

Abstract

Before we illustrate our project it is necessary to explain the set up of our school and how our team works. We attend the Salesian Scientific Secondary School Rainerum, in which laboratories are offered during curricular lessons. The students have to choose one laboratory of two lessons a week they then attend for the whole school year. 16 students attend the robotics' laboratory and 18 students attend the biology's one. Three students of the first one and two students of the second one joined to realize a project thought in the Spring of 2007 during the treatment of a so complicated topic, such as the transmission of the nervous signal in the human body.

The following three questions are the ones which we started from:

- How can we simplify the understanding of this topic to students and to non-specialists?
- How can we simulate this phenomenon to better comprehend the way it works?
- Which could be the better simulation that would help us in controlling and influencing artificially the phenomenon?

We decided firstly to enlarge as much as possible our knowledge regarding the topic. We read high school and university books and asked suggestions to experts of the sector.

The first product that we thought to was a computer simulation, but we noticed that this wouldn't have guaranteed a true correspondence to the real mechanism, that is hard to be completely described with mathematical algorithms.

The idea that we elaborated was to realize a model of the electrochemical transmission of the signal by using chemical solutions. The movement of the ions is controlled by mechanical parts, set in motion by a computer.

We attempted in many ways, a lot of which failed. The difficulties that we found spaced from the chemical ambit to the mechanical one.

The principal problem was to make revertible the whole sequence of phenomena as in the cell. Finally, we found a solution that allows us to simulate the mechanism of the transmission of the impulse at both synaptic and axonal levels.

Some parts are not faithful to the reality, but on the whole we reproduced the fundamental mechanism and we can transmit a signal.

To realize this complex project, two hours in a week are not enough. To work on it, we sacrificed a lot of our free time. We met us in the August of 2007 almost every day until the beginning of the school year. Then, meetings continued for many afternoons and evenings. In the final period, in which it was necessary to complete the project, we concentrated the work leaving every other activity. The cause of this is a passion that is greater than the interests of the scholastic notes. The experience of realizing something innovative thanks to the notions acquired during the study is gratifying and involving. This project helped us in discovering the pleasure of the research and spurs to go further than the sterile study of a subject that evolves continuously.