

VOCATIONAL SECONDARY SCHOOL OF ELECTRONICS

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SKILLS ACQUIRED
DURING
THE CHANGE
PROJECT





Introduction

Secondary vocational school of electronics

Specialized in :

System programming

Application programming

Computer systems and technology

5 teachers and 50 students took part
in the project activities each year

Theoretical and practical lessons were conducted

Experiments and data analysis were performed

Monitoring reports were executed

KNOWLEDGE

Students **improved their knowledge** about :

- Indoor air quality
- Climate change
- Greenhouse effect
- The causes of the high levels of CO2 emission
- Materials and obsolescence
- Citizen science



THE CHANGE PROJECT:

- Contributed to **raising students' awareness** to the concerns of air quality indoors
- **Improved their knowledge** about the air pollution
- **Engaged** them in an important teamwork which could help further scientific research

PROGRAMMING & PRACTICAL SKILLS

Students in Systems Programming and Applied Programming **developed their programming skills** by :

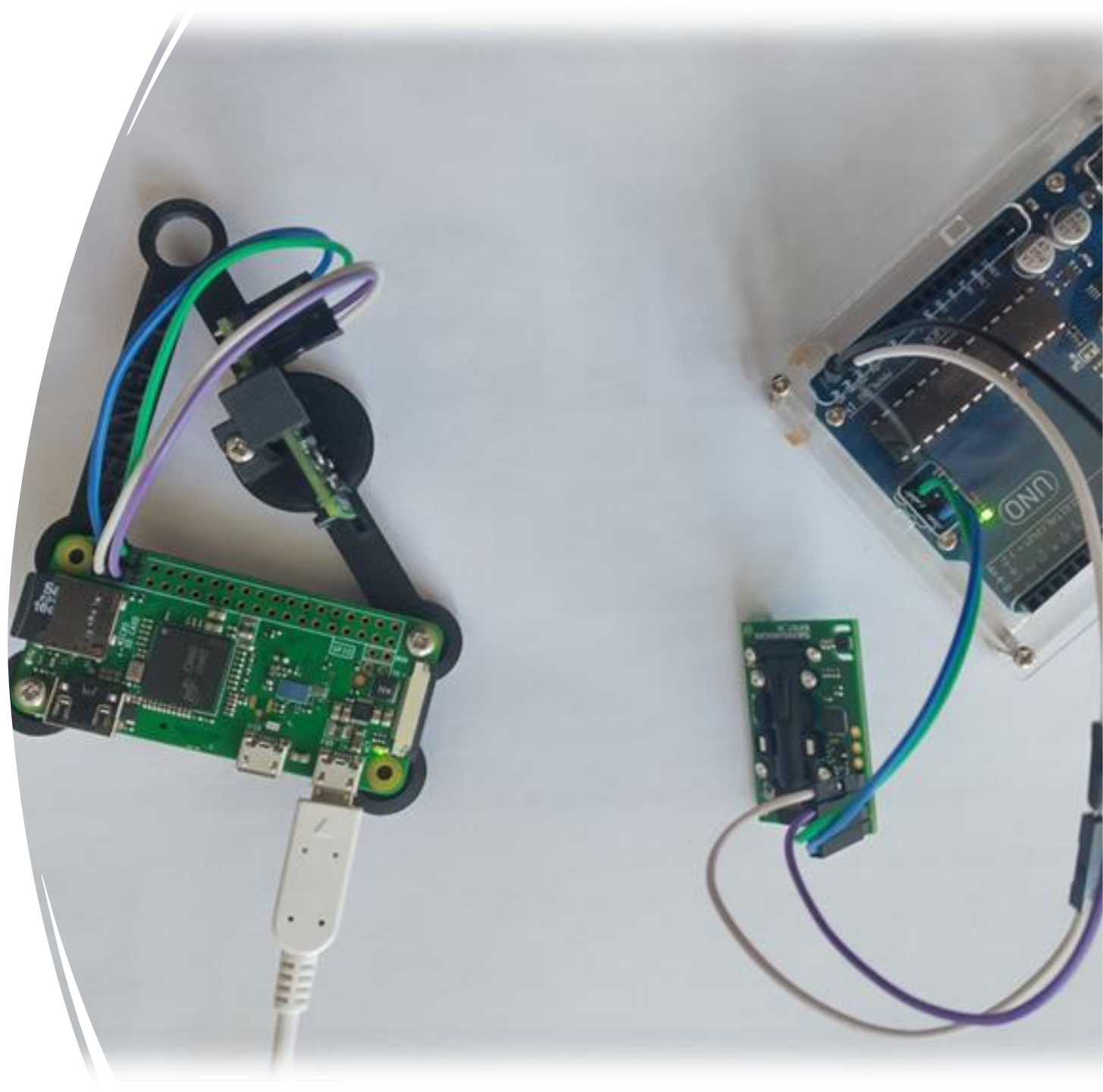
- ✓ comparing C++ and Python
- ✓ by importing and using an open-source module
- ✓ developing data mining code testing with a Raspberry Pi
- ✓ learning about structure and syntax on Python
- ✓ Web Application
- ✓ Raspberry PI platform



Students developed **practical skills** to assemble the monitoring stations and learnt how the system works.

INNOVATION AND MOTIVATION

All the project activities motivated some students to start a local project and **create similar monitoring stations based on Arduino**. This way students gained knowledge about various boards and web applications and **developed their technical and innovation skills**.



DATA PROCESSING

The CHANGE project provides opportunities for students to:

- **developed their ability to collect information and thoroughly analyze it**
- **understand how to interpret and manipulate large data sets**
- **synthesize information gained through observations**

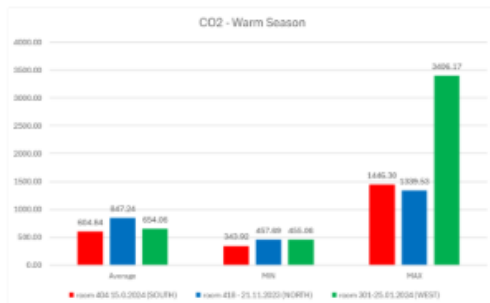


854.27ppm, which is not the highest value for the day. The average RH value is the highest for room 301 (west) - 40.68%, and for the same room, the average CO2 concentration is the highest (1174.01ppm). But with the rest of the rooms, no such dependence is visible. **The relationship of RH with temperature is interesting, as at high temperature low RH is observed.** The humidity in room 404 (South) with the highest temperature is lower than that in the other two rooms (25.68% versus 36.88% and 40.68%).

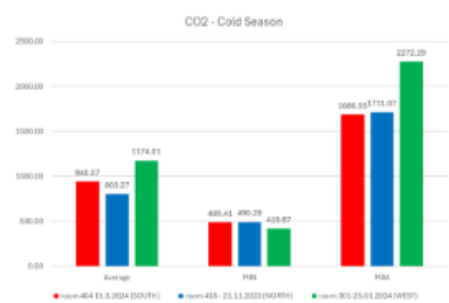
From the data in **Table 3**, it can be seen that during the warm season, when the rooms are not heated, the average CO2 concentration is about 200 ppm lower than the cold period (702.05 ppm and 972.62 ppm, respectively). In all rooms, while classes are being held, the windows are open, and in the southern room, even the door is open.

Graphs 1 and 2 show the mean, minimum and maximum values of CO2 during the two seasons in three rooms.

Graph 1. Warm season



Graph 2. Cold season



According to the graphs above, in both seasons, the minimum values of CO2 in the three rooms vary around 450 ppm, being slightly higher in the heating season. The average maximum value of CO2 is slightly higher during the warm period (2064 ppm) compared to that during the cold period (1890 ppm). The same dependence is observed in the maximum temperatures - the average maximum temperature for the warm season is greater (30.42°C) compared to that for the cold season (26.34°C). **Therefore, the CO2 concentration is directly related to the room temperature, which in turn is affected by the outdoor temperature in the warm season under natural ventilation.**

Table 6 presents the measurements of CO2, temperature and relative humidity at specific times of the school days during the warm season.

Table 6. CO2, temperature, and RH during warm season in 3 rooms

WARM SEASON - NON-HEATING									
time	room 404- 12.04.2024			room 418- 19.03.2024			room 301-12.04.2024		
	CO2 (ppm)	temp (°C)	RH (%)	CO2 (ppm)	temp (°C)	RH (%)	CO2 (ppm)	temp (°C)	RH (%)
8:00	569.38	31.58	28.4	558.8	25.07	33.2	624.55	26.67	37.2
8:45	399.33	29.97	31.9	582.8	25.88	33.2	612.62	26.8	37.4
10:50	611.38	33.38	26.5	867.64	27.11	33.4	500.64	26.82	38
11:45	587.05	31.91	24.6	1079.15	26.64	37.7	1457.21	27.33	37.5
13:35	520.6	35.1	24.6	1001.3	26.26	35.4	760.19	28.1	38.3

LANGUAGE SKILLS

Some of the training materials were introduced in English. Students **excelled their language skills** as they prepared all monitoring reports, training materials and presentations in English. They **improved their capacity to communicate in English** and the ability to learn in **international context**.

COMMUNICATION & PUBLIC SPEAKING

THE CHANGE project allowed all students to develop **strong communication skills** and to encounter for first time with **public speaking**. This was possible through the public events where the project was presented to the citizens.



PEER-TO-PEER EDUCATION → COACHING SKILLS

Some students involved in the project **practiced their coaching skills.**

Peer coaching is a form of learning and development that helps students solidify their knowledge by teaching each other.

During the second year of the project 10th grade students worked together with 8th grade students to share ideas in the process of monitoring and while preparing reports.



THE CHANGE PROJECT was **an excellent opportunity** to engage school students in science activities, where they could **take the role of scientists**: design their own experiments, monitor their local environment, and gather data that was relevant to their own perceived problems.

Developing a **diverse skill set** through the project could be valuable for their personal growth and future career.



THANK YOU FOR YOUR ATTENTION !