

Gamification as a way to involve young adults in energy efficiency and sufficiency – a case study

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ECEEE Summer Study 2019



Agenda

- Project *Learn2Behave*
- Gamification Strategies (Mobile APP "Minha Energia")
  - Energy Profile
  - Ecoquiz
  - Quantitative Results
- Additional Results
  - Pedagogical Dimension
  - Research Dimension
- Conclusions and Further Work

Project Learn2Behave

OBJECTIVES

Energy behaviours are a crucial resource in the context of promoting end-use energy efficiency in the residential sector, particularly in smart grids

1	**Characterisation** of **energy behaviours**
2	**Dissemination of best practices**
3	**Promotion of behavioural changes:** end-users and students
4	**Improving energy efficiency and reducing costs**

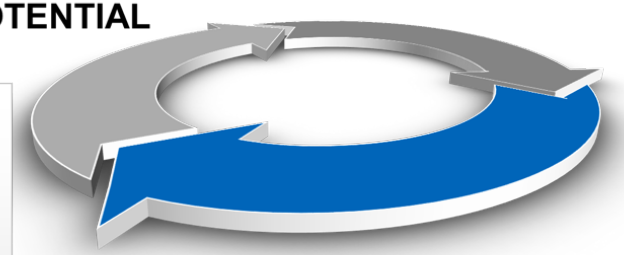


Project Learn2Behave

ACTIVITIES

BEST PRACTICES & SAVINGS POTENTIAL

FEEDBACK



Task 1. Portfolio of energy efficiency opportunities and energy savings

A portfolio of energy behaviours with corresponding savings potential to the best practices available is typified

Task 2. Innovative communication tools

Interactive apps will enable an effortless information gathering on energy behaviours while providing automatic feedback on the best practices and potential savings

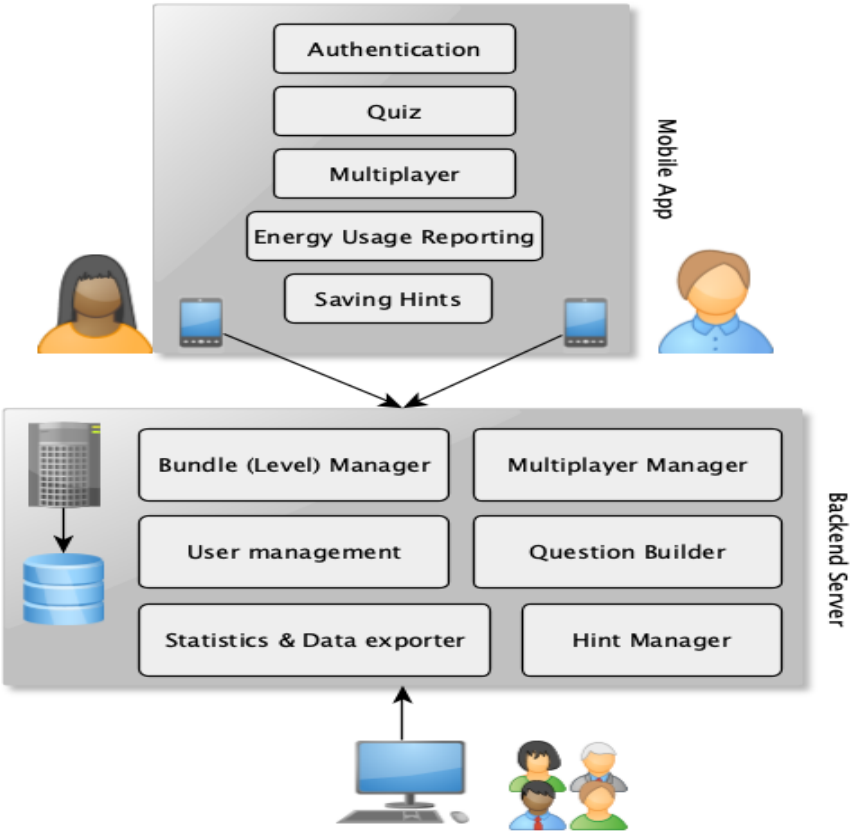
ELICITATION OF ENERGY BEHAVIOURS

Task 3. Behavioural change

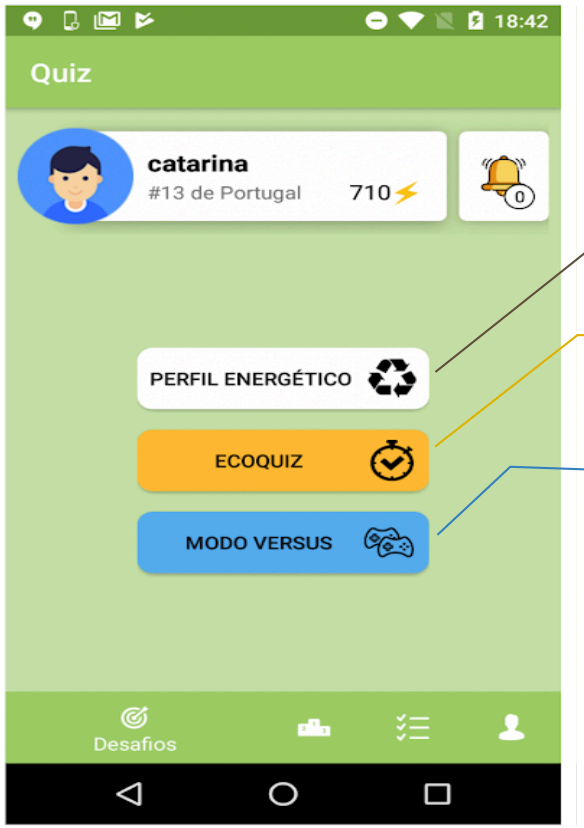
Continuous assessment of behavioural change: identifying new behaviours/practices and estimating effective savings

Gamification Strategies (Mobile APP "Minha Energia")

General Architecture



Gamification Strategies (Mobile APP "Minha Energia")

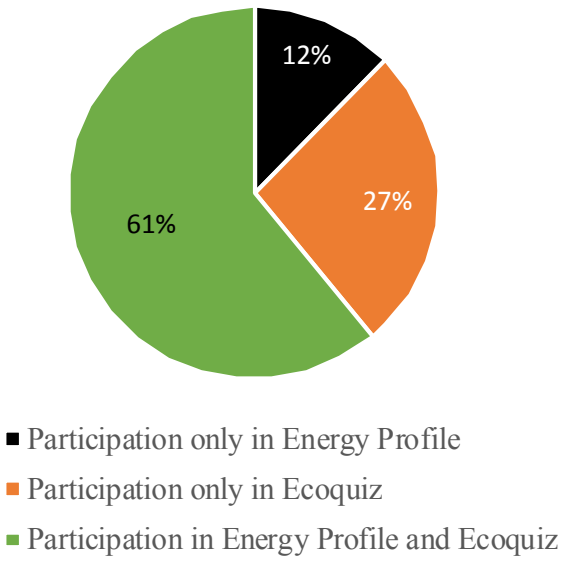


Main Challenges

Energy Profile - Survey

Ecological Quiz – Play & Learn

Community Building – Knowledge Sharing and Motivation

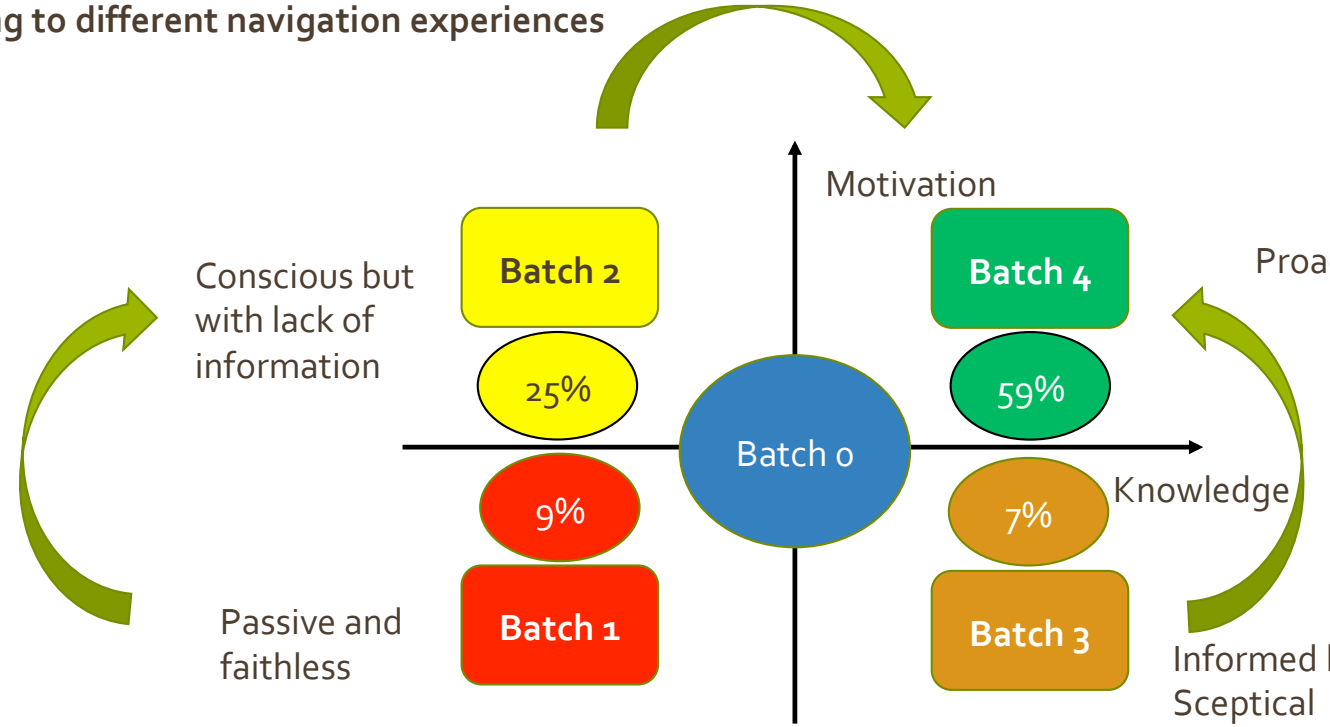


Gamification Strategies (Mobile APP "Minha Energia")

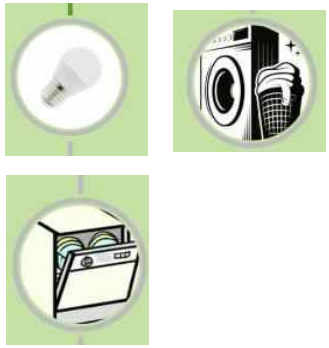
Energy Profile

Batches of questions, according to the user profile

Leading to different navigation experiences

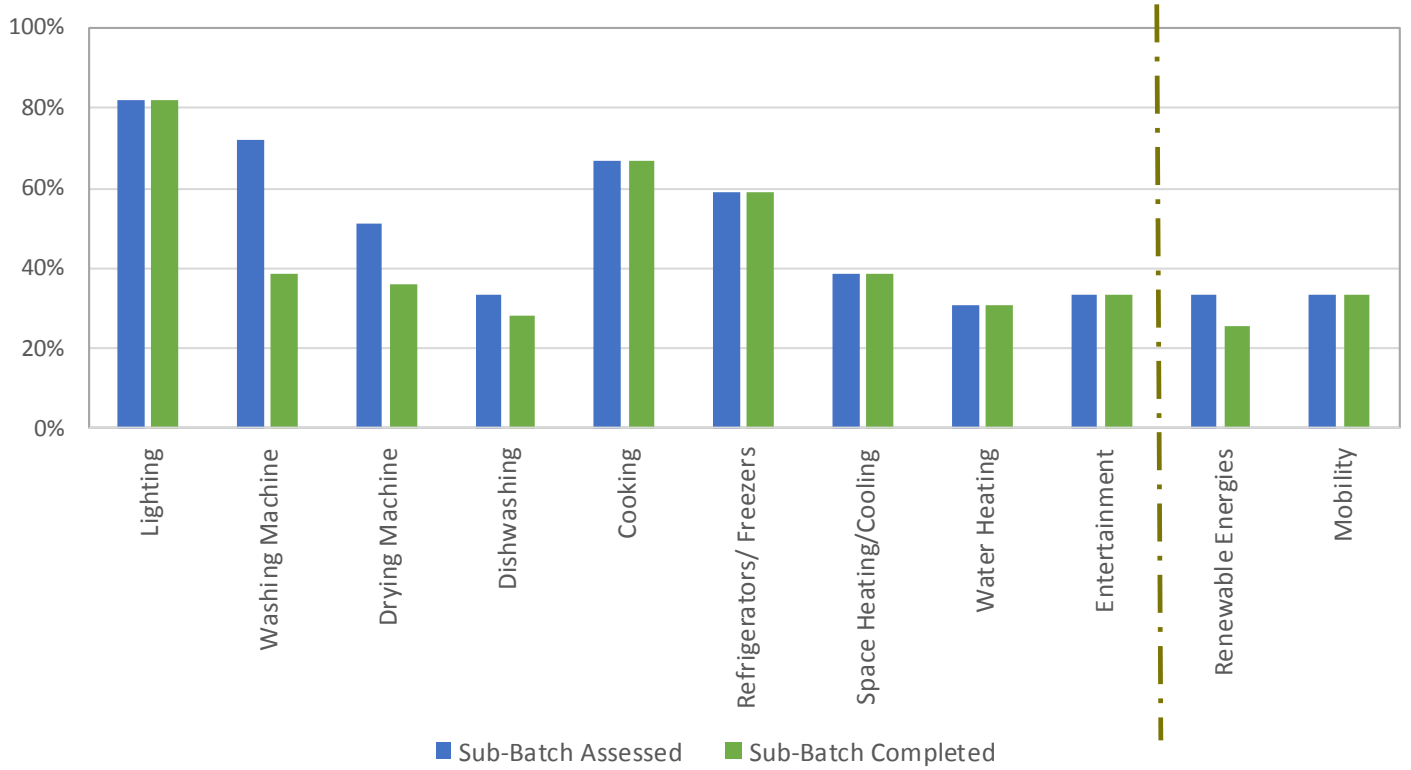


Batch 4 includes different sub-batches to enable end-uses consumption characterization



Gamification Strategies (Mobile APP "Minha Energia")

Energy Profile - Measuring the level of interest in specific end-uses/ thematics

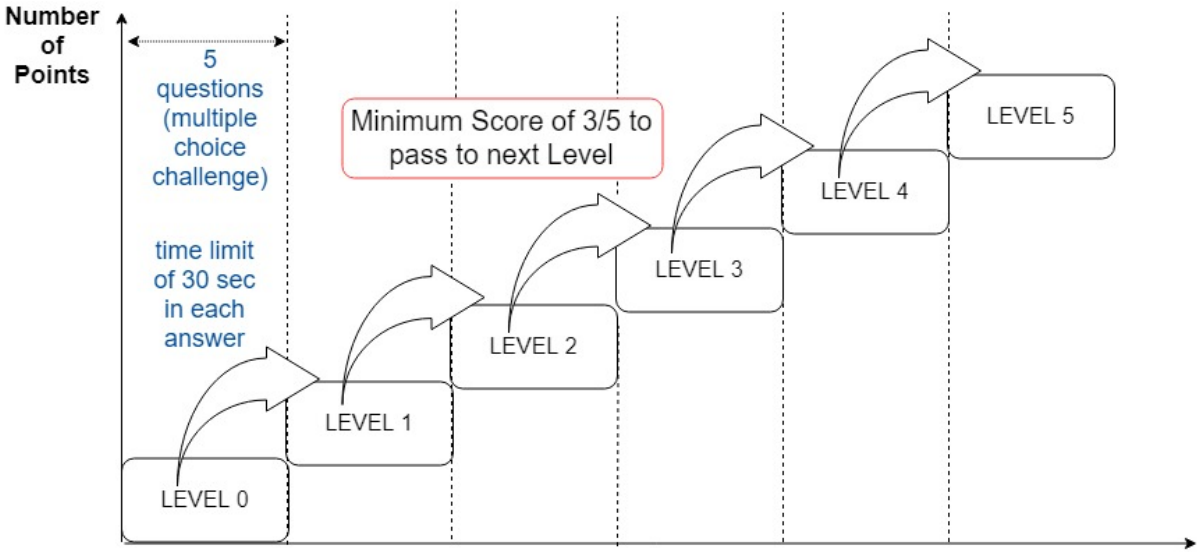


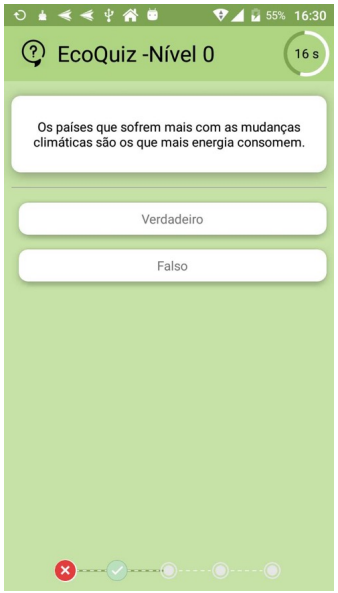
Gamification Strategies (Mobile APP "Minha Energia")

Ecological Quiz

Organised in Levels to evaluate literacy related with:

- GHG Emissions Impacts - EU Goals for 2030 - Commercial Options
- EE in Buildings - Electric Mobility

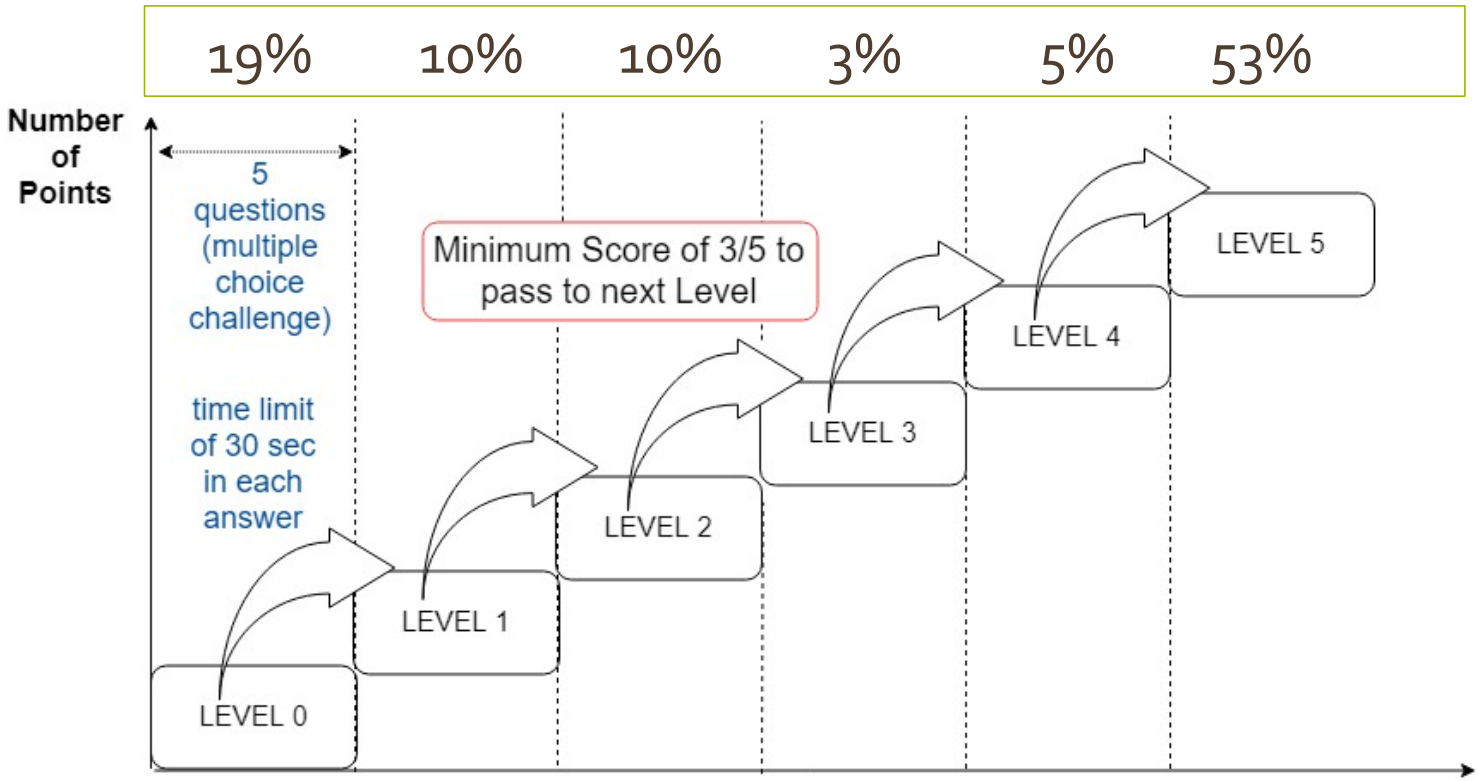






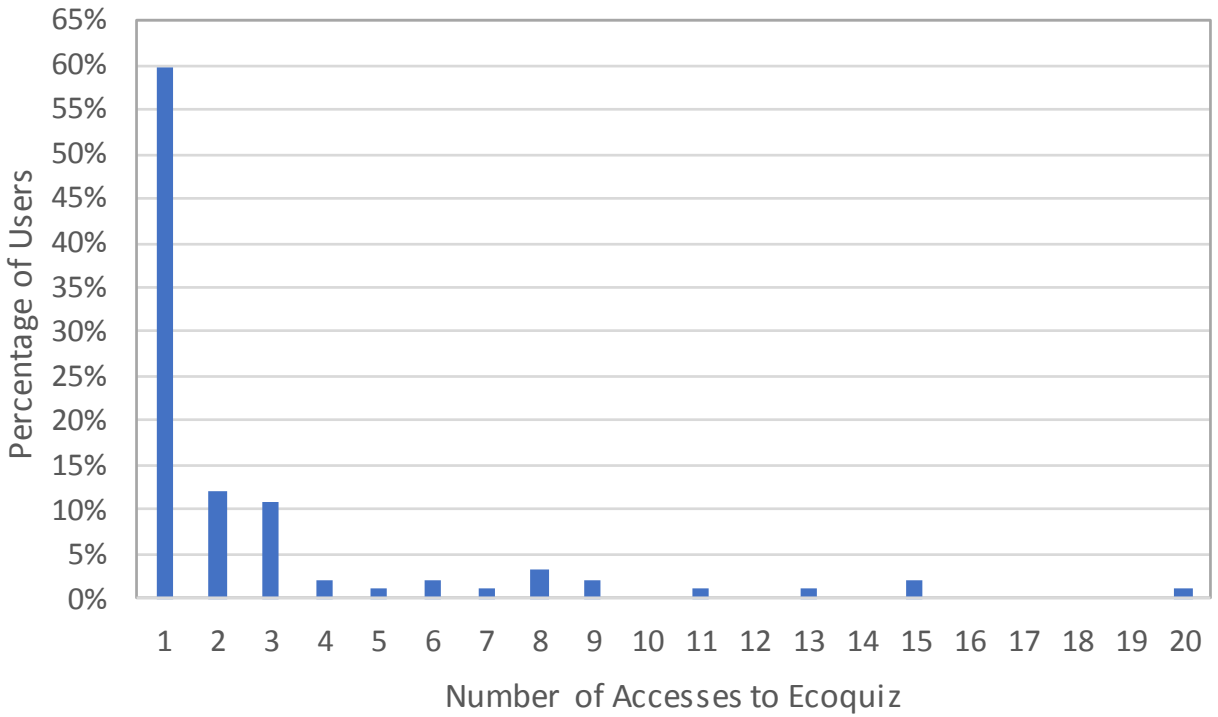
Gamification Strategies (Mobile APP "Minha Energia")

Ecological Quiz - % of Participants per Reached Level



Gamification Strategies (Mobile APP "Minha Energia")

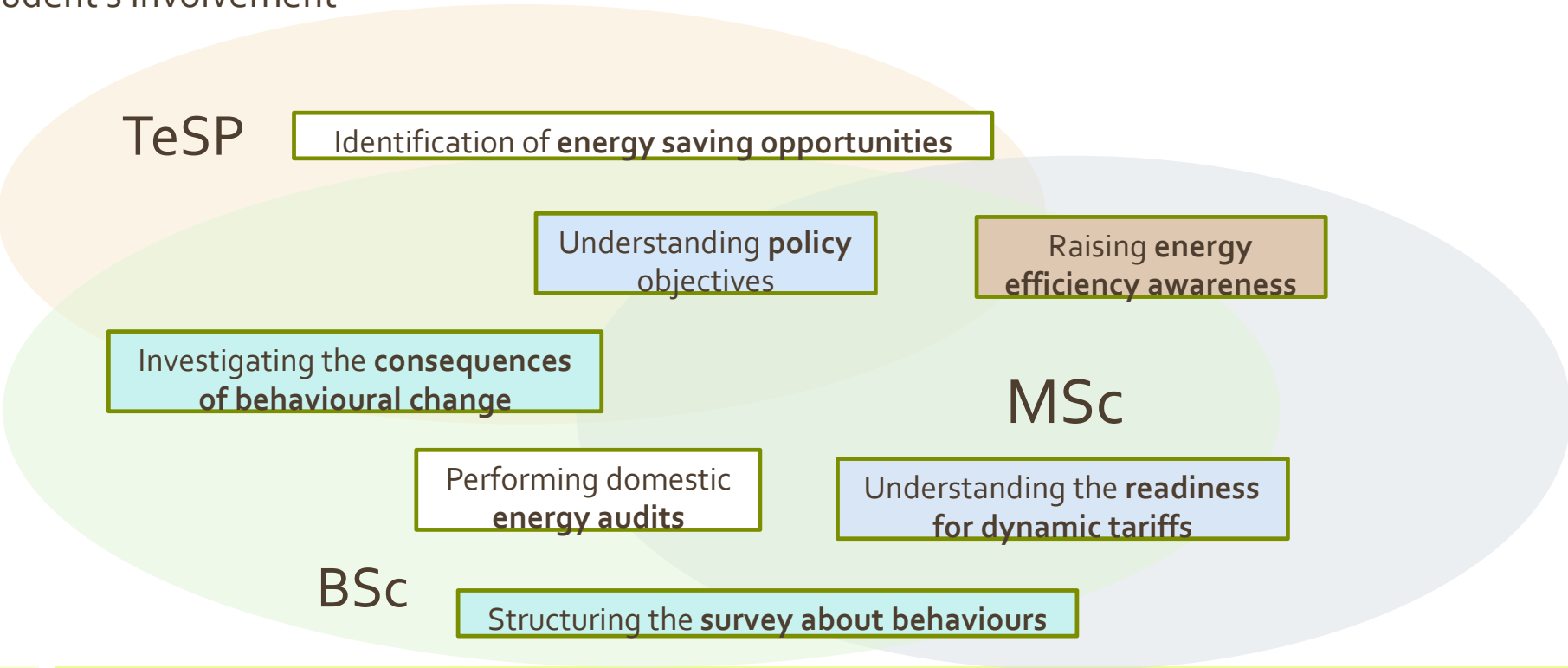
Ecological Quiz – Quantifying Number of Accesses



Additional Results

- Pedagogical Dimension -

- Student's involvement



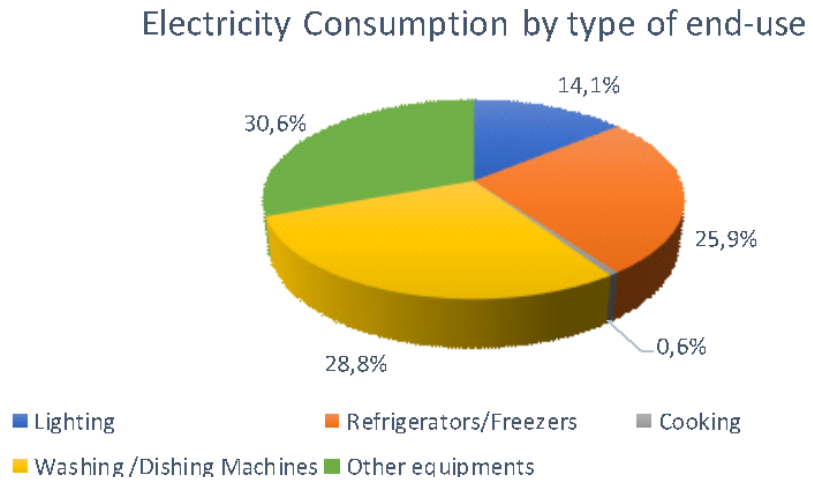
Additional Results

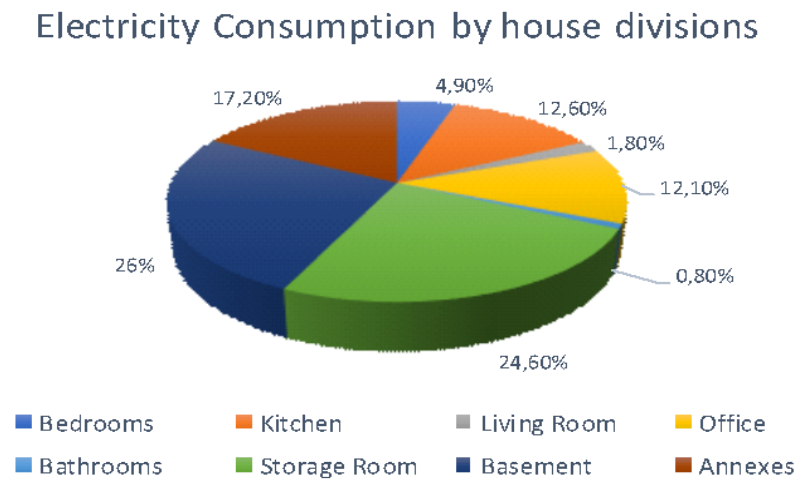
- Pedagogical Dimension -

- Student's involvement

  - Energy Diagnosis in Households







Additional Results

- Pedagogical Dimension -

79% of students assume to be now more aware to Energy Efficiency

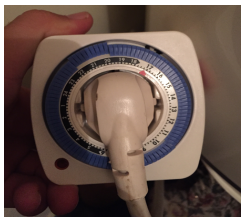
17% of students assume that have changed behaviours/technology

- Student's involvement

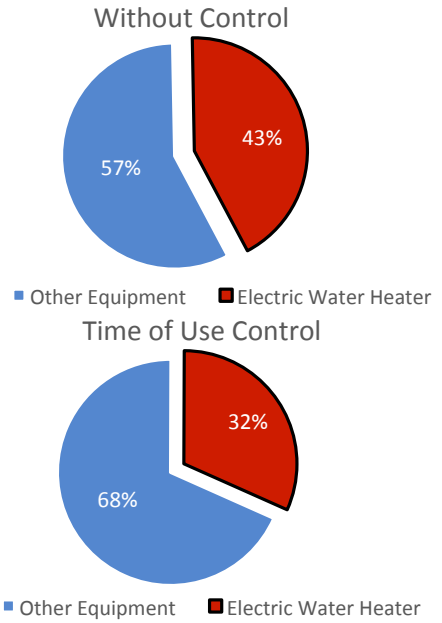
  - Energy Consumption Measurements before/after best practices adoption (eg. Electric Water Heater)







Equipment – Electric Water Heater		Monthly Consumption	Annual Savings
Prior Status	No Control	147 kWh	146 €
Measure Adopted	Time of Use Control	92 kWh	



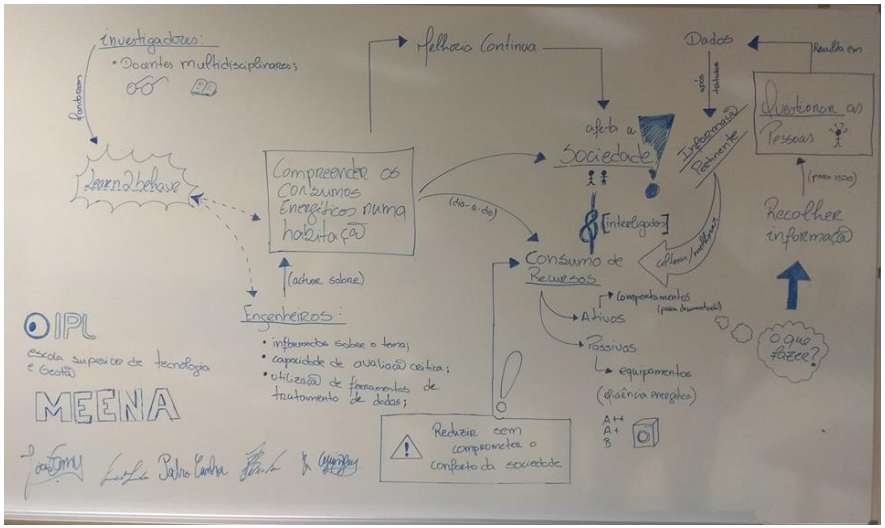
Additional Results

- Pedagogical Dimension -

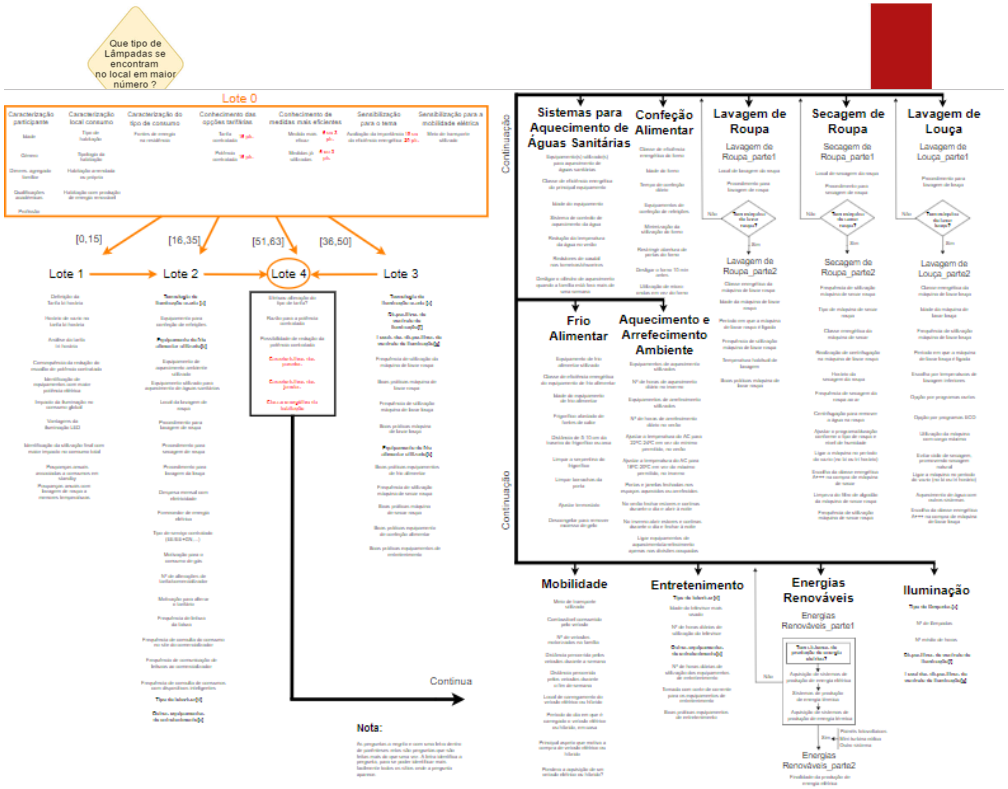
- Student's involvement

  - Structuring the problem

Applying Soft Systems Methodology



Flow charts to guide questionnaire building



67% of students have developed (at least) one assignment related with the Project L2B

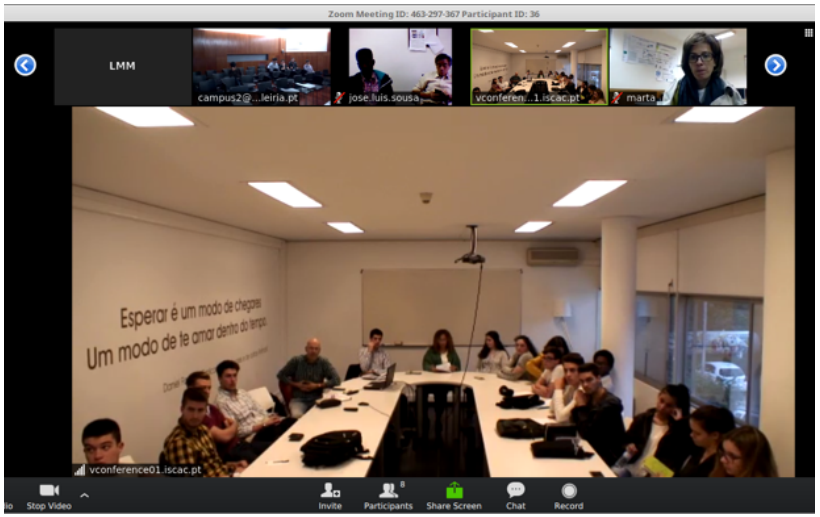
Additional Results

- Pedagogical Dimension -

- Student's involvement

  - Workshops

    Works Presentation and Experience Sharing





97% of students attending these courses, have participated in (at least) 1 Workshop

High interest in preparing presentations and promotion of fruitful discussions between students from different HES.

Additional Results

- Pedagogical Dimension -

- Student's involvement

  - APP Functional Tests and Feedback:

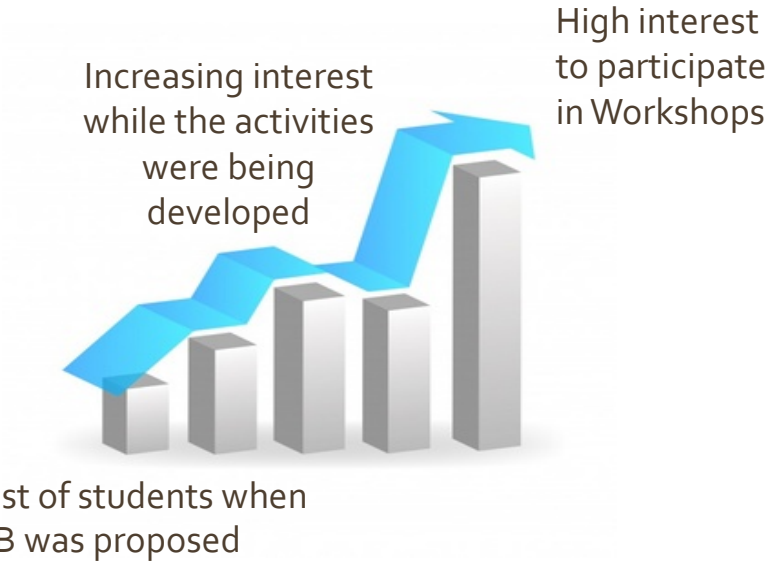
    - ❑ **58% of students** assume that **APP** was quite **interesting to motivate in practice and learning** of the Curricular Unit Syllabus
    - ❑ **Ecoquiz** motivates participation due to its **competitiveness nature**
    - ❑ Some improvement proposals:

      - increase diversity of questions
      - limit some batches' length
      - bugs correction
      - adaptation to iOS

Additional Results

- Pedagogical Dimension -

- Lecturers feedback - about the Project L2B



- **Interdisciplinary development** (colaborative process between schools and even between colleagues from different Departments of the same Institution)

- **Project Based-Learning** Approach and the use of **Gamification** to **enhance the learning outcomes**

Additional Results

- Pedagogical Dimension -

- Lecturers feedback - about APP "Minha Energia"

  - ❑ **Useful as teaching tool,** helping to motivate and consolidate topics in the curricular unit syllabus

  - ❑ Gamification just have impact on competitive students

  - ❑ Learning Outcomes should be better evaluated through a measurement and verification methodology

  - ❑ A higher number of questions should be proposed in the quiz. Despite a scheme of random questions, participants soon learn from the past errors (rapid curve of learning)

Additional Results

- Research Dimension -

Research Works (completed/ongoing)

- Evaluation of **impacts** resulting from the **integration of RES** in the **Urban Environment** (MSc Thesis)
- Evaluation of Energy Efficiency measures in **Scholar Buildings** (BSc Project)
- **Comparative Analysis** of strategies for promoting **Energy Efficiency in Different Countries** (MSc Thesis)
- Characterization of **behaviours** and their influence in energy consumption (MSc Thesis)

Potential R&D

- Energy Efficiency Promotion through behavioral changes in **other sectors of activity**
- Analysis of the impact of **gamification** strategies to enhance **learning outcomes** in the High Level Education

Conclusions and Further Work

- Project Learn 2 Behave reveals to be interesting and motivating to our Students during classes

- At this time, statistic analysis of the data is being done to better characterize our consumers' sample

- Besides gamification, new ideas must be found to keep participants engaged:

  - forums creation to share energy savings experiences

  - set agreements with companies to get discounts for the participants with highest scores in APP

  - constantly updating of information in Backoffice, according to the participants expectation

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QUESTIONS?

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