

R22: Good practices manual

Initially, before the project started, several meetings were made to explain teachers and students the objectives, ideas, purposes and criteria of the project and its development mode. The project activities began with the selection of the classes involved in the project.

The choice, being a project based on electric-mechatronics design, was oriented on the study profiles of mechanical engineering, electrical engineering and computer science. For the three sectors the classes were chosen according to the teachers who joined the project. For these reasons the following classes were selected: two 4th form mechanical classes, a 4th form electrical engineering class and one computer science 3rd form class.

The participation in the project by the students of the classes involved was of two types: As for the development of educational topics introduced by the project, all students have participated in the work and in the development of the project itself with a total involvement. As for the development of the technical activities of the project, design, creation and implementation of the *minicar*, participation has been on a voluntary basis.

The students involved in the educational activities of the MESA project were about 100, while for the realization of the *minicar* about 15 students actively participated in the work.

Almost all operations were carried out in the afternoon, in students' free time and not in scheduled hours.

Teachers who joined the project thought the following subjects: Mechanics and Fluid Machinery, Technology Design, Industrial Automation, Electrotechnics, Computer Science and English.

The transformation of the car, initially with a combustion engine, presented several problems to solve in order to meet the project requirements.

Mainly we had to solve the problem of the housing of the motor and the anchorage of the motor itself on all that was pre-existing, and we had to eliminate all that was superfluous to our mission.

Then we had to solve the problem of the battery housing by adjusting the spaces and choosing suitable batteries.

We also had several problems with the power controller that we had to send back to the manufacturer for a software update.

Unfortunately we haven't been able yet to fully test the autonomy of the *minicar*, but we'll try to test the car in a private circuit before the end of the year.

After the conclusion of the project the prototype, which cannot be driven on the road, will be used as a reference model for the development of future educational vehicles with electric motors or similar. Student assessment was made at the end of the course in May to better collect data concerning the students' engagement and commitment. The students had to fill questionnaires, carry out the learning units tests, but the best evaluation of all was the real functioning of the car. Student assessment was certainly good for the operational part of the activity, some students criticised the theoretical treatment of topics, but many were glad of having worked using the English language and only a few were skeptical about the validity of the entire project.