Published Date: - 25-11-2025
Page No: - 258-260

IMPROVING THE PROFESSIONAL AND METHODOLOGICAL TRAINING OF PRE-SERVICE BIOLOGY TEACHERS DURING PEDAGOGICAL PRACTICE

Aliyeva Mavjudaxon
Department of biology at Kokand state university, Uzbekistan

Abstract
The article looks at how to make the professional and methodological training of biology teachers who are just starting out better during their teaching practice. It contends that school-based practicum constitutes an essential setting for the integration of subject knowledge, pedagogical content knowledge, and classroom skills into a cohesive professional identity. Based on recent studies in biology teacher education and reflective practice, this paper presents a model that integrates structured mentoring, inquiry-based lesson design, and systematic reflection on teaching experiences. The analysis indicates that when pedagogical practice is structured as a research-informed, collaboratively supervised process, pre-service biology teachers exhibit enhanced methodological competence, confidence, and preparedness for independent teaching.

Keywords
Pre-service biology teachers, pedagogical practice, methodological training, pedagogical content knowledge, reflective practice.

Introduction
The quality of pedagogical practice in many teacher education programs determines whether knowledge gained in theory becomes stable professional competencies. This stage is especially important for future biology teachers because they have to learn a lot of complicated scientific material, choose age-appropriate ways to teach it, and handle a wide range of interactions in the classroom all at once. International research indicates that pre-service teachers frequently encounter difficulties in linking theoretical coursework to actual classroom requirements and in converting general pedagogical principles into specific lesson plans and instructional strategies in biology. These challenges underscore the necessity for a more structured and research-informed organization of pedagogical practice that emphasizes professional and methodological training.

The article is predicated on a conceptual and descriptive analysis that integrates findings from recent studies concerning initial biology teacher education, pedagogical practice, and the advancement of pedagogical content knowledge. We looked at theoretical ideas about practice-based teacher education, apprenticeship models, and reflective practice to find out what makes for good methodological training. Quantitative and qualitative studies examining pre-service biology teachers' lesson planning, classroom implementation, and reflective writing were analyzed to identify essential mechanisms that facilitate the development of methodological competence during practicum. Based on this, a practice-oriented model was created that

focuses on mentoring, looking into one's own teaching, and the purposeful use of both digital and traditional teaching materials in biology classes.

The analysis identified multiple interrelated factors that enhance the professional and methodological training of pre-service biology teachers during pedagogical practice. Mentoring relationships that are well-organized, with university supervisors and school mentors both responsible for helping the student teacher, help to close the gap between what students need to learn in school and what they actually do in the classroom. Regular joint planning, observation, and post-lesson conferences provide a structure for talking about methodological choices in relation to specific learning goals. Inquiry-based lesson design, in which pre-service teachers establish learning objectives, predict common student misconceptions, and devise formative assessment strategies, enhances their pedagogical content knowledge and promotes a more profound comprehension of the biology curriculum. Systematic reflection, facilitated by reflective diaries, video lesson analysis, and peer feedback, empowers student teachers to discern recurring patterns in their teaching, acknowledge both effective and ineffective habits, and reconstruct their practice based on evidence rather than intuition.

Interpreting these findings in the context of the broader literature on science teacher education indicates that the organization of the practicum significantly influences the methodological development of prospective biology teachers. When pedagogical practice is limited to classroom management and the completion of formal documentation, it often perpetuates conventional teaching methods and fails to enhance methodological competence. A practicum, on the other hand, is purposefully set up as a learning space with clear goals for experimentation, analysis, and reflection. This makes it a catalyst for professional growth. Joint lesson planning and post-lesson analysis compel pre-service biology teachers to rationalize their methodological decisions and explore alternative strategies. Reflective instruments like structured diaries and guided inquiries facilitate the incremental development of professional vision, whereas the incorporation of simulations, virtual laboratories, and digital formative assessment tools enhances the array of pedagogical strategies and aligns practicum with modern trends in biology education.

Enhancing the professional and methodological training of pre-service biology teachers during pedagogical practice necessitates a transition from perceiving practicum as a mere testing ground to conceptualizing it as a structured environment for practice-based learning. The examination of theoretical and empirical studies, along with the proposed model, demonstrates that effective methodological training is founded on three essential components: coordinated mentoring, inquiry-based lesson design, and systematic reflection facilitated by suitable tools. In these circumstances, student teachers are more inclined to cultivate substantial pedagogical content knowledge, adaptable methodological strategies, and a reflective disposition regarding their own practice.

REFERENCES

1. Fernandes G. N. M. Pedagogical practices in initial biology teacher training: strategies and challenges // RCMOS – Multidisciplinary Scientific Journal of Knowledge. 2025. Vol. 7, No. 3. P. 1–19.

2. Diem H. T. T., et al. Exploring practical pedagogy in high school biology education: a qualitative study of pre-service teachers // European Journal of Educational Research. 2024. Vol. 13, No. 2. P. 557–570.

3. Offermann M., et al. Development of pre-service biology teachers' intention to implement digital incremental scaffolds // Frontiers in Psychology. 2025. Vol. 16. P. 1–14.

4. Sæleset J., et al. Pre-service science teachers' pedagogical content knowledge: integrating students' understanding in instructional design // Eurasia Journal of Mathematics, Science and Technology Education. 2021. Vol. 17, No. 7. P. 1–17.

5. Etkina E., Gregorcic B., Vokos S. Development of habits through apprenticeship in a community: a conceptual model of teacher preparation // Physical Review Special Topics – Physics Education Research. 2015. Vol. 11, No. 2. P. 1–18.