

## **The MEM project: 5 years of experiences, challenges, and outcomes of an international double master-level degree**

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### **Abstract**

*In the 2016-2017 academic year, a novel Double Degree educational project named MEM (Master in Engineering Management) between the University of Parma and New Jersey Institute of Technology (NJIT) had begun. Since then, three (3) double degree master's programmes have been developed, starting with the Engineering Management course. To date, 113 students have attended the MEM programme.*

*This paper aims to assess the impact of the MEM double degree programme. To this end, a questionnaire was developed and submitted to the students who completed the project and entered the workforce (66 students). An analysis of the survey results was then conducted to determine the impact, if any, of the MEM programme on the students' academic careers and/or their entry into the workforce. The results were compared across two (2) sets of students: those who participated in the programme and the students that graduated from the standard degree course.*

**Keywords:** *Double degree, internationalization, engineering management education.*

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## **1. Introduction**

The world today is experiencing major challenges that require multicultural professionals to help in addressing them. It is no secret that the nature of the present supply chains is very complex, as they transcend political, cultural, technological, and geographical barriers. In essence, one of the main fulcrums that the resilience of these supply chains depends on is humans that have the capabilities to provide the needed nuances for their maintenance. Higher education is a major supplier of graduates that possess these traits.

As reported in the literature, the past decade has witnessed the development of many joint international programmes where students receive dual, double, and joint degrees, as well as several exchange programmes. Among these programmes is MEM. In HEAd 2018 (Montanari et al., 2018), we presented our experience at that time. In this paper, we share the recent developments, data, and extensions since then.

## **2. Literature analysis**

In recent years global initiatives in higher education have received growing attention. This growth has resulted in a plethora of publications and conference presentations. This section reviews some of the pertinent ones.

Tran et al. (2023) have presented an in-depth analysis covering a study of 227 English-written articles that examine the transition of higher education, with a focus on internationalization. They report that, while the transition from domestic to international frameworks can be rewarding, it requires appropriate planning and support. Hynek (2021) has instead focused on how to achieve effective internationalization. He states that it is essential to build strong international partnerships by establishing joint degree or double degree programmes that integrate international students.

Maldonado (2022) describes in his paper the requirements, procedures, benefits, and results in the development of a dual programme in Mechanical Engineering between two universities in Mexico and Japan. For the past 15 years, the programme has graduated students who master three languages (English, Spanish, and Japanese), in addition to international experiences that have transformed their lives. Similarly, Stegall et al. (2021) have explored the benefits of integrating two international programmes for undergraduate business students. They demonstrated how these programmes enrich the students' experiences and provide employers with candidates that enjoy global exposure.

Knight (2012) has introduced a framework to improve the mobility of both students and scholars. The author has pointed out the risks and benefits of internationalization. He also provides a conceptual structure to analyze the meaning, trends, and opportunities of international dual, joint, and double degrees. Asgary and Robbert (2010) have presented a

cost-benefit analysis of dual international degrees. They also point out the risks and rewards of such programmes.

In his paper, Oliveira (2011) has illustrated how today's global markets require engineers with value-added experiences, particularly in humanities. In this work, the author reports on the opportunities resulting from the development of a consortium of three (3) universities in the US and Brazil. An interesting approach to internationalization was proposed in Gulick et al. (2006), where the authors introduce international co-op/internship programmes that allow expanded technical knowledge.

For additional insights, the interested reader is referred to (Aasmundtveit et al., 2018), (Cheng, 2021), (Corno et al., 2016), (Ivanova et al., 2020), (Ober et al., 2021), (Curtis and Ledgerwood, 2018), (Reardon et al., 2022), and (Wei et al., 2020).

As can be seen from the foregoing, the interest of the community towards the innovation, experiences, and opportunities that international dual, double, and joint degree programmes offer is very high. In the following introduction section, we present our own experience and results of double degrees developed between the University of Parma and the New Jersey Institute of Technology (NJIT) showing the progress achieved since our earlier paper presented in HEAd 2018 (Montanari et al., 2018).

### **3. The MEM Project**

The MEM project (Montanari et al., 2018) provides students with an opportunity to receive two master's degrees from the University of Parma (UNIPR) and the New Jersey Institute of Technology (NJIT). The participating institutions collaborate on a non-exclusive basis on the development of master-level degrees in Engineering, where the Master of Engineering Management (MEM) dual degree programme (MoU, 2015) being the first one. Since then, two (2) further Master's degree programmes were added, one in Mechanical Engineering (MoU, 2016) and the second one in Engineering for the Food Industry (MoU, 2019.)

As stated before, MEM aims to advance academic exchange and cooperation in the fields of engineering in order to increase the transnational expertise of European and American students, enhance job opportunities, competitiveness, cultural exposure, and language skills (Malek et al., 2014). Students participating in the programme must pass core and elective courses in both institutions. The host University identifies the set of courses that should be taken by the participating students, according to each student's specific programme requirements. The approach allows more flexibility to meet the student's needs while fulfilling the graduation requirements of both universities. In designing the study plan for each student, it is essential, however, to develop the academic paths by appropriately balancing the length and the workload of the courses offered by the two universities. The

equivalence and the validity of the study plans and academic paths are verified by administrative advisors in each institution.

## **4. Methodology**

### **4.1. Aims**

The study aims to assess the impact of MEM from different perspectives, related to (i) the students' academic careers; (ii) the universities involved; (iii) the MEM project; and (iv) entry into the workforce. To perform this analysis, the phases before, during, and after the mobility were analyzed. First, the study seeks to identify any correlations between the academic careers of “standard students” (i.e., attending the standard master’s degree programme at the University of Parma) and “MEM students” (i.e., attending the double master’s degree). For instance, it aims to evaluate the “good grade point average” (GPA) of MEM students before their mobility period and at the end of their academic career, comparing it to the GPA of standard students. With reference to the University of Parma, the analysis aims to assess whether MEM contributes to enhancing the attractiveness of academic degrees, thus increasing the number of students coming from other universities and other regions of Italy. As far as the MEM project itself is concerned, the study seeks to quantify the satisfaction of the MEM students in terms of the academic curricula and the usefulness of the skills obtained for their job. Finally, regarding job placement, the study aims to define the impact, if any, of the MEM programme on the salary and the time elapsing between graduation and the first day of work, as well as the positive impacts of attending the project on the placement phase.

### **4.2. Source of data**

Since the academic year 2016-2017, 113 students have been involved in the MEM programme. 81 of these students have completed their international mobility period, and 66 of them are already working. Based on the data gathered during these years of activity, a database was built to derive important insights into the project. To conduct the analysis, different statistical samples were defined based on the project phase investigated (before, during and after the mobility) (Figure 1). It is important to point out that all data were processed anonymously, to respect the privacy of the students. Additionally, several data sources were designed, starting with the UNIPR and NJIT databases. Another data source considered was the AlmaLaurea survey (AlmaLaurea Interuniversity Consortium and AlmaLaurea srl). The consortium involves 80 Italian universities and, since 1999, it has been carrying out annual surveys on the graduates’ profiles, providing a wide-ranging portrait of their characteristics, university achievements, and employment status. Specifically, the ranking focuses on the positioning of the graduates on the job market, the characteristics of the job, the salary, and the usefulness of the skills acquired within the degree courses. In this

study, an analysis of the past four years (2019-2022) was conducted, evaluating the responses for the Engineering Management degree class (LM-31, 34/S) both on the national level (about 2300 students per year) and with respect to the University of Parma (about 90 students considered per year). Finally, to determine the impact of MEM, a survey was conducted through a questionnaire submitted to 66 students who have completed their academic careers and are currently working. A response rate of 83% was achieved.

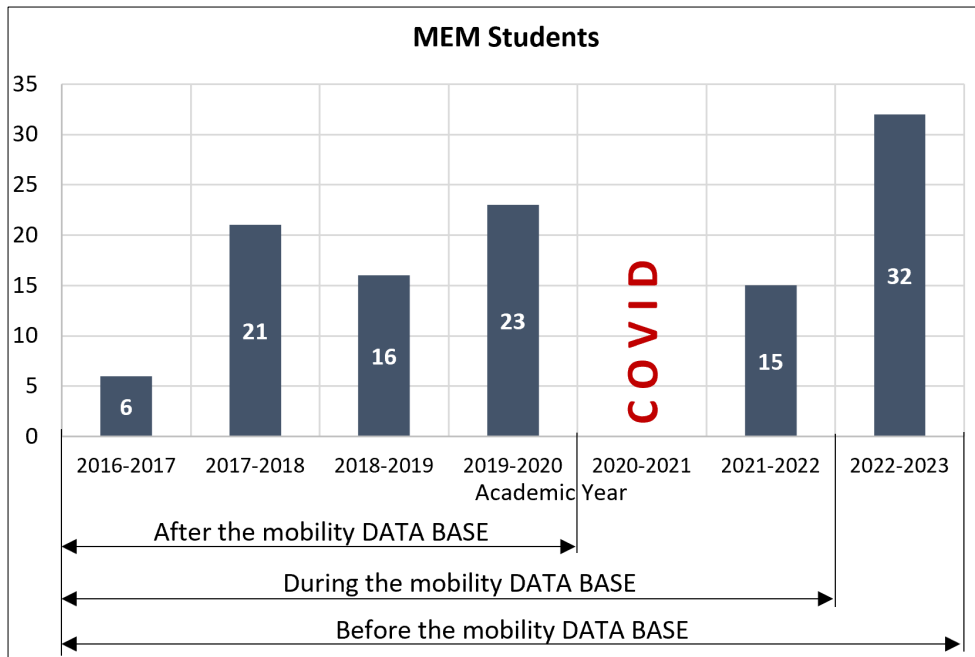


Figure 1. Number of MEM students over the years

## 5. Results

### 5.1. Academic Career

Based on the UNIPR data (Table 1), except for the COVID period, the number of MEM students has increased over the years, with 32 students participating in the project during the academic year 2022-2023. During the COVID period, there were no students enrolled in the double degree program as none were interested in acquiring the degree through remote mode, despite being given the opportunity to do so.

**Table 1. MEM's impact on Academic career**

	<b>Standard Students</b>	<b>MEM Students</b>
Bachelor's degree grade	101.1/110	97.8/110
Master's degree grade	103.2/110	106.8/110
Master's degree age	26.50 years old	25.11 years old
% of students graduated on time	81.25%	80.50%

### **5.2. Parma University**

Thanks to MEM, the University of Parma has increased its visibility and attractiveness. In the first years of MEM only 12.12% of the master's students came from a different university, whereas in the last two academic years, the MEM students who did not get their bachelor's degree from the University of Parma were 27.7%. This value is higher than the percentage of standard students coming from other universities (22.1%, 15.4% on a national basis). Not only the double degree programme has increased its visibility and attractiveness over time, but now it appears to be more attractive than the standard master's degree course.

### **5.3. MEM Project**

Based on the survey conducted among the MEM students, the following feedback (Table 2) was collected, with the ratings on a scale from 1 (completely disagree) to 5 (completely agree)

**Table 2. Feedback provided by MEM students**

	<b>MEM Students</b>
I would do the double degree experience again	4.64/5
I would recommend the MEM project to other students enrolled in the master's degree course	4.62/5
The double degree enhances the development of soft skills such as adaptation, flexibility, problem-solving, teamwork, curiosity, empathy, and organization	4.30/5
The skills acquired thanks to the double degree project are adequate for my job	4.29/5
Acquiring double degree is worthwhile, even if not specifically required for employment	4.54/5

### **5.4. Job placement**

The impacts of MEM on job placement are the following:

**Table 3. MEM's impact on Job placement**

	<b>Parma Standard Students</b>	<b>National Average</b>	<b>MEM Students</b>
Working students after one year	83.0%	85.0%	90.7%
Months to entrance into the job market	3.1	2.8	2.4
% stable contracts after one year	33.5%	37.3%	80.0%
% graduates working abroad	2.2%	2.8%	9.3%
Salary after one year	1541.00€/m	1505.75€/m	1567.71€/m
Salary after two years	1605.00€/m	1590.00€/m	1636.25€/m

## 6. Conclusion

This article represents an important milestone in the field of double-degree programmes as there are very few cases in the literature where quantitative data are available to measure the impact of these projects. It is, indeed, extremely difficult to numerically quantify their impact. Moreover, an apparent peculiarity has been found regarding the salary. Clearly, it is the job market that determines its value, and not much can be said about it. However, it is evident that if, on one hand, students view the project positively despite receiving the same salary as those who did not undertake the double degree program, it means that, fortunately, "money" is not their priority. In other words, it is very reductionist to associate one's work with the salary earned: other values count in a career, such as the role, training, job quality, and the ability to work abroad, all of which can be achieved through a project of this kind. In addition, the University of Parma has increased its attractiveness and visibility. Most importantly, MEM students believe that the MEM project is an extremely positive value in job placement.

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