

Problem Based Learning and Teaching by Example in Dimensioning of Mechanisms: Feedback

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Abstract : This article outlines the development of the Project Based Learning (PBL) at the level of a last year's Bachelor's Degree. This form of pedagogy has for objective to allow a better involving of the students from the beginning of the module. The theoretical contributions are introduced during the project to solving a technological problem. The module in question is the module of mechanical dimensioning method of Supméca a French engineering school. This school issues a Master's Degree. While the teaching methods used in primary and secondary education are frequently renewed in France at the instigation of teachers and inspectors, higher education remains relatively traditional in its practices. Recently, some colleagues have felt the need to put the application back at the heart of their theoretical teaching. This need is induced by the difficulty of covering all the knowledge deductively before its application. It is therefore tempting to make the students 'learn by doing', even if it doesn't cover some parts of the theoretical knowledge. The other argument that supports this type of learning is the lack of motivation the students have for the magisterial courses. The role-play allowed scenarios favoring interaction between students and teachers... However, this pedagogical form known as 'pedagogy by project' is difficult to apply in the first years of university studies because of the low level of autonomy and individual responsibility that the students have. The question of what the student actually learns from the initial program as well as the evaluation of the competences acquired by the students in this type of pedagogy also remains an open problem. Thus we propose to add to the pedagogy by project format a regressive part of interventionism by the teacher based on pedagogy by example. This pedagogical scenario is based on the cognitive load theory and Bruner's constructivist theory. It has been built by relying on the six points of the encouragement process defined by Bruner, with a concrete objective, to allow the students to go beyond the basic skills of dimensioning and allow them to acquire the more global skills of engineering. The implementation of project-based teaching coupled with pedagogy by example makes it possible to compensate for the lack of experience and autonomy of first-year students, while at the same time involving them strongly in the first few minutes of the module. In this project, students have been confronted with the real dimensioning problems and are able to understand the links and influences between parameter variations and dimensioning, an objective that we did not reach in classical teaching. It is this form of pedagogy which allows to accelerate the mastery of basic skills and so spend more time on the engineer skills namely the convergence of each dimensioning in order to obtain a validated mechanism. A self-evaluation of the project skills acquired by the students will also be presented.

Keywords : Bruner's constructivist theory, mechanisms dimensioning, pedagogy by example, problem based learning

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