Intelligent House 4.0 – Smart Light Control

In this module you will learn how to install and configure a light control system as part of smart home infrastructure. The module is based on the students' module with the same title which contains an exemplary collection of task that enable students to acquire competences in designing, installation and configuration of smart lighting systems in an existing house installation

- Intelligent House 4.0 - Smart Light Control
- 2018-11-18-VET4.0-Präsentation-Smart-Home.pdf
- 2018-11-18-VET4.0-Präsentation-Smart-Home.pptx

The teacher's module explains the developed teaching materials and gives hints for the practical implementation, evaluation and reflection of the submodule "Smart light control". Also, this material can be the basis for a development of further modules in other smart home areas (e.g. smart home and security, smart home and comfort, smart home and heating control).

The topic "Intelligent House 4.0" covers a wide range of competences which are mapped in the matrix. For the further education of teachers and trainers with regard to 4.0 competences, it is in a first step necessary to analyse one owns competences and then to acquire lacking competences. The mapped matrix shall help teacher and trainer in this process. References for possible online sources are given in the module.

Below you will find an illustration which shows a simple device that gathers smart home components. Thereunder is the teachers' competence matrix 4.0 in which all necessary competences are mapped. After this and as core of this module, you find your tasks. You can either extend the smart home components and/or adapt it to other learning groups.

Competences Trained by Working on this Module

Marked: Necessary competences for teaching the students module "Smart Light Control"

Additional competences for further development of the module

Competences Matrix Teachers Vet 4.0				
Digital competencies				
Competence development fields	1. Professional competences 4.0	2. Media competences	3. Application know-how	4. Basic ICT know-how and skills
A. To develop and implement annual teaching plan and to manage documents	1.1. To identify technological and organizational changes in the mechatronics and electronics in the systemic way for the training course and to prepare them didactically. 1.2. To evaluate the possibilities and risks of the digitalized work and business processes. 1.3. To restructure networked process chains in learning 1.4. To train by applying content of embedded systems, including their operating systems. 1.5. To provide know-how on handling interactions with sensors, reading information and collecting of data. 1.6. To train on handling the processes of robotics (robot and "cobot"), including know-how to program and control production robots in the different technological processes. 1.7. To provide know how on the installation and exploitation of the Internet of Things and CPS.	2.1 To identify and assess digital key competences applied in the ICT media. 2.2 To identify the media competences applied in the work, business and social contexts. 2.3 To design and plan the installation of the media technologies in the school. 2.4 To organize cooperation of learners in the digital learning environment. 2.5 To organize knowledge management.	3.1. To install learning management systems. 3.2. To install specialized social media 3.3. To install professional software for learning 3.4. To select and install the didactic instruments for cooperative learning 3.5. To document the digital teaching plans for common (cooperative) usage. 3.6. To handle software for management.	4.1 To install professionnally Office software appliances. 4.2 To configure and set-up learning management systems. 4.3 To provide digital applications in the local area network
B. To plan and design learning processes	1.1. To design the concept of digital process chain (4.0) in the teaching and learning process. 1.2. To select digitalized learning and teaching scenarios that facilitate problem oriented and self-organized learning. 1.3. To plan and execute interactive, virtual and individual learning phases. 1.4. To organize the interdisciplinary cooperation in the learning process.	2.1. To select, install and evaluate the digital teaching and learning scenarios. 2.2. To check the used media for accessibility/openness, problem solving and requirement level. 2.3. To check on how the media facilitate development of decision making skills, abilities to cooperate and creativity.	3.1 To install the elements of digital learning scenarios and formats (Blended und Online-Learning)	4.1. To integrate audio and video data 4.2. To prepare video-tutorials 4.3. To prepare Digitalized Content 4.4. To integrate the data from external and internal sources in the teaching. 4.5. To consider copyright protection issues.
C. To communicate, cooperate	1.1. To select interactive media for learning and training. 1.2. To present the information and data for learners by using interactive media. 1.3. To ensure the safety of personal and corporate data used in the training and work processes.	2.1. To execute timely and operative communication with the internal (school) and external addressees regardless their location and time.	3.1. To apply the digital communication instruments for the regular and remote teaching. 3.2. To use electronic teaching diaries.	4.1. To evaluate the data of learning, teaching and work processes. 4.2. To handle inquiries and feedback from the digitalized instruments.
D. To analyze and evaluate learning process, achievements and success of learners	1.1. To check media usage for occupational and learning relevance. 1.2. To design reflection processes. 1.3 To evaluate content, human and technical resources for media use.	2.1. To identify informally and non-formally acquired digital skills. 2.2. To analyze students' media literacy development. 2.3. To analyze and classify media technology in the course of education.	3.1. To plan and evaluate the formats of individual and team activities. 3.2. To select and install the online tools for diagnostics and assessment of performance at learning and work.	4.1. To collect, aggregate, analyze and evaluate data from learning processes (Learning Analytics) 4.2. To adjust the performance rating tools. 4.3. To apply privacy and data security requirements

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Tasks

1. Please, retrace the student module and the intended learning process.

Tools: mapped teacher matrix, student's module, basic questions

2. If necessary, rebuild the final product by your own. Tools: student's module,
3. Reflect on where there were difficulties and how to avoid them in class.
4. Consider the need for adjustment with regard to your own students and map the competence matrix for students.

Tool: competence matrix for students

5. Adjust the module or refine it by filling out these forms:

Tools:

Explanation of the structure of student`s modules
Form Sequencing student`s module
Learning Modules Requirement
Evaluation student`s module

6. Evaluate your own learning process.

Evaluation form

Additional material for teacher and trainer:

The following documents gives you a further information about the construction of the smart wall, useful information on the practical handling of the smart wall and hints for solving possible problems.

1. Further information about the construction of the smart wall.

- 1_Smart_Light_control_teacher-description-Smart-Wall-ENG.pdf
- 1_Smart_Light_control_Component_List_v1-ENG.pdf

2. Information about:

- Time Framing
- What the students need to know
- What the students need to use
- Internet connection and network (Information and troubleshooting)
- 230V AC-Installation
- Controlling of Philips-Hue-devices with the Bosch App (Information)
- Network structure

- 1_Smart_Light_control_student-tasks-information-for-teachers-ENG.pdf
- 9_Smart_Light_control_teachers_Information_Network_Communication-ENG.pdf
- Jan Bartkowski, Bachelorarbeit: „Sicherheitsanalyse eines App-gesteuerten Smart Home Systems"

Assessment

Assessment of all products to be delivered:

- list of important changes of work processes for your students
- list of competences you and your students need to reach
- list of competences you want to acquire in short-term
- your students' module
- an evaluation tool

Evaluation

Reflect and exchange your experience with other colleagues (in your working group or a virtual working group), define a focus you want to reflect on with your students and create a suitable evaluation tool for them.

⇒   Proposal for Self Reflection

Useful links

- https://www.surveymonkey.de/
- https://www.limesurvey.org/de/
- https://www.umfrageonline.com/
- https://de.wordpress.com
- https://de.jimdo.com/
- https://de.wix.com/
- https://www.weebly.com/de
- https://www.tumblr.com/
- https://www.blogger.com

Co-funded by the European Union