Active Learning as a Catalyst for Enhancing Engagement and Critical Thinking in Higher Education Chemistry Classes: A Perspective

Priy Brat Dwivedi
Assistant Professor, College of Engineering
National University of Science & Technology, Oman
Email: priydwivedi@nu.edu.om

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Abstract

Embracing active learning can transform chemistry education, preparing students for success in academia and beyond. This perspective study highlights the importance of active learning in chemistry education.

It discusses the limitations of direct teaching methods and emphasizes the benefits of active learning, including real-world application, collaborative skills, and problem-solving abilities.

This study acknowledges challenges in implementation, such as resistance to change and resource limitations, and suggests strategies to overcome them.

INTRODUCTION

Promoting creativity and critical thinking skills in education is crucial as it nurtures holistic growth in students, encompassing intellectual, emotional, and social dimensions. By equipping students with the necessary skills and mindset to adapt in a rapidly evolving world, fostering creativity becomes essential. Moreover, it encourages personal and cultural enrichment, stimulates innovation, and cultivates critical thinking abilities. Ultimately, the promotion of creativity in education benefits individuals and society as a whole, leading to well-rounded individuals capable of embracing the challenges of the future. (Khalil etal., 2023). As educators, it is our responsibility to create an environment that fosters the development of critical thinking skills in our students (van der Zanden etal., 2020). In the context of chemistry classes within higher education, traditional direct teaching methods may fall short in fully engaging students and cultivating their critical thinking abilities (Hafeez, 2021). This article explores the importance of active learning methods in enhancing students' engagement and critical thinking skills in chemistry classes, while also addressing the potential challenges in implementing these methods.

THE LIMITATIONS OF DIRECT TEACHING

Direct teaching, often characterized by lecturing and information delivery, has been the prevailing approach in many higher education settings. While this method can effectively convey information, it may not fully engage students or promote critical thinking. Passive listening and rote memorization are often the dominant activities, limiting students' opportunities to actively engage with the subject matter (Ghaleb, 2024; Tadeese etal., 2023).

THE BENEFITS OF ACTIVE LEARNING

Active learning, on the other hand, places students at the center of the learning experience, encouraging them to actively participate, analyze, and apply knowledge (Christianson, 2020). By incorporating active learning methods in chemistry classes, educators can create an environment that fosters deeper engagement and enhances critical thinking skills (Khalil etal., 2023).

One of the key benefits of active learning is that it allows students to connect theoretical concepts with real-world applications. Through hands-on experiments, problem-solving activities, and group discussions, students are encouraged to think critically, analyze data, and draw conclusions. This approach not only enhances their understanding of chemistry but also equips them with the skills needed to tackle complex problems in their future careers (Hafeez, 2021).

Active learning also promotes collaboration and communication skills. By working in groups, students learn to articulate their thoughts, listen to the perspectives of others, and engage in constructive dialogue. These collaborative experiences not only deepen their understanding of chemistry but also prepare them for the teamwork required in professional settings (Qureshi, 2023).

CHALLENGES IN IMPLEMENTING ACTIVE LEARNING METHODS

While the benefits of active learning are clear, implementing these methods in higher education chemistry classes can pose certain challenges. One such challenge is the resistance to change, both from educators and students. The traditional lecture-based approach has been deeply ingrained in educational systems, and transitioning to active learning requires a shift in mindset and teaching strategies (Owens, 2020; Børte, 2023).

Another challenge is the need for appropriate resources and infrastructure to support active learning. Laboratories, equipment, and technology are often essential for hands-on experiments and interactive activities. However, limited funding or outdated facilities can hinder the implementation of these methods (Børte, 2023).

Furthermore, larger class sizes can make it challenging for educators to provide individualized attention and guidance during active learning activities. This may require additional planning and organization to ensure that all students have meaningful opportunities to engage and develop their critical thinking skills.

OVERCOMING CHALLENGES AND EMBRACING ACTIVE LEARNING

To overcome these challenges, it is crucial for educators and institutions to prioritize the integration of active learning methods in chemistry classes. This can be done through professional development programs that equip educators with the necessary skills and strategies for effective implementation (Nguyen etal,, 2021).

Additionally, institutions should invest in modernizing and equipping laboratories and classrooms to support active learning activities (Tsalapatas, 2021). Collaborations with industry partners and access to external resources can also help address resource limitations.

Furthermore, educators should create a supportive and inclusive learning environment that encourages active participation and critical thinking. Providing regular feedback, fostering a culture of curiosity, and promoting open discussions are essential in nurturing students' confidence and motivation (Tripon, 2023).

CONCLUSION

Active learning methods have the potential to transform higher education chemistry classes by enhancing students' engagement and critical thinking skills (Singhal, 2020). By shifting from passive listening to active participation, educators can create a dynamic learning environment that prepares students for the challenges of the real world (Christianson, 2020).

While challenges may exist in implementing active learning methods, they can be overcome through a collective effort from educators, institutions, and students themselves. By embracing active learning, we can revolutionize chemistry education and empower students to become lifelong learners who are equipped with the skills needed to thrive in their academic and professional journeys (Christianson, 2020).

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