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Project:	Network of Competence on Internet of Things [NEON]
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Work Package 5:	Training and internship implementation
Title:	D5.5 Report on teacher training modules
Lead Organization:	UNMDP
Participating Organization:	UNI-KLU, UC3M, UNC, UNS, UNMDP, UdelaR, UCU, INCUTEX, ALASSIO, ALENET, TEAC, EYCON, ALLIANSYS SRL, Santex, TELECOM ARGENTINA S.A, CONTROLNET S. A., ABM ingeniería y sistemas S.R.L., UTE, CONAE.
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Deliverable data	Work Package and Outcome ref.nr	WP5 D5.5
	Title	Report on teacher training modules
	Type	☐Teaching material ☐Event ☐Learning material ☒Report ☐Training material ☐Service/Product
	Description	A report that describes the teacher training modules developed in the framework of the NEON project
	Date	24.11.2023
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Target groups	☒Teaching staff ☐Students ☐ Trainees ☒ Administrative staff ☐ Technical staff ☐ Librarians ☐ Other	
Dissemination level	☐Department/Faculty ☐ Local ☒ National ☒ Institution ☒ Regional ☒ International	
Lead Organization	UNMDP	
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Task	T5.6 Implementation of three workshops on IoT technologies	

Revision History				
Version	Date	Author(s)	Organization(s)	Brief description of change
1	27.9.2023	P. Donato, D. Carrica	UNMDP	Draft with contents of all sections
2	24.11.2023	P. Donato, D. Carrica	UNMDP	Addition of photographies of the activities and review of all sections
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1. Introduction

The Work Package 5 (WP5) **Training and internship implementation** is oriented to training and internship activities organized during the ERASMUS+ NEON project. Training activities will mainly target students, but specialized training targeting teaching staff will also be organized. The teacher training sessions will deal about innovative teaching methods, such as, for example: remote lab tools, teaching practices, educational trainings, training in prototyping tools, etc.

The deliverables and their associated tasks, related to WP5 are the following

- D5.1 Report on the training/internships website section (M6).
- T5.1 Creation of a section in the project website where training and internship opportunities are listed.

- D5.2 Report on the framework for training and internships (M11).
- T5.2 Implement framework for student training in cooperation with EU partners and industry.

- D5.3 Report on organized hackathons for students of the region (M19).
- T5.3 Implement framework for student internships in companies.

- D5.4 Report on student training modules on technical and entrepreneurial subjects (M30).
- T5.4 Offer techno-economic, entrepreneurial and IPR related training modules.

- D5.5 Report on teacher training modules (M35).
- T5.5 Implement teacher staff training on technology and modern prototyping tools for IoT.
- T5.6 Implementation of three workshops on IoT and ICT technologies.

The objective of the deliverable D5.5 is to report about the teacher training modules comprised into the scope of NEON project. In particular, this document summarize the following information:

- List of training events performed
- List of teacher training modules developed
- Description of the main content of the teacher training modules.

2. Overview of the implemented teacher training sessions

This deliverable presents a summary of the teacher training workshops held, including the training topics and materials, the number of participants from the participating universities and the general conclusions regarding these training events.

The activities of WP5, Training and internship implementation, started in the second year of the NEON project. The task T5.6 of WP5 established the implementation of three workshops on IoT and ICT technologies. The first workshop, planned to take place in Klagenfurt in mid-2021, had to be rescheduled to May 2022 due to mobility restrictions imposed as a result of the Covid-19 pandemic. This also led to rescheduling the second workshop, planned for July 2022, to November 2022. The third workshop was held according to the original schedule in June 2023.

3. Workshop in Klagenfurt, Austria (May 2-5, 2022)

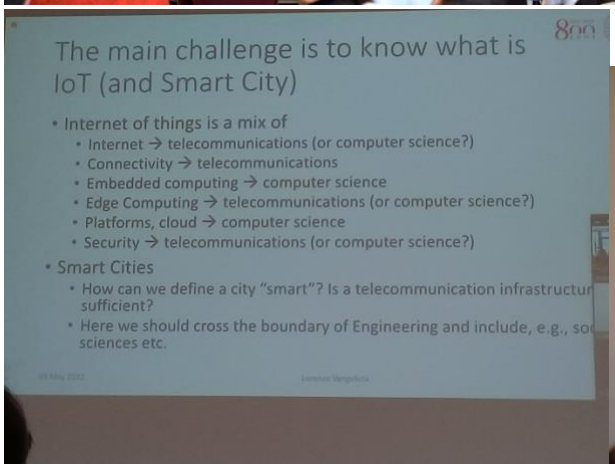
Due to the contingencies caused by the covid19 pandemic during year 2021, it was impossible to host the kick-off meeting of the NEON project at the University of Klagenfurt in that year. For this reason, both events were delayed until May 2022. The entire event (kick-off meeting and workshop) extended over four days, but the workshop was concentrated in two days. The format was in-person and it was devoted to teaching methodologies for IoT. It included the following activities with invited talks from Academics & Industry experts in the field of IoT. The activities were organized in two days:

Day 1 (activities in University of Klagenfurt)
1) Lorenzo Vangelista (University of Padova, Italy) - Teaching IoT and Smart Cities at Univ. of Padova: my experience from last 7 years
2) Stefan Pasterk (University of Klagenfurt, Austria) - Didactical Aspects for Teaching IoT
3) Gleb Radchenko (Silicon Austria Labs, Austria) - Industrial IoT and Fog Computing Support of Digital Twins
The second half of the day had all participants forming NEON Working Groups to discuss their Ideas, Proposals, Issues faced & Solutions arising in the areas of Teaching, Student Engagement, Internships and Labs & Continuous Education.

Day 2: Activities on the facilities of the INFINEON factory, in Villach
1) General information about by the IoT recent technologies and market (by Davide Chiola
2) RADAR, Time-of-Flight (ToF), CO2 sensors used in IoT applications (by Mathias Wolfmueller)
3) Mobile robotics (by Jannik Gade)
4) Infineon facilities tour
The second part of the day was dedicated to sharing teaching experiences by representatives of the partner universities:
- Summary of case studies: A. Tonello, J. Cousseau, J. Finocchietto, N. Imbert, M. Miguez
- Students engagement: A. Garcia Armada, C. Cabrera, R. Cherini, M. Kuzman, N. Letizia, C. Schmidt
- Internships: D. Carrica, M. J. Caro, F. Favaro, L. Mendez, H. Mendoza

- Labs and continuous education: G. Corral Briones, A. Derregibus, F. Estevez, P. Iturralde, V. Korzhun, L. Steinfeld

The workshop was attended by 23 teachers from the universities involved in the project, UK (4), UC3M (2), UNS (2), UNC (4), UNMDP (2), UDELAR (3), UCU (3), Incutex (1), Alassio (1), Alenet (1).




Didactical Aspects for Teaching IoT
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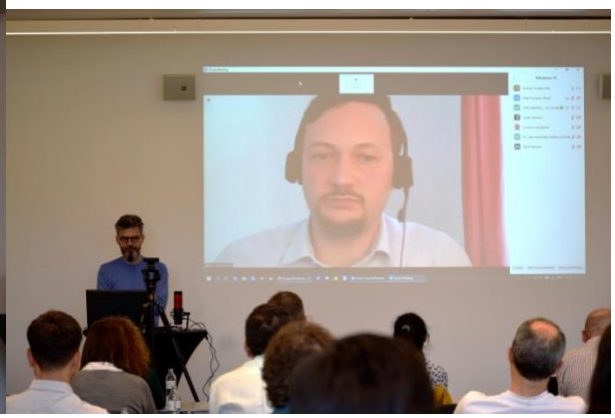
University of Klagenfurt


Field of Didactics


Learning Objectives: Bloom's Taxonomy
evaluate
analyze
apply
understand
remember


INDUSTRIAL IOT AND FOG COMPUTING SUPPORT OF DIGITAL TWINS
Gleb Radchenko, Ph.D.
Dependable Electronic Based Systems




Ikonen der Mikroelektronik
Icons of microelectronics
1947
1958
1959
1965
William Shockley
Jack Kilby
Robert Noyce
Gordon Moore


NEON

4. Workshop in Madrid, Spain (November 14-18, 2022)

A second workshop, focused on communication technologies for IoT, was held at the Universidad Carlos III, in Madrid, with an on-site format. It included the following activities with invited talks from Academics & Industry experts in the field of IOT:

Day 1
Giovanni Giambene (Univesity of Siena) - IoT via 5G and Beyond 5G Satellite Systems

Day 2
1) Shahid Mumtaz (Nottingham Trent University) - Ultra Reliable and Low Latency Communication (URLLC) for 5G, IoT, Time Sensitive networking and V2X communication
2) Visit to the Nokia facilities in Madrid

Day 3
Sinem Coleri (Koc University) - AI based Machine-to-Machine Communications in 6G

The workshop was attended by 23 teachers from the universities involved in the project.

5. Workshop in Montevideo, Uruguay (June 29-30, 2023)

The third wokshop was held physical at the Universidad de la República, in Montevideo. The focus were the IoT technologies for agriculture market, and included the following activities:

Day 1
1) Janise McNair (University of Florida, via zoom) - "IoT in Agriculture: Creating Access and Opportunity"
2) Mark Trotter (Central Queensland University, via zoom) - "Why IoT is set to revolutionize the livestock grazing industries!"

Day 2
1) A discussion panel devoted to the demand perspective was done, integrating members from Uruguayan agriculture research and professionals ecosystem: Guadalupe Tiscornia (INIA), Santiago Ferrando, Ana Meikle (Facultad de Veterinaria), Alvaro Otero (INIA), Chair: Federico Lecumberry (Fing, Udelar)
2) Industry panel, integrated by the representatives of the following companies: BQN (Uruguay), Focus (Uruguay), Incutex (Argentina), Nettra (Uruguay), Sensor Data (Uruguay). Chair: Mariana Siniscalchi (Fing, Udelar)
3) Mehmet Can Vuran (University of Nebraska-Lincoln, via zoom) - "Agricultural Internet of Things: From Low -data-rate Underground Sensing to High-data-rate Autonomous Operations to Grow More Crop for Drop".

The workshop was attended by 27 teachers from the universities involved in the project.

6. Conclusions

This deliverable summarises the training activities performed for the teacher staff. In the framework of the NEON project, three workshops were planned and implemented for the staff of the participating universities, focused on IoT, communications, pedagogical activities, etc. Although in the first year of the project (2021) the activities were affected by the restrictions caused by the Covid-19 pandemic, the three workshops could be implemented in the years 2022 and 2023, in person and at the locations agreed in the project proposal.

The training topics covered in the workshops were appropriately selected with the main idea of improving the attendees' knowledge on IoT and other selected topics. It was observed that most of the events aroused the interest of the attendees for the chosen topics and motivated them for the next trainings.