

# Integrating and engaging students in the first year of Mechanical Engineering at FEUP

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## Introduction

The transition from high school to university can pose a significant challenge for Generation Z students, making it imperative to implement measures that facilitate their integration and engagement. This work examines the integration strategies adopted within the Bachelor in Mechanical Engineering (L.EM) program at the University of Porto, Faculty of Engineering, assessing their effectiveness based on feedback gathered from students via surveys.

These surveys aimed to identify aspects that have impacted students' daily lives and well-being, covering areas such as:

- Integration experiences;
- Orientation effectiveness;
- Engagement levels;
- Participation in activities;
- Habits change and time management.

With the objective of understanding the integration and engagement process of the first year of the L.EM students, two anonymous surveys were applied for the students in the academic year 2023-2024 as a tool for collecting students' perceptions of the first contact with Bachelor in Mechanical Engineering and feelings about this new phase.

In this academic year, 220 students were admitted to the Bachelor in Mechanical Engineering (L.EM) program at the University of Porto.

Students were invited to fill out surveys in the classroom with personal computers available and the survey was available from their institutional login.

The survey was in an anonymous format to get honest feedback and it was not mandatory.

- The first survey was realized four months after their enrollment at FEUP (December) and the other at the end of the academic year (June).
- The questionnaire was structured to understand how students feel in this new phase of their academic career.

## Results and Discussion

### 1. End of the First Semester

The first survey at the end of the First Semester enrolled 106 students and it was structured focusing on the main following aspects:

- How the motivation of the L.EM students changed since their enrollment in Mechanical Engineering Bachelor;
- The difference in learning-teaching methods between High School and University;
- Effectiveness of the work and study methods adopted;
- The time management between classroom, study, family, friends, and leisure activities;
- How students feel integrated and engaged in the course.

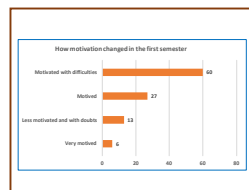


Figure 1

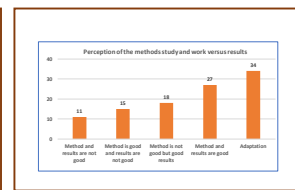


Figure 2

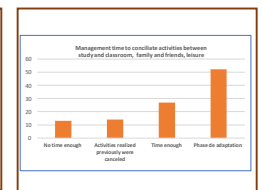


Figure 3

The figures show that:

- Students express difficulty in different situations but they continue motivated and encouraged;
- The most significant aspect is adaptability for the methods of study and work.

Figure 1- shows the characterization of students' relativity to motivation and engagement.

Figure 2- depicts the perception of the methods study applied versus the results.

Figure 3- compare the management time between different activities (social, leisure and academic).

Figure 4- from left to right: the feeling of integration at the end of the first semester and the differences in methods of learning and teaching.

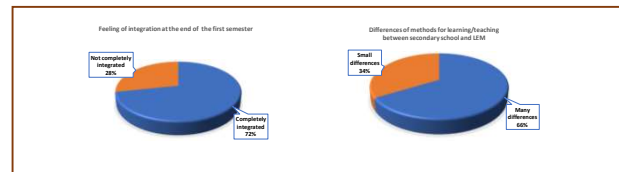


Figure 4

### 2. End of First Academic Year

The survey at the end of the first year enrolled 101 students, nine months after attending L.EM to identify the changes and the evolution after the first semester, highlighting the following aspects:

- How integration and engagement evolved throughout the academic year;
- Management of time;
- Academic performance.

The last two issues of the survey consist of open questions proposed to the students such as:

- To indicate aspects considered obstacles and challenges in their new daily routine;
- To suggest changes to improve their well-being and academic performance in the future.

The number of answers to the open questions was low (about 20) but the majority of answers was clear and consistent:

- The time spent in means of transport (many of them indicated 2h 30m per day) ;
- They would like to spend less time in transport, live near FEUP, and learn to manage time.

The previous aspects indicated are closely related.

Figures 5 and 6 – show the mean value calculated from the number of responses counted in each category.

It was considered the answers in five classes:

highest unsatisfied, unsatisfied, neutral, satisfied, and highest satisfied respectively with the values 1,2,3,4,5.

Figure 7- compare the number of hours spent per week in activity and study.

Figure 8- displays the answers relative to the integration process at the end of first academic year.

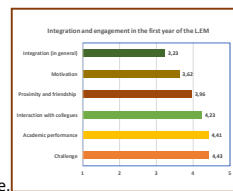


Figure 5

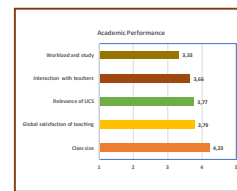


Figure 6

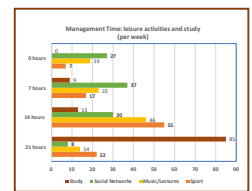


Figure 7

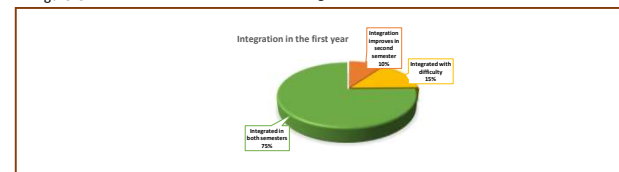


Figure 8

### 3. Peer mentoring program at the L.EM

The Peer Mentoring Program has been implemented in the L.EM and plays an important role in the integration process.

In Mechanical Engineering, the Mentoring Program is called WelcoMEC. Peer mentoring facilitates the transition between secondary and higher education, reducing stress through informal supportive relationships.

The main goals of this program are:

- To integrate and monitor the new first-year students (mentees) at L.EM with other students who attend advanced years (mentors);
- Create a collaborative academic environment involving first-year students, mentors, and teachers where students' well-being, growth, personal and academic development are the main priorities;
- Promote moments of sharing experiences and developing feelings of belonging to the FEUP community.



2023-2024 220 students	
Mentees	Mentors
180	94

## Conclusions

The present work presents an analysis of the collected data from surveys to define strategies to improve the process of integration and engagement in this new phase of the first year of the L.EM students. Students come from secondary school with habits acquired, stable in terms of daily routine, methods of study, and assessment very similar over many years. The results observed from the answers conclude that the transition from high school to university is a new process with interesting challenges. Several aspects contribute to this meaningful challenge and it is visible how management time is a task difficult in this context and is hard for the students to deal with. The integration process has essentially social, and academic components. Relatively to the first one students feel integrated and involved in the L.EM highlighting the contribution of the mentoring program. This social component is very important to create engagement without which there will not be well-being and academic performance. Students feel motivated but with difficulties, emphasizing the adaptation to the new methods of learning-teaching and ways of studying.

Nevertheless, to have more strong conclusions, from the results obtained of this work, in the future more specific questionnaires have to be applied, for instance, on an annual basis, to collect and further analyse larger volumes of data.

