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Mixing Students: an Educational Experience with Future Industrial Designers and Mechanical Engineers

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Abstract : It is not new that industrial design projects are a result of cooperative work from different areas of knowledge. However, in the academic teaching of Industrial Design and Mechanical Engineering courses, it is not recurrent that those competences are mixed before the professional life arrives. This abstract intends to describe two semester experiences carried out by two professors - a mechanical engineer and an industrial designer - in the last two academic years, for which they created mixed teams of Industrial Design and Mechanical Engineering (UPorto University). The two experiences differ in several factors; the main one is related to the challenges of online education, a constraint that affected the second experience. In the first year, even before foreseeing the effects that the pandemic would reconfigure the education system, a partnership with the Education Service of Águas do Porto was established. The purpose of the exercise was the project development of a game that could be an interaction element oriented to potentiate a positive experience and as an educational contribution to the children. In the second year, already foreseeing that the teaching experience would be carried out online, it was decided to design an open briefing, which allowed the groups to choose among three themes: a hand scale game using additive manufacturing; a modular system for ventilated facade using a parametric design basis; or, a modular system for vertical gardens. In methodological terms, besides the weekly follow-up, with the simultaneous support of the two professors, a group self-evaluation was requested; and a form to be filled individually to evaluate other groups. One of the first conclusions is related to the briefing format. Industrial Design students seem comfortable working on an open briefing that allows them to draw the project on a conceptual basis created for that purpose; on the other hand, Mechanical Engineering students were uncomfortable and insecure in the initial phase due to the absence of concrete, closed "order." In other words, it is not recurrent for Mechanical Engineering students that the creative component is stimulated, seemingly leaving them reserved to the technical solution and execution, depriving them of the co-creation phase during the conceptual construction of the project's own brief. Another fact that was registered is related to the leadership positions in the groups, which alternated according to the state of development of the project: design students took the lead during the ideation/concept phase, while mechanical engineering ones took a greater lead during the intermediate development process, namely in the definition of constructive solutions, mass/volume calculations, manufacturing, and material resistance. Designers' competences were again more evident and assumed in the final phase, especially in communication skills, as well as in simulations in the context of use. However, at some moments, it was visible the capacity for quite balanced leadership between engineering and design, in a constant debate centered on the human factor of the project - evidenced in the final solution, in the compromise and balance between technical constraints, functionality, usability, and aesthetics.

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