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TECHNOLOGY FOR PREPARING FUTURE TEACHERS BASED ON THE DEVELOPMENT OF STUDENTS' REFLECTIVE ABILITIES

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Abstract: *This article develops and theoretically substantiates a pedagogical technology for preparing future teachers based on the systematic development of students' reflective abilities. Reflection - the capacity to examine, analyse, and evaluate one's own thinking, actions, and professional decisions - is widely recognized as a cornerstone of professional teaching competence, yet the practical mechanisms through which it can be developed during university study remain insufficiently structured. Many teacher education programmes acknowledge the importance of reflection in their goals but lack a coherent, staged, and methodologically explicit technology for achieving reflective development. The purpose of the article is to design a comprehensive pedagogical technology that transforms reflective ability from an abstract aspiration into a structured, measurable, and systematically cultivated professional capacity. The research draws on the foundational theoretical frameworks of Dewey, Schön, Korthagen, and Kolb in international reflective practice scholarship, as well as the contributions of Uzbek scholars including Muslimov, To'rayeva, Djurayev, and Ishmuhamedov, who have studied professional competence formation, pedagogical mastery, and innovative educational technologies in the Uzbek context. The article proposes a four-stage technology - orientation, analytical, constructive, and autonomous - that progresses from initial awareness of reflection through guided analytical practice and independent reflective design to self-sustaining reflective autonomy. Each stage is defined by specific goals, content, methods, tools, and assessment criteria. The main result is a complete technological model that specifies what is developed at each stage, how it is developed, what tools support the development, and how progress is assessed. The study concludes that reflective ability develops most effectively when it is treated not as a by-product of teaching experience but as a deliberately engineered professional capacity that requires its own pedagogical technology with clear stages, progressive complexity, and continuous diagnostic feedback.*

Keywords*: reflective abilities, pedagogical technology, future teachers, teacher preparation, reflective practice, professional competence, self-analysis, metacognition, experiential learning, teacher education*

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ТЕХНОЛОГИЯ ПОДГОТОВКИ БУДУЩИХ УЧИТЕЛЕЙ НА ОСНОВЕ РАЗВИТИЯ РЕФЛЕКСИВНЫХ СПОСОБНОСТЕЙ СТУДЕНТОВ

Аннотация: *В статье разрабатывается и теоретически обосновывается педагогическая технология подготовки будущих учителей на основе систематического развития рефлексивных способностей студентов. Рефлексия - способность анализировать и оценивать собственное мышление, действия и профессиональные решения - широко признаётся краеугольным камнем профессиональной педагогической компетентности, однако практические механизмы её развития в период вузовского обучения остаются недостаточно структурированными. Многие программы педагогического образования признают важность рефлексии в своих целях, но не располагают целостной, поэтапной и методически явной технологией достижения рефлексивного развития. Цель статьи - разработать комплексную педагогическую технологию, превращающую рефлексивную способность из абстрактного устремления в структурированную, измеримую и систематически формируемую профессиональную способность. Исследование опирается на фундаментальные теоретические рамки Дьюи, Шёна, Кортхагена и Колба в международной литературе по рефлексивной практике, а также на вклад узбекских учёных, изучавших формирование профессиональной компетентности, педагогическое мастерство и инновационные образовательные технологии. Основным результатом является полная технологическая модель, определяющая четыре этапа развития: ориентировочный, аналитический, конструктивный и автономный, - каждый с конкретными целями, содержанием, методами, средствами и критериями оценки.*

Ключевые слова: *рефлексивные способности, педагогическая технология, будущие учителя, подготовка учителей, рефлексивная практика, профессиональная компетентность, самоанализ, метакогниция, обучение на опыте, педагогическое образование*

TALABALARNING REFLEKSIV QOBILIYATLARINI RIVOJLANTIRISH ASOSIDA BO‘LAJAK O‘QITUVCHILARNI TAYYORLASH TEXNOLOGIYASI

Annotatsiya: *Ushbu maqolada talabalarning refleksiv qobiliyatlarini tizimli rivojlantirish asosida bo‘lajak o‘qituvchilarni tayyorlashning pedagogik texnologiyasi ishlab chiqiladi va nazariy jihatdan asoslanadi. Refleksiya - o‘z tafakkuri, harakatlari va kasbiy qarorlarini tahlil qilish va baholash qobiliyati - kasbiy pedagogik kompetensiyaning asosiy tarkibiy qismi sifatida keng tan olingan, biroq uni universitet tahsili davrida rivojlantirishning amaliy mexanizmlari yetarlicha tuzilmaga ega emas. Ko‘pgina pedagogika ta'limi dasturlari refleksiyaning ahamiyatini o‘z maqsadlarida*

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e'tirof etadi, ammo refleksiv rivojlanishga erishish uchun yaxlit, bosqichma-bosqich va metodik jihatdan aniq texnologiyaga ega emas. Maqolaning maqsadi refleksiv qobiliyatni mavhum intilishdan tuzilmalashtirilgan, o‘lchanadigan va tizimli ravishda shakllantirilgan kasbiy qobiliyatga aylantiruvchi kompleks pedagogik texnologiya ishlab chiqishdan iborat. Tadqiqot xalqaro refleksiv amaliyot ilmiy adabiyotlarida Dyui, Shon, Kortxagen va Kolbning fundamental nazariy ramkalariga, shuningdek kasbiy kompetensiyani shakllantirish, pedagogik mahorat va innovatsion ta'lim texnologiyalarini o‘rgangan Muslimov, To‘rayeva, Djurayev va Ishmuhamedov kabi o‘zbek olimlarining hissalariga tayanadi. Asosiy natija to‘rtta bosqichli texnologik model bo‘lib, har bir bosqich aniq maqsadlar, mazmun, metodlar, vositalar va baholash mezonlari bilan belgilangan.

Kalit so‘zlar: *refleksiv qobiliyatlar, pedagogik texnologiya, bo‘lajak o‘qituvchilar, o‘qituvchilarni tayyorlash, refleksiv amaliyot, kasbiy kompetensiya, o‘z-o‘zini tahlil, metakognitsiya, tajribaga asoslangan o‘rganish, pedagogika ta'limi*

INTRODUCTION

The concept of pedagogical technology implies a systematic, reproducible, and results-oriented approach to organizing the educational process. Unlike a general teaching method, which describes a broad direction of pedagogical action, a technology specifies the sequence of stages, the activities at each stage, the tools and resources required, and the criteria for assessing whether the intended results have been achieved. When applied to the development of reflective abilities in future teachers, a pedagogical technology must answer four fundamental questions: What reflective capacities should be developed? In what sequence should they be developed? Through what specific activities and tools? And how can progress be measured at each stage?

The theoretical foundations for reflective practice in teaching were established by Dewey (1933), who defined reflection as the active, persistent, and careful consideration of any belief or form of knowledge in light of the grounds that support it. Dewey distinguished between routine action, which is guided by habit, tradition, and authority, and reflective action, which involves the willingness to engage in constant self-appraisal and development. Schön (1983) advanced this thinking by introducing the concepts of reflection-in-action, the ability to think and adjust during professional activity, and reflection-on-action, the ability to analyse professional events after they have occurred. For teacher education, Schön's work demonstrated that professional competence is not simply the application of theoretical knowledge to practical situations but involves a kind of knowing that is embedded in and generated through practice itself.

Korthagen (2001) made a decisive contribution to structuring reflection in teacher education through his ALACT model: Action, Looking back on the

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action, Awareness of essential aspects, Creating alternative methods of action, and Trial. This model transforms reflection from an abstract cognitive process into a concrete, repeatable cycle that student teachers can learn, practise, and internalize. Kolb's (1984) experiential learning cycle - concrete experience, reflective observation, abstract conceptualization, and active experimentation - provides a complementary framework that situates reflection within a broader theory of learning from experience. Together, these four theorists - Dewey, Schön, Korthagen, and Kolb - provide the international theoretical foundation for any technology of reflective development in teacher education.

In the Uzbek pedagogical tradition, the development of professional competence and pedagogical mastery has been approached from several perspectives that are highly relevant to reflective ability. Muslimov (2014) provided a comprehensive analysis of professional competence formation in vocational teacher education, arguing that competence includes not only knowledge and skills but also the capacity for continuous self-improvement through reflective analysis. To‘rayeva (2006) studied the formation of professional self-awareness in future teachers, demonstrating that reflective self-analysis is inseparable from the development of professional identity. Djurayev and Turgunov (2006) developed the technology of pedagogical mastery formation, which includes self-assessment and reflective practice as essential components. Ishmuhamedov, Abduqodirov, and Pardayev (2008) proposed innovative educational technologies for the Uzbek context that emphasize interactive, student-centred methods - precisely the methods that create the experiential foundation for reflective development.

Despite this rich theoretical heritage, a gap exists between the recognition of reflection's importance and the availability of structured technologies for developing it. Many teacher education programmes include reflective components - journals, self-assessment forms, post-lesson discussions - but these components are often isolated, unsystematic, and not organized into a coherent developmental progression. A student may keep a reflective journal in the third year and write a self-analysis report during the practicum, but if these activities are not connected by a progressive technology that builds reflective capacity over time, the result is scattered experience rather than systematic development.

The research problem of this article can be formulated as follows: what should be the structure, content, and progression of a pedagogical technology for preparing future teachers through the systematic development of reflective abilities? The purpose of the study is to design, theoretically substantiate, and present a complete pedagogical technology that transforms reflective

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development from a collection of isolated activities into a coherent, staged, and assessable system. The object of the study is the process of professional preparation of future teachers at pedagogical universities. The subject is the pedagogical technology for developing reflective abilities as a foundation of professional teaching competence.

The hypothesis of the article is that reflective abilities in future teachers develop most effectively when the preparation process is organized according to a technology that includes four progressive stages - orientation, analytical, constructive, and autonomous - each with specific goals, activities, tools, and assessment criteria. The progressive structure ensures that students are not asked to perform complex reflective operations before they have developed the foundational capacities needed for such operations. The staged approach also allows for diagnostic assessment at each transition point, enabling instructors to identify students who need additional support and to adjust the pedagogical process accordingly.

Methods

The article employs a theoretical design methodology. The method includes systematic literature review, comparative analysis of reflective practice frameworks, pedagogical technology modelling, and criteria-based design. The literature base covers four categories: international theoretical frameworks on reflective practice (Dewey, Schön, Korthagen, Kolb); empirical research on reflective development in teacher education; Uzbek scholarly works on professional competence, pedagogical mastery, and educational technology; and curriculum documents from pedagogical universities.

The design procedure was organized in five stages. At the first stage, the theoretical foundations of reflective ability were synthesized from international and Uzbek sources. At the second stage, the components of reflective ability were identified and organized into a developmental sequence. At the third stage, the four-stage technology was designed, with each stage defined by goals, content, methods, tools, and assessment criteria. At the fourth stage, the internal consistency and theoretical coherence of the technology were evaluated. At the fifth stage, the conditions necessary for effective implementation were identified.

The article presents a theoretical technology design rather than experimental results. This approach is justified because the design of any pedagogical technology must precede its experimental implementation. A clearly articulated technology with defined stages, methods, and criteria provides the basis for subsequent empirical testing, without which experimental research would lack a structured object to test.

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Results

1. Components of reflective ability in future teachers

The first result is the identification of five components that constitute reflective ability in future teachers and form the content basis of the proposed technology.

No.	Component	Definition	Professional significance
1	Self-observation	The ability to notice and register one's own actions, thoughts, and emotional states during professional activity	Provides the raw material for all subsequent reflection; without self-observation, there is nothing to reflect upon
2	Analytical deconstruction	The ability to break down a professional event into its constituent elements and identify causal relationships	Enables the teacher to understand why something happened, not merely that it happened
3	Evaluative judgement	The ability to assess the quality and effectiveness of professional actions against criteria and standards	Enables the teacher to distinguish between effective and ineffective practice on rational grounds
4	Constructive redesign	The ability to generate alternative approaches and design improved courses of action based on reflective analysis	Transforms reflection from retrospective analysis into prospective improvement planning
5	Metacognitive regulation	The ability to monitor and direct one's own reflective process, knowing when, how, and how deeply to reflect	Enables autonomous, self-sustaining reflective practice that continues after formal education ends

These five components are ordered developmentally: self-observation is the most foundational capacity, while metacognitive regulation is the most advanced. The technology is designed so that earlier stages focus on developing the foundational components, while later stages develop the more advanced ones. However, the components are not entirely sequential - they interact and reinforce each other throughout the process. Muslimov (2014) noted that professional competence is an integrated quality that develops through the coordinated formation of its components, not through the isolated development of separate skills.

2. Four-stage pedagogical technology

The second result is the complete four-stage pedagogical technology for developing reflective abilities in future teachers.

Stage	Primary goal	Target components	Core methods	Assessment focus

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Stage	Primary goal	Target components	Core methods	Assessment focus
1. Orientation (Year 1–2)	Develop awareness of reflection as a professional tool	Self-observation; initial analytical deconstruction	Structured journals; guided observation; introductory workshops	Presence and regularity of self-observation; willingness to engage
2. Analytical (Year 2–3)	Develop systematic analytical and evaluative capacities	Analytical deconstruction; evaluative judgement	ALACT cycle practice; video analysis; peer review; case studies	Depth of analysis; use of evidence; quality of evaluative reasoning
3. Constructive (Year 3–4)	Develop the ability to redesign practice based on reflection	Constructive redesign; integration of all previous components	Practicum-based reflection; design challenges; action research projects; mentored teaching	Quality of redesign proposals; connection between analysis and improvement; implementation during practicum
4. Autonomous (Year 4+)	Develop self-sustaining reflective autonomy	Metacognitive regulation; full integration of all components	Independent reflective practice; professional portfolio; self-directed inquiry; reflective mentoring of peers	Independence of reflective practice; sophistication of metacognitive awareness; quality of professional portfolio

Stage 1: Orientation (Years 1–2).

The orientation stage introduces students to the concept and value of professional reflection. At this stage, most students have no prior experience with systematic self-analysis in a professional context. Their understanding of reflection is often limited to informal self-assessment or to the colloquial meaning of the word as simply thinking about something. The goal of the orientation stage is to transform this vague understanding into a concrete awareness of reflection as a structured professional tool with specific procedures and measurable outcomes.

The primary activities at this stage include structured reflective journals with guided prompts, observation of experienced teachers with specific analytical tasks, introductory workshops on reflective frameworks, and small-group discussions about personal learning experiences. The journal prompts are deliberately simple and concrete: What did I learn today that I did not know before? What was difficult for me and

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why? What questions do I still have? These prompts develop the habit of self-observation without requiring the complex analytical skills that will be developed later. To‘rayeva (2006) emphasized that professional self-awareness begins with the simple act of directed attention to one's own professional experience, and the orientation stage is designed to cultivate precisely this foundational capacity.

Assessment at the orientation stage focuses on participation, regularity, and the presence of genuine self-observation rather than on the depth of analysis. The instructor provides formative feedback that encourages honest self-examination and gently redirects students who confuse reflection with summary or self-praise. The diagnostic criterion for readiness to move to the analytical stage is the student's demonstrated ability to notice and describe specific features of his or her own learning and teaching-related experiences with concrete detail rather than vague generalities.

Stage 2: Analytical (Years 2–3).

The analytical stage develops the capacity for systematic analysis of professional events. Students who have developed basic self-observation in the orientation stage are now ready to move beyond description to explanation. The central question shifts from What happened? to Why did it happen, and what does it mean?

The primary activities at this stage include structured practice with the ALACT reflective cycle, video analysis of teaching episodes, peer review of reflective writing, case study analysis, and critical incident analysis. The ALACT model provides a concrete procedural framework: Action (what was the situation?), Looking back (what were my thoughts, feelings, and actions?), Awareness (what are the essential aspects and connections?), Creating alternatives (what could I do differently?), and Trial (what will I try next time?). Korthagen (2001) designed this model specifically for teacher education, and it has been validated across multiple cultural contexts. In the analytical stage, students practise moving through all five phases of the cycle with increasing independence.

Video analysis is a particularly powerful tool at this stage. Students record short teaching episodes - either during microteaching in university or during early practicum experiences - and analyse the recordings using structured observation protocols. Video creates a concrete record of practice that can be revisited, paused, and examined from multiple angles. It transforms the ephemeral experience of teaching into a stable object for analytical reflection. Ishmuhamedov, Abduqodirov, and Pardayev (2008) emphasized that innovative educational technologies should engage students as active analysts of the learning process rather than passive recipients of information, and video analysis exemplifies this principle.

Assessment at the analytical stage focuses on the depth and quality of analysis. Rubrics evaluate whether the

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student identifies specific elements of the situation, explains causal relationships with evidence, considers multiple perspectives, and connects the analysis to theoretical concepts from pedagogical disciplines. The diagnostic criterion for readiness to move to the constructive stage is the student's demonstrated ability to produce analytical reflections that go beyond description to explanation and that connect specific observations to broader pedagogical principles.

Stage 3: Constructive (Years 3–4).

The constructive stage develops the ability to translate reflective analysis into improved pedagogical design. Analysis without construction remains intellectually interesting but professionally incomplete. A teacher who can explain why a lesson went poorly but cannot design a better lesson has not yet achieved full reflective competence. The constructive stage closes this gap by requiring students to generate, justify, and implement alternative approaches based on their analytical reflections.

The primary activities at this stage include practicum-based reflective cycles where students teach, reflect, redesign, and reteach; design challenges where students create improved versions of lessons they have observed or taught; action research projects where students investigate a specific pedagogical question through systematic cycles of planning, acting, observing, and reflecting; and mentored teaching where an experienced teacher provides structured reflective guidance before, during, and after lessons.

The connection to practicum is essential at this stage. Reflective construction must be grounded in real pedagogical experience, not in hypothetical scenarios. Kolb's (1984) experiential learning cycle provides the theoretical rationale: concrete experience provides the basis for reflective observation, which leads to abstract conceptualization, which leads to active experimentation - and the cycle continues. In the constructive stage, students are expected to complete multiple iterations of this cycle during their practicum, with each iteration producing a documented record of reflection, redesign, and implementation. Djurayev and Turgunov (2006) argued that pedagogical mastery develops through the cycle of practice, analysis, and improvement, and the constructive stage operationalizes this principle.

Assessment at the constructive stage evaluates the quality and feasibility of redesign proposals, the logical connection between analytical findings and constructive solutions, and the evidence of implementation during practicum. Students are assessed not on whether their redesigned lessons are perfect but on whether their redesign process demonstrates thoughtful integration of reflective analysis with pedagogical design. The diagnostic criterion for readiness to move to the autonomous stage is the student's demonstrated ability to independently identify areas for

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improvement, generate evidence-based alternatives, implement changes, and evaluate the results.

Stage 4: Autonomous (Year 4 and beyond).

The autonomous stage develops self-sustaining reflective practice that does not depend on external prompts, assignments, or institutional structures. The ultimate goal of the technology is not to produce students who reflect when told to do so but to produce graduates who reflect as a natural, integrated dimension of their professional work. At this stage, the external scaffolding that supported reflective development in earlier stages is gradually removed, and the student takes full responsibility for directing his or her own reflective process.

The primary activities at this stage include independent reflective practice without prescribed formats, professional portfolio development that documents reflective growth over time, self-directed inquiry into professional questions that emerge from practice, and reflective mentoring where advanced students guide less experienced peers through reflective processes. The portfolio is a central tool at this stage: it collects evidence of reflective practice across the full period of university study, demonstrating the progression from initial self-observation through analytical reflection and constructive redesign to autonomous reflective professionalism.

Metacognitive regulation - the most advanced component of reflective ability - is the primary developmental focus at this stage. Students learn to monitor their own reflective process: recognizing when reflection is needed, selecting the appropriate depth and method of reflection for different situations, and evaluating the quality of their own reflective practice. A teacher with developed metacognitive regulation does not reflect on everything with equal intensity - that would be paralyzing - but knows which situations require deep analytical reflection, which require quick reflection-in-action, and which can be handled through routine professional judgement. Muslimov (2014) described the highest level of professional competence as the capacity for continuous self-improvement, and metacognitive regulation is the mechanism that makes such continuous improvement possible.

Assessment at the autonomous stage evaluates the independence, sophistication, and sustainability of the student's reflective practice. The professional portfolio is the primary assessment tool, evaluated through criteria that include comprehensiveness of documentation, evidence of progression over time, quality of metacognitive commentary, and the connection between reflective insights and professional development plans. The culminating assessment is the student's demonstrated capacity to continue reflective practice independently after graduation - a capacity that can be partially assessed through the portfolio and partially projected from the trajectory of reflective

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development observed during university study.

3. Tools and instruments of the technology

The third result is a systematized set of tools and instruments that support the technology at each stage.

Stage	Primary tools	Digital supplements	Assessment instruments
Orientation	Guided reflective journals; observation protocols; prompt cards; reflective workshop materials	Blog-format journals; LMS reflection forums; simple audio recordings	Journal regularity rubric; self-observation checklist; participation assessment
Analytical	ALACT cycle templates; video recording equipment; peer review forms; case study collections; critical incident forms	Video annotation software; collaborative analysis platforms; digital peer review tools	Analytical depth rubric; causal reasoning assessment; theoretical connection evaluation
Constructive	Lesson redesign templates; action research guides; practicum reflection protocols; mentor feedback forms	Lesson planning software; e-portfolio platforms; practicum documentation systems	Redesign quality rubric; implementation evidence checklist; action research evaluation criteria
Autonomous	Professional portfolio framework; self-directed inquiry guides; peer mentoring protocols; professional development plans	Digital portfolio platforms; professional learning networks; AI-assisted reflection prompts	Portfolio comprehensive evaluation; metacognitive sophistication rubric; reflective autonomy assessment

4. Conditions for effective implementation

The fourth result is the identification of five conditions necessary for the effective implementation of the technology.

The first condition is institutional integration. The technology must be embedded across the curriculum, not confined to a single course. Reflective activities at the orientation stage should be integrated into introductory pedagogy

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and psychology courses. Analytical activities should be connected to didactics and methodology courses. Constructive activities should be linked to the practicum. Autonomous activities should be supported by the final qualifying work and professional development planning. This cross-curricular integration requires institutional commitment and coordination among faculty members.

The second condition is instructor competence. University instructors who guide reflective development must themselves be reflective practitioners. They must be able to model reflective thinking in their own teaching, to provide constructive feedback on students' reflective work, and to create the psychologically safe environment necessary for honest self-examination. Faculty development programmes should include training in reflective mentoring techniques.

The third condition is a psychologically safe environment. Reflection requires honesty about weaknesses, mistakes, and uncertainties. Students will not engage in genuine reflection if they fear that honest self-analysis will result in lower grades or negative evaluation. The technology addresses this by using formative rather than summative assessment of reflective work in early stages and by establishing explicit norms that value analytical depth over positive self-presentation.

The fourth condition is progressive complexity. The technology is designed with deliberate progression from simple to complex reflective operations. Attempting to develop all components simultaneously or expecting sophisticated metacognitive regulation from first-year students violates the developmental logic of the technology and produces confusion rather than growth. Each stage must be completed with reasonable adequacy before the next stage begins.

The fifth condition is continuity with professional practice. The technology should be designed so that the reflective habits developed during university study transfer naturally to professional work. The autonomous stage explicitly addresses this transfer by removing institutional scaffolding and developing self-sustaining reflective practice. Graduates who have completed all four stages should enter the profession with the capacity and the habit of continuous reflective improvement.

Discussion

The proposed technology is consistent with major international frameworks for reflective practice in teacher education. The four-stage structure corresponds to the general logic of professional development described by Korthagen (2001): from supported, structured reflection toward independent, internalized reflective practice. The experiential foundation of the technology - particularly the central role of practicum in the constructive stage - is aligned with Kolb's (1984) experiential learning theory. The progressive development of five reflective components from self-observation to metacognitive regulation

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follows the cognitive developmental logic described in the educational psychology literature on metacognition and self-regulated learning.

The Uzbek scholarly tradition provides essential contextual grounding. Muslimov (2014) emphasized that professional competence in teacher education is not a single quality but an integrated system of capacities that must be developed through purposeful pedagogical activity. The five-component model of reflective ability proposed in this article is consistent with this integrative view. To‘rayeva (2006) demonstrated that professional self-awareness develops through stages and requires sustained institutional support. The four-stage technology provides exactly this staged, supported development. Djurayev and Turgunov (2006) argued that pedagogical mastery is formed through the technology of graduated professional development, and the proposed technology applies this principle specifically to reflective competence. Ishmuhamedov, Abduqodirov, and Pardayev (2008) emphasized that innovative educational technologies must be interactive, student-centred, and experientially grounded, and these principles are reflected in the methods and activities of each stage.

Several important distinctions should be noted. First, the proposed technology is not a single course but a cross-curricular system that spans the entire period of university preparation. This distinguishes it from isolated reflective activities that may appear in individual courses without being part of a coherent developmental plan. Second, the technology defines not only what students should do but also how their reflective development should be assessed at each stage. This assessment dimension is often missing from discussions of reflective practice, which tend to advocate reflection without specifying how to measure reflective growth. Third, the technology includes both face-to-face and digital tools, recognizing that contemporary teacher education must prepare students to reflect using the full range of available technologies.

Limitations should be acknowledged. The technology is presented as a theoretical design and has not yet been empirically tested. While each component is grounded in established theory and evidence, the specific combination and staging proposed here require empirical validation. The effectiveness of the technology may vary depending on institutional resources, instructor competence, student characteristics, and cultural factors. The developmental timeline - orientation in years one to two, analytical in years two to three, constructive in years three to four, autonomous in year four and beyond - is approximate and may need adjustment for different programme structures.

For practical implementation, the discussion suggests that pedagogical universities should begin by conducting an audit of existing reflective activities

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across their programmes, identifying gaps and disconnections. A working group of faculty members across departments should then map the four-stage technology onto the existing curriculum, identifying which courses and practicum experiences can host each stage's activities. Faculty development should be organized to prepare instructors for their roles in the technology. Pilot implementation in a single programme, with careful documentation and evaluation, should precede full-scale adoption.

Conclusion

The pedagogical technology for preparing future teachers based on the development of reflective abilities consists of four progressive stages - orientation, analytical, constructive, and autonomous - that systematically develop five components of reflective ability: self-observation, analytical deconstruction, evaluative judgement, constructive redesign, and metacognitive regulation. Each stage is defined by specific goals, content, methods, tools, and assessment criteria, creating a complete technological model that transforms reflective development from an abstract aspiration into a structured, measurable, and reproducible process.

The main conclusion of the study is that reflective ability develops most effectively when it is treated as a deliberately engineered professional capacity rather than as a natural by-product of teaching experience. Students do not become reflective simply by encountering challenges in teaching practice. They become reflective when a systematic technology provides them with the conceptual frameworks, procedural tools, experiential opportunities, and diagnostic feedback necessary for progressive reflective growth. The proposed technology provides this systematic support while maintaining the ultimate goal of autonomous reflective practice that sustains professional development throughout the teaching career.

Further research should focus on empirical testing of the four-stage technology in pedagogical university settings, development and validation of assessment instruments for each stage and each component of reflective ability, longitudinal tracking of reflective development from the orientation stage through early professional practice, comparative studies of reflective development in programmes that implement the technology and those that do not, and investigation of the cultural and institutional factors that facilitate or hinder reflective development in the Uzbek educational context.

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