Learning by Teaching... children: an experience in Mechanical Engineering

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ISEP is an Engineering Higher Education School, in Oporto, Portugal. Bologna is for us a challenge, especially in teaching student's soft skills and the ability to transfer information and knowledge to the general public.

Using Ldl (Learning by teaching) with small children is a way to improve our students abilities in communication but also in designing and conceiving experiments and didactical resources in science education.

Students with ages from eighteen to twenty learn fluid mechanics and experimental methods and instrumentation, teaching young children with ages from six to ten. The subjects are water, air and its properties, buoyancy, temperature, pressure, etc.

In one of the first year disciplines, the students are monitors in +LAB, a laboratory that was created to promote science education in the first grades. There are several exhibitions and activities during the year; the schools register and come spend a morning or an afternoon with us. Alternatively, we can go to the schools and do some activities there, in special occasions.

There are no costs to the schools when they come to visit us, thanks to the funding of Ciência Viva, a governmental agency, and also of some private funding from Habiserve, SGPS.

1) THE CHILDREN

+LAB is a laboratory of the Mechanical Engineering Department in Instituto Superior deEngenharia do Porto, in Portugal. It was created to promote science education, and active collaboration between a Higher Education Institution and other schools.

The past year we've worked with children with ages between six and ten, and we are continuing the work this year.

One of our activities is "Tale by tale we experiment science" in which children learn about science with the help of a story we've wrote to that purpose. Their writing and comprehensive skills are also developed by means of a worksheet.

As we tell the story, a puppet theater allows us to demonstrate some physical evidence of the session theme. Last year, our subjects were water, air and its properties, buoyancy, temperature, pressure.

Then, each two children receive an experimental kit to work with and explore.

These kits were developed in +LAB thanks to the funding of Ciência Viva, a governmental agency, and also of some private funding from Habiserve, SGPS.

The experimental work is also supported by a worksheet. The final activity involves a drawing or a class art project.

Another activity is “Seeing with the hands” which is an exhibition, where the children can experiment a variety of themes all at once.

2) OUR STUDENTS

Our Mechanical Engineer students are monitors in +LAB. With the help of the teacher they have to figure out how to explain, for instance, pressure to small children, and they actually have to do it.

The students have an active role in all the activities, and are observed by the teacher. In the end of the session, the teacher points out errors and aspects to improve, and the students tell the teacher their difficulties. Teacher and students talk in order to improve the activity, until the next session.

The students have also to conceive and improve the material used in the experimental kits, and imagine new ways of teaching the subjects.

By doing so, they are learning, not also fluid mechanics, but also communication skills and creativity.

Regarding this experiment some of our students said:

“At first I was concerned about working with children, but as soon as I saw their enthusiasm, my doubts fade away.”

“The first time I had some difficulties in finding the right words because I wasn’t used to work with children.”