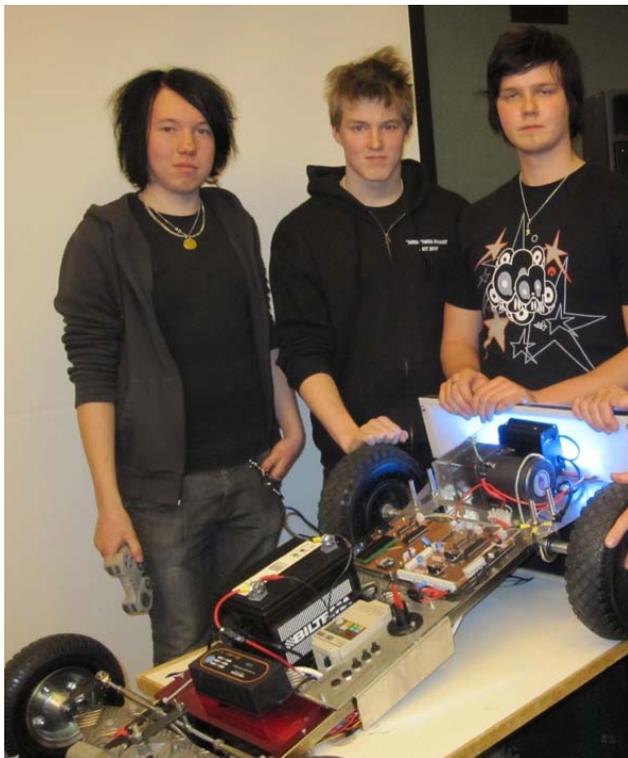


Spotlight on Finnish vocational schools

One of the things that amazes me when I travel is the difference in teaching methods around the world. Of course I am most familiar with the teaching system in the UK as this is the market we know best – from personal experience and from our 19 years of selling into this market. One of the places where vocational education is taught in a pretty unique way is in Finland.

In 2010 in a previous article we showed you how electronics departments in the Jyväskylä technical school, with students aged between 16 and 19, use a project based methodology for learning. Rather than having formal classes students are formed into small groups and are given a sequence of projects that they need to complete. They learn by doing, and clearly they enjoy it. As you can see from the photograph below the results are impressive. Antti Koivurova, Kalle Häkkänen and Jasu Romo made a fully functional wi-fi controlled electric car using multiple microcontrollers and the CAN bus protocol to connect the various parts of the car together.



Antti Koivurova, Kalle Häkkänen and Jasu Romo

This all takes place under the supervision of the four electronics teachers. Keijo Salonen, a team leader in the Jyväskylä Technical School Electronics department, sees his role as being more of a coach than as a teacher. He sets the projects, checks that students are progressing, nudges the students in the right direction when they stray, and makes sure they are getting through the work and . Although actually this does not seem to be a problem: the labs are open outside normal class hours and many students put in significant amounts of ‘overtime’. The course has a great reputation locally and the classes with 20 students in each year, are now oversubscribed.

At Matrix we are really proud that our E-blocks and Flowcode technologies have been used to allow students to create this project. This system is made possible by

Finland's attitude to vocational education, its funding, and the skill and commitment of Finnish teachers.

On a recent trip to Finland we have seen how this philosophy extends to teaching automotive students. In the Automotive department students are encouraged to undertake a project in a subject of their choice guided by the teachers. The students are also encouraged to work with other students from departments outside the automotive department.

One example of this can be seen in the photograph below. Here a group of three students has developed a car chassis. Two of the students were from the automotive department and one was from the electrical department.



The three students set out to 'make a car'. They fabricated the body, painted it, took parts from an existing car and incorporated them, and designed a complete electrical control system based on two MIAC controllers connected by a CAN bus. The project fulfils its brief, looks great and the limited electrical system functions well. There was not time to put in a seat or an electric engine - perhaps next year's students can add those. The students prioritised their work according to what they wanted to make: the car has a great stereo and the massive speaker makes the system really loud.

Another example from Oulu technical school in Finland is a project to create an electric motorbike. Under the guidance of Osmo Lukkarila a group of students took a crashed Honda CB125 motorbike and converted it to electricity. The

motor is permanent magnet DC motor capable of 4.8 KW continuous and 15 KW for 30 seconds. For voltages from 12 to 48 VDC input and 100 amps continuous (300 amps for 30 seconds). The three batteries are 12V 20Ah LiFePO4 batteries, each with its own BMS card which balances charging and indicates if a battery is over or under charged.

Again one of our MIAC automotive controllers was used to control the project with all switches, lights and controls wired to it. After the MIAC was programmed everything works like before our conversion. Both students and the teachers in the automotive department at Oulu have learned from the project and the students have even raced the motorbike on a track.

