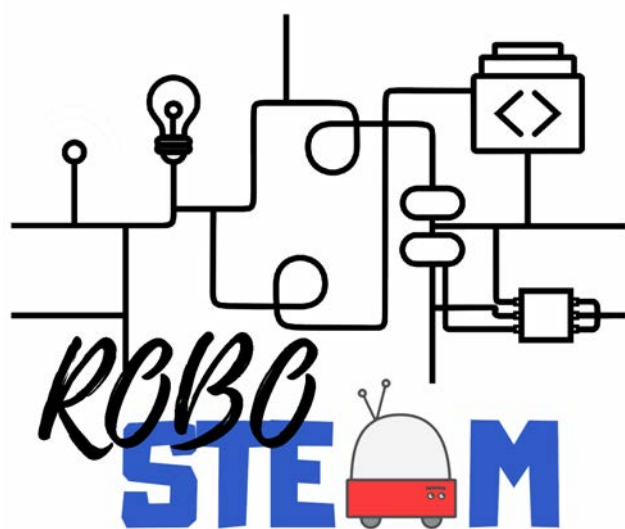


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# RoboSTEAM C6 – University of Eastern Finland Teacher Training School – Virtual Students Exchange

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## Version History

Version	Date	Comments
1.0	29/05/2021	Final version
1.1	29/05/2021	Errata correction

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## 1. C6. Virtual Students Exchange

This document describes C6-Students Exchange carried out in University of Eastern Finland Teacher Training School the context of RoboSTEAM project [1-8] from 21 to 22 January 2021. The document includes the pilot description, the context and the main results.

## 2. Exchange description

This section describes how the activity was carried out and the context of such activity

### 2.1. Context

The C6-exchange was carried out as virtual exchange because of the COVID-19 situation [9-21]. Agenda of the exchange:

#### **RoboSTEAM C6 Virtual Exchange Agenda 21<sup>st</sup>, 22<sup>nd</sup> of January 2021**

**Date: 21/01/2021 (<https://meet.google.com/tnk-wbhv-dcm>)**

- C6 Welcome (9:30 CET) – UEF
  - I. **Juha Paavilainen and Sampo Forsström (UEF learning environments)***
- Challenge description, group distribution and access to SUFFER machines(9:35 CET) – UEF and ULE

Challenge: Snow Plowing

- What challenges we have with climate? What kind of living environment we have? One of our challenges with climate is snow. There are many positive aspects but also problems caused by snow. It affects especially in traffic and transportation, but also in everyday life. Design solutions using robotics.

Guidelines: These are for teachers guiding a group

- Nanochallenges: detect material (snow), follow the line (road), avoid obstacles (buildings)
- Minichallenges: Warning and plowing

Goals:

- study partners climate and habitat
- study mobile robots in virtual lab
- study sensors and motors
- design a solution for snow plowing
- collaboration

Evaluation:

- documentation (by group)
- evaluation of working (teachers)
- Challenge development (9:40 – 12:30) – All

Guideline for working in group:

1. Introduction of team (decide team leader!)
  2. Defining challenge
  3. Sharing responsibilities
  4. Documentation (continuously)
- Lunch time (12:30 – 14:00)
  - Working at home (14:00-17:00)

***Working with challenge own part and preparing own climate issues***

**Date: 22/01/2021 (<https://meet.google.com/tnk-wbhv-dcm>)**

- Review of the work carried out (9:30 CET) – All

***Teamleader of each group will present their situation of work***

- Challenge development (10:00 – 12:00) – All
- Results presentation (12:00 – 12:30) - All

***Teamleaders present their desing and solutions***

## **Roles and instructions**

Hosting Institution (UEF):

- Facilitate UEF students' hummingbird kits
- Review and guide challenge addressment
- Elaborate Certificates for the Students
- Signature lists for the event (for their students and teachers)

ERAS, AEEG and CIC:

- Attend to the meeting
- Students would participate through SUFFER and videoconference
- Teachers should review what the students are doing
- Distribute your students and teachers in three groups
- Signature lists for the event (for their students and teachers)

ULE

- Provide the students with access to a remote lab (a common machine) for each partner where the students will work together. It will have a chat to facilitate their interaction.

The remote labs are at <https://cindy.unileon.es>

Group 1 (videoconference link for group interaction:

<https://meet.google.com/sgd-hdzt-iqv>)

User: student1 Password: student1

User: student2 Password: student2

...

User: student10 Password: student10

User: teacher1 Password: teacher1

User: teacher2 Password: teacher2

User: teacher3 Password: teacher3

Group 2 (videoconference link for group interaction:

<https://meet.google.com/hgr-besd-tzj>)

User: student11 Password: student11

User: student12 Password: student12

...

User: student20 Password: student20

User: teacher4 Password: teacher4

User: teacher5 Password: teacher5

User: teacher6 Password: teacher6

Group 3 (videoconference link for group interaction:

<https://meet.google.com/epm-hetq-qrp>)

User: student21 Password: student21

User: student22 Password: student22

...

User: student30 Password: student30

User: teacher7 Password: teacher7

User: teacher8 Password: teacher8

## 2.2. Students and teachers involved

There were students and teachers involved from Braganca (Portugal), Leon (Spain) and Joensuu (Finland). Totally 18 students and 8 teachers were involved in virtual exchange.

## 2.3. Nano-challenges to be addressed

**Author: Juha Paavilainen, Hannu Vähäkoski & Ilkka Jormanainen**

**Institution: UEF, University training school**

<b>Title</b>	<i>Snow Plowing</i>
<b>Description</b>	
<p style="text-align: center;"><i>Snow Plowing</i></p> <ul style="list-style-type: none"> <li>· <i>study partners climate and habitat</i></li> <li>· <i>study mobile robots in virtual lab</i> <ul style="list-style-type: none"> <li>· <i>study sensors and motors</i></li> </ul> </li> <li>· <i>desingn a solutions for snow plowing</i> <ul style="list-style-type: none"> <li>· <i>collaboration</i></li> </ul> </li> </ul>	
<b>Goal/s</b>	
<ul style="list-style-type: none"> <li>- <i>learn about partners climate and habitat</i></li> <li>- <i>design solution for snow plowing</i></li> <li>- <i>consideration of different approaches</i></li> <li>- <i>making of research and working plan</i></li> <li>- <i>using of robotics and computational thinking</i> <ul style="list-style-type: none"> <li>- <i>collaboration</i></li> </ul> </li> </ul>	
<b>Evaluation</b>	
<p style="text-align: center;"><i>During this challenge we can evaluate:</i></p> <ul style="list-style-type: none"> <li>- <i>collaboration</i></li> <li>- <i>self-guidance</i></li> <li>- <i>understanding the concept</i> <ul style="list-style-type: none"> <li>- <i>documentation</i></li> </ul> </li> <li>- <i>STEAM-skills and computational thinking</i></li> </ul>	



Any challenge can be divided in Nanochallenges, please describe them.

**NANOCHALLENGE** (Repeat as many tables as nanochallenge you have for the current minichallenge)

<b>Title</b>	<i>Follow lines and avoid walls and obstacles with a mobile robot</i>
<b>Specific Issue to deal with</b>	
<i>Design a mobile robot with a plow to follow line, turn before wall and avoid obstacles and react different detecs</i>	
<b>Description</b>	
- <i>Design a solution for snow plowing</i>	
<b>Goal/s</b>	
<ul style="list-style-type: none"> <li>- <i>study mobile robots</i></li> <li>- <i>study sensors</i></li> <li>- <i>study possible way to control the robot</i></li> <li>- <i>design and built a possible approach of a mobile robot with a plow that can follow line, turn before wall and avoid obstacles</i></li> <li>- <i>collaboration</i></li> </ul>	
<b>Kits to use</b>	
<i>Hummingbird (microbit-based extension kit</i>	
<b>Evaluation</b>	
<ul style="list-style-type: none"> <li>- <i>self-evaluation</i></li> <li>- <i>group-evaluation</i></li> <li>- <i>documentation of challenge</i></li> <li>- <i>self-assessment of STEAM-skills and CT before and after the challenge</i></li> </ul>	

## 2.4. Kits employed

<b>Title</b>	<i>Snow Plowing</i>
<b>Reference</b>	
<b>Description</b>	
- <i>design solution for snow plowing</i>	
.	

<b>Proposal</b>
<i>Hummingbird</i>
<b>Components (Repeat this rows as many times as components you have)</b>
<p><i>Hummingbird Bit Premium Kit Contents:</i></p> <ul style="list-style-type: none"> <li>• 1 - Bit Controller</li> <li>• 1 - Terminal Tool</li> <li>• 1 - Battery Pack (4x AA) <ul style="list-style-type: none"> <li>• 1 - Green LED</li> <li>• 1 - Red LED</li> <li>• 1 - Yellow LED</li> <li>• 2 - Tri-color LED</li> </ul> </li> <li>• 2 - FS5103B Servo</li> <li>• 2 - FS5103R Servo</li> <li>• 2 - Servo Wheels</li> <li>• 2 - Lego Adapters</li> <li>• 4 - Servo Extension Cables <ul style="list-style-type: none"> <li>• 1 - Light Sensor</li> <li>• 1 - Dial Sensor</li> </ul> </li> <li>• 1 - Distance Sensor</li> <li>• 1 - Sound Sensor</li> <li>• 1 - User Manual</li> <li>• 1 - Premium Kit Case</li> </ul>
<b>Sample of use</b>
<p><i>You can build many different types of robots with the Hummingbird kit. Some robots are stationary, and others move around their environment. A wheeled robot is called a mobile robot or a rover.</i></p>
<b>User Manual</b>
<p><u><a href="https://store.birdbraintechnologies.com/collections/hummingbird-bit/products/hummingbird-bit-premium-kit">https://store.birdbraintechnologies.com/collections/hummingbird-bit/products/hummingbird-bit-premium-kit</a></u></p>
<b>Other information</b>
<p><u><a href="https://www.birdbraintechnologies.com/hummingbirdbit/">https://www.birdbraintechnologies.com/hummingbirdbit/</a></u></p>

## 2.5. Cultural activities

Students presented a presentation of their own climate and habitat.

### 3. Signatures



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of the European Union



ERASMUS PLUS STRATEGIC PARTNERSHIP PROJECT  
ROBOSTEAM – INTEGRATING STEAM AND COMPUTATIONAL THINKING  
DEVELOPMENT BY USING ROBOTICS AND PHYSICAL DEVICES

Pilot Phase 2 CO6

Virtual Exchange

Colégio Internato dos Carvalhos, Vilanova de Gaia, Portugal

from 21<sup>st</sup> to 22<sup>nd</sup> January 2021

#### LIST OF THE PARTICIPANTS

LIST OF TEACHERS		SIGNATURES
Nº PARTICIPANT	NAME / SURNAME	
1	Manuel Domingos Moreira de Jesus	<i>Manuel Moreira</i>
2	Jonny Filipe Alves	<i>Jonny Alves</i>
LIST OF STUDENTS		
1	Diogo Gomes Cardoso	<i>Diogo Cardoso</i>
2	João Carlos Nicola Salgado Leiria Teixeira	<i>João Teixeira</i>
3	Rafaela Alexandra Rodrigues Clemente	<i>Rafaela Clemente</i>
4	Pedro Filipe Oliveira Cardoso	<i>Pedro Cardoso</i>
5	Beatriz Bonifácio Pinto Martins	<i>Beatriz Bonifácio</i>
6	Miguel Guedes Rodrigues de Sousa	<i>Miguel Sousa</i>
7	José Luis Rangel Sousa	<i>José Rangel</i>
8	Francisco José Alves Jesus Reis	<i>Francisco Reis</i>

Portugal, 22nd January, 2021



Co-funded by the  
Erasmus+ Programme  
of the European Union

**ERASMUS PLUS STRATEGIC PARTNERSHIP PROJECT**  
**ROBOSTEAM – INTEGRATING STEAM AND COMPUTATIONAL THINKING**  
**DEVELOPMENT BY USING ROBOTICS AND PHYSICAL DEVICES**

**LEARNING-TEACHING-TRAINING PROJECT MEETING**

Hosted by UNIVERSITY OF FINLAND, JOENSUU (FINLAND)

from 14<sup>th</sup> to 15<sup>th</sup> January 2021

**LIST OF THE PARTICIPANTS**

LIST OF TEACHERS				
Nº PARTICIPANT	NAME SURNAME	COUNTRY	SCHOOL	SIGNATURE
1	Susana Celis Tena	Spain	Instituto de Eras de Renueva (IER)	
2	Covadonga González Barrientos	Spain	Instituto de Eras de Renueva (IER)	
3	Julio Carlos Fernández Domínguez	Spain	Instituto de Eras de Renueva (IER)	
4	Manuel Pérez Martínez	Spain	Instituto de Eras de Renueva (IER)	
LIST OF STUDENTS				
1	Nerea Carral Martínez	Spain	Instituto de Eras de Renueva (IER)	
2	Adriana Urdiales Martínez	Spain	Instituto de Eras de Renueva (IER)	
3	Hugo Hernández Mayo	Spain	Instituto de Eras de Renueva (IER)	
4	Alejandro Ramos Martínez	Spain	Instituto de Eras de Renueva (IER)	
5	Andrés Riaño Honrubia	Spain	Instituto de Eras de Renueva (IER)	
6	César Juan Rodríguez	Spain	Instituto de Eras de Renueva (IER)	
7	Mónica Montes Magalhaes	Spain	Instituto de Eras de Renueva (IER)	
8	Álvaro Sarmiento de la Puente	Spain	Instituto de Eras de Renueva (IER)	

Spain, 15th January 2021

**ERASMUS PLUS STRATEGIC PARTNERSHIP PROJECT**

**ROBOSTEAM – INTEGRATING STEAM AND COMPUTATIONAL THINKING  
DEVELOPMENT BY USING ROBOTICS AND PHYSICAL DEVICES**

Pilot Phase 2 CO6

Virtual Exchange

Agrupamento de Escolas Emídio Garcia (AEEG), Bragança, Portugal

from 21<sup>st</sup> to 22<sup>nd</sup> January 2021

**LIST OF THE PARTICIPANTS**

LIST OF TEACHERS		Signatures
Nº PARTICIPANT	NAME / SURNAME	
1	Lúisa Fernandes	
2	David Maltez	
3	Maria João Ramos	
4	Caio Camargo (IPB Master student)	
LIST OF STUDENTS		
1	André Amaro	
2	Helena Rosa	
3	Íris Alves	
4	Nuno Pires	
5	Pedro Maltez	

Portugal, 21st January, 2021

**C6 Virtual Exchange**

January 21 – 22, 2021

Online event

**Participant List**

	Name and Surname	Institution	Country	Date of Birth	Signature
1	Juha Paavilainen	University of Eastern Finland	Finland		<i>Juha Paavilainen</i>
2	Laura Ylönen	University of Eastern Finland	Finland	190293	<i>Laura Ylönen</i>
3	Hannu Vähäköske	University of Eastern Finland	Finland	100479	<i>Hannu Vähäköske</i>
4	Marek Pinter	University of Eastern Finland	Finland		
5	Richard Pinter	University of Eastern Finland	Finland		
6	Veikka Lehtikoinen	University of Eastern Finland	Finland		
7	Rasmus Kosonen	University of Eastern Finland	Finland	021105	<i>Rasmus Kosonen</i>

Signed by: Ilkka Jormanainen (Responsible leader for RoboSTEM project at UEF)

2018-1-ES01-KA201-050939

## 4. Results

### Team work

Students worked in mixed teams of 4 to 6 members from the four participating schools. All the teams worked in a coordinated way to solve the challenges proposed, obtaining good results both in the programming part and the virtual presentation of the proposals of each team.

Teams were 2 days working on the project and all of them finished their proposals successfully.

Photos of the work done by the different teams are attached.

### Assessment instruments:

- **STEAM Semantic Survey**

Before starting with the different projects, this survey was carried out to assess assess learners' starting points.

At the end of the Project, the survey will be carried out again to evaluate their progress in skills related to control, robotics and physical devices.

The project carried out in this exchange will be decisive in the overall progress of our students.

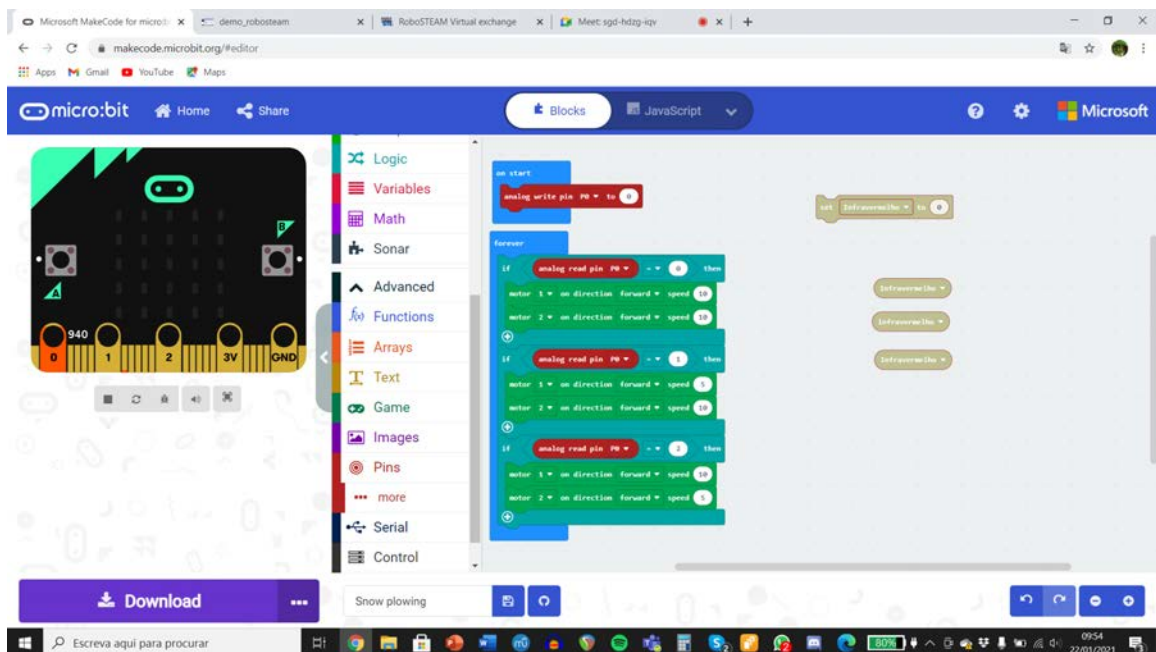
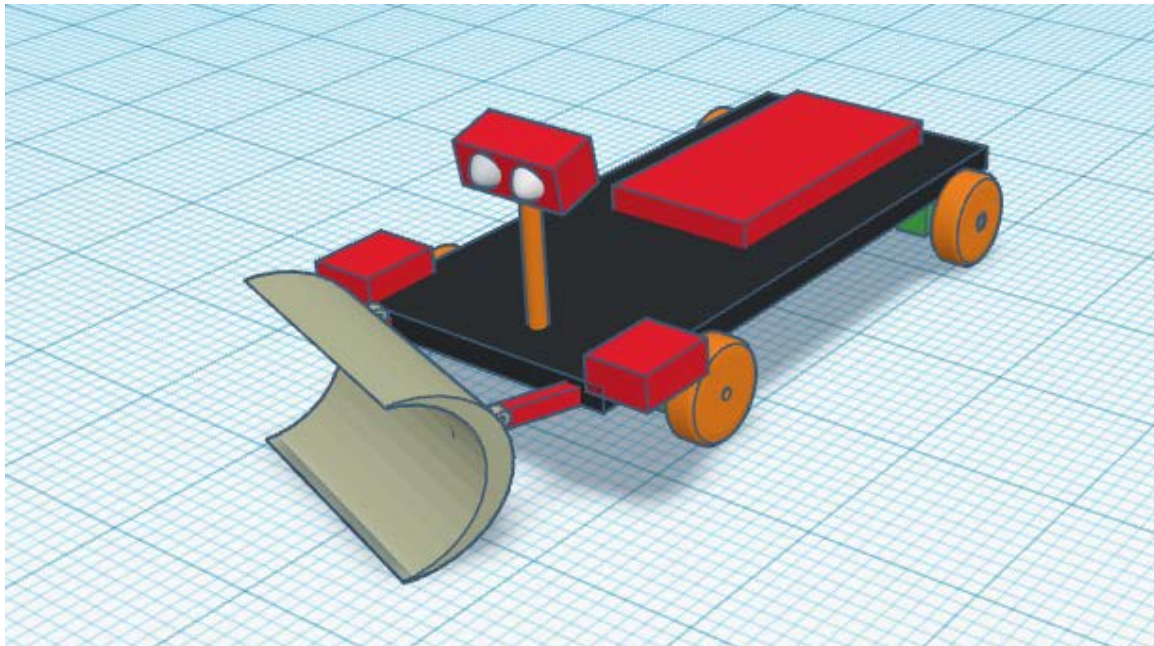
- **Co-Measure rubric**

A rubric to assess student collaboration in STEAM units.

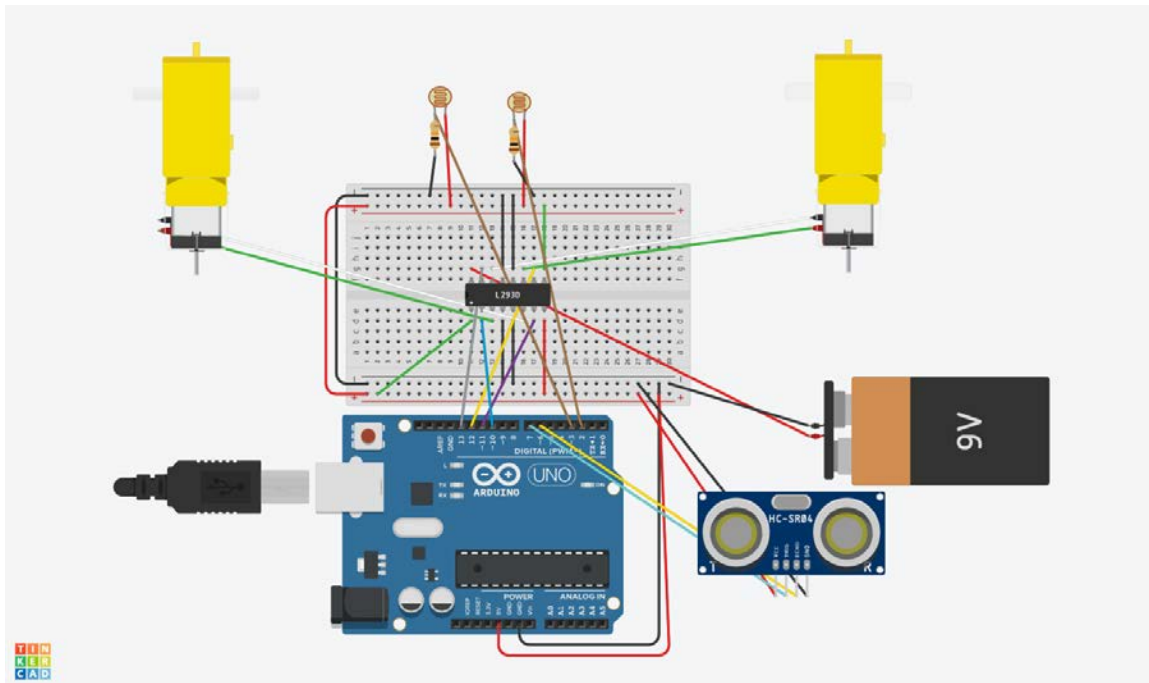
This rubric was used for the evaluation and co-evaluation of the work developed by each team. It values both teamwork and the variety of solutions provided by each team, and the problem-solving process as well.

## 5. Photos

<https://padlet.com/juhapaavilainen/robosteam>

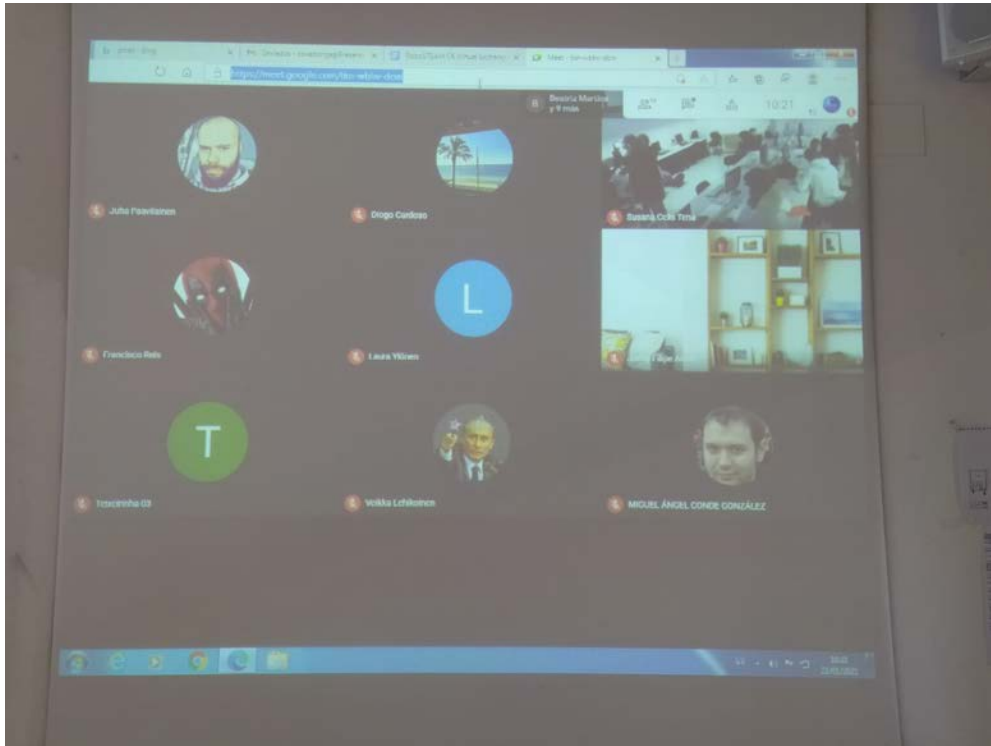






**Spanish Students Team**





Virtual Meeting





**Listening to instructions**



**Teamwork**

**Exposing their proposals**



## 6. Teachers' and students' perceptions

This virtual exchange was a good opportunity for students to work in a digital way and collaborate with students of different countries.

## 7. Acknowledgements

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