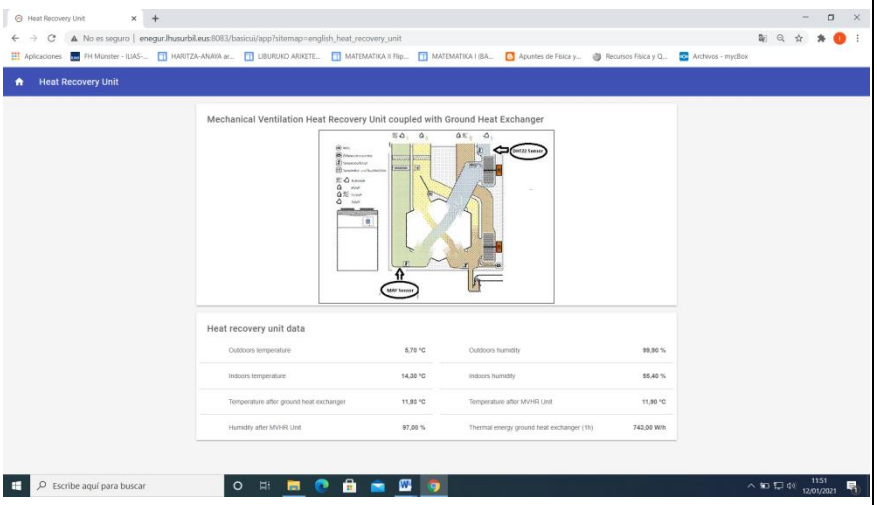
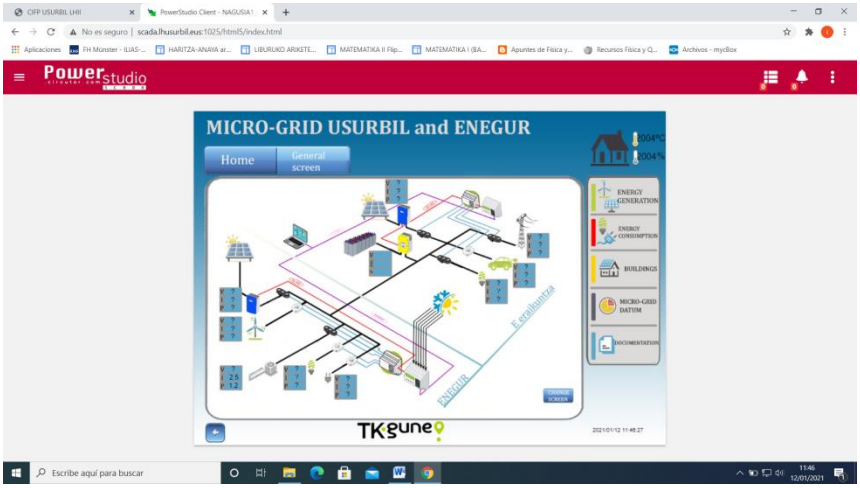
CASE STUDY from CIFP Usurbil LHII

Aspect 1	**Toolkit on "Smart Energy Management" – Training Modules Piloting**	
Specific Modules	M1. Introduction to Smart Energy Management M2. Energy Efficiency: Thermal Installations	
Piloting group's qualification	Higher Technician in "Energy Efficiency and Solar Thermal Systems"	
SQF level	4	
SEM qualification : Aggregated Unit of LOs (Learning Outcomes)	U1- Introduction to Smart Energy Management	LO1. Climate change and the need to save energy LO2. Basics of Smart Energy Management LO3. Smart Energy Management Experts
	U2- Design and Analysis of Smart Energy Measurement Systems	LO1. Identification of measurement points and parameters LO2. Implementation of energy measurement sensors and grid analysers (thermal/electric) LO3. Implementation of monitoring platforms LO4. Analysis of energy balance and efficiency rates LO5. Analysis of consumer behaviour related energy consumption patterns
Aspect 2	**Definition of the Project Task**	
General task	Thermal and Electrical efficiency analysis of the F building of School 	
Specific tasks which cover LOs of	- Thermal Analysis of existing Air recovery system through free hardware and software based monitoring system	

Training Modules	  - Electrical self-sufficiency analysis of the F building through a proprietary monitoring system 

Aspect 3	**Time arrangements**
Teachers	The teaching team (teachers who deliver classes to the group) has been set up so as to have their workload concentrated, as much as posible, with the same group. That way there is the possibility to be flexible in terms of the specialist teacher taking charge of the group as the Project progresses and the need of guidance changes (in terms of subject been covered by Project that time) for students. The team did work as a self-managed one.
Students	The student's timetable changes radically while they are carrying out the Project so there is no división in terms of subject taught but a continuous time during the day devoted to the Project.
Aspect 4	**Adaptation of spaces and infrastructure**
Furniture	There was used flexible furniture so it was easy to change the layout of the room. When groupal "traditional classes" were held out it was possible to arrange tables in a typical rectangular way whereas while working in teams they could be moved and grouped as wanted. The blackboard is a traditional one and, even if it would be much appreciated, there are no paintable walls. 

ICT connections	Each student has a portable computer so it is easy for him to move and work in team basis or individual basis. There is wifi coverage so as to work in Internet. 
Aspect 5	**Process management: Teacher role/Student role**
Teacher role	The role of the teacher has been more guiding students through complexities of the Project rather than delivering just contents. It has been very important to establish some check-points through the Project development so students don't lose the objective and cope with such a long work without getting lost or really depressed. This new role is not easy at first and pedagogically requires a change for the teacher who feels sometimes more confortable delivering contents and not forcing students to get the results on their own.
Student role	The Toolkit was a really helpful tool for them as it enabled them to have the knowledge related to the Learning Outcomes in a way (online) much more flexible. This means each group could have Access to the diferent concepts needed throughout the development of the Project in a synchronised way. The teacher was there, of course, to give support while doing the tasks and for any query related to the online course itself.
Aspect 6	**Team building**
Techniques	In our piloting experience, we did not use any tecnique for building up the teams since our group was a second year group so we knew how each student was in terms of character and profile. We did try to mix up people in groups of 2-3 people in which their characters (creative, manager, hard worker…) did have a balanced structure so as to have a better experience. Nevertheless, sometimes it is better to mix up homogeneus character students so as to force them to take up roles they are not used to. Nevertheless, the use of any technique or dynamic should be envisaged

	in case students from the group are new and there is not any experience with them by the group of teachers.
Aspect 7	**Assessment / Qualitative experience**
Assessment	Students were assessed both in technical and transversal skills. Technical aspects were corrected by each corresponding teacher and the transversal skills were assessed by the group of teachers together. These late rones were base on evidences taken about initiative an responsibility, team working and communication skills.

Technical competences (%60)	Transversal competences(%40)			
Design and Analysis of Smart Energy Measurement Systems (%100)	**Report, presentation and ICTs (%10)**	**Team Work (%10)**	**Individual work (implication and autonomy) (%10)**	**Oral communication (%10)**

U04: DESIGN AND ANALYSIS OF SMART ENERGY MEASUREMENT SYSTEMS

Assessment criteria	1	2	3	4
Learning Outcome-1. Is able to define energy measurement parameters in the system				
■ He/She does not know which are the parameters (electrical energy in generation and consumption) to measure to analyse self-sufficiency and neither how to measure thermal	**1**			

efficiency rate for MVHR unit and ground air heat exchanger.				
■ He does know which are the parameters to measure but is not able to identify where to measure them .		**2**		
■ He knows which are the parameters to measure and, even if not all the sensors are located, he knows where to locate them.			**3**	
■ He knows which the energy parameters to measure are and where to locate them with its sensors .				**4**
Average				
Learning Outcome-2. Implementation of measurement sensors and grid analysers (thermal/electric)				
■ He has no idea about the kind of sensor to place into the installation	**1**			
■ He knows what kind of sensor to place but is not able to accomplish the connection and register of data		**2**		
■ He knows what kind of sensor to place, i sable to make the acquisition of data but not the registering of it in a database			**3**	
■ He is able to select the right kind of sensor and even register data in time intervals				**4**
Average				
Learning Outcome-3. Is able to identify and implement which platform to use for integration of monitored data				
■ He/she is not able to identify a current existing monitoring platform	1			
■ He is able to identify a current monitoring platform but is not able to implement new measurement data in it		2		
■ He is able to identify and implement new measurement data but is not able to show it in UI			3	

■ He is able to identify and implement new measurement data as well as integrate it in a UI				4
Average				
Learning Outcome-4. Is able to identify energy balance and efficiency rates				
■ Is not able to determine energy balance in the system and the efficiency rate.	1			
■ Is able to carry out a yearly balance of energy identifying energy surplus and shortage periods but the parameters have not been correctly chosen NS he does not assess efficiency rate correctly even if he applies the formula		2		
■ Is able to carry out energy balance analysis and efficiency rates calculation but does not interpret the results			3	
■ Is able to determine both energy balance and efficiency rates and the justification.				4
Average				
Learning Outcome-5. Is able to identify consumer behaviour related patterns and its accordance with estimated use.				
■ He is not able to generate the electrical energy profile of the installation.	1			
■ He is able to generate the electrical energy profile but not to analyse the pattern		2		
■ He i sable to generate the electrical energy profile and analyse it but the interpretation is wrong			3	
■ He i sable to generate the electrical energy profile and correctly analyse and interpret it.				4
Average				

- The transversal competences to assess in this challenge will be teamwork, communication (in written support), individual performance and oral communication and they will be assessed individually.

- The ponderation of the transversal competences will be as shown below.
- The way to assess these will be done in different ways: teachers, auto-assessment by students and coevaluation among them. Finally, we will do an average of all the marks.

COMPETENCE	Who will assess			
	Teachers (google forms)	Teammate	Auto-assessment	**AVERAGE**
Teamwork (%10)				
Report, presentation and ICTs (%10)				
Individual work and autonomy (implication) (%10)				
Oral communication(%10				

Qualitative experience	The experience was really interesting for both students and teachers since it enabled to practise a blended learning experience taking as a base a MOOC course. Students judged the implemented material very useful for the Project development since it was possible for them to access the needed knowledge in a very livable manner (the majority of it is based on teacher recorded videos with online assessment material to prove student has reached mínimum target). Until then, it has been required to deliver groupal classes to the whole group while implementing the Project. This has the disadvantage that the development pace is different for each group and it is difficult to uniformise it.

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