Abstract
We report the experience of an integrated project for master students in chemical engineering to acquire soft skills and address challenges related to energy transition.
Differently teaching techniques were used and they did not perform equally well. This project represented challenges for students that had to master technical and soft skills, but also for the teaching team that needed to work together to follow up and assess students.

Objectives of the integrated project
The case study was to make Reunion Island as energy independent and CO2-neutral as possible by 2030.

Two constraints were set: wastewater treatment and use of synthetic liquid fuel. The targeted soft skills included:

• Work in groups ≥ 4 students
• Efficient written and oral communication
• Integration of knowledge from various disciplines
• Development of critical mind
• Demonstration of independent and creative thinking.

The 10-ECTS project was divided in two parts (1/semester):
• Propose a Sankey diagram of energy flows on Reunion Island in 2030.
• Model two processes identified in the first part, namely the synthesis of bio-ethanol and bio-methanol from biomass.

Mentoring and assessment
8 professors and scientists mentored and assessed the project. Different tools to ease the mentoring and encourage the acquisition of soft skills were proposed:

<table>
<thead>
<tr>
<th>Impact of following idea on:</th>
<th>Students</th>
<th>Teachers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shared on-line portfolio</td>
<td>Good for internal communication</td>
<td>Not really used</td>
</tr>
<tr>
<td>Presentations of progress reports every two weeks</td>
<td></td>
<td>Work overload for presentations</td>
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<tr>
<td>Agreement of field experts to be contacted</td>
<td>Students rather relied on internet</td>
<td>No impact</td>
</tr>
<tr>
<td>New team leaders in turn every fortnight</td>
<td>Prevented clear group structure</td>
<td>No impact</td>
</tr>
<tr>
<td>Work tables with teachers</td>
<td>Efficient work</td>
<td>Efficient work</td>
</tr>
<tr>
<td>Help in group organization from PSGO (Psychology of groups and organizations)</td>
<td>Useful feedback</td>
<td>No impact</td>
</tr>
</tbody>
</table>

The assessment was based on technical results for 60%, and soft skills for 40%:

• Evaluation of technical skills was partly done by all teachers equally, partly by respective teachers in their field of expertise.
• Efficient communication, creativity, links with conventional lectures were assessed by all teachers, as well as critical thinking. Group work was self-assessed by students.

Conclusions and perspectives
This project gave students a first opportunity to improve their soft skills along with their technical knowledge. Perspectives for next year’s project include experimental work in addition to simulation work. Moreover, the assessment may be modified by evaluating soft skills all year long so both the final result and the improvement contribute to the grade.

Reference