CCS2025
7ª Conferência Campus Sustentável
16 e 17 outubro

Exploring Environmental Literacy in Online Education at Universidade Aberta

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Universidade Aberta

16 de outubro

Politécnico de Coimbra

APECHE Project

Fundação para a Ciência e a Tecnologia

Context:

8 Portuguese HEIs:

Universidade da Madeira

Instituto Politécnico de Leiria

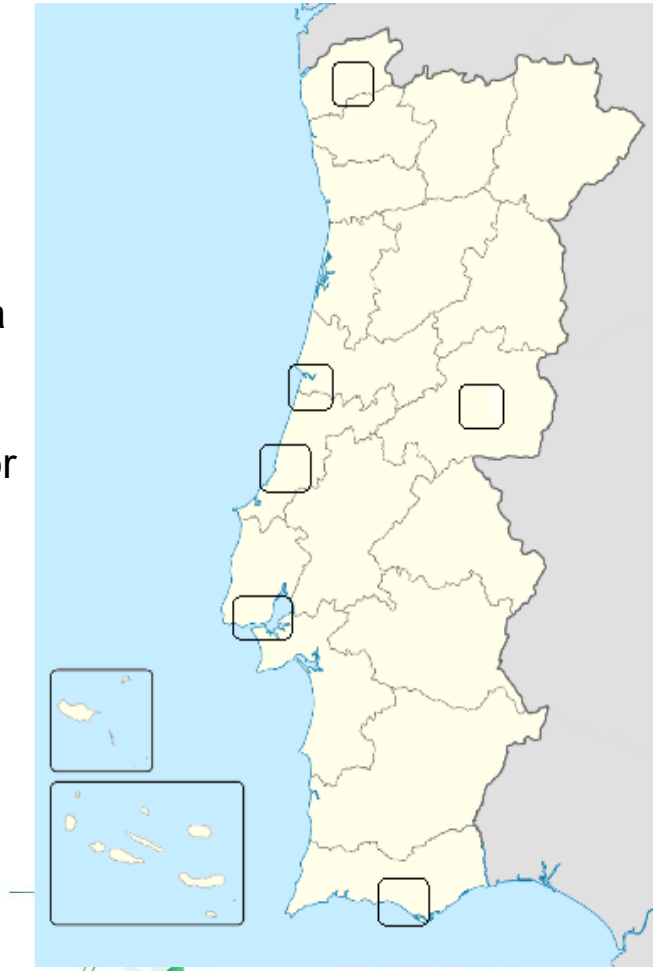
Universidade Aberta

Universidade da Beira Interior

Universidade de Aveiro

Universidade do Algarve

Universidade dos Açores



Aims:

Understand the Environmental Literacy (EL) progression in Portuguese higher education and contribute to its improvement, characterising the EL and Environmental Culture levels, its progression and the most influential variables.

March 2023 – July 2026

Environmental Literacy

- multidimensional paradigm of **k**nowledge, **a**ttitudes, and **b**ehaviours
- critical **driver of** cultural **transformation**
- Higher Education Institutions have undertaken the challenge of **embedding environmental sustainability,** both in their curricula and within the institutional culture.

Key Insights from Universidade Aberta

Context:

Key Insights from Universidade Aberta

Objectives:

Characterize the environmental literacy profile of:

- students across various undergraduate programs;
- teachers

Assess the level of

Environmental sustainability in the curricula within all undergraduate courses at the university.

Methodology: Research Design

Quantitative analysis

1st phase (2023/2024)

Online survey:

1st year students
+
faculty members
(teachers)

Quantitative analysis

2nd phase (2025)

Online survey:

2nd year students

Qualitative analysis

Content analysis on
all curricula
(information onsite)

12 undergraduate
degree programs

Online survey: Dimensions

Environmental **Attitude** (17 items)

Subdimensions:

New Ecological Paradigm (**NEP**)
+ Environmental Responsibility (adaptation).

Environmental **Knowledge** (39 items)

Subdimensions:

General Knowledge
Waste
Water
Energy

Environmental **Behaviour** (23 items)

Subdimensions:

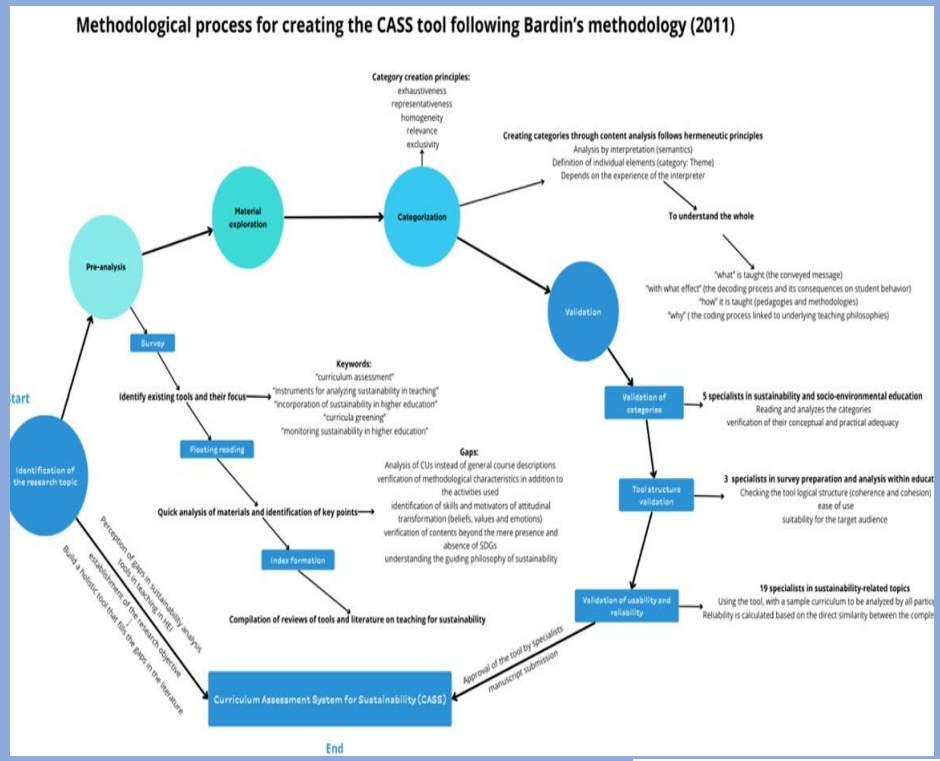
Waste Management
Water Consumption
Energy Use
Food
Mobility
Participation

Environmental **Engagement** (8 items)

Qualitative analysis :

- **Content analysis** of the curricular programs (website):
  - synopsis
  - keywords
  - skills
  - content
  - bibliography
  - teaching methods
  - assessment

Curriculum Assessment System for Sustainability *(CASS) (de Oliveira et al., 2025)*



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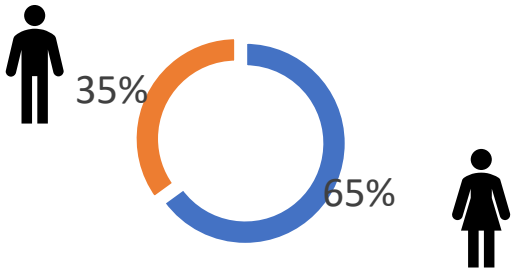
Online survey: Sample

1st year Students

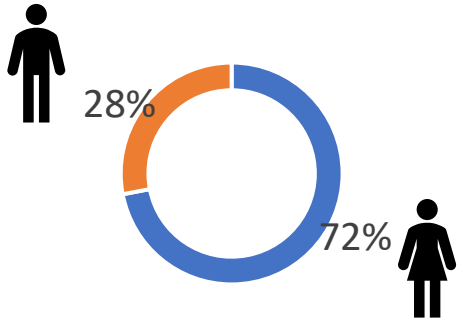
(n = 480, **14%** 1st year Students)



Age (average): 53 years old

2nd year Students

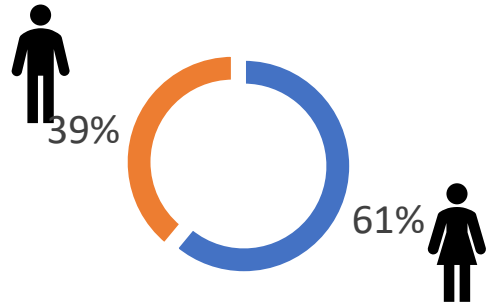
(n = 177, **7%** **2nd** year Students)



Age (average): 46 years old

Teachers

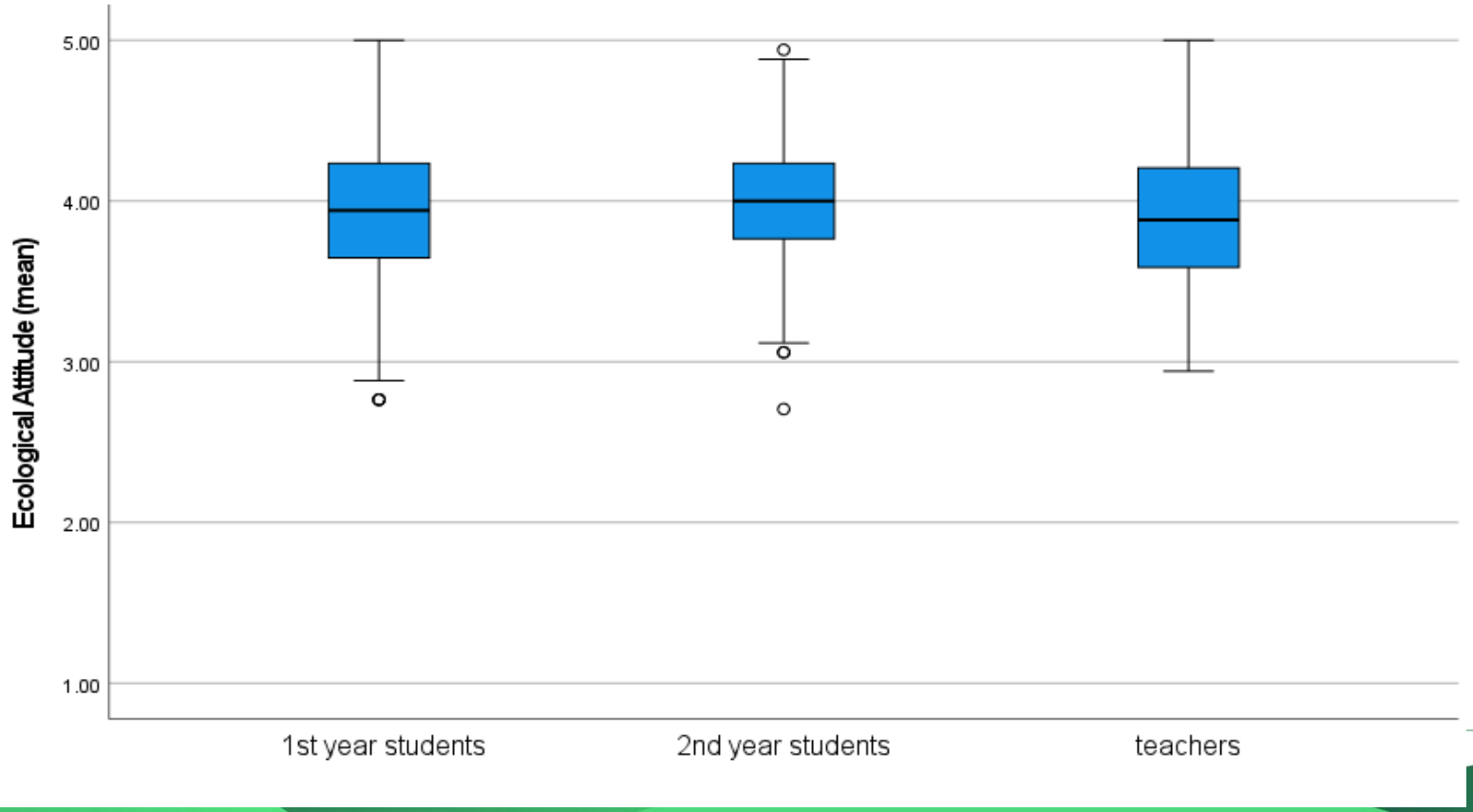
(n=95, **58**% Teachers)



Age (average): 60 years old

Results: Survey Environmental Attitude

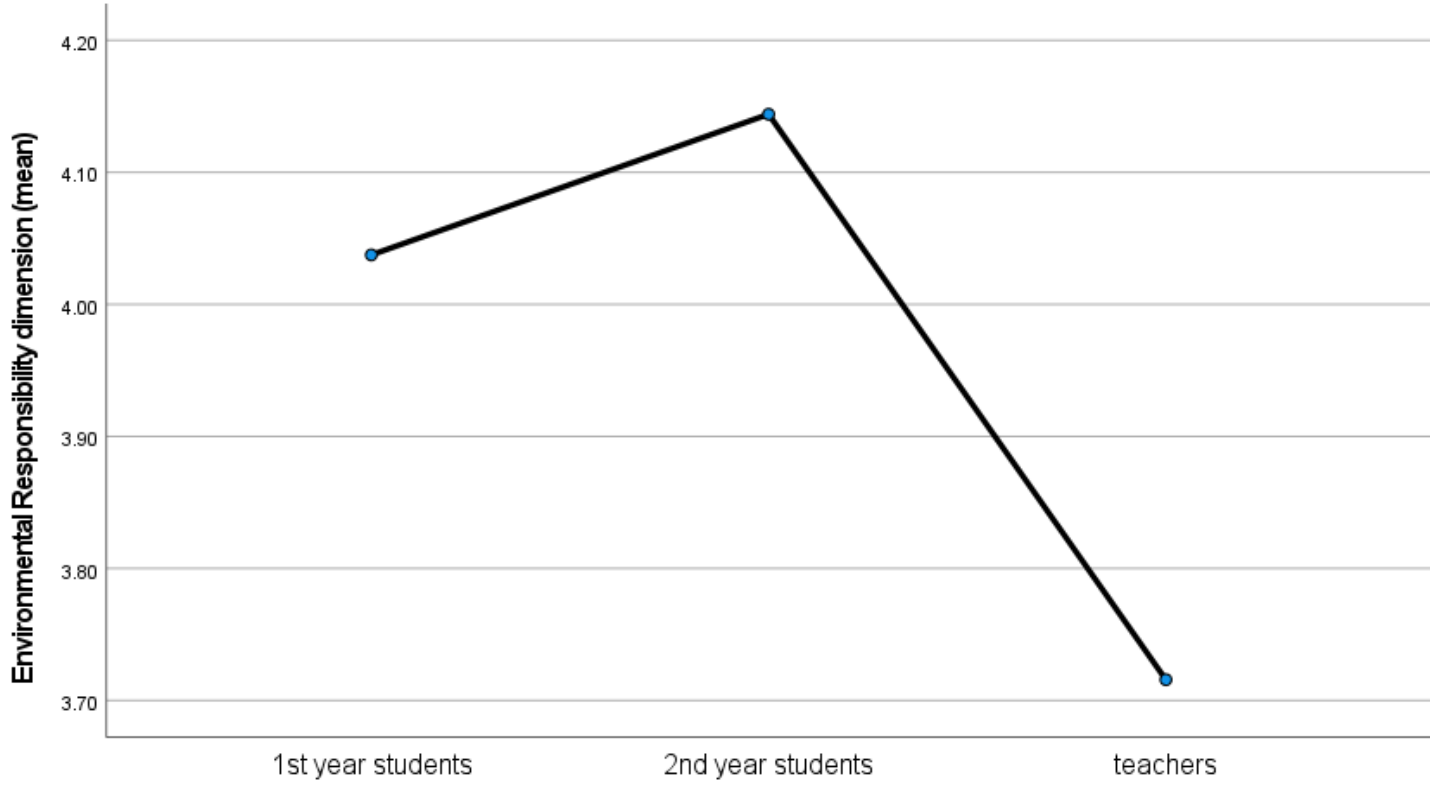
✓ Students and teachers have **moderate to strong** environmental attitude (no significant difference between groups)



Results: Survey Environmental Attitude

Although on the Environmental responsibility subdimension:

- ✓ **Teachers have a lower environmental responsibility attitude** than the 1st and 2nd Students
  $F_{(2, 749)} = 11.219$, $p < .001$



Results: Survey Environmental Knowledge

✓ Students and teachers have a good **environmental knowledge** (most achieved more than 70% correct answers)

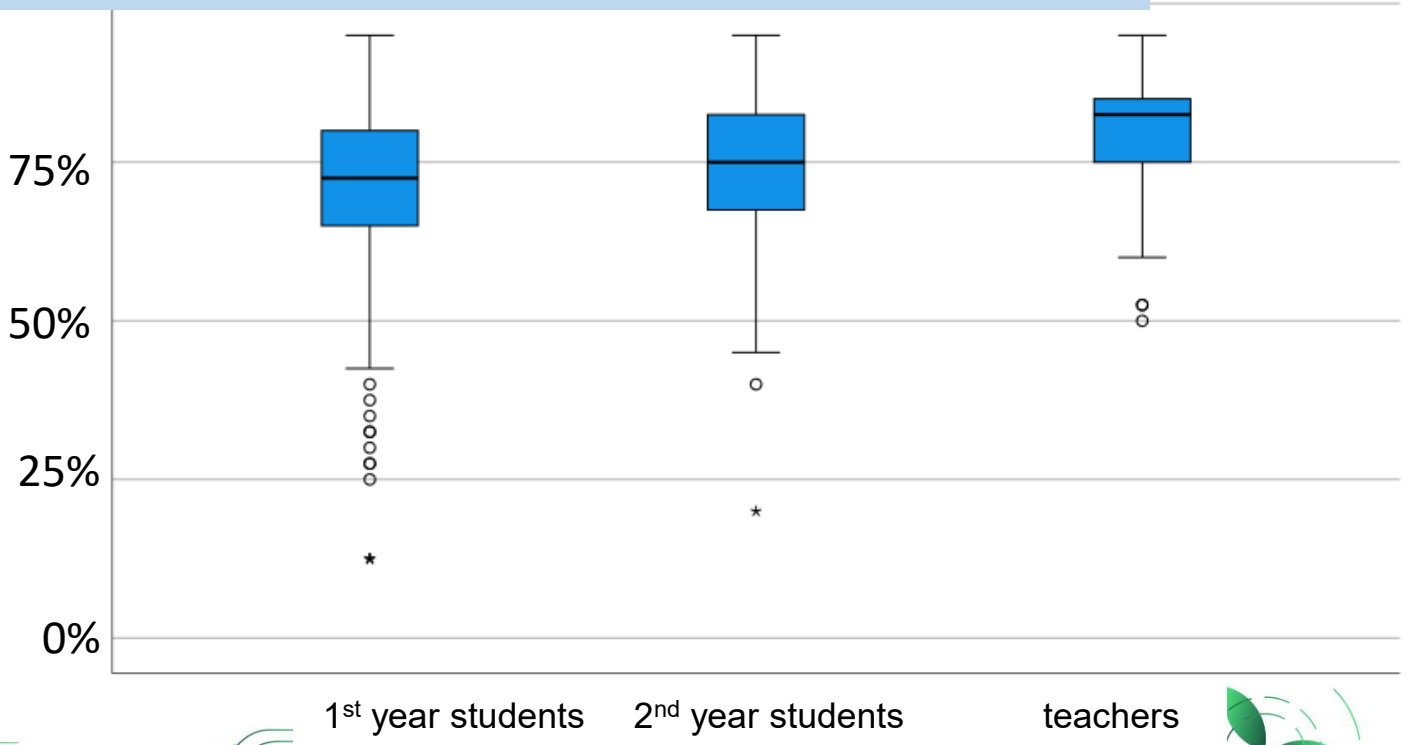
✓ **Teachers have** a significantly **higher level of knowledge** than the 1st and 2nd Students

$X^2_{KW}(2) = -5.005$, $p = .001$

$X^2_{KW}(2) = -3.597$, $p = .001$

✓ **2nd year Students have** a significantly **higher level of knowledge** than the 1st year Students

$U=48839.5, W=645925.5$; $p<0.003$

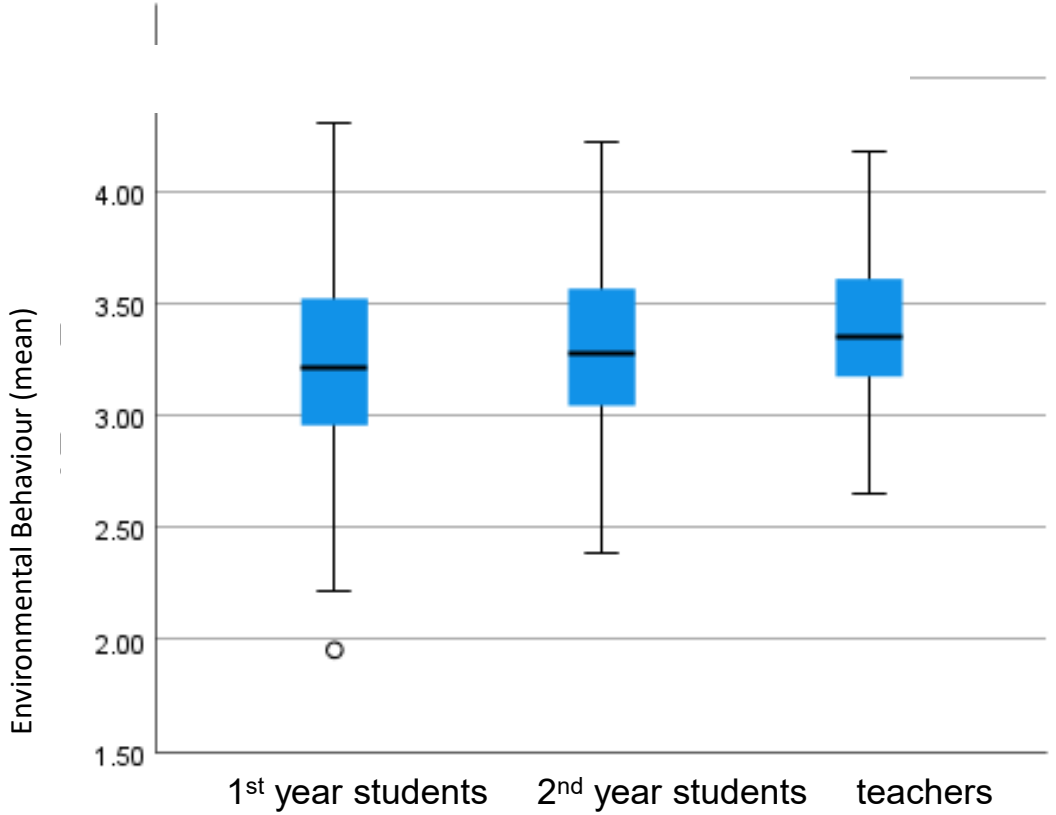


Results: Survey Environmental Behaviour

✓ Students and teachers reveal a **moderate frequency of environmental behaviour**.

✓ **Teachers have environmental behaviours more frequently** than the 1st Students
$X^2_{KW}(2) = -3.458$, $p = .002$.

No significant difference between 1st year and 2nd year students
(t(655)= -1.742; p=0.082)



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Students and Teachers reveal a:

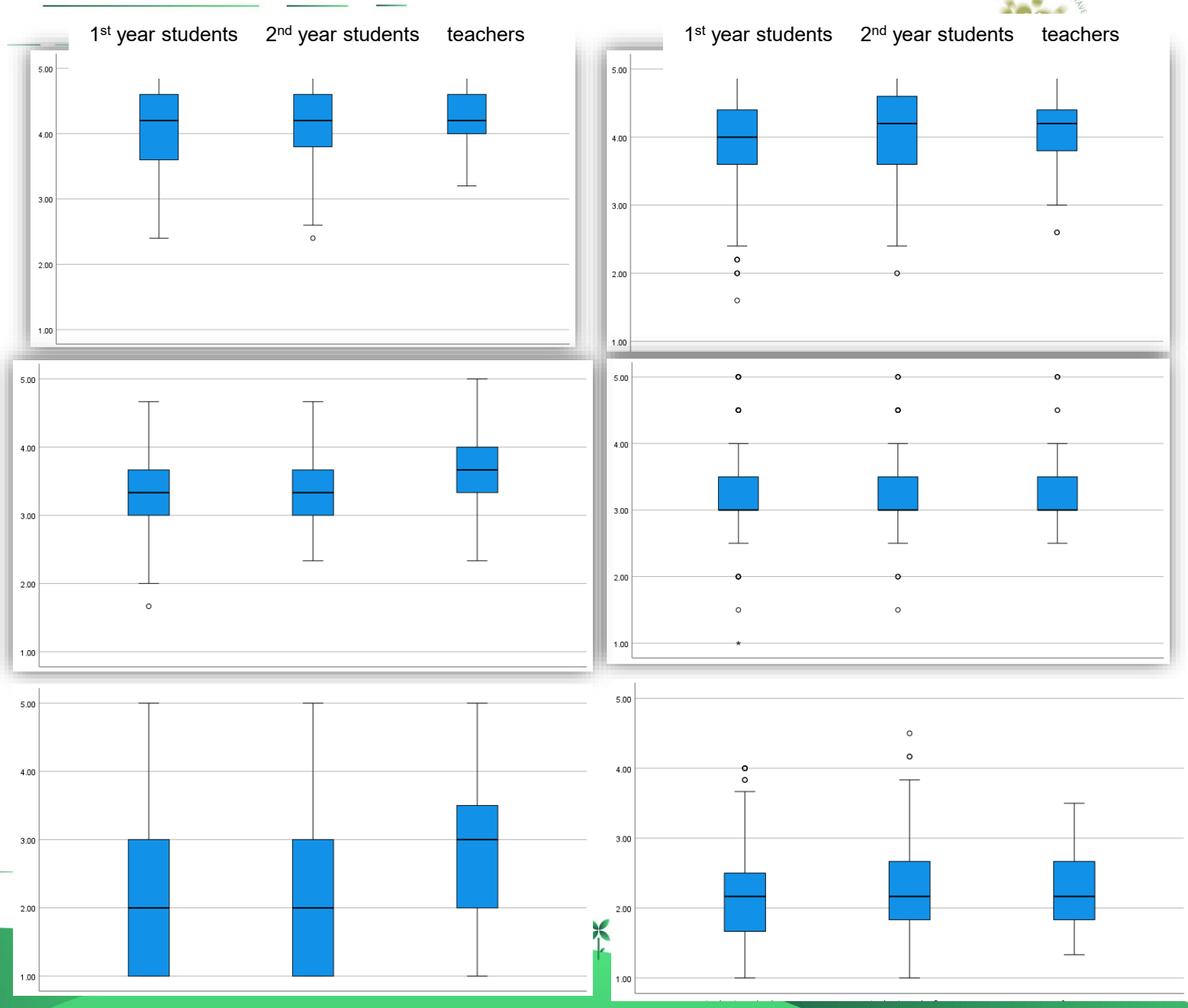
FREQUENT **Waste management and Water saving behaviours**

Low effort behaviours

MODERATE **Food and Energy-saving behaviours**

High effort behaviours

OCCASIONAL **Mobility and Environmental Participation behaviours**



Results: Survey Environmental Behaviour

MODERATE **Food and Energy-saving behaviours**

Food consumption

The majority (66.1%) always save the leftovers for the next meal.

The majority (81.4%) often eat meat or fish

Energy-saving

The majority (67.7%) always turn off unnecessary lights

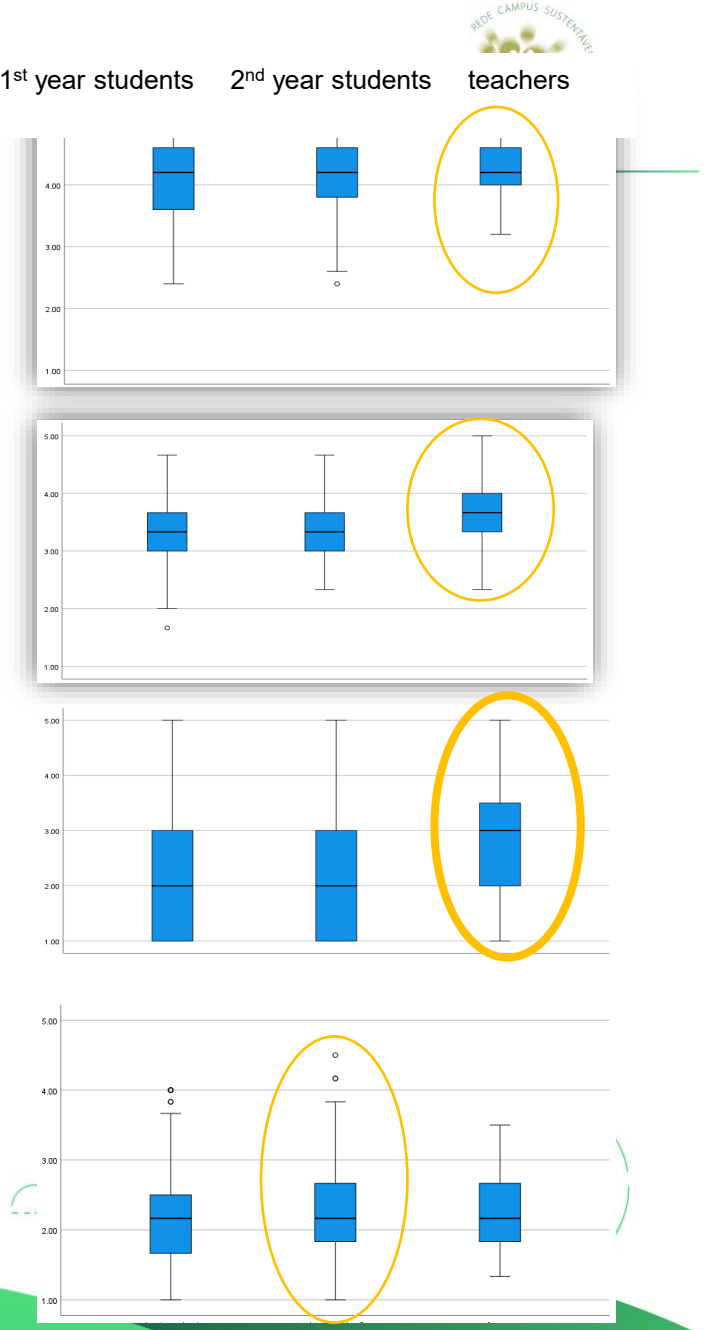
The majority (63.4%) always switch off the television using the remote control

Teachers have **waste** management behaviours **more frequently** than 1st and 2nd year Students

Teachers have environmental **food** consumption behaviours **more frequently** than 1st and 2nd year Students

Teachers have sustainable mobility behaviours **more frequently** than 1st and 2nd year Students

2nd year Students have environmental participation behaviours **more frequently** than 1st year Students



Study's Implications

Environmental Literacy profile shows that most have a:

- **moderate to strong** ecological **attitude**;

  ++ improve the environmental responsibility dimension of professors.

- **robust** environmental **knowledge**;

  ++ improve specific items for the general, waste management and water consumption knowledge.

- **moderate** frequency of environmental **behaviours**

  ++ improve the frequency of high effort environmental behaviours

Study's Implications

Environmental Literacy profile shows:

- The **ATTITUDE-BEHAVIOUR GAP**:

  Moderate to strong ecological attitude **does not translate** to high frequency of environmental behaviours

- The **KNOWLEDGE-BEHAVIOUR GAP**:

  Solid environmental knowledge **does not translate** into a high frequency of environmental behaviour

Study's Implications

Environmental Literacy profile shows a Knowledge-behaviour gap BUT:

- Comparing teachers and students:

A higher level of knowledge **corresponds to** a higher level of environmental behaviour,
with pertinent examples for the high effort behaviours:
meat consumption and sustainable **mobility.**

- Comparing 1st and 2nd year students:

Higher level of knowledge **does not translate** into more frequent environmental behaviours

Overall, these results suggest the existence of a tipping point where a higher level of knowledge translates into more frequent behaviour

Study's Implications

Content analysis of the curricula (Environmental Sciences degree)

Contents: **E**nvironmental **pillar** (SDG 6, 9, 14, 15)

Pedagogical Methodologies: non-authoritarian banking education, connection between theory and practice through exemplification, but some with no connection; guided study, problem-solving exercises

Disciplinary Complexity: disciplinary approaches

Computer Science and **Mathematics**
are the ones further away from the contents.

Conclusions

The study provides insights into:

- Environmental Literacy profile of 1st year and 2nd year students and teachers at Universidade Aberta.
- EL levels of students entering higher education and their advancement throughout their degrees.
- By exploring the integrated results among students, teachers, curricula, and campus, the key areas for improvement can be identified and strategically planned.

Thank You !

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