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**WirelessUP!**

**UPraising VET skills for innovation in European electrotechnical sector**

Project number: 2017-1-HR01-KA202-035434

## **WirelessUP! Benchmarking Guide**

**Intellectual Output 5**

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## Introduction

In the emerging era of Digital Economy and Industry 4.0 the vocational education and training are lacking behind with delivering relevant offer and skills of new VET professionals. The WirelessUP! project aims at delivering new and innovative learning contents in the sector of electrotechnics. The sector is chosen because it is the sector which has cross-cutting influence and covers the field of building, industry and automatization.

## Intellectual Output 5: WirelessUP! Benchmarking Guide

The Wireless-UP! Skills Benchmarking is designed to be conducted through skills competitions, which provide both a benchmark for high-performance and an objective way to assess vocational excellence.

The idea is that classrooms provide exceptional opportunities to facilitate team-like cooperation in a competitive environment. VET teachers and trainers can utilize instructional opportunities in order to maximize student learning and professional development, preparing them both to cooperate and compete by structuring learning activities that require them to cooperate in teams that compete against one another. While “neither cooperation nor competition is inherently good or bad in supporting the learning process, how instructors employ these strategies in order to enhance student learning determines their value in preparing well-educated soon-to-be professionals.”<sup>1</sup> A properly balanced approach combining cooperation and competition in fostering student learning best serves students as they are able to achieve academic success both in concert with others on their team and on an individual basis within the team. Therefore, by employing both competition and cooperation, instructors can enhance learning opportunities for students pursuing professional careers.

Benefits from training for and competing in skills competitions will accrue to the individual competitor or to other individuals and organisations with whom that competitor is associated at the time of competing or subsequently. Prior evidence suggests a wide range of potential benefits. Some benefits of participating in a skills competition may be immediate, such as development of technical skills, whereas others may take some time to accumulate. Wireless-UP! skills competition will help competitors to develop technical skills and ‘soft’ skills that are crucial for their career progression.

Competitions can enhance:

1. Improving Teamwork and Collaboration - Competition is not the antonym to collaboration. If VET teacher and trainers design a well-structured competition it can foster collaboration and team work. Teamwork oriented educational competitions require VET students to take on challenging tasks that require good communication, collaboration, and teamwork.
2. Social and emotional learning - Through competitions VET students can gain better understanding of how to deal with conflicting situations and ideas. They can learn how to collaborate with different personalities and in context of WirelessUP! with different cultures. They can learn to manage subjectivity.
3. Beneficial peer comparison - When well-designed, competitions can help students move towards beneficial peer comparisons and place them in a similar high regard along with other social status comparisons.

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<sup>1</sup> <http://www.isetl.org/ijtlhe/pdf/ijtlhe121.pdf>



4. Strengthen academic self-concept – Important aspect of a well-structured competition is to ensure benefits for all participants of competitions. More accent should be put on participation and not on the negative aspects of not winning.
5. Build meant toughness – One of the key transversal skills is resilience which is a component of mental toughness. VET students can through competitions learn how to manage stress, competitive situations and possible failure.
6. Improve risk-analysis – Well-structured competitions can provide the opportunity to VET students to acquire skills of risk analysis and risk evaluation.

WirelessUP! Benchmarking is a way to promote teaching contents, Wireless-UP! module and its methodology. On this account, it forms a positive interaction among teaching modernization, technological innovation and vocational skills competitions, in order to improve the quality of teaching and achievements of competitions.

## Conducting a competition

### The way the competition works

International student teams will be formed randomly. This means that the names of the students will be drawn randomly. Number of teams varies according to the number of students approaching the competition. All the teams get the same tasks which they can solve the way they choose. However, they have to include technology that is given for use, e.g. RaspberryPi, Arduino, IQRF etc.

The competition is made of a short theoretical part and a practical part. The sum of points from both parts will determine the winner.

### Goals of the competition

The main goal of the competition and an important function of skills benchmarking is to improve the quality and innovativeness of VET. That means in detail:

- Improving vocational education and training attractiveness for students
- Promoting the progress of professional skills
- Promoting technical skills and soft skills that are crucial for their career progression
- Improving vocational education and training attractiveness to students
- Dissemination of knowledge and deepening of the acquired knowledge beyond the complexity of educational programs
- Deepening knowledge on professional modules
- Developing psychophysical abilities
- Identifying and promoting talent for the research work
- Motivation to deepen knowledge and test it with experimental achievements
- Enforcing socializing of young people from different schools and countries
- Developing a sense of accuracy, independence and responsibility for results
- The competition will promote peer to peer teaching of complex contents

All in one, the competition is a way to increase and develop excellence in the students' respective professional training and it also to acquires and develops communication and interpersonal skills that will allow them to present their expertise more effectively. Furthermore, the transnational



competences will allow the participants to develop confidence and self-reflection, together with the skills of time management and communication.

## Registration

The students register for the (school and the international) competition at the according teacher who is in charge of organizing the competition at the school. For international competition, the teacher will send the registration form to the organizer.

The form has to contain the following information for each team member.

- Name and location of the school
- Candidate's name and surname

## Competition schedule

An example of how to form a competition with a suggested timing and activities.

Date	Time	Activities
	08:15	Formation of student groups
	08:30	Handing out the tasks and clarification of the rules and modalities
	09:15	Theoretical test
	10:00 – 15:00	Practical part of the competition (students can work freely and decide when to have a break)
	09:00 – 15:00	Practical part of the competition (students can work freely and decide when to have a break)
	15:00 – 16:00	Evaluation of the results and award ceremony

## Introduction to the competition

There will be a 30\* minutes preparation time prior to the first competition to familiarize all the participants with the workplace facilities and equipment.

## Supplies

Teams must have the necessary equipment on the lists for each box individually. The list must include an unambiguous description of the equipment and the number of pieces.

*The Competition Organizer is responsible for providing a suitable workshop area and equivalent equipment on workplaces for each team and part of competition.*

## The organizer of the competition

The VET school organizing the competition should be defined at the beginning of the organisation of a competition with responsible persons and their tasks.

## Tasks

Each and every participant will receive the official English version of the tasks as they are defined within the consent of the partners.

## During the competition

All contestants have to wear their ID badges during the competition and the presentation of their solution. The order of the presentations will be determined by drawing.



## Tasks of the competition committee

The Competition Commission has the following tasks:

- Preparing, design and scoring the assignments
- Running the competition
- Organizing and carrying out the evaluation of the competitors' solutions
- Determining the order of the competitors after the success and declare it
- Determining recipients of bronze, silver and gold awards

## Scoring

### **Theoretical part:**

Each student competes individually in the theoretical test. The individual competitor's points are part of a five-members team. The sum of points of the team members represents the points of the team.

### **Practical part:**

The practical part will be evaluated by the jury according to the determined parameters (see evaluation table in Annex). The reached points of both, the theoretical and practical part, will be counted together and form the team's result.

## Announcement of the results

The jury has to announce the results at the end of the competition. These announcements will be made in a common language and they will be both published on the competition server and announced verbally in the contest hall.

## Teacher Participation

The members of all participating VET schools are involved in organizing and running the competition. The teacher-mentors and other professional associates receive certificates for professional cooperation after the completion of competitions at all levels. The certificates contain information on the type of mentorships and a description of the professional works.

The certificates for diplomas and certificates of attendance will be provided by the organizer of the competition.

All diplomas awarded for the competitors and certificates for the mentors, members of competition boards must be signed and stamped by the organizer. The signatory is the director of the VET school organizer.

## Appeal process

Every appeal will be reviewed by the jury and the teams will be notified about the committee's decision. All appeals and their resolutions will be summarized at a jury meeting.

In the event that a mistake is discovered in the grading of a task, the mistake will be corrected, and the submissions of all contestants will be re-graded and re-scored, whether or not the scoring of that particular submission has been appealed. Note that re-scoring may result in a higher or lower score for any contestant.

## Annex 1



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## WirelessUP!

### UPraising VET skills for innovation in European electrotechnical sector

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### International contest – evaluation form

Team name: \_\_\_\_\_

The following criteria form part of the evaluation: knowledge, competences, skills in using technologies, presentation of the solutions

Please fill in the number of points that you would like to give to the team and add them up.

	Points up to	Points scored
<b>Use of technology</b>		
Short description of the project (e.g. components, source of information, gateway, ...)		
Use of two sensors	<b>2</b>	
Performance of the sensors	<b>2</b>	
Performance of the actuators	<b>3</b>	
Connectivity and reliability of the network	<b>5</b>	
Data transmission	<b>5</b>	
Display of the data and monitoring (user-friendly, clarity, ...)	<b>5</b>	
Controlling of the system (automatically, manually, user-friendly)	<b>5</b>	





Messaging/ warning	5	
<b>Soft skills</b>		
Originality of the system/ Name	1	
Innovativeness	1	
Development procedure	4	
Teamwork	5	
Presentation of the project (style, media, clarity, confidence, ...)	5	