The Maker Experience or
How to Shape the Hybridization of Skills
for Students of Engineering, Management
and Architecture

TREO Talk Paper

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Abstract

Since 2014, École Centrale de Nantes, Audencia Business School and Ecole Nationale Supérieure d'Architecture in Nantes (ensa Nantes) formed a strategic alliance that builds on their complementarity. This alliance combines engineering, management, architecture and creation to enrich teaching, research, business relations and the international outreach of the three schools. The resulting hybridization of skills, which creates value, is a breeding ground for the innovation process.

During three days in March 2017, one thousand third-year students from the three schools were mixed together to participate in several workshops. The objective of these workshops was to materialize the hybridization of skills with regard to students' different backgrounds.

One of these workshops, “The Maker Experience of the Alliance”, revisited the biplane as a symbol of the hybridization of the skills of tomorrow’s Engineer-Manager-Architect. It used three digital fabrication processes: laser cutting, vinyl cutting and 3D printing. 30 students (15 engineers, 8 architects and 7 managers) were divided into 5 teams. Different pieces of 5 pre-built biplanes were given to each team. The teams then had to create, model and build the missing parts to complete their project. Students were also informed that the workshop would end with them giving a pitch of their project and presenting the biplane that they built.

The workshop began with a presentation of the three digital production machines and what they would be able to do with them. The two workshop leaders answered questions from students about the different fabrication processes. The next step was a team discussion about their biplane concept. These two activities were conducted during the first half-day.

During the next six half-days, teams worked on their project and the two facilitators coached each team individually, just-in-time and on-demand, giving them advice and input to help them out with the feasibility of their project and how to operate the machines. This coaching was based on a trial-and-error approach as a problem-solving method of investigation. The last half-day was dedicated to each team pitching their project and concluded with a student debrief about their three-day Maker experience.

This workshop was clearly a great experience for the students as well as for the facilitators. No formal course was delivered, but each team was able to approach and solve their problem by acquiring new skills in another academic area than the one they were used to and through a more powerful learning process. This was possible because students solved the problems they faced regarding the concept they wanted to prove and by the role played by the facilitators who asked questions rather than giving answers. In fact, for most students, it was the first time they were conscious of the power of the alliance of the three schools. They discovered three actual digital processes and machines to design and develop prototypes, which is a common activity to the three fields covered by the Alliance: engineering, management and architecture.

Another positive aspect was that, in the majority of the other workshops, facilitators faced a very high rate of absenteeism that was not the case with our workshop. According to the students, it was due to the fact that the concepts used in other workshops were too close to concepts that they were already used to using.