



## Proper Choice of Design Projects in Teaching Telecommunications Engineering

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We studied the effectiveness of various design projects in teaching Telecommunications engineering at the National Autonomous University of Mexico (UNAM) during several consecutive years. The main objective of the study was to find out the optimal characteristics of the projects, establish the feasibility of large-scale implementation of the PjBL, and derive recommendations for the faculty on the implementation of PjBL in our conditions. The particular educational objective was to integrate the knowledge previously obtained through various courses with practical experience as well as to promote self-learning.

We have found that the projects that comprised the design, prototyping and evaluation of fully functional devices were educationally very effective. Also, the interdisciplinary projects were more effective than strictly telecommunications-related projects. For example, a project consisting in the development of non-standard intrusion alarm system stimulated the students to look for new possible solutions of the sensor part of the system, analogue and digital signal processing, radio or optical transmission link etc. Such projects generated a lot of interest and enthusiasm among the students as well as stimulated competition between different student teams. The competition made the projects much more interesting for the students and thus more productive. Students completed several anonymous surveys, which indicated that learning experiences obtained from such project were highly appreciated. While the projects consisting in the development of pieces of telecommunications equipment were less popular among the students and educationally less effective.

The surveys completed by students and professors allowed us to identify the reasons for success or failure of seemingly good design projects and derive recommendations for the academy on optimum choice of project topics, content and extension. Our results show that the PjBL is educationally very effective, provided the singularities of particular careers are taken into account and project topics, content, and extension are carefully selected.