apaBoard - multi-tool for easy-build devices ready for IoT

"Predictions say there will be 50 billion connected devices by 2020 and in our lifetime we will experience life with a trillion-node network" (TI). Those young people, who can build these devices, will shape the world.

That far-seeing society, economy or even that device will be successful which helps young people to be able to understand IoT.

It's hard to make complex experiments without deep knowledge but we must do them. So we need a tool for successful experiments which also provides the connectivity of them by its various modules.

A successful experience can establish the interest which later helps to learn easily and to become motivated. The ARM CortexM4 TivaC LaunchPad, the Energia IDE and apaBoard are a good start for students. With professional Integrated Development Environments like Code Composer Studio, IAR Systems Embedded Workbench or ARM®'s Keil™ microVision it can be used in higher education as well.

Using high technology we have to reshape educational practice: first build devices successfully and after that become interested in learning processes.

I have designed, built and tested the apaBoard's hardware which has 34 modules and 161 components.

Understanding and usage of embedded systems can be simple with my device – this is what I want to prove. So I decided to hold presentations in schools and workshops.

In order to awaken interest in microprocessors and embedded systems the best solution seemed to be presenting simple and spectacular experiments that can be implemented at home as well. The order of the experiments was based on the idea to eventually prove even to the less interested students how many-sided these devices are.

The scheme of the presentation was the following: the current → cables → circuits → printed circuits → resistance → resistance models (voltage, current dividing) → analog signals → digital signals → PWM → embedded system, components, sensors, motors → the possible experiments with apaBoard.

I have been working on a method that would enable the presentation and better understanding of the apaBoard and embedded systems. It is a 2x45 minutes presentation supported by experiments and explanations that guides the young, interested people from generating electrical current to the embedded systems.

A flyer addresses students on their own language and invites them to the presentation. The Quick Start Guide, the poster of modules, the package box and its website make apaBoard ready for distribution.

At the same time with the submission, the information of the apaBoard became accessible on the http://eskolar.com domain under the http://apa.eskolar.com subdomain powered by MediaWiki which is a Wikipedia platform that I chose for the reason that it provides a free access to edit, improve and complete the materials for anyone. During the time of the application I uploaded 55 videos to the YouTube video-sharing website that are embedded into the Wiki website as well. All materials are open source.

Foundational experiments start from analog and digital input, output, ADC, HD44780 LCD display, ADXL335 accelerometer, 8 bit level shifter, led matrix, sound input, output, amplifier, SD, EEPROM, capsens, servo, stepper, DC motor control I2C, SPI, UART data transmission, etc.

My intention was to make a generally usable device which enables the acquirement of knowledge in a relatively inconspicuous way and, by the acquired knowledge, provides experience in creating new devices.