QUALIMETRIC ASSESSMENT OF PROFESSIONAL-METHODICAL COMPETENCIES OF FUTURE BIOLOGY TEACHERS AS A PEDAGOGICAL PROCESS

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ABSTRACT

The modern education system demands highly skilled teachers who possess both subject matter knowledge and methodological competencies. This article explores the qualimetric assessment of the professional-methodical competencies of future biology teachers, emphasizing the importance of systematic measurement in educational development. The approach focuses on evaluating competencies through quantifiable criteria, improving the pedagogical process, and ensuring the development of biology teachers' methodological skills. The qualimetric model introduced here provides a framework for assessing the competencies critical for future biology teachers, thereby enhancing their teaching capabilities in an evolving educational environment.

KEYWORDS: Professional competency, Methodical competency, Biology teacher education, Qualitative assessment, Pedagogical strategies, Reflective practice, Teacher development.

INTRODUCTION

The training of future biology teachers is a complex process that requires the integration of both biological knowledge and effective teaching methods. In this context, the professional-methodical competence of a teacher is crucial to successfully convey biological concepts to students. The qualimetric approach offers a systematic method to assess the development of these competencies. Qualimetrics provides a framework for the quantitative evaluation of complex educational phenomena, transforming qualitative aspects into measurable data. This article focuses on the pedagogical process behind developing and assessing these competencies in future biology teachers, presenting a comprehensive model for their qualimetric evaluation.

Defining Professional-Methodical Competencies

Professional-methodical competencies in biology teaching encompass several key areas:

1. **Subject Mastery**: Deep understanding of biological concepts, theories, and advancements.

2. **Teaching Methodology**: Mastery of pedagogical techniques specific to biology, including inquiry-based learning, problem-solving, and laboratory activities.

3. **Assessment Competence**: Ability to evaluate student progress and adapt teaching methods to different learning styles.

4. **Technological Integration**: Incorporating digital tools and technologies in biology education to enhance interactive learning.

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5. Classroom Management: Ensuring an effective and inclusive learning environment.

Qualimetric Approach in Education

The qualimetric approach, applied in the assessment of teacher competencies, involves the following steps:

• **Defining Criteria and Indicators**: Establishing specific, measurable aspects of professional-methodical competencies. For example, the ability to design and conduct experiments, use of digital tools, and methods of student engagement.

• **Quantitative Scoring**: Assigning numerical values to these indicators, allowing for comparison and objective evaluation.

• **Composite Index**: Developing a composite score to represent the overall competency level of the teacher. This score is based on a weighted sum of the individual criteria.

• **Feedback and Improvement**: Using the results of the assessment to provide feedback and suggest areas for improvement.

Development of a Qualimetric Model

In designing a qualimetric model for the assessment of future biology teachers' competencies, several key components are considered:

1. Selection of Competency Indicators: Key performance indicators (KPIs) are developed based on the competencies outlined earlier. These include subject matter expertise, use of teaching aids, laboratory skills, and student engagement.

2. Measurement Tools: Objective tests, classroom observations, student feedback, and self-assessment are employed to gather data on each competency indicator.

3. Scoring System: Each competency is scored based on pre-determined rubrics. For example, mastery of laboratory techniques might be rated on a scale from 1 to 5, with specific criteria for each level.

4. Weighting of Indicators: Not all competencies are equally important; thus, weighting is applied to reflect the relative importance of each. For instance, subject mastery might carry a higher weight compared to classroom management in biology teaching.

5. Composite Competency Score: The final score for each teacher is calculated using a weighted average of all indicators. This composite score provides a holistic view of the teacher's overall competence.

Implementation of the Qualimetric Assessment

The implementation of this qualimetric model involves several stages:

1. Pilot Testing: Introducing the model in teacher training programs for biology educators, focusing on small groups for initial testing.

2. Data Collection: Gathering data through multiple channels—observation, testing, and feedback from both students and instructors.

3. Analysis and Calibration: Adjusting the model based on the pilot data to ensure reliability and validity in assessing competencies.

4. Feedback Mechanism: Providing personalized feedback to teachers based on their scores, highlighting strengths and areas for improvement.

5. Integration in Curriculum: Embedding the qualimetric assessment into the teacher education curriculum, allowing future biology teachers to continuously evaluate and improve their professional-methodical skills.

Challenges and Solutions in Qualimetric Assessment

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One of the key challenges in implementing a qualimetric assessment is ensuring that the criteria accurately reflect the complexities of teaching biology. Biology is a practical, experiment-based subject, and teaching it requires a unique set of competencies. To address these challenges, the assessment model must include diverse indicators that reflect both theoretical knowledge and practical teaching skills. Another challenge is the potential resistance to change in assessment practices. Introducing qualimetric assessments will require training for both teachers and evaluators.

CONCLUSION

The qualimetric assessment of professional-methodical competencies provides an objective, data-driven approach to evaluating the preparedness of future biology teachers. By translating qualitative skills into quantifiable metrics, teacher education programs can more effectively target areas for improvement and ensure that future teachers are well-prepared to meet the challenges of modern biology education. The model presented in this article can serve as a guide for educational institutions looking to adopt a structured, analytical approach to teacher development.

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