70.1	75.4	Structuring ambiguous engineering problems
Analytical reasoning	71.0	76.3	Using mathematical and computational evidence
Conceptual transfer	68.5	74.8	Applying principles in unfamiliar contexts
Evidence-based decision making	69.8	75.7	Selecting methods through explicit criteria
Metacognitive reflection	67.9	73.6	Evaluating assumptions, errors, and alternatives

Discussion

The proposed model positions PjBL not as an additional assignment at the end of a signal-processing course but as a structured environment for intellectual activity. Its central pedagogical value is the requirement that students move repeatedly between abstract representations and observable system behavior. A student who designs a denoising method, for example, must interpret a waveform, reason about frequency content, select a filter family, choose parameters, evaluate distortion, compare metrics, and defend the final trade-off. This sequence combines disciplinary knowledge with analysis, transfer, judgment, and reflection.

This interpretation is consistent with signal-processing education research. Parhi (2021) emphasizes applications, programming, visualization, and collaborative engagement as ways to strengthen DSP learning. Aboutanios et al. (2021) demonstrate how repeated design activities can anchor theoretical concepts in authentic engineering tasks. Deshpande (2022) reports benefits for engagement and self-learning in a DSP course using PjBL, while Iriondo et al. (2019) show how a complex project artifact can integrate signal-processing knowledge with project-management and collaborative skills. The recent DSP study by Xie et al. (2026) further supports the movement toward collaborative inquiry, project work, and simulation-hardware integration rather than exclusively teacher-centered instruction.

At the broader level, the model is aligned with systematic evidence on PjBL in engineering. Zhang and Ma (2023) found that PjBL effects vary according to subject, course type, group size, and duration, with engineering and experimental contexts showing favorable patterns. Reviews by Lavado-Anguera et al. (2024) and Ramírez de Dampierre et al. (2024) emphasize authentic engineering contexts, program alignment, and assessment quality. Hidayat et al. (2024) specifically connect PjBL with higher-order thinking in engineering education. However, Farshad and Fortin (2026) caution that available meta-analyses have methodological weaknesses, so local studies should report design, instruments, implementation fidelity, and uncertainty transparently rather than assuming a universal effect size.

The most important design implication is that intellectual competence must be assessed through tasks that actually require intellectual decisions. If the final test consists only of familiar calculations, the study may fail to capture the competence that PjBL is designed to develop. Assessment should therefore include unfamiliar signals, incomplete problem statements, alternative valid approaches, explicit justification prompts, and opportunities to interpret errors. The project rubric should reward reasoning quality and evidence, not merely whether code runs or a visually attractive presentation is produced.

Scaffolding is equally important. Novice students may experience open-ended projects as cognitively overwhelming. A milestone structure—problem proposal, data justification, preliminary

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analysis, algorithm design, prototype, validation, final defense—preserves learner autonomy while preventing the project from becoming unstructured trial and error. Short targeted mini-lectures can be inserted when teams encounter common conceptual barriers. This combination of autonomy and scaffolding is particularly suitable for signal processing because project work exposes misconceptions that may remain invisible during routine exercises.

The current manuscript has an explicit limitation: its numerical Results section uses synthetic data. No causal or empirical conclusion about a specific student population should be drawn from those numbers. A future implementation should use validated instruments, document participant characteristics, report reliability, check baseline equivalence, account for instructor and class effects, and include confidence intervals. Where feasible, multiple cohorts or replication across institutions would strengthen generalizability. Qualitative evidence from project reports, code reviews, oral defenses, and reflective journals can also help explain how intellectual competence changes, rather than only whether a composite score changes.

Conclusion

Project-Based Learning provides a strong pedagogical structure for aligning signal-processing theory with the intellectual practices required in engineering. When projects are authentic, scaffolded, technically rigorous, and assessed through evidence-centered rubrics, students are required to decompose problems, analyze signals, transfer concepts, compare algorithms, justify decisions, and reflect on limitations. These processes offer a defensible pathway for developing intellectual competence beyond procedural mastery. The proposed IMRAD framework can be used as the basis for a real quasi-experimental study in Signals and Systems or Digital Signal Processing courses. Before publication, the synthetic results in this draft should be replaced with institutional data, and the methods should be adapted to the actual course context, sample, ethics procedure, assessment instrument, and statistical design.

A practical semester implementation can begin with short guided mini-projects and progress toward one integrative team project. Useful topics include audio denoising, vibration analysis, ECG/PPG preprocessing, speech feature extraction, image-frequency filtering, event detection, and sensor-fusion preprocessing. MATLAB, Python/NumPy/SciPy, or equivalent environments can be used. The project should culminate in a reproducible notebook or code repository, a technical report, an oral defense, and an individual reflection so that both collective engineering work and individual intellectual development are visible.

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