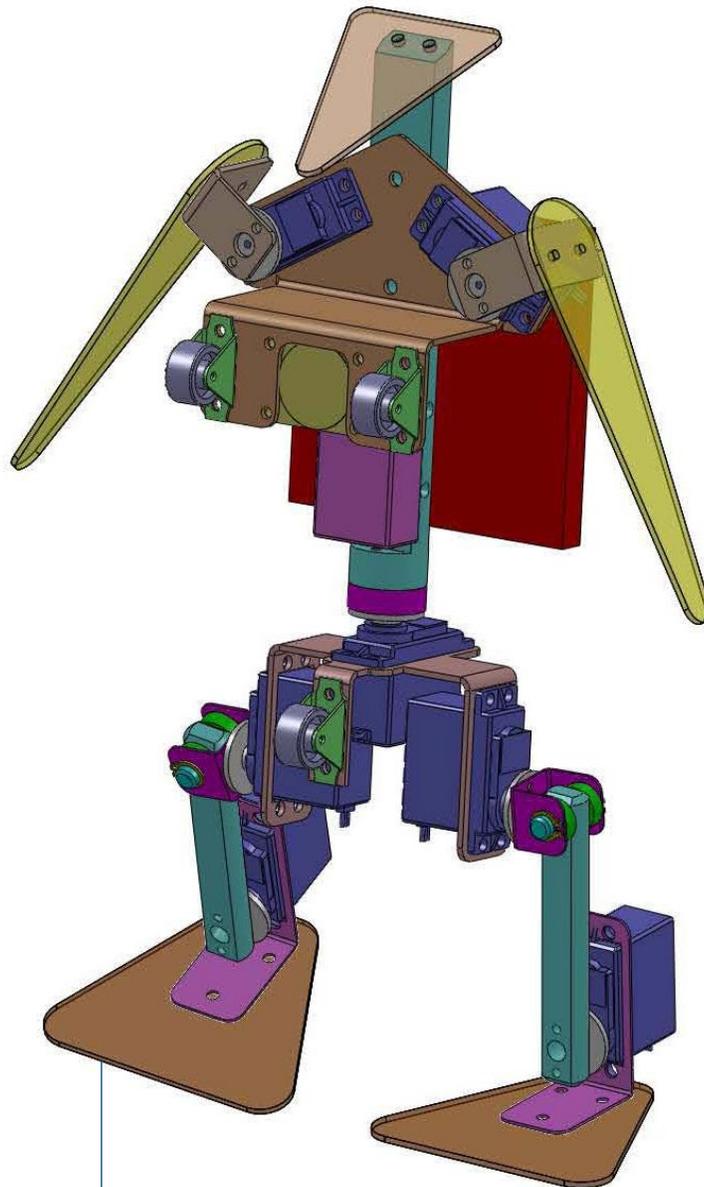


LYCÉE COLBERT LORIENT

DESIGNING ROBOTS WITH SOLIDWORKS
EDUCATION EDITION



Pingu robot designed by
the Lycée Colbert students—
Winner 2013 of Robofiesta,
academic championship

Challenge:

Enable 10th-grade students in France to learn English, electronics, mechanics, and computers by building a robot and participating in international robotic competitions.

Solution:

Implement SOLIDWORKS Education Edition to provide 280 10th-grade students with the opportunity to learn about design, engineering, and innovation by using the software on an interdisciplinary educational project.

Results:

- Won two gold medals at World Robot Olympiad in United States
- Acquired rich educational content for building robot
- Participated in robotic competitions in English-speaking countries
- Inspired students to pursue careers in engineering

Lycée Colbert Lorient is a multidisciplinary high school in Lorient, France, that integrates general, technical, and professional educational programs. With more than 1,200 students, including approximately 280 in the 10th grade, the Brittany-based school offers all academic curricula, ranging from literature and science to technology, economics, and sociology, as well as advanced training through higher vocational training certificates.

The high school addresses the challenges associated with providing students with a broad view of all subjects by exposing students to multidisciplinary educational projects. To provide 10th-grade students with opportunities to acquire general, business, and technical knowledge and skills, the Lycée Colbert teaching team has worked with students on the design and manufacture of robots since 2010, with the objective of participating in international robotic competitions, many of which take place in English-speaking countries.

“Three teachers in particular have been embarking on this adventure,” says Jacques Le Coupanec. “One teaches English, and the other two teach science and technology subjects.”

The robotics project kicks off in September with the formation of a practical planning group, which works for four hours each week to encourage communication and the exchange of information. “It is essential that we inform the students about the entire approach that will lead from their initial idea to producing the robot,” explains Le Coupanec. “Nothing is left to chance. From the initial research of the design to construction and assembly, the different stages are managed just like the process for developing a new product in industry.”

Lycée Colbert Lorient chose SOLIDWORKS® Education Edition design software to drive the project because it is easy to use, provides complete design and simulation capabilities, and offers opportunities to use English. The robotic project is organized into three phases. In phase one, the students learn how to use the software. Phase two focuses on using SOLIDWORKS Education Edition to design. During phase three, the students design new parts, validate the design, and build the robot.

HOW TO DESIGN

The students learn how to design the robot, in part, by learning how to use SOLIDWORKS Education Edition software. “We need to help our students familiarize themselves with the tool,” points out Engineering Teacher Thierry Martin. “This happens quickly because the 3D solution is so simple to use and the teachers help.”

After choosing the components for the robot, the team moves on to validation and assembly. “Some of the students design and simulate their parts prior to assembly,” Martin notes. “They proceed step by step, just as they would in a design department. They create, calculate, test, and validate the parts one at a time, and then, simulate the entire assembly. The SOLIDWORKS solution is absolutely crucial for the successful realization of this project.”

During the design phase, the students learn how to model and resize components, and begin to explore the world of mechanics with all its possibilities, challenges, technology, and purpose.

LEARNING ENGLISH WHILE DESIGNING A ROBOT

The school decided from beginning that they would create the whole project using English as primary language. This would promote conversations with international teams, prepare for them participating in international competitions and the students also learned English as they designed the robot. While the students design parts for the new robot, the teachers create a standard electronic card (e-card). It’s up to the students to integrate the e-card within the robot assembly design.

“Everything must be consistent. Even if it is an engineering sciences exploration, the objective is above all to participate and, if possible, to win the competitions that we take part in at the end of the year,” Martin stresses. “Integration is essential for the success of this educational project. This integration occurs at the end of the product development process.



“After a search on the type of robot to build, students quickly use SOLIDWORKS for the design part of the project. They can familiarize themselves with the basic CAD techniques: drawing, 3D, design of complete assemblies and simulation, and all this, in English. The work presents a real teaching interest, both technically and linguistically, and an excellent source of stimulation for our young people.”

— Jacques Le Coupanec

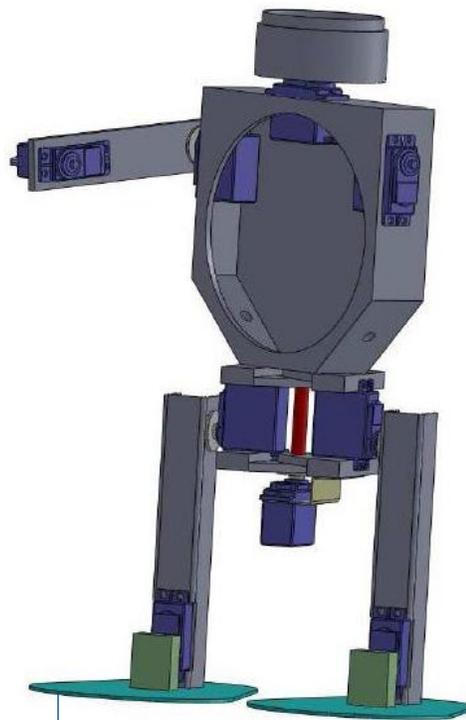
“The ability to use SOLIDWORKS Education Edition to test and simulate our assemblies gives us the opportunity to find the right place for the e-card integration,” Martin continues. “This requires a lot of work, but the process is extremely informative for students and provides practice in using the English language to support these iterations.”

COMPETING INTERNATIONALLY

Once a robot is manufactured and assembled—Lycée Colbert has a manufacturing workshop and students following professional baccalaureate studies provide significant assistance for the 10th-grade students during this process—the team performs final tests and checks before moving on to international robotic competition.

The school’s team participated in the RoboGames and the World Robot Olympiad in San Francisco, California, for 2012–2013. “The project would not be complete if our students were not involved right to the end,” emphasizes Le Coupanec. “The students defended their technology choices and projects, in English, before the English-speaking jury. The result for Lycée Colbert and its teams was a crop of medals including two golds.”

Martin adds, “Since we started this robotic project, we have seen that by the end of the 10th grade, 80 percent of students are moving towards careers in engineering. It’s about more than mere discovery, this is an educational reality.”



Drumbot robot - Winner 2014 of Robofiesta, academic championship

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