THE ROLE OF THE METHOD OF TEACHING CHEMISTRY TO STUDENTS USING

THE "ASSESSMENT" METHOD

Choriqulova Dildora Oʻtkirjon qizi¹ *E-mail: dildoradda@gmail.com* Pardayev Ulug'bek Xayrullo o'g'li² *E-mail: pardayevulugbek125@gmail.com* Kosimova Xurshida Rajabboyovna² *E-mail: kosimovaxurshida82@gmail.com* Jamolova Nodirabegim Jobirovna¹

E-mail: jamolovanodirabegim@gmail.com

Organization: 1 – Bukhara State Pedagogical Institute. Uzbekistan, Bukhara, Piridastgir street, 2. 2 – Uzbekistan-Finland Pedagogical Institute. Uzbekistan, Samarkand, Spitamen branch street,

166.

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Abstract. In the realm of chemistry education, the choice of teaching methodology plays a pivotal role in shaping students' understanding and proficiency in the subject. This article delves into the specific approach known as the "Assessment" method and thoroughly investigates its role in teaching chemistry to students. Through a meticulous examination of relevant literature, pedagogical practices, and empirical studies, this paper elucidates the principles, benefits, and challenges associated with employing the "Assessment" method in chemistry education. The "Assessment" method emphasizes continuous evaluation and feedback as integral components of the learning process. Unlike traditional instructional approaches, this method places a strong emphasis on formative assessment techniques, such as quizzes, concept maps, and peer evaluations, to gauge student understanding and facilitate learning progress. Additionally, summative assessments are employed to measure overall achievement and provide insights into areas for improvement.

Keywords: chemistry education, teaching methodology, assessment method, formative assessment, summative assessment, continuous evaluation, feedback, student engagement, self-regulated learning, metacognitive awareness, critical thinking, problem-solving skills, conceptual understanding, instructional alignment, assessment validity.

РОЛЬ МЕТОДИКИ ОБУЧЕНИЯ ХИМИИ УЧАЩИХСЯ С ИСПОЛЬЗОВАНИЕМ МЕТОДА «ОЦЕНКА»

Аннотация. В сфере химического образования выбор методики преподавания играет решающую роль в формировании понимания и владения учащимися предметом. В

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этой статье рассматривается конкретный подход, известный как метод "Assessment", и подробно исследуется его роль в преподавании химии студентам. Благодаря тщательному изучению соответствующей литературы, педагогической практики и эмпирических исследований в этой статье раскрываются принципы, преимущества и проблемы, связанные с использованием метода "Assessment" в химическом образовании. Метод "Assessment" подчеркивает постоянную оценку и обратную связь как неотъемлемые компоненты процесса обучения. В отличие от традиционных подходов к обучению, этот метод уделяет большое внимание методам формирующего оценивания, таким как викторины, концептуальные карты и коллегиальная оценка, чтобы оценить понимание учениками и облегчить прогресс в обучении. Кроме того, суммативное оценивание используется для измерения общих достижений и выявления областей, требующих улучшения.

Ключевые слова: химическое образование, методология преподавания, метод оценки, формативная оценка, суммативная оценка, непрерывная оценка, обратная связь, вовлечение учащихся, саморегулируемое обучение, метакогнитивная осведомленность, критическое мышление, навыки решения проблем, концептуальное понимание, согласованность инструкций, валидность оценки.

Introduction: In the dynamic landscape of education, the method of teaching plays a crucial role in shaping students' learning experiences and outcomes, particularly in disciplines like chemistry that demand both conceptual understanding and practical application. Among the myriad teaching methodologies available, the "Assessment" method emerges as a prominent approach, emphasizing continuous evaluation and feedback as integral components of the learning process. This article seeks to explore the nuanced role of the "Assessment" method in teaching chemistry to students, examining its principles, benefits, challenges, and implications for educational practice.

Chemistry education stands at the intersection of theory and experimentation, requiring students to grasp complex concepts while developing practical laboratory skills.^[1] Traditionally, instructional approaches in chemistry often centered on lectures, textbooks, and laboratory experiments, with assessment relegated to occasional tests and exams. However, the "Assessment" method challenges this conventional paradigm by foregrounding assessment as an integral aspect of teaching and learning. At its core, the "Assessment" method adopts a holistic approach to evaluation, encompassing both formative and summative assessment strategies.

NEW RENAISSANCE international scientific journal *ResearchBib IF-2023: 11.01, ISSN: 3030-3753, Valume 1 Issue 9* Formative assessments, such as quizzes, concept maps, and peer evaluations, serve to gauge student understanding, identify misconceptions, and provide timely feedback for course

correction. In contrast, summative assessments, including exams, projects, and presentations, offer comprehensive evaluations of student achievement and proficiency in chemistry. The shift towards the "Assessment" method reflects broader pedagogical trends emphasizing active learning, student-centered instruction, and metacognitive development. By integrating assessment tasks seamlessly into instructional activities, educators can foster a dynamic learning environment that promotes critical thinking, problem-solving skills, and conceptual understanding among chemistry students. Moreover, the emphasis on continuous evaluation encourages self-regulated learning and metacognitive awareness, empowering students to monitor their progress, set goals, and reflect on their learning strategies. However, the implementation of the "Assessment" method is not without challenges. Educators must navigate issues of assessment validity, reliability, and fairness, ensuring that assessment tasks align with instructional objectives and accurately measure student learning. Moreover, the transition to a more assessment-driven approach requires careful consideration of instructional design, curriculum alignment, and feedback mechanisms to optimize student engagement and learning outcomes.^[2,3]

Literature analysis and methodology: The literature analysis for this article involves a thorough examination of scholarly works, research studies, and pedagogical resources related to the role of the "Assessment" method in teaching chemistry to students. Key themes to be explored include the principles and theoretical foundations of assessment-driven instruction, empirical evidence supporting the effectiveness of the "Assessment" method, and challenges associated with its implementation in chemistry education.

1. Principles of Assessment-Driven Instruction:

• The literature review will delve into the theoretical underpinnings of the "Assessment" method, exploring its alignment with constructivist learning theories, active learning approaches, and principles of formative assessment.

• Key concepts such as feedback loops, metacognitive awareness, and self-regulated learning will be examined to elucidate their role in facilitating student engagement and conceptual understanding in chemistry education.

2. Empirical Evidence and Best Practices:

• Empirical studies examining the impact of the "Assessment" method on student learning outcomes in chemistry will be reviewed, with a focus on quantitative assessments of knowledge acquisition, problem-solving skills, and laboratory proficiency.



• Best practices and case studies illustrating successful implementations of the "Assessment" method in chemistry classrooms will be analyzed to identify strategies for optimizing instructional design, assessment tasks, and feedback mechanisms.^[2,4]

3. Challenges and Considerations:

• The literature analysis will also address challenges associated with the implementation of the "Assessment" method in chemistry education, including issues of assessment validity, reliability, and fairness.

•Considerations related to instructional alignment, curriculum design, and student diversity will be explored to provide insights into overcoming barriers to effective assessment-driven instruction.

The methodology employed in this article encompasses a systematic review of literature, qualitative analysis of empirical studies, and synthesis of best practices in chemistry education.

A.Literature Review:

• A comprehensive search will be conducted across academic databases, including PubMed, ERIC, Web of Science, and Google Scholar, using relevant keywords such as "Assessment method," "chemistry education," and "student learning outcomes."

•Selected literature will be critically evaluated to identify key themes, theoretical frameworks, and empirical evidence related to the role of the "Assessment" method in teaching chemistry to students.

B.Qualitative Analysis:

• Qualitative analysis techniques, such as thematic analysis, will be employed to identify recurring themes, patterns, and critical insights emerging from the reviewed literature.

• Themes will be organized around key topics, including the principles of assessment-driven instruction, empirical evidence supporting its effectiveness, and challenges in its implementation.

C.Synthesis and Discussion:

• The findings from the literature analysis will be synthesized to provide a comprehensive overview of the role of the "Assessment" method in teaching chemistry to students.

•The discussion section will critically examine the implications of the findings, identify areas for further research, and offer recommendations for educators seeking to implement assessment-driven approaches in chemistry education.

Through a rigorous literature analysis and qualitative synthesis, this article aims to provide valuable insights into the role of the "Assessment" method in teaching chemistry to students,

offering guidance for educators seeking to enhance their instructional practices and optimize student learning outcomes in the field of chemistry.^[5]

Results: The results of this study provide a comprehensive understanding of the role of the "Assessment" method in teaching chemistry to students, highlighting its impact on learning outcomes, student engagement, and instructional practices.

1. Enhanced Learning Outcomes:

•Empirical evidence suggests that the "Assessment" method contributes to enhanced learning outcomes in chemistry education. Formative assessments, such as quizzes and concept maps, enable students to monitor their understanding of key concepts in real-time, identify misconceptions, and receive timely feedback for course correction. Moreover, summative assessments provide comprehensive evaluations of student achievement, proficiency, and conceptual understanding in chemistry.

• Studies have demonstrated that students taught using the "Assessment" method exhibit higher levels of knowledge acquisition, problem-solving skills, and laboratory proficiency compared to those taught using traditional instructional approaches. The continuous feedback loop inherent in the "Assessment" method fosters metacognitive awareness and self-regulated learning, empowering students to take ownership of their learning journey and make informed decisions about their study strategies.^[6]

2.Increased Student Engagement:

• The "Assessment" method promotes active engagement and participation among students in chemistry classrooms. By integrating assessment tasks seamlessly into instructional activities, educators create a dynamic learning environment that encourages critical thinking, collaborative learning, and knowledge construction. ^[7] Formative assessments, in particular, provide opportunities for peer collaboration, discussion, and reflection, enhancing student engagement and motivation in the learning process.

• Studies have shown that students perceive the "Assessment" method as more engaging and interactive compared to traditional instructional approaches. The opportunity to receive regular feedback, engage in self-assessment, and track their progress promotes a sense of ownership and responsibility for learning outcomes, leading to increased motivation and persistence among students.

3. Optimized Instructional Practices:

•Educators who adopt the "Assessment" method in teaching chemistry benefit from optimized instructional practices that prioritize student-centered learning, active participation, and

differentiated instruction. The emphasis on continuous evaluation and feedback encourages educators to adapt their teaching strategies in response to student needs, preferences, and learning styles.

•Best practices in assessment-driven instruction include the use of a variety of assessment tools and techniques, alignment of assessment tasks with instructional objectives, and incorporation of student feedback into instructional design. Moreover, the "Assessment" method promotes a culture of assessment literacy among educators, fostering ongoing reflection, professional development, and continuous improvement in teaching practices.^[8,9]

Discussion: The discussion section of this article delves into the implications of the findings presented regarding the role of the "Assessment" method in teaching chemistry to students. It critically analyzes the impact of assessment-driven instruction on learning outcomes, student engagement, and instructional practices, while also addressing potential challenges and considerations for educators.

Enhancing Learning Outcomes:

The discussion highlights the significant contribution of the "Assessment" method to enhancing learning outcomes in chemistry education. By providing continuous evaluation and feedback, formative assessments enable students to monitor their understanding, identify misconceptions, and refine their learning strategies. Moreover, summative assessments offer comprehensive evaluations of student achievement and proficiency, providing valuable insights into areas for improvement. The findings underscore the importance of assessment-driven instruction in promoting knowledge acquisition, problem-solving skills, and conceptual understanding among chemistry students.

Fostering Student Engagement:

Assessment-driven instruction is shown to foster increased student engagement and participation in chemistry classrooms. The integration of assessment tasks into instructional activities promotes active learning, collaboration, and knowledge construction among students.

Formative assessments, in particular, provide opportunities for peer interaction, discussion, and reflection, enhancing student motivation and persistence in the learning process.^[10] The discussion emphasizes the role of the "Assessment" method in creating a dynamic learning environment that empowers students to take ownership of their learning journey and develop lifelong learning skills.

> Optimizing Instructional Practices:

Educators who embrace the "Assessment" method benefit from optimized instructional practices that prioritize student-centered learning, differentiation, and continuous improvement.

The emphasis on continuous evaluation and feedback encourages educators to adapt their teaching strategies to meet the diverse needs and preferences of students. Best practices in assessment-driven instruction include the use of a variety of assessment tools and techniques, alignment of assessment tasks with instructional objectives, and incorporation of student feedback into instructional design. The discussion highlights the importance of fostering a culture of assessment literacy among educators, promoting ongoing reflection, professional development, and collaboration in teaching practices.

Addressing Challenges and Considerations:

While the "Assessment" method offers numerous benefits, the discussion also acknowledges potential challenges and considerations for educators. Issues such as assessment validity, reliability, and fairness require careful attention to ensure that assessment tasks accurately measure student learning and achievement. Moreover, educators must navigate considerations related to instructional alignment, curriculum design, and student diversity to optimize the effectiveness of assessment-driven instruction. ^[11] The discussion emphasizes the importance of ongoing research, professional development, and collaboration to address these challenges and promote the continued advancement of assessment-driven approaches in chemistry education.

Conclusion: In conclusion, this article has provided a comprehensive exploration of the role of the "Assessment" method in teaching chemistry to students, highlighting its significance in enhancing learning outcomes, fostering student engagement, and optimizing instructional practices. Through a thorough analysis of empirical evidence, pedagogical principles, and best practices, several key insights have emerged. The "Assessment" method offers a powerful framework for promoting active learning and continuous improvement in chemistry education.

By integrating formative and summative assessment strategies seamlessly into instructional activities, educators create dynamic learning environments that empower students to monitor their progress, identify misconceptions, and refine their understanding of key concepts. Assessment-driven instruction promotes increased student engagement and participation in chemistry classrooms. The opportunity to receive regular feedback, engage in peer collaboration, and reflect on their learning experiences motivates students to take ownership of their learning journey and develop lifelong learning skills. Educators who embrace the "Assessment" method benefit from optimized instructional practices that prioritize student-centered learning, differentiation, and ongoing professional development. By aligning assessment tasks with instructional objectives, incorporating student feedback into instructional design, and fostering a culture of assessment

literacy, educators can create enriching learning experiences that meet the diverse needs and preferences of students.

However, the implementation of the "Assessment" method is not without challenges.

Educators must navigate issues related to assessment validity, reliability, and fairness, as well as considerations related to instructional alignment, curriculum design, and student diversity.

Addressing these challenges requires ongoing research, collaboration, and professional development to ensure the effectiveness of assessment-driven approaches in chemistry education.

The role of the "Assessment" method in teaching chemistry to students is multifaceted, encompassing principles of evaluation, feedback, and student empowerment. By leveraging assessment-driven instruction, educators can create enriching learning experiences that empower students to succeed in the field of chemistry and beyond. Through continued exploration, innovation, and collaboration, assessment-driven approaches will continue to play a pivotal role in shaping the future of chemistry education and fostering the development of knowledgeable, skilled, and engaged learners.

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