

## Collaborative Learning Strategies in Engineering Tuition Focused on Students' Engagement

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**Abstract :** Peer to peer learning is an educational tool very useful to enhance teamwork and reinforce cooperation between mates. It is particularly successful to work with students of different level of previous knowledge, as it often happens among pupils of subjects in the first course of science and engineering studies. Depending on the performed pre-university academic itinerary, the acquired knowledge in disciplines as mathematics, physics, or chemistry may be quite different. This fact is an added difficulty to the tuition of first-course basic science subjects of engineering degrees, with inexperienced students that do not know each other. In this context, peer to peer learning applied in small groups facilitates the communication between mates and makes it easier for the students with low level to be helped by the ones with better prior knowledge. In this work, several collaborative learning strategies were designed to be applied in the tuition of the subject 'chemistry', which is imparted in the first course of an engineering degree. Students were organized in groups combining mates with different level of prior knowledge. The teaching role was offered to the more experienced students who were responsible for designing learning pills to help the other mates in their group. This workload was rewarded with an extra mark, and more extra points were offered to all the group mates if every student in the group reached a determined level at the end of the semester. It was very important to start these activities from the beginning of the semester in order to avoid absenteeism. The obtained results were positive as a higher percentage of mates signed up and passed the final exam, the obtained final marks were higher, and a much better atmosphere was observed in the class.

**Keywords :** peer to peer tuition, collaborative learning, engineering instruction, chemistry

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