Área temática: T1. Nuevas Metodologías Docentes

Case-based learning in "Particle Technology"

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Resumen

Following the previous works developed by the authors in "Particle Technology" subject [1, 2], the aim of this communications is to briefly describe the methodology we have employed during the academic course 2021/2022, to motivate and catch the attention of the students (Gen Z), and to analyze if this adaptation of our teaching style has developed in a better implementation of our performance. The methodology has been developed in the framework of a Teaching Innovation Project, whose purpose was to make "Powder Technology" more appealing as a subject to this new generation of students by emphasizing the flipped learning and collaborative approaches. Both approaches are important as these students are more prone to a certain issue if they are given certain autonomy to decide their learning style [3].

Traditionally, the laboratory sessions of the subject took place in two sessions, once all the syllabus has been covered. However, despite of it, the students', traditionally did not pay enough attention probably due the lab sessions were placed at the end of the semester. Therefore, to overcome this drawback we decided to pose a case-base alternative so that the students were developing the experimental work in four short sessions distributed along the semester all related to one another, so that the output of the first session was the input of the second one and subsequently, using a common conductive challenge. Additionally, we counted with the participation of three former students who acted as mentors, with the aim of making the subject more attractive to students due to closeness of the previous students. Finally, to emphasize the importance of the experimental data, a former student and now worker of a company related to the development of milling additives, gave a lecture to make the students aware of the importance of these additives in a milling process (such as the one they perform in the laboratory).

The employed conductive challenge was "Preparing and conditioning the size particle and moisture content of brown sugar for its further employment", and the four laboratory steps were:

1) To further condition the powdered solid, it is necessary to determine its primary and secondary properties: density, bulk density, porosity, particle size distribution.
2) It is necessary to prepare a mixture with the adequate proportions of the different sizes. It is also compulsory to check the quality of the mixture by taking different samples and determining their particle size distribution.
3) To further employ the fraction with the highest size in the previous mixture it is necessary to carry out a milling procedure in a ball mill and determine the particle size distribution of the product after the size reduction.
4) Finally, to check the possibility of employing a fluidized bed dryer, it is necessary to carry out a fluidization experiment of the previously solid mixture with air.

Flipped learning approach was employed during the experimental working. During the sessions, the students were informed about the experimental setup, but they were the ones who had to decide how to obtain the experimental data. The collaborative learning approach was considered by diving the students in three-person groups to complete the challenge. According to previous courses taken by the authors [2], 3 is the optimal number to ensure that the participation of all the member of the group is necessary to complete the task. The assessment of the methodology was carried out by means of a survey conducted among the students. The main conclusion of the survey is that the students perceive that the degree of learning they have achieved is clearly higher that the one they would have acquired following a traditional methodology.

Referencias

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