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METHODOLOGY FOR DEVELOPING THE PROFESSIONAL COMPETENCE OF PROSPECTIVE PRIMARY SCHOOL TEACHERS BASED ON PEDAGOGICAL COACHING AND ARTIFICIAL INTELLIGENCE

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Abstract. This article theoretically and methodologically substantiates a methodology for developing the professional competence of prospective primary school teachers through the integration of pedagogical coaching and artificial intelligence (AI) tools. The methodology combines the competency-based approach, reflective practice, collaborative learning, microteaching, criterion-referenced assessment (rubric/checklist), and multi-source feedback (self/peer/mentor) into a single cyclical framework. AI tools support the methodological process as a "coach assistant" by preparing a bank of powerful questions for GROW sessions, structuring reflective journals, identifying rubric indicators on the basis of evidence, and generating alternative individualized improvement plans. The article proposes stages for an 8–12-week module, monitoring indicators, a lesson analysis rubric, and a sample peer-feedback protocol. Ethical safety principles such as privacy, fairness, human-in-the-loop, and academic integrity are presented as essential methodological conditions. As a result, an integrated methodological solution has been developed to support the step-by-step development of the prospective teacher's methodological-didactic, assessment, communicative, and reflective competences on the basis of evidence.

Keywords: pedagogical coaching, artificial intelligence, professional competence, GROW, microteaching, rubric, peer feedback, reflective journal, formative assessment.

Introduction

The preparation of prospective primary school teachers in higher education today cannot be limited to "theoretical knowledge" alone; they must be able to demonstrate lesson planning, classroom management, assessment, communication, and reflection skills in conditions that are close to real-life situations. International studies show that teachers' professional growth is strongly linked to continuous learning, collegial collaboration, and evidence-based analysis [2; 3]. From this perspective, for the development of a prospective teacher's professional competence, the mechanisms of "practical trial + criterion-based analysis + developmental feedback + reflection" should function within a unified system.

The pedagogical coaching approach supports precisely this kind of systematic development: it cultivates in learners the ability to set goals, view a situation through evidence, generate options, and adopt a clear action plan [4; 5]. However, the impact of coaching becomes much stronger when it is integrated with practical training (microteaching), assessment based on rubrics/checklists, peer feedback, and reflective journaling [9–11]. With the emergence of AI tools in education, opportunities have expanded to organize, personalize, and monitor this integration more effectively. At the same time, the use of AI tools requires ethical safeguards such as privacy, fairness, academic integrity, and human oversight as mandatory conditions. International recommendations on AI in education emphasize precisely the priority of responsible and ethical use.

The purpose of this article is to substantiate an integrated methodology for developing the professional competence of prospective primary school teachers through the integration of pedagogical coaching and artificial intelligence, and to propose practical tools such as a rubric, checklist, peer-feedback protocol, and monitoring indicators.

Research Methodology and Literature Review

The article applies theoretical analysis, modeling, and methodological design approaches. Professional competence is interpreted as the integration of "knowledge–skills–attitudes–experience," and the necessity of demonstrating learning outcomes through observable indicators is substantiated [2; 3; 12]. The collaborative philosophy of coaching and the GROW model (Goal–Reality–Options–Will) were accepted as a

methodological framework for structuring the session process [5]. Reflective practice was explained as the internal mechanism of professional development based on Schön's concept [6], while the cycle of "experience–analysis–conclusion–retrial" was linked to Kolb's approach [7]. Scientific evidence on the effectiveness of formative assessment and feedback [9; 10], as well as the influence of peer assessment on collaboration and self-regulation [11], strengthened the core components of the methodology.

In the methodology, AI tools are positioned not as "decision-makers instead of the teacher," but rather as a "coach assistant," that is, as a supportive instrument for generating question variants, structuring analysis, organizing evidence, and facilitating planning. In the use of AI in education, a responsible approach based on human-in-the-loop, transparency, fairness, and safety is aligned with international recommendations and policy documents.

Main Part

1. Structure of Professional Competence and the Logic of Its Development

The professional competence of a prospective primary school teacher is manifested in the following key areas:

1. **Methodological-didactic competence** (defining objectives and outcomes, lesson design, selecting methods);
2. **Assessment competence** (criterion-based assessment, formative feedback, transparency);
3. **Communicative competence** (questioning culture, active listening, collaboration);
4. **Classroom management** (time, discipline, student engagement, inclusive environment);
5. **Reflective competence** (evidence-based analysis, conclusions, and planning) [2; 3; 12].

In competence development, the cycle of "practical trial (microteaching) → evidence collection (video/observation) → analysis using rubric/checklist → planning through coaching questions → retrial" is substantiated as the most effective mechanism [6; 7; 9; 10]. When repeated, this cycle transforms the teacher's experience from a "simple attempt" into "evidence-based professional growth."

2. Integration of Pedagogical Coaching and AI: Functions of the "Coach Assistant"

In the proposed methodology, AI tools are used in the following six areas, all under teacher/mentor supervision:

1. **GROW question bank:** generating variations of questions that clarify goals, direct attention to evidence, broaden options, and break action plans into small steps [5; 6].

2. **Rapid lesson design check:** creating checklist reminders regarding indicators such as alignment between objectives and outcomes, time allocation, and the presence or absence of assessment criteria in the lesson plan [10].

3. **Linking rubric indicators to evidence:** organizing evidence obtained from video/observation (for example, length of instruction, types of questions, interruptions in timing) as observed facts corresponding to rubric criteria. The evaluation is made by the mentor; AI only organizes the evidence [9; 10].

4. **Structuring the peer-feedback protocol:** standardizing feedback in the format "Strength – Evidence – Suggestion – Next step" [11].

5. **Scaffolding the reflective journal:** systematizing reflection through weekly templates such as "Goal → Evidence → Analysis → Conclusion → Next step" [6].

6. **Personalized improvement planning:** offering 2–3 minimal-action alternatives for "+1 level growth," while the final choice is made by the student and mentor [5; 7].

This integration should comply with the principles of the responsible use of AI in education: privacy, fairness, transparency, and human oversight are methodological requirements.

3. Integrated Methodology: An 8–12-Week Module Model

The methodology is implemented in higher education within an 8–12-week module and operates in three stages:

A) Diagnostic Stage (Week 1)

- Initial microteaching (7–10 minutes) with video/observation;
- "Start profile" based on the rubric (mentor assessment + self-assessment);
- Coaching session to identify the "two most important growth points" [5; 10; 11].

B) Intervention Stage (Weeks 2–10)

A weekly recurring cycle: **Coaching session (GROW) → Microteaching → Analysis based on video/observation → Rubric/checklist → Peer feedback → Reflective journal → Repeated micro-lesson**

C) Final Assessment Stage (Final Week)

- Final microteaching + rubric;
- Portfolio (lesson plan, rubric sheets, peer-feedback protocols, reflective entries);
- Growth dynamics: "before–after" comparison [9–11].

4. Tables and Instruments

Table 1. Components of the Integrated Model and the Competences Developed

Component	Main Function	Competence Developed
Coaching session (GROW)	goal–evidence–options–plan	reflection, planning, communication
AI "coach assistant" (under supervision)	question bank, template, structuring	quality of reflection, clarity of planning
Microteaching	practical trial	methodological competence, classroom management
Video/observation evidence	objective analysis	lesson analysis, reflection
Rubric/checklist	criterion-based assessment	assessment competence
Peer-feedback protocol	collaborative reflection	communicative competence, collaboration
Reflective journal/portfolio	documenting growth	professional self-regulation

Table 2. Lesson Analysis Rubric (Short Model)

Criterion	A — Low	B — Medium	C — High
Clarity of objectives and outcomes	objectives are unclear	objectives exist, but measurement is weak	objectives are clear, and outcome indicators are specified

Quality of instruction	long / unclear	understandable, but checking is insufficient	short, clear, and comprehension is checked
Questioning and activation of thinking	too many reproductive questions	mixed	questions encouraging thinking predominate
Time management	stages are interrupted	partial	clear distribution, rhythm maintained
Classroom management	noise / scattered attention	partially managed	preventive strategies and clear signals/rules are used
Transparency of assessment	criteria not provided	criteria exist, but are applied inconsistently	criteria are clear and assessment is evidence-based
Differentiated approach	same for all	partial	tasks/support are provided for different levels

5. Monitoring Indicators (Minimum Package)

It is proposed to monitor the effectiveness of the methodology not by "impression," but through evidence-based indicators:

1. **Planning indicator:** the objective is SMART, measurement is specified; the plan is in the format "who–when–what" [5; 10].

2. **Methodological indicator:** instructions become shorter, questions become more analytical, and lesson rhythm is restored [10].

3. **Assessment indicator:** rubric criteria are clearly stated at the beginning of the lesson, and feedback follows the logic of "fact → impact → next step" [9; 10].

4. **Collaboration indicator:** regularity of peer feedback and its basis in evidence [11].

5. **Reflection indicator:** the structure "evidence → conclusion → next step" is maintained in the journal [6; 7].

6. Ethical and Methodological Safety Conditions

In the integration of AI, the following conditions must be strictly observed:

- **Privacy:** video/observation materials must be used in a closed environment with permission; personal data must not be disclosed.
- **Human-in-the-loop:** rubric scoring and final pedagogical decisions are made by the mentor/committee; AI serves only as an assistant.
- **Transparency:** the student records in the reflective journal at which stage AI support was used.
- **Fairness:** AI suggestions should be treated not as absolute truth, but as alternatives; the possibility of stereotypes or biases must be monitored.

Conclusion

In conclusion, the integration of pedagogical coaching and artificial intelligence makes it possible to organize the development of the professional competence of prospective primary school teachers in a systematic, evidence-based, and personalized way. In this methodology, the coaching session clarifies the student's goals, microteaching creates a real field for practical testing, and video/observation evidence transforms lesson analysis from subjective impression into objective fact. Rubrics and checklists make assessment criterion-based, peer feedback strengthens the culture of collaboration and self-regulation skills, and the reflective journal documents the dynamics of growth. Overall, AI tools, acting as a "coach assistant," increase the effectiveness of the methodological process by facilitating question generation, structuring reflection, and supporting planning; however, this produces the expected results only when ethical safeguards and human oversight are ensured. As a result, the prospective teacher gradually strengthens lesson planning, assessment, communication, and reflection competences and learns to manage their own professional growth on the basis of evidence.

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