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Demonstration and study visit: Digital learning at the University of Ljubljana

Remote laboratory work – case study
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Virtual meeting via Zoom application

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Agenda

- Remote Laboratory work – Covid challenge
- Presentation of the use case at the Faculty of Electrical Engineering





Remote laboratory work - challenge

- Laboratory work is performed in computer classrooms or in premises with the laboratory equipment; requires physical presence of teachers and students
- With the lockdown during Covid19, this was a huge obstacle;
 - Initially, with partial lockdown it was possible to perform exercises in smaller groups (more repetitions, but still live)
 - After University was closed down, we needed to go fully online;
- The challenge: overcoming physical distance (remote controlling of the lab equipment or software); collaboration & communication as well as support to students in real time;

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Remote lab set-up

- The idea:
 - students access computers in computer classrooms from home
 - computers in the computer classrooms are preprepared for the specific lab exercise (additional equipment is connected as well as software needed)
 - students perform the exercise and monitor the progress
 - teacher monitors the progress of each of the students
 - teacher provides support through the separate channel individually or commonly (videoconferencing, chat)
 - sounds simple, but requires preparation



Initial set-up for students

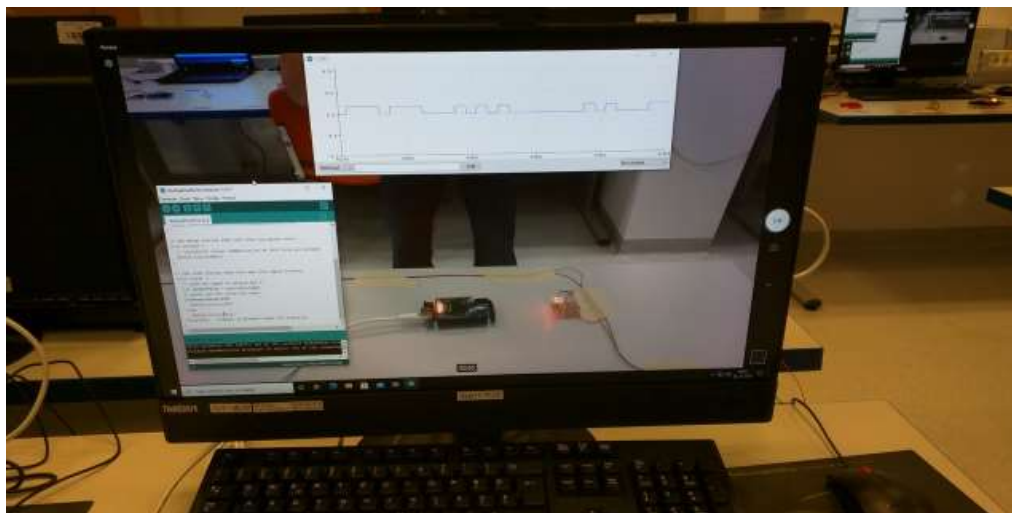
- (1.) Remote access to computer classroom
 - selecting the classroom
 - using OpenVPN to access to the Faculty network and the specific classroom
 - OpenVPN uses University students digital identity credentials (ULID)
- (2.) Remote access to the specific computer/desktop in the classroom
 - Using TightVNC program
- There is a OpenVPN configuration file for each classroom; If student wants to connect to a different classroom, he/she needs to break the connection and establish different one (protection from ghost users)





Accessing specific computers in the classroom

- Each student knows in advance which computer to log on to (from the LMS)
 - All accesses to computers are logged in detail
- Students access to keyboard, screen, computer software and equipment connected to the computer
 - They see “their” computer and surroundings through the camera



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Communication with the students

- Using parallel channel, independently of the VPN connection: Zoom, Teams or MiTeam;
- Sharing the students home computer screen is essential; following chat as well;



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Lab exercise performance (1/2)

- (1.) Proper setting up of connection
- (2.) Presentation of the lab exercise
- (3.) Teachers are in the classroom; they look at the screens of the computer and monitor progress; if needed, they communicate individually (T: student at the computer 11, you have to...; S: please check if the device at the computer 16 works properly);



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Lab exercise performance (2/2)

- Students perform the exercise;
- In the specific case, students needed to switch on/off their LED lights, according to the specific algorithm
- They watch the progress with different cameras



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Questions and remarks?

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