The UPV Design Factory. What is it good for?

M.F. Collado [1]
Universitat Politècnica de València
Valencia, Spain

I. Villalonga
Universitat Politècnica de València
Valencia, Spain

E. Gimenez -Carbo
Universitat Politècnica de València
Valencia, Spain
https://orcid.org/0000-0002-2856-4081

M. E. Gómez-Martín
Universitat Politècnica de València
Valencia, Spain
https://orcid.org/0000-0003-1555-4383

Conference Key Areas: *Student Engagement, Co-creation with students*
Keywords: *Student engagement, talent, learning innovation, learning communities*

[1] *M.F. Collado.*
macollo@cfp.upv.es

doi:10.5821/conference-9788412322262.1326

ABSTRACT

Universities have the challenge and responsibility to society to train good professionals. Moreover, they must adapt to current demands. They must do so not only by improving the contents of the different degree programs but also by incorporating new programs and activities that help students develop soft skills, teamwork, connections between the university and real life, making them the best professionals and excellent citizens.

To this end, in 2014, the UPV launched a program called Design Factory to channel and frame initiatives carried out by students to develop their prototypes and participate in student competitions.

The program facilitates the creation of interdisciplinary learning communities in which students are committed to their goals, their teams, and the university. The program's spirit is to encourage learning in an eminently practical way. Students have to lead the projects, attract and select candidates, manage a budget, carry out their activities and try to achieve their goals, which involves many soft skills.

For the program's operation, the university provides a team including management, technical and administrative staff, facilities, and economic endowment to the teams to carry out their activities. Funds are distributed in terms of the quality proposal, impact on the university, and results from the previous edition.

More than 2,000 students participate in more than 60 engaged teams whose coordinators show high satisfaction with their roles in the current academic year.

1 INTRODUCTION

1.1. UPV Design Factory

Since 2014, the Universitat Politècnica de València (UPV) has been promoting projects managed by students with the tutoring and support of professors.

The students motivated the creation of this program, asking for support to participate in specific championships such as Formula Student, in which students are responsible for designing and building an F1 prototype for a students competition.

Later in 2018, the UPV the Design Factory Program was officially approved, describing it as a training program that aims to support the extracurricular activities carried out by the university's students. These activities are characterized by contributing to the student's comprehensive development and facilitating the acquisition of transversal skills, self-learning, and new teaching-learning methodologies that promote training based on practice and integration of students in the university community from a broad perspective.

In 2020, with previous years' experience, the UPV approved the Rules for the Design Factory Program, which includes the operating guidelines. The regulations include the functioning of the groups to focus on the objective, that is, students learning by doing.

1.2. Design Factory promotes student learning

Aalto University (Finland) was the pioneer in promoting design factory groups in higher education.

The origin was creating an ideal working environment for students to develop their projects autonomously, with the collaboration of researchers and professionals.

This model of work teams has been exported to other universities, and after several years of experience, it can be affirmed that they contribute to improving students' learning and provide them with skills that often have no place in the curricula of the bachelor's degrees [1].

These skills developed are often called cross-curricular learning outcomes and undoubtedly have great importance in graduates' employability at the end of their studies [2]; we can highlight the development of skills related to teamwork and leadership, among others. On the other hand, belonging to these teams forces students to work in interdisciplinary, competitive, and complex environments, which leads to the development of skills that employers demand and are necessary for entrepreneurship [3,4,5].

For all these reasons, belonging to a Design Factory team will significantly impact the graduates' professional life development.

2. OPERATION OF THE PROGRAMM

The program's direction promotes that the students decide the topic, the project, and, if case, the competition they wish to participate in. The regulations require interdisciplinary teams, with a minimum number of members and a professor tutor who can supervise and help in the work they develop. The fact is that projects are complex and often require the help of multiple professors, which makes learning more valuable.

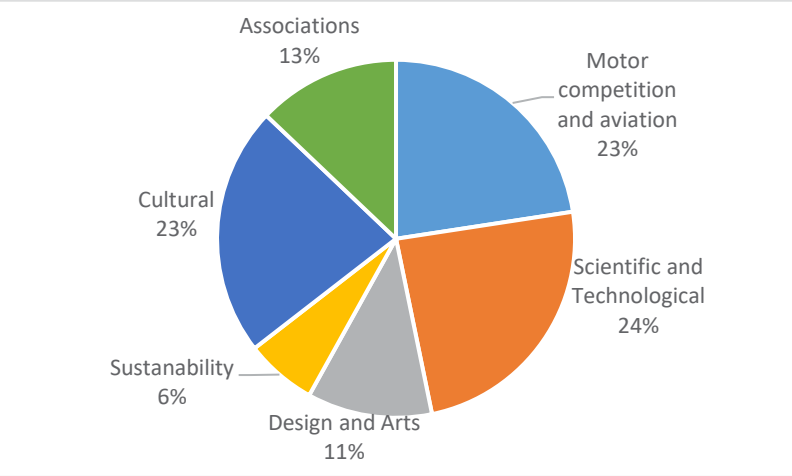
Two calls for funding are made per year, coinciding with the beginning of the course and the year. However, every year, projects are becoming more and more complex, consequently needing more budget, so teams need to seek sponsors to help cover the expenses of their projects, getting good partners. Collaborations can be both economic and in kind. These sponsors can also become partners of the university in different ways.

Each team has a lead captain who is the interlocutor with the program's direction. However, most complex teams usually have several coordinators who assume the direction of communication, management, design, and construction tasks.

3. RESULTS

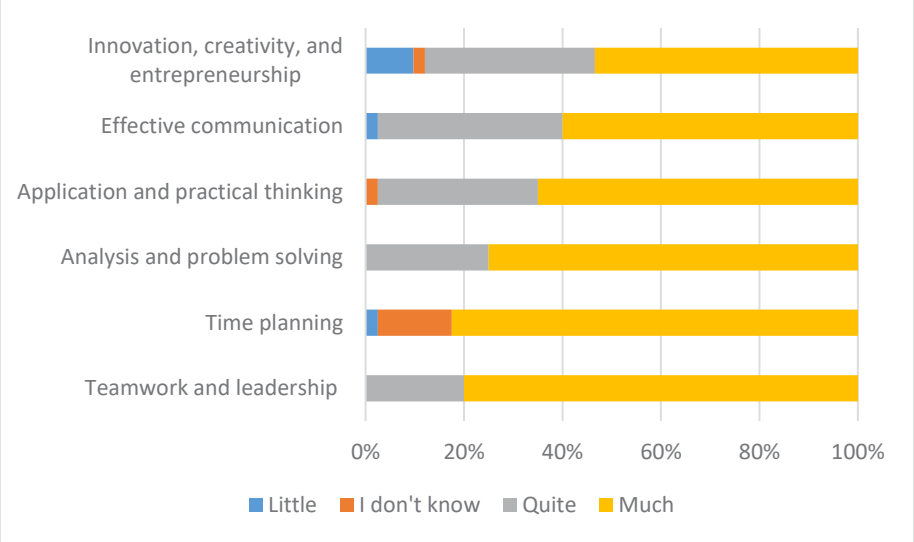
The most immediate successful result is the number of teams enrolled in the program and that has increased from 18 in the 2017-2018 academic year to 62 in the 2021-2022 academic year, distributed in the following categories:

Fig. 1. Design Factory Teams in the 2021-22 academic year by category



In addition, in a recent survey sent to students about their experience leading the team, they answered regarding the soft skills that they considered had developed more, the following:

Fig. 2. Soft skills developed by students' perception



Furthermore, 87.5% of team coordinators believe that being part of a team improves their readiness to enter the job market, and 72.5% of the coordinators consider their expectations met.

Lastly, the answer to whether they would recommend students join a Design Factory Team was 100 % positive.

4. CONCLUSION

There are many benefits to belonging to a Design Factory team, despite the challenge of making it compatible with formal learning. Students can put their knowledge into practice, improve their soft skills, interact with peers from other disciplines, and participate in events and competitions with other students, providing them with a well-rounded education.

REFERENCES

[1] Lahdenperä J, Jussila J, Järvenpää AM, & Postareff L. (2022). Design Factory – Supporting technology students' learning of general competences through university-industry collaboration. *LUMAT: International Journal on Math, Science and Technology Education*, Vol. 10, No.1. pp. 127-150, https://doi.org/10.31129/LUMAT.10.1.1672

[2] Chan, C. K. Y., & Fong, E. T. Y. (2018). Disciplinary differences and implications for the development of generic skills: A study of engineering and business students' perceptions of generic skills. *European Journal of Engineering Education*, Vol.43, No.6, pp. 927–949. https://doi.org/10.1080/03043797.2018.1462766

[3] Björklund TA, Keipi T, Celik S, & Ekman K. (2019). Learning across silos: Design Factories as hubs for co-creation. *European Journal of Education*, Vol. 54, No. 4, pp. 552–565. https://doi.org/10.1111/ejed.12372

[4] Caballero, G., Álvarez-González, P., & López-Miguens, M. J. (2020). How to promote the employability capital of university students? Developing and validating scales. *Studies in Higher Education*, Vol 45, No.12, pp. 2634–2652. https://doi.org/10.1080/03075079.2020.1807494

[5] Tuononen, T., Parpala, A., & Lindblom-Ylänne, S. (2019). Graduates' evaluations of usefulness of university education, and early career success – a longitudinal study of the transition to working life. *Assessment & Evaluation in Higher Education*, Vol 44, No. 4, pp. 581–595. https://doi.org/10.1080/02602938.2018.1524000