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METHODOLOGICAL APPROACHES TO DEVELOPING FUNCTIONAL LITERACY THROUGH INTERDISCIPLINARY INTEGRATION

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Abstract: This article explores methodological approaches for developing the functional literacy of future chemistry teachers based on PISA assessments. The study emphasizes various forms of literacy, including mathematical, scientific, financial, global competence, and creative thinking. Furthermore, task samples developed using problem-based technology, FSMU, and Delphi techniques are presented. Practical recommendations based on the research outcomes are also provided.

Keywords: functional literacy, PISA, methodology, chemistry teacher, competence

Introduction

Modern education demands not only the acquisition of knowledge by students but also the development of functional literacy, which enables them to solve real-life problems. PISA assessments reveal the importance of mathematical, scientific, financial, and global competencies, as well as creative thinking, particularly for future educators. Therefore, equipping prospective chemistry teachers with methodological training in these areas is crucial. They must be capable of fostering internationally recognized competencies in their students.

Literature Review

This study is based on literature by authors such as Shernazarov I.E., Iskandarov O.Y., and Khasanova S.G‘., who have developed PISA-contextualized chemistry tasks. Key components of PISA scientific knowledge, methodological understanding, and epistemic awareness - have been thoroughly analyzed. The review highlights the significance of teacher competence, as an educator who lacks high-level functional literacy cannot effectively transfer these skills to learners. [1-2].

Methodology

The following methodological approaches were employed:

- Problem-based technology to address real-life issues;
- FSMU (F — State your opinion, S — Support it with a reason, E — Provide an example, C — Conclude or summarize) technique to develop critical thinking;
- Delphi technique for collective evaluation and refinement of solutions;
- Situational method for simulating professional scenarios;
- Concept analysis method to master core subject-specific terminology.

Tasks were developed in alignment with PISA criteria, ensuring real applicability in the classroom and measurable outcomes. [3-4].

Results

The developed tasks yielded the following results:

- Practical tasks involving marble and acetic acid were used to enhance scientific literacy;
- Exercises on calculating averages and analyzing graphs were created to develop mathematical literacy;
- Discussion questions based on ecological issues promoted global competence;
- Logic-based math problems were used to improve financial literacy;
- Creative thinking was enhanced through structured opinion-based reasoning exercises (FSMU).

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Each task was designed to broaden students' thinking and encourage independent decision-making in real contexts. [5-6].

Discussion

The findings confirm the importance of interactive methods in developing functional literacy. PISA-aligned chemistry tasks significantly improve students' problem-solving, analytical, decision-making, and evaluation skills. Teachers can implement these tasks in regular classes, extracurricular activities, and self-guided learning. A teacher's modern methodological competence directly influences education quality and student development.

Conclusion

The use of competency-based tasks is a vital tool in preparing future chemistry teachers in accordance with modern educational standards. These methods and approaches play a significant role in preparing for PISA assessments and in enhancing teacher qualifications. Continuous development of digital literacy, integration of international best practices into the educational process, and reflective teaching (the ability to analyze one's own practice) are essential components of a successful educator's profile.

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