Knowledge diffusion through experiential education, focusing on robotic technologies, virtual reality and internet of things

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Modern Pedagogical Theories

- Student-oriented teaching model

- Students are a co-shaper of the knowledge

- Knowledge implemented through carrying out experiential and exploratory activities

- Students acquire new knowledge by detecting, exploring and generally acting

- Immersing to modern assisted living environments and technologies

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- A new form of living that aims to help the:

    elderly and/or people suffering from chronic conditions

    people with mobility difficulties

- Offer new opportunities and solutions

- New multidisciplinary and multifaceted services

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- New challenges arise

  - High degree of technologies heterogeneity

  - Plethora of devices, sensors, communication protocols and software.

  - A new, innovative approach to knowledge dissemination through know-how and experiential learning and transfer experiments

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- The ESDA Lab's AAL House Use Case

  - Open, extendible and versatile end-to-end Ambient Assisted Living Environment architecture

  - Integration of Robotic technologies in Ambient Assisted Living Environment

  - Robotic platform in collaboration with an AAL environment

ESDA as a Member of European Digital Innovation Hubs

- Is a certified Digital Innovation Hub of European Commission

- Is one of 6 DIHs in Greece and the only one in Western Greece

- Aims to transfer know-how to research and academic institutes, SMEs and slightly bigger companies

- ESDALAB DIH develops Knowledge Transfer Experiments to students
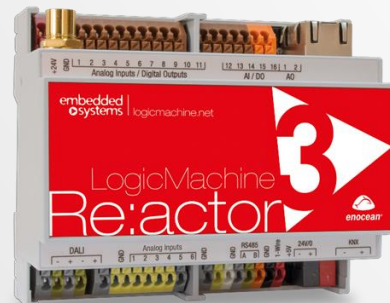
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Infrastructure & Services Provided

- Incorporates a series of sensors :

  Humidity, Air quality (CO2), Temperature and Light

- Incorporates a series of actuators :

  Pressure sensors in bed and sofa, Distance and voice

- Include various operating protocols :

  MQTT, HTTP, Wi-Fi, BLE, EnOcean, ZigBee, Z-Wave, BACnet and KNX

- Turtlebot2 Robotic platform :

  Recognition of human activities

- LEGO Mindstorms platform :

  for educational purposes
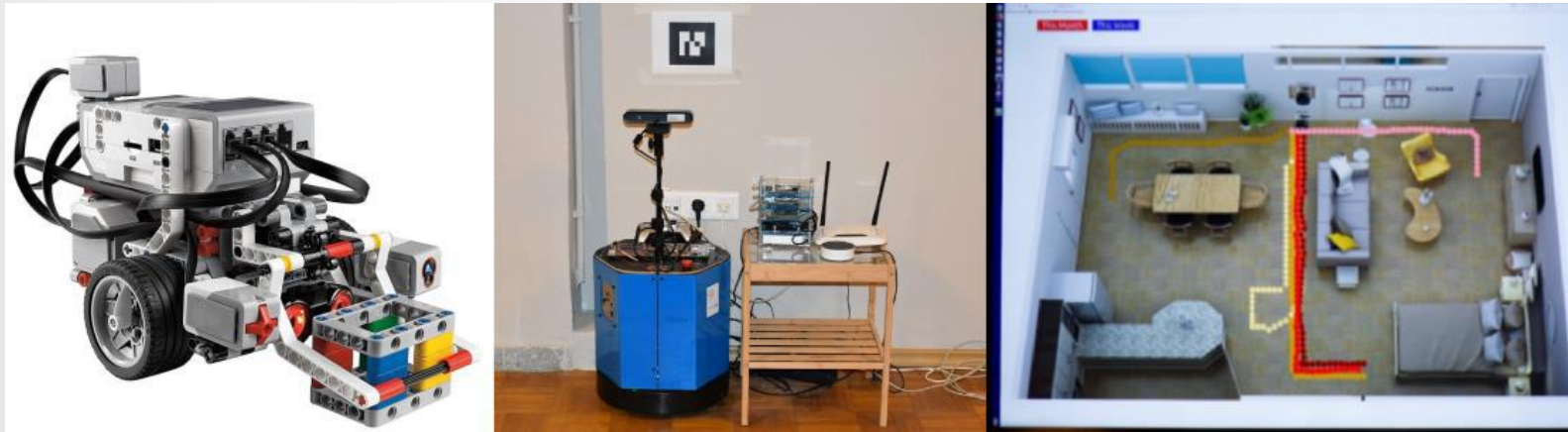
ATLAS Platform

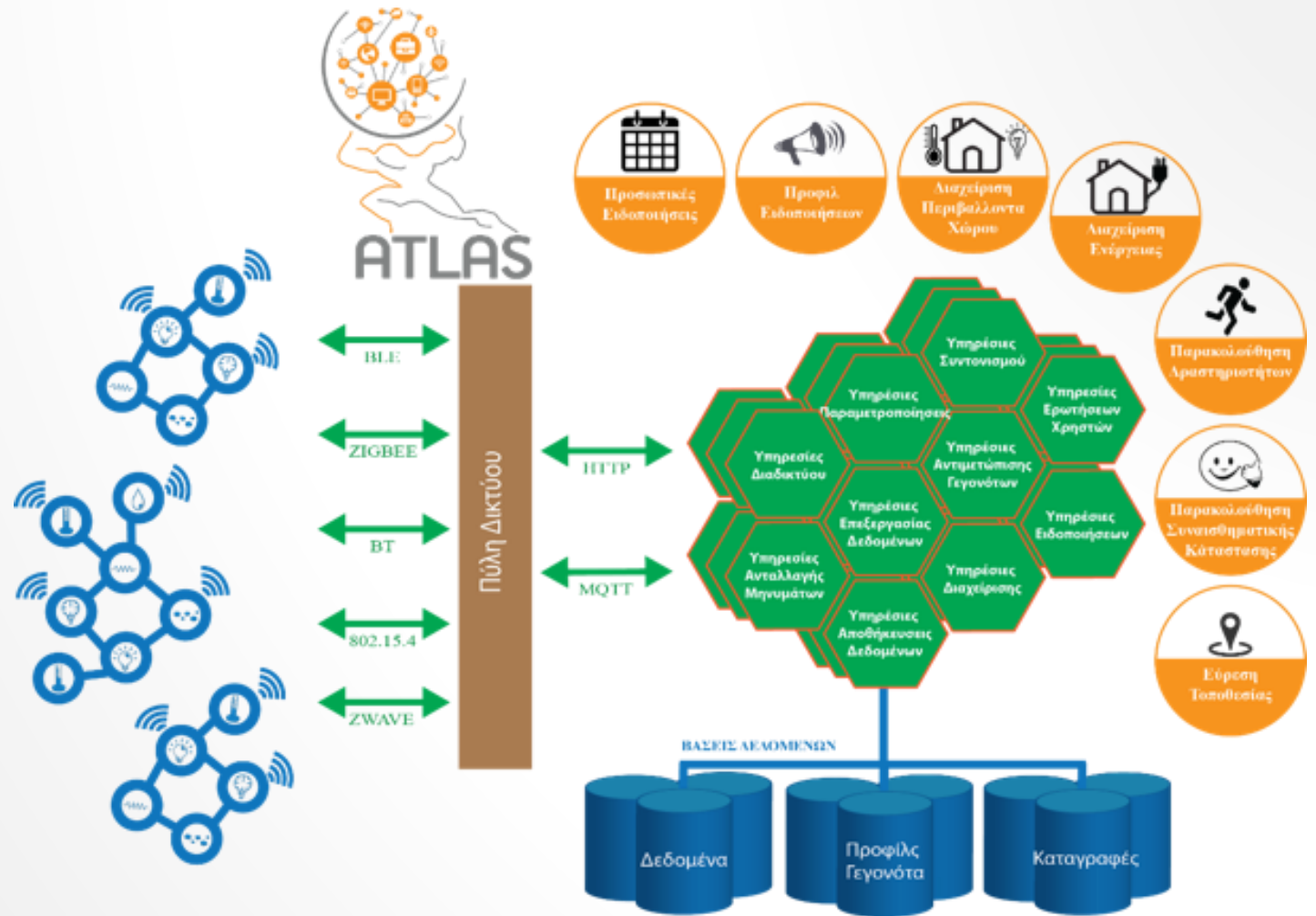Platform for interconnection and support of the heterogeneous technologies and devices

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Expertise Transfer Experiments

- Infrastructure is fully functionally and tested both at research and commercial level

- Infrastructure is open and accessible to anyone

- High number of schools and students of all levels have visited the infrastructure and tested the facilities offering very positive feedback

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Expertise Transfer Experiments

- Main objectives of visits:

  Knowledge transfer from the University to secondary education (and not only)

  Analysis of student's educational needs

  Upgrading existing experiments and creating new ones

  Interconnection of the knowledge transfer process

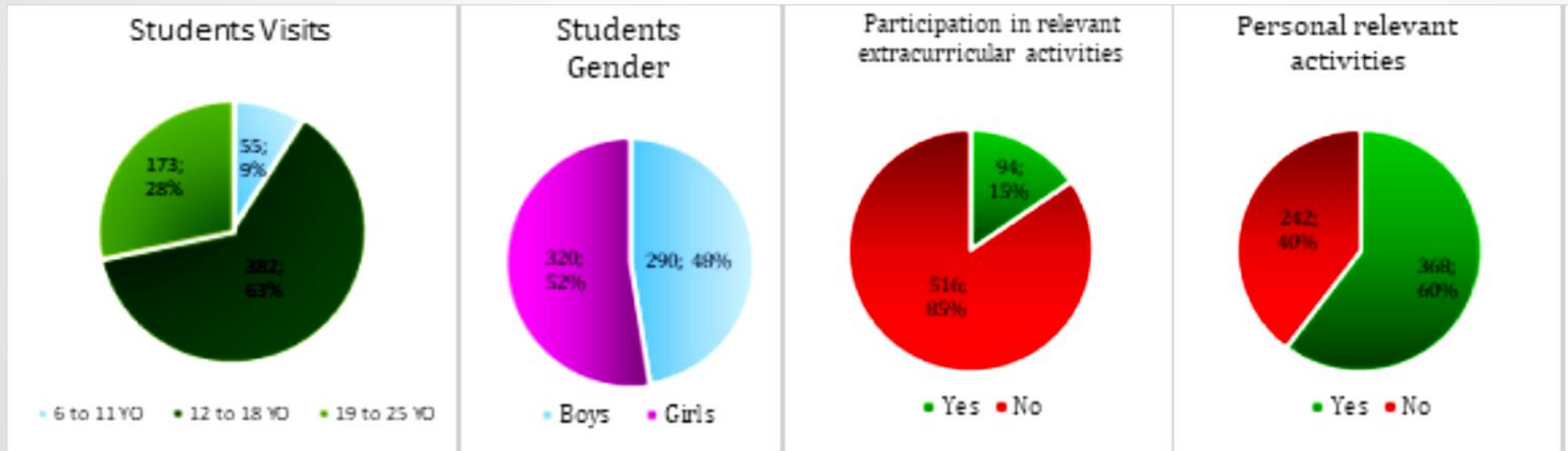 Knowledge transfer through the experiments to as many schools

  Students familiarization with the Open-Source Code

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Evaluation and Results

In last 2 years, 610 students have visited the laboratory

- Scenarios that the students followed:

Movement in space along with the robotic assistant

Adjust the brightness sensor

Triggering the pressure sensors to activate different scenarios

Search for keys and cell phone with voice

Control of lighting, electrical and electronic devices

Door opening control and activation of house lock

Read Email, Turn on the TV, Use the smart mirror

Conclusion – Future Work

- The role of technology in education and how achieve this goal through experiments

- The goal is to increase the number of visits and enrich the offering scenarios

- Emphasis will be placed on STEM technologies - educational robotics

- development of small projects, which will include the practical application of theoretical knowledge presented to students

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Esda Lab

- Embedded System Design and Applications Laboratory it belongs to the Department of Electrical and Computer Engineering of the University of Peloponnese and it is validated as a Digital Innovation Hub (DIH) of European Commission.

- More information about our Laboratory you will found at:

https://www.esda-lab.gr/

https://aalhouse.esda-lab.gr/

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