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Modernizing the chemical engineering curriculum via a student-centered framework that promotes technical, professional, and technology expertise skills: The case of unit operations

[Education for Chemical Engineers](#) • Article • 2021 • DOI: 10.1016/j.ece.2020.12.004 [Ballesteros, Miguel Ángel](#)^a; [Sánchez, Juan Sebastián](#)^b; [Ratkovich, Nicolás](#)^a; [Cruz, Juan C.](#)^{c, d} ; [Reyes, Luis H.](#)^a ^aGrupo de Diseño de Productos y Procesos (GDPP), Department of Chemical and Food Engineering, Universidad de los Andes, Bogotá, Colombia[Show all information](#)

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Abstract

The development of a comprehensive set of skills, including technical, professional, and technology expertise, is critical to succeeding in the increasingly competitive global job marketplace. We proposed to develop such skills in our junior students (third year) via a flipped-classroom approach, a PO-PBL problem, and interactive e-learning tools. The intervention was implemented in the core course of Unit Operations and led to an increase in the students' perception of the development of teamwork and people-related skills. Despite the benefits of promoting student learning, our intervention revealed that we still need to conduct work to approach more robust peer-to-peer interactions and connectedness. In this regard, students showed a marked tendency to have superficial discussions, which reflected their inability to develop superior emotional connections with peers. This is critical to promote complex thinking and ideation as well as continued engagement with the course contents and will be the focus of our future work. © 2020 Institution of Chemical Engineers

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Author keywords

Flipped classroom; Information and communications technologies; Professional skills; Unit operations

Indexed keywords

Engineering controlled terms

Chemical operations; Curricula

Engineering uncontrolled terms

Chemical engineering curricula; Complex thinking; Core course; Course contents; E-learning tool; Emotional connections; Peer-to-peer interaction; Student learning

Engineering main heading

Students

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