Modernising Undergraduate Renewable Energy Education:
EU Experience for Jordan (MUREE)
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National University for Distance Learning (UNED)
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Report

Team
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5. Mr. Mamon Dmour - Jordan University

Day 1: 18/2/2013
- The meeting started with a brief introduction by Salva and his team assuring that:
    1. UNED will assist in selection of the equipment for the Renewable Energy Remote Labs
    2. UNED will assist in installation and integration of the labs with the VLE
    3. UNED will train engineers, technicians and programmers form Jordan member universities on how to build and integrate the labs with their VLEs
    4. It was assured that all of us will not be Content providers, we are technical providers.
- Then Belal Sababha presented the current status of Remote labs at PSUT
- Dr. Ahmad Khasawneh presented the current status of VLEs at HU
- The project will include two main parts:
    1. The Remote lab setup
    2. The Virtual Learning Environment (VLE) that would include
        a) LMS probably Moodle
        b) Plugins to Moodle and other software tools to manage: tasks queue and lab booking system (Scheduling)
    3. The Hardware-cloud interfaces (software and hardware)
- The team agreed that we are missing the part about how to integrate the remote labs with the VLE
- The team agreed on using Moodle as the learning management system to be integrated with the other interfacing software and remote labs
- This following question has to be answered:
    i. Management Questions:
        - How will the servers and LMSs be distributed?
        - Or will they be centralized?
        - Who is the master? One or many?
        - How many remote labs? One? Four?

ii. Technical Questions (To be answered by Technicians and Content Providers to be able to select the hardware):
- What are the labs?
- What are the capabilities of the hardware setup
- What are the experiments we need to do?

- Initial work plan:
  - March 2013: Design the experiments
  - April 2013: Purchase the equipment
  - June 2013: Content providers visit to grace
  - July 2013: Technical Training (Conference calls then a two week visit to UNED)

• The team visited Edibon International, a manufacturer in the field of technical teaching equipment.
• The chairman of the company presented a few of the learning lab equipment to the team. Yet, discussion with the content providers has to occur before selecting the equipment and what their capabilities are.

Day 2: 19/2/2013
This was a meeting about the IoLEEE project. Salva from UNED, Edmundo from UPM and Belal from PSUT. We discussed the proposal, work plan and financial issues regarding this project.
I will provide a detailed report about this meeting in a separate document.

Day 3: 20/2/2013
This work day included various presentations by the UNED team members as follows:
1. A technical presentation about remote labs, the difference between:
   i. Real Hands on Labs
   ii. Virtual Local Simulation Labs
   iii. Virtual Labs
   iv. Remote Labs
2. The discussion included technical issues on constructing remote labs, all parts of the chain: student -> webserver -> Lab server -> DAQ -> Circuit
3. The discussion covered the type of people and what kind of personnel have to be involved in every piece of the chain: IT people, Programmers, Technicians, Engineers.
4. The presentation showed the types of experiments:
   i. Batch Experiments
   ii. Interactive Experiments
   iii. Sensor Experiments
5. It was assured here that the procedures and content are to be developed and designed by the content providers prior setting up the hardware and experiments
6. There was also a discussion on the server characteristics and client characteristics
7. Also software options were discussed:
   i. Labview built-in webserver
   ii. Data Socket server and Data Socket API for developing clients and communication with clients
   iii. Applet View: a commercial product to make remote front panels, creating java applets
   iv. Lab VNC: open source utility

8. Three communication protocols:
    i. Student -Internet
    ii. Internet -Lab Server
    iii. Lab Server -DAQ
9. Also some important services and initiatives were discussed:
    i. Scheduling Service: Queue or Calender
    ii. Tracking Service: by Owners or Teachers or Researchers
10. Some initiatives were case studied: as ILAB (MIT) and Labshare (Austria)

As a conclusion of the previous meetings:

It is important to create the learning scenario, prepare a document that shows how we want to implement the lab, the way how students will have to be guided by their instructors to go through their experiments. Decide where and how experiments and labs will be implemented at each university or distributed...etc.

The following will have to be addresses: Login, Authentication, Privileges, Single or Multi access, Single or Multi University implementation and management.

Physical Equipment: where is it? Batching-Queue-Booking?

Need to answer all these considerations to know where we will go and how we will work and plan and implement the project.

Day 4: 21/2/2013
1. During this meeting several technical and management issues were discussed.
2. One aspect was about: Who is the technical person who should come to attend the next workshop at UNED?
3. It should be a team of multidisciplinary backgrounds that has the following skills:
    i. Database Programming: MySQL
    ii. Web Programming: php, html, python, and web services
    iii. Knowledge of Hardware, DAQ and LabView
    iv. Technical knowledge of electronics and actual hardware to be used in the lab experiment
4. The above could be: Employees or Master students doing their Thesis having UNED as a co-advisor
5. Important -the selection of the team that would be sent for training at UNED:
    i. Send CVs of candidates to UNED
    ii. Start Conference calls and online meetings between UNED team and Jordanian team prior traveling to Madrid.
    iii. Then travel for 2 weeks for the practical part of the training
    iv. Then come back to Jordan and work on the actual implementations

It is important to conduct a meeting here at PSUT that would include: the project manager, the content providers, and the team who went to Madrid on the investigation visit to work together on what is next.

Dr. Belal Sababha