

# ASCILITE 2023

*People, Partnerships and Pedagogies*

## Enhancing chemistry education through technology-enhanced learning: Impact on student outcomes

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This scientific poster presentation highlights the student-led feedback and modifications made to improve chemistry subjects, along with the subsequent impact on student outcomes. Our team has embraced technology-enhanced learning as an effective approach to enhance the learning experiences of a diverse student cohort. The literature emphasizes that blending face-to-face, online, and self-paced learning tools lead to increased student engagement and improved learning outcomes (Serrano et al., 2019).

Our chemistry subjects have undergone significant evolution to incorporate technology-enhanced elements, such as custom-made resources like short lightboard videos and virtual laboratories, which are integrated with our active classroom environment. This integration of theory and practice fosters meaningful, dynamic, and student-centered learning, drawing upon Lev Vygotsky's Zone of Proximal Development (ZPD) to provide differentiated instruction through scaffolding.

Our diverse student cohort consists of individuals with varying chemistry backgrounds and enrolled in different degree programs, yet they all undertake the same chemistry subjects. To cater to the varying entry-level knowledge, scaffolding resources have been provided to guide students with lower proficiency through complex concepts, while additional resources engage and challenge more experienced students. This approach places active classes within the optimal zone, where the average student is challenged beyond their comfort zone but not to the extent of disengagement.

This instructional approach is complemented by a sociocultural structure that encourages critical engagement among students working in peer groups as well as with the educator. In the absence of our team, virtual educators, via our lightboard videos, support this sociocultural, student-centered approach between classes.

The presentation will showcase innovative initiatives that embody the evolution of technology-enhanced learning, with a particular focus on the impact of lightboard videos and virtual laboratory experiments on students' overall learning experiences and outcomes. The influence of these resources is evident locally, nationally, and internationally, as demonstrated by usage statistics and invitations to showcase our work. These resources have garnered strong support from peer reviewers, academics, high school teachers, and key stakeholders.

Through this abstract, we aim to provide a concise overview of our innovative approach to chemistry education, emphasizing the positive impact of technology-enhanced learning on student outcomes. Our findings contribute to the growing body of knowledge on effective instructional strategies in science education, and we believe they have the potential to inform and inspire educators in their pursuit of enhancing student learning experiences.

Keywords: Technology-enhanced, lightboard, virtual experiments, student-led, chemistry, curriculum design.

## References

- Serrano, D., Dea, A., Gonzalez-Burgos, E., Serrano-Gil, A., Lalatsa, A., Correspondence, D., & Serrano. (2019). Technology-enhanced learning in higher education: How to enhance student engagement through blended learning. *European Journal of Education*, 54, 1-14. <https://doi.org/10.1111/ejed.12330>

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