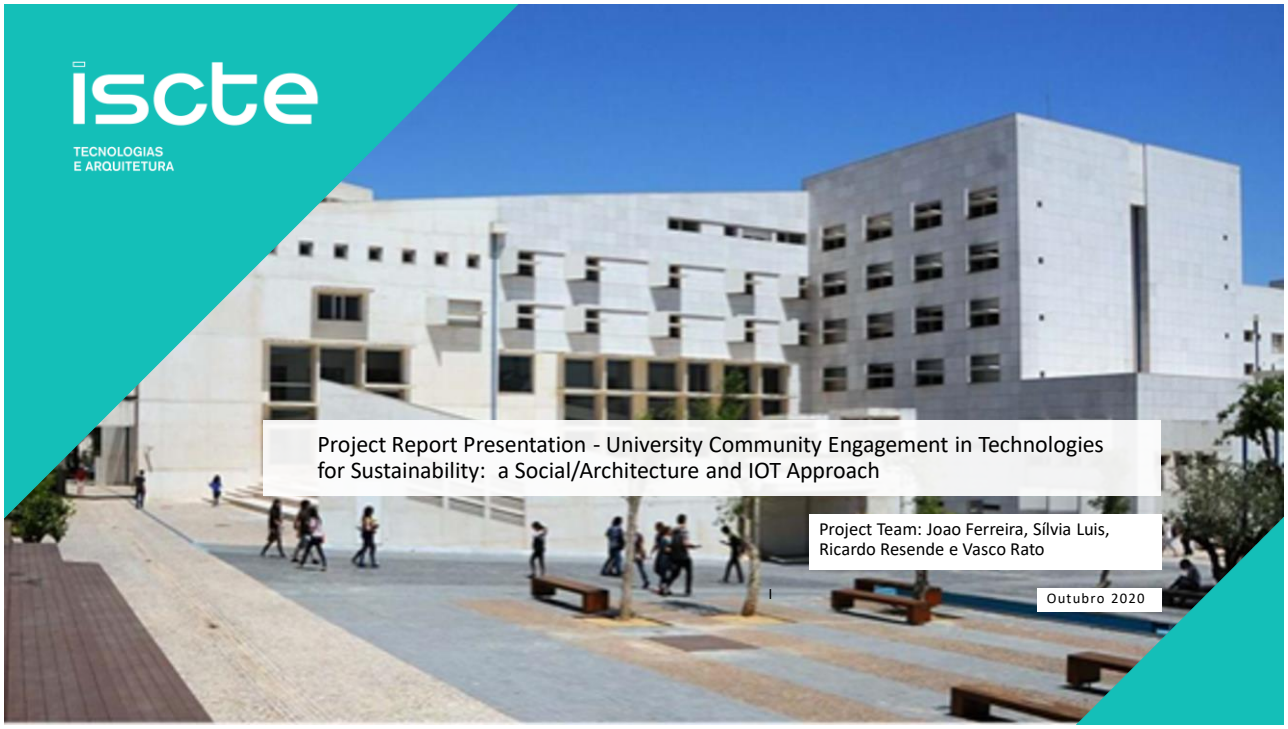

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Project Outputs (1st Year)

- Smart Cities Summer School in July to October2020
- Four masters thesis and one PhD
- Publications at journals
  - **LoBEMS—IoT for Building and Energy Management Systems** at electronics journal of MDPI (ISSN 2079-9292, Quartil one) . Information available at https://www.mdpi.com/2079-9292/8/7/763/htm
  - **IoT Power Monitoring System for Smart Environments** at sustainablity journal of MDPI (ISSN 2071-1050, quartil two). Information available at https://www.mdpi.com/2071-1050/11/19/5355/htm
- Publication at conferences in book chapters
  - CCIOT(August 2019, Japan), "Data Center Environment Monitoring System". Proceedings of the 2019 4th International Conference on Cloud Computing and Internet of ThingsSeptember 2019 Pages 75–81https://doi.org/10.1145/3361821.3361824
  - Sustainable Energy for Smart Cities, Braga December 2019, "Smart Auditorium: Development and Analysis of a Power and Environment Monitoring Platform", published in Sustainable Energy for Smart Cities, Springer International Publishing, 2021, https://doi.org/10.1007/978-3-030-45694-8
- Workshop participation
  - 1ª Conferência Campus Sustentável Social (CCS2019) "Social IoT Platform" – presented by Vasco Rato, ISCTE-IUL - Porto October 2019

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2

Project Outputs (2nd Year- 1st Semester)

- Smart Cities Summer School in July to October 2020 - http://istar.iscte-iul.pt/summerschool2020/
- Three master's thesis (Daniel Calé, Iran Carimo e Kaiser Carimo) and one PhD (Bruno Mataloto)
- Publications at journals
  - **BIM in People2People and Things2People Interactive Process** at sensors journal of MDPI (ISSN 2079-9292, Quartil one) . Information available at https://www.mdpi.com/1424-8220/20/10/2982
  - **Things2People Interaction toward Energy Savings in Shared Spaces Using BIM Process** at Applied Science journal of MDPI (ISSN 2079-9292, Quartil one) . Information available at https://www.mdpi.com/2076-3417/10/16/5709/xml
- Workshop participation
  - International workshop (SUSTAINABLE CITIEs Viewpoints of the Pioneer Alliance) Things2People and People2People interactions in the context of a Smart City – Can Sensors change Human Behaviour? By Joao Ferreira (21.10.2020)
  - 2ª Conferência Campus Sustentável Social (CCS2020) PERCEPCÃO DA COMUNIDADE ISCTE SOBRE A SUSTENTABILIDADE AMBIENTAL E COMPORTAMENTOS PRÓ-AMBIENTAIS NO CAMPUS | Authors: Carla Mouro, Patrícia Duarte, Rita Moura, Sílvia Luís, Vasco Rato, Ricardo Resende and João Carlos Ferreira- Porto October 2020
  - Porto - Individual Skills Tracking for the 21st century (12.11.2020) – Presentation of THINGS2PEOPLE AND PEOPLE2PEOPLE INTERACTIONS IN THE CONTEXT OF A SMART CITY by João Ferreirahttps://digieduhack.com/en/porto-individual-skills-tracking-for-the-21st-century

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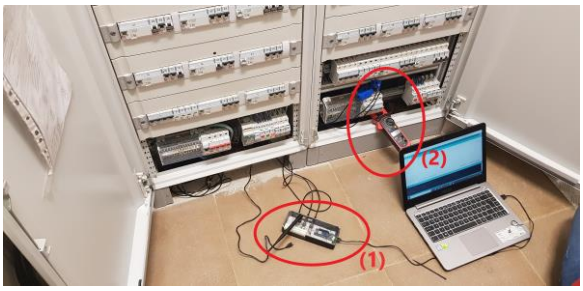
3

Implementation: Serviços Académicos – ISCTE-IUL



1) Function programming and LoRa Sensor communication
2) Sensor Calibration
3) General circuit breaker monitoring
4) Emergency circuit breaker monitoring
5) Implemented Sensors

4

Implementation: AVAC – Q.G.B.T Edifício 1

1) HVAC General Circuit Breake

2) Sensor calibration

3) Three-phase AC clamps

4) Implemented Sensor

5

Application Layer: Dashboard

➢Node-RED

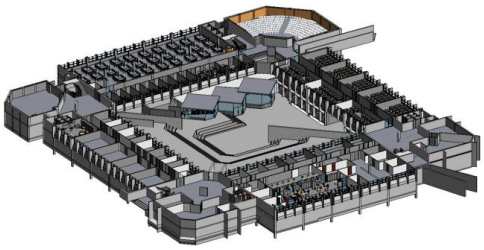
- Administration and Maintenance Dashboard

➢Power BI

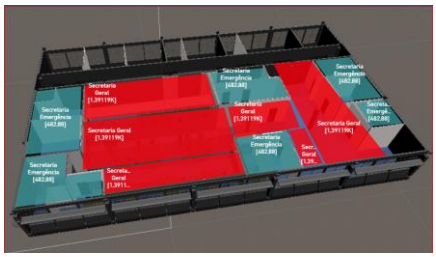
- Users and Statistics Dashboard

6

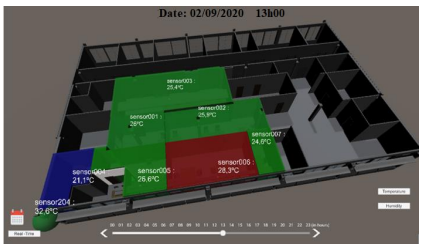
Application Layer: BIM(Building Information Modeling

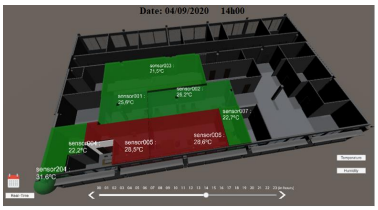


- 3D model – ISCTE Edificio 1



- BIM model – Seviços Academicos





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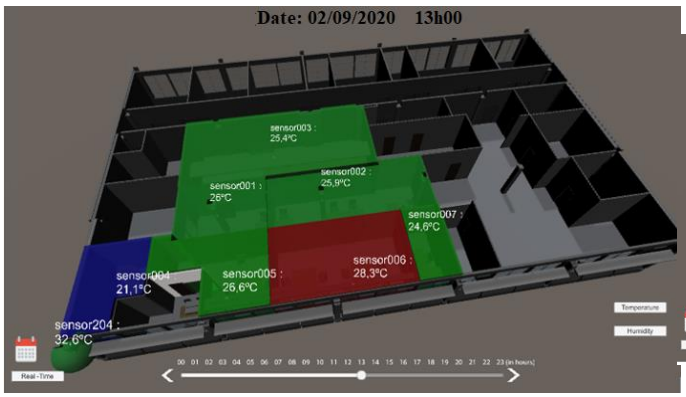
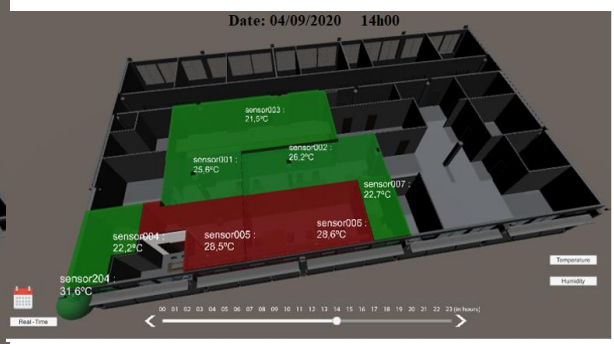
Building Information Models (BIM)

Based on a color display procedure, the temperature and humidity values were coded according to the previously defined comfort ranges, in which the color changes according to the values obtained.





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8

Community Survey

- **People engagement**
  - A Survey was preformed at the beginning of 2020 at ISCTE as part of the "University Community Engagement In Technologies For Sustainability: A Social Architecture" project, with a universe of **463** students, **101** professors and researchers and **58** technicians and administrative employees.

  - **64.4%** of participants never saw any information about campus energy savings or resource management at the Campus;
  - Participants claim that ISCTE-IUL only shows **minor efforts** to promote sustainability projects and initiatives;

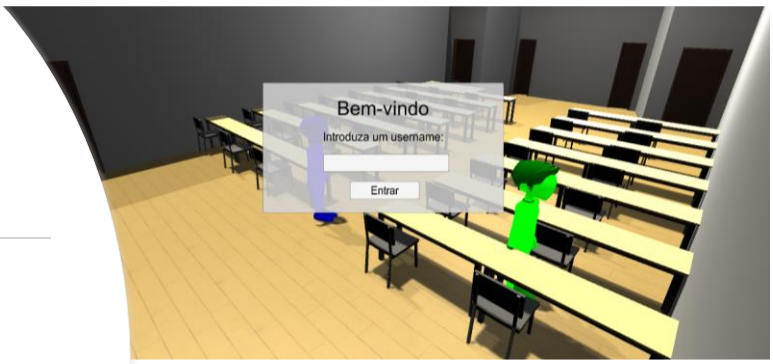
9

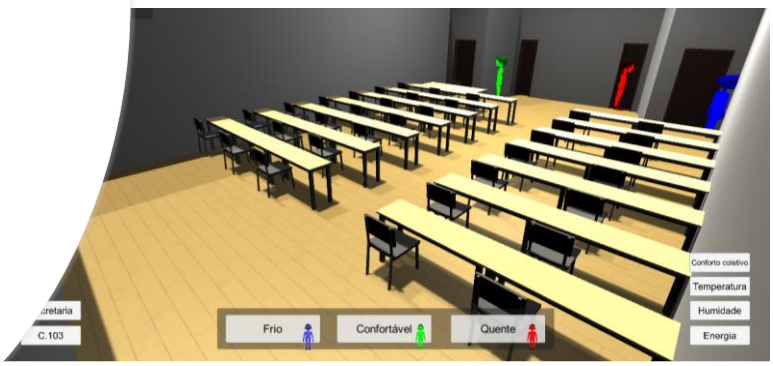
9

Unity Simulation

- The user is represented by a colored Avatar in a 3D building based on the BIM model;

- The 3 colors represent the user thermal Comfort perception, Blue for a Cold environment, Green for a Confortable environment and Red for Hot environments;





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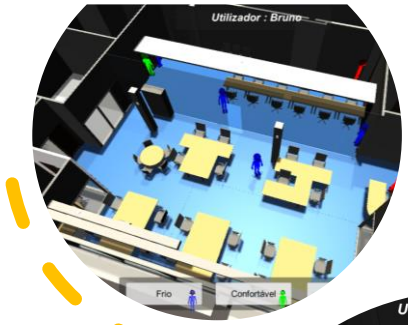
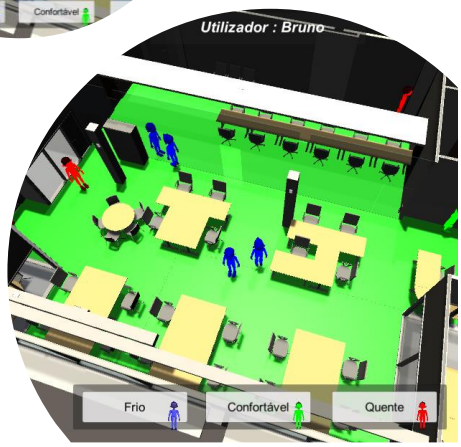
Unity Simulation

- The user can choose the room and variable to be displayed, and give his evaluation at any time. This action creates a new Avatar (if it didn't exist), with the respective color.



- The Colective confort mode displays the comfort color scale on the room's floor, based on the users feedback, while the other variable modes are based on standard ranges.



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Next (Period Nov 2020 to Set 2021

- **Pilots at secretary open space and classroom C103**
- **2nd survey**
- **Lessons learnt**

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