



Continuing Professional Development in Vocational Education and Training

Home Automation

Inspiration for online teaching



In the COVET project, we have collected many great examples of teaching that have been transformed from the classic off-line version into a modern online learning method.

These sample lessons have been created by VET teachers from different EU countries. We present them to you as inspiration for your work.

The lessons are particularly suitable for vocational teachers, but can also serve as a training tool for teachers, trainers and lecturers in other educational settings.

All sample lessons, training materials as well as all information about the project are available at:

<https://www.covet-project.eu/>

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Home Automation

Offline version of the lesson

The aim of the lesson is to set up an air conditioning system that can maintain the temperature of a room of the house between 19°C and 22°C.

Materials to be used:

- A heating system
- A cooling system
- An automated Wi-Fi relay (Sonoff Basic R2).
- An automated temperature sensor (Sonoff TH16).

Computer applications:

- Android Operating System
- eWeLink

This circuit will maintain the temperature in the room in such a way that when it exceeds 22°C the fan system will be activated and if the temperature drops below 19°C the heating system will be in charge of raising the room temperature.

We will focus on the dynamics of the cycle (the way in which we are able to raise, lower the temperature and detect it to activate each of the heating/cooling systems. Therefore, it is very likely that in a real situation we will have to add variables so that the systems do not have to be running continuously, for example by increasing the temperature range. This would be a second part of this practice).

In the original lesson, the students first have to design the circuit. After describing the necessary components, the students design the circuit and start to assemble it. Once the assembly has been validated by the teacher, the software part begins: using the eWeLink application to connect the programmable relay to the sensors. In this case, the device is connected to the classroom's Wi-Fi network and can be accessed from computers on the classroom's local area network. Students check the results of their work directly on the circuit and in the classroom temperature system.

Online version of the lesson

In order to move this lesson into the online environment, I first had to consider something very obvious: the students were not going to be in class with the components of the circuit in front of them to modify it and create a new design. So the first thing I had to do was change the way I explained the design.

In addition, the students would be at home, so they would not have access to the local network to load the software onto their hardware.

In order to continue with the course, I had to change the direction of the classes, the way the information was presented to them and the way they had to interact with the tools.

Initially, I had to use online classes through Meet to continue with the explanations. In this way, I could maintain direct contact with them, give the appropriate explanations and continue to interact with the students.

The design of the circuit, instead of being done by them after the explanations, we did it together, trying to get the students to contribute as much as possible and for the teacher, showing the elements with the webcam, to assemble the circuit according to the students' instructions, discussing and correcting during the assembly.

I changed the nature of the work: from individual to group work, in order to try to overcome the isolation that the confinement situation caused. To facilitate this, once I explained the theory and how it worked, I divided the students into groups and opened as many meeting rooms as there were groups of students. Only the members of each group and I had access to these rooms. This way they had their own digital space to develop the work, exchange ideas, etc.

We had to modify the security conditions of the school network to allow access to the programming of the programmable relay in safe mode, and to allow students to access it from home. To do this, we used a VPN and gave them usernames and passwords. Using their mobile phones or any other device, they could access the network to carry out the work.

Using Node.js and a webcam, we created a website where students could see what was happening in the circuit as they uploaded their programmes to the relay.

The applications used for the work were the same ones they would use for normal classroom development, only they had to be disguised to save the physical distance between the students and the school. Thus, we used Meet to replace face-to-face classes. And instead of giving the students access through the centre's local network, we gave them remote access. To compensate for not being able to physically work with the circuit, they had a website from which they could view it.

More than managing the Meet itself, the most important thing for me was learning how to interact appropriately with students through this tool, trying to keep their attention and interest.

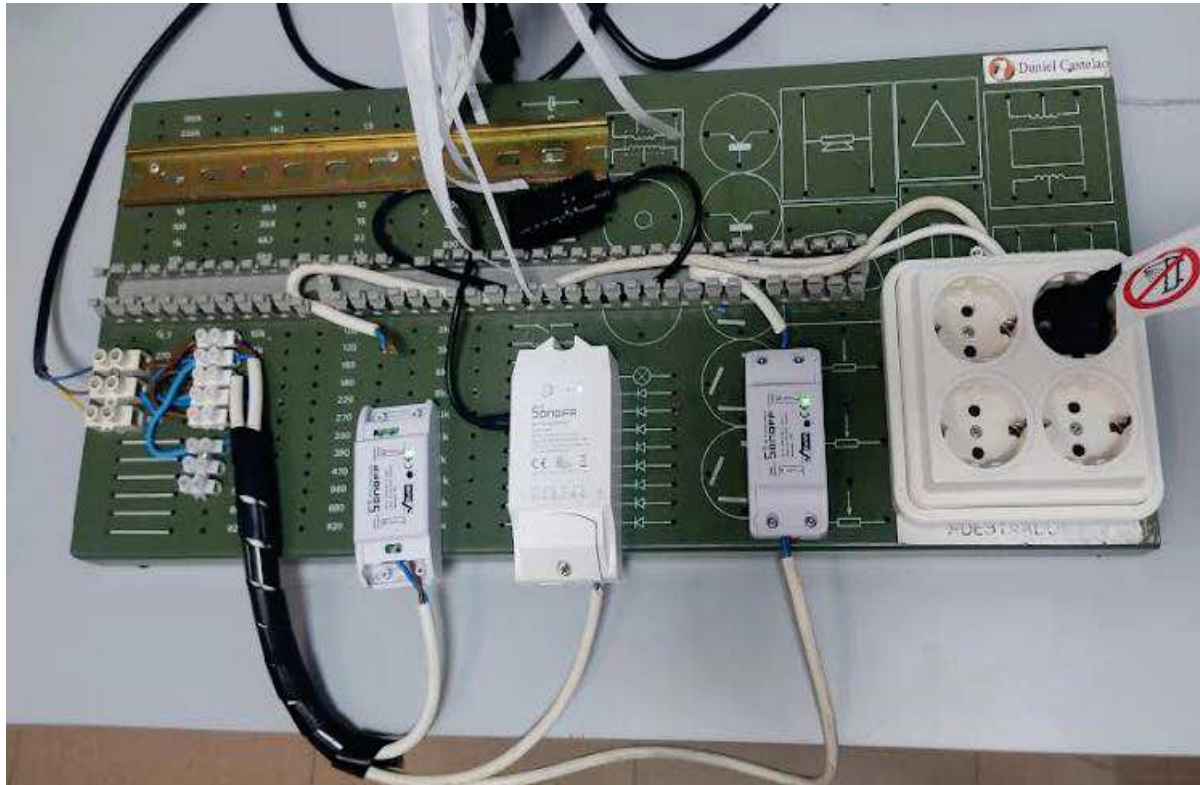
Learning how to use Node.js to create a web page to display a webcam was very easy and fast. There are many very simple and well explained manuals.

I think that the most difficult thing is the digital interaction with the students, because although we think that we all know a lot about using mobile phones and computers, we are not used to transferring the work in the classroom to a digital space where everything has to be done in a very different way.

One of the decisions I made was to reduce the actual working time on the subject and spend the beginning of the class talking about the state of mind we were all in and then trying to create a relaxed atmosphere. That was done in order to improve the mood, which was rather low, to be able to face the work and to have a little moment of concentration.

All the digital tools I used in these classes are free and have a very steep learning curve: you learn a lot in a short time. They made the work much easier and allowed me to concentrate on the academic part of dealing with the students instead of spending time on the more technical part.

Final result



The lesson plan consisted of:

- Meetings with the students with the following format: a few minutes in which they did not talk about the subject, but about themselves, about how they were. This time was variable, depending on the students' desire to interact. And then an explanation of the hardware and software used.
- Meetings where all the students in the class discussed the assembly of the hardware and the teacher assembled it according to the instructions. The students were able to follow the assembly on the web that was made available to them. In the last part of the meetings, the teacher commented on the errors they made and corrected them.
- Meetings where only the students of each group were present to discuss and decide which software to load. The teacher went from one to the other, clarifying doubts and monitoring progress.
- The last sessions where each group of pupils took turns to load their software, the functioning of the circuit was checked and the teacher corrected it.

Final feedback

I think that the overall experience was not bad. Initially I had to spend a lot of time deciding how to explain the subject and how to interact with the students.

Once the decisions were made about how to carry out the technical work, the most difficult part was how to establish the digital relationship with the students to involve them in the work. The personal and emotional situation of many students was complicated, so I think the idea of moving from a classroom to working groups where we could all discuss how to do the work helped a lot.

Nevertheless, many students did not turn on the cameras or were withdrawn for many days. But that was understandable at such times.



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