Review of: "Integrating Virtual Tools Into the Face-To-Face Teaching of Undergraduate Analytical Chemistry"

Claudia Hernandez-Mena[1]

1 Tec de Monterrey

Potential competing interests: No potential competing interests to declare.

The paper presents well-founded research that significantly contributes to analytical chemistry education, offering practical and evidence-based recommendations for implementing hybrid teaching modalities in university education.

The authors conducted a comparative assessment of pedagogical tools implemented during the virtual education period due to the pandemic; the research methodology is appropriate and well-structured. This assessment included: a detailed description of the analytical chemistry courses, a comparison of face-to-face, virtual, and hybrid teaching modalities, surveys of students to understand their preferences and perceptions of different teaching modalities, a critical evaluation by the teaching team of practical and theoretical activities in both modalities, the use of simulation software to complement laboratory work, and analysis of results and improvement proposals based on the collected experiences and opinions.

The paper contributes to the state of the art in educational innovation, particularly in teaching analytical chemistry. It provides empirical evidence on the advantages and disadvantages of face-to-face, virtual, and hybrid teaching modalities. Additionally, it offers valuable insights into integrating software simulators in laboratory practices, which is relevant for developing practical skills in analytical chemistry students. The study also emphasizes the importance of flexibility and adaptability in university teaching, especially in emergencies like the pandemic.

The study's results and conclusions are relevant and offer significant contributions. The conclusions highlight the importance of a carefully designed hybrid education model that combines the strengths of each modality to achieve a comprehensive and engaging learning experience.