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OpenPass4Climate: Students' Perceptions on Climate, Key Climate Engagements and Competences, and Usefulness of Open Recognition



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Introduction

- **What we aim to achieve.** The primary goal of the OpenPass4Climate project is to propel climate-related activities from mere awareness to a commitment for change and justice. This is to be achieved by providing visibility through Open Badges and the OpenPass4Climate platform. Furthermore, the project seeks to assess the tangible impact of these activities on driving real changes for climate justice. It also aims to understand the mechanisms that facilitate the rapid replication of "positive" behaviors.
- **Necessary prior information.** To effectively identify and evaluate diverse climate commitments and gauge students' perceptions of their needs, it is imperative to collect information concerning the nature of students' engagement with climate-related activities, encompassing both implicit and explicit forms of recognition. This comprehensive study is the core objective presented in this research, aiming to provide insights into the multifaceted aspects of students' commitment to climate causes.

Materials and Methods

Survey Design and Distribution. A 20-question survey was administered to students from four European countries—France, Italy, Portugal, and Spain. The survey, accessible at <https://forms.office.com/e/1Qre9GYRee> (QR code below), was crafted in compliance with the European Union's General Data Protection Regulation.

Constructs Measured:

- Climate change views
- Environmental values and identity
- Personal responsibility and emotional responses
- Social norms
- Eco-pedagogical activities
- Learning interest/flexible learning pathways/training
- Open-badges system/awareness



Methodological Approach:

- Responses, provided on a Likert scale (1-5), were subjected to statistical analysis. The meaning of extreme scale values was explicitly defined for all questions.
- Demographic factors, including age, gender, level of education, and country of origin, were considered in the analysis.
- Given that the assumptions of homogeneity and homoscedasticity were not met (verified by Shapiro-Wilk and Levene tests), the Kruskal-Wallis non-parametric test was employed to ascertain statistically significant differences among two or more groups. *Post hoc* multiple pairwise comparisons were conducted using the Conover-Iman test.

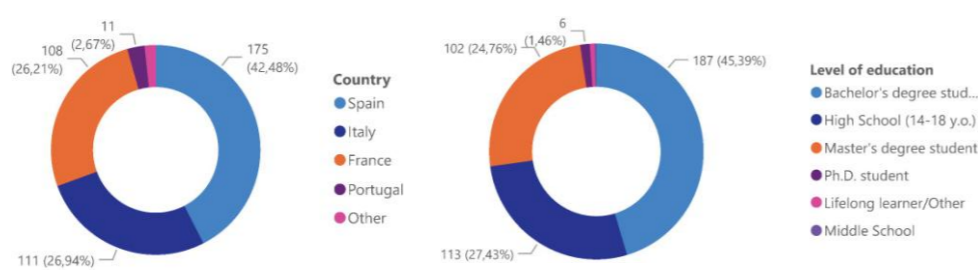


Figure 1. Demographic information: (left) gender; (center) country of study; (right) level of education.

Table 1: Survey responses - Median values (Likert 1-5 scale) with significance indicators.

Gender	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11
Female	4.16 b	4.50 b	3.86 b	4.50 a	4.58 a	4.02 b	3.70 a	3.38 a	2.53 a	2.93 a	2.28 a
Male	3.72 a	4.21 a	3.45 a	4.29 a	4.38 a	3.66 a	3.63 a	3.04 a	2.70 a	2.84 a	2.38 a
Other	3.93 ab	4.60 b	4.00 b	4.60 a	4.33 a	4.27 b	3.47 a	2.80 a	2.27 a	2.73 a	2.13 a
Total	3.99	4.40	3.71	4.43	4.50	3.89	3.66	3.23	2.58	2.89	2.31

Level of education	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11
Bachelor's degree	3.96 ab	4.36 a	3.69 a	4.45 a	4.48 a	3.86 a	3.70 a	3.24 a	2.47 a	2.84 a	2.24 a
High School (14-18 y.o.)	3.79 a	4.31 a	3.60 a	4.28 a	4.49 a	3.77 a	3.69 a	3.16 a	2.74 a	2.78 a	2.45 a
Master's degree	4.21 b	4.50 a	3.87 a	4.56 a	4.50 a	4.04 a	3.56 a	3.26 a	2.60 a	3.05 a	2.23 a
Ph.D.	4.83 b	5.00 a	4.00 a	4.67 a	5.00 a	4.67 a	4.00 a	3.83 a	3.00 a	3.67 a	3.33 a
Total	3.99	4.39	3.71	4.44	4.50	3.89	3.67	3.23	2.59	2.89	2.31

Country	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11
France	4.29 b	4.62 b	3.88 a	4.51 a	4.57 a	4.07 a	3.60 a	3.12 a	2.49 a	3.10 b	2.06 a
Italy	3.76 a	4.31 a	3.59 a	4.26 a	4.49 a	3.77 a	3.68 a	3.17 a	2.73 a	2.74 a	2.46 b
Spain	3.91 a	4.29 a	3.62 a	4.45 a	4.44 a	3.83 a	3.66 a	3.26 a	2.48 a	2.82 ab	2.33 ab
Total	3.97	4.38	3.68	4.41	4.49	3.88	3.65	3.20	2.55	2.88	2.29

Gender	Q12	Q13	Q14	Q15	Q16	Q17	Q18	Q19	Q20
Female	3.26 a	3.39 a	2.19 a	3.98 b	4.25 b	4.23 b	3.67 a	3.38 a	3.11 a
Male	3.07 a	3.63 b	2.13 a	3.63 a	3.93 a	3.87 a	3.36 a	3.05 a	2.89 a
Other/Prefer not to say	3.47 a	3.80 b	1.87 a	3.87 ab	4.33 b	4.07 ab	3.33 a	3.00 a	2.80 a
Total	3.20	3.49	2.16	3.85	4.14	4.09	3.55	3.24	3.02

Level of education	Q12	Q13	Q14	Q15	Q16	Q17	Q18	Q19	Q20
Bachelor's degree	3.02 a	3.37 a	1.95 a	3.77 a	4.05 ab	4.10 a	3.53 a	3.26 a	3.00 a
High School (14-18 y.o.)	3.17 a	3.58 a	2.14 ab	3.61 a	4.04 a	3.95 a	3.37 a	3.29 a	3.03 a
Master's degree	3.53 a	3.60 a	2.50 b	4.23 a	4.38 b	4.23 a	3.78 a	3.21 a	3.02 a
Ph.D.	3.50 a	3.83 a	2.83 b	4.67 a	4.67 b	4.33 a	4.00 a	3.17 a	3.67 a
Total	3.19	3.49	2.15	3.85	4.14	4.09	3.56	3.25	3.02

Country	Q12	Q13	Q14	Q15	Q16	Q17	Q18	Q19	Q20
France	3.63 b	3.74 b	2.62 c	4.28 b	4.44 c	4.25 a	3.77 b	3.10 a	2.95 a
Italy	3.19 a	3.59 ab	2.17 b	3.63 a	4.06 b	3.97 a	3.39 a	3.32 a	3.03 a
Spain	2.87 a	3.25 a	1.79 a	3.68 a	3.98 a	4.07 a	3.45 a	3.26 a	3.01 a
Total	3.17	3.48	2.12	3.83	4.13	4.09	3.52	3.23	3.00

Note: Different letters indicate significant differences according to the Kruskal-Wallis test at $p < 0.05$.

Results and Discussion

Reliability analysis

The obtained alpha coefficient for our study was 0.845, indicating a commendable ability of the questionnaire items to measure the same latent factor among subjects.

Demographic information

- The survey garnered responses from a total of 412 participants. Notably, the majority (70%) fell within the 18-24-year age bracket. Gender distribution revealed a prevalence of female respondents, comprising 60% compared to 37% male respondents (Figure 1, left).
- Participants pursuing a Bachelor's degree constituted the largest segment, representing 45% of the respondents. Of these, 150 respondents hailed from Spain, and 33 from France. A significant portion of the respondents (27%), mainly from Italy, were A-level students. Master's degree students accounted for 25% of the respondents, with the majority (70) from France, followed by 18 from Spain and 8 from Portugal (Figure 1, center and right).

Climate Attitudes and Values Among Survey Participants

- **Climate change views (Q1 to Q4):** Participants expressed significant concern about climate change, scoring an average of 4.0 out of 5. A strong consensus (4.4/5) was observed regarding the acknowledgment of human activities as significant contributors to climate change. Participants generally believe in the individual's capacity to make a difference in addressing climate change (3.7/5). Government intervention received high endorsement, with participants largely agreeing that governments play a pivotal role in addressing climate change (4.4/5). Notably, French students demonstrated significantly higher values for the first two questions.
- **Environmental values and identity (Q5 to Q7):** Protecting the environment was deemed of high importance by the majority of participants (4.5/5). Prioritizing environmental conservation over economic growth received relatively less strong support (3.7/5), with female respondents showing the highest scores. Participants perceived their alignment of actions with environmental values as medium-high (3.7/5).
- **Personal responsibility and emotional responses (Q8 and Q9):** Participants reported a moderate sense of responsibility for reducing the negative effects of climate change (3.2/5). There is a general lack of hope about the future of the environment, as indicated by a score of 2.6 out of 5.
- **Social norms (Q10 and Q11):** The perceived level of concern about the environment and climate change within the students' social circles was rated as medium (2.9/5). However, when asked about people in positions of responsibility in their country, participants indicated a lower level of concern, with a score of 2.3 out of 5.

Educational Engagement and Perspectives on Climate Learning and its Recognition

- **Eco-pedagogical activities (Q12 to Q14):** Participants perceive their level of formal training on climate change as moderate (3.2/5), with higher values noted among Master's and PhD students, particularly those in France. The Likert score increases to 3.5/5 for training received through informal education. Notably, the majority of students have participated infrequently in eco-pedagogical activities in the past year (2.1/5), with higher participation rates among Master's and PhD students.
- **Learning interest/flexible learning pathways/training preferences (Q15 to Q17):** Students express a moderate-to-high interest (3.8/5) in learning about climate-related topics, with heightened interest observed, especially in France. There is a strong consensus (4.1/5) among students that formal education should cover climate-related topics. Simultaneously, students agree (4.1/5) that informal learning can be effective in teaching about climate-related subjects.
- **Open-badges system/awareness (Q18 to Q20):** Students moderately value recognition for completing climate-related learning activities (3.5/5). The motivation for learning about climate-related topics solely for earning open badges is perceived as not particularly strong (3.2/5). Participants generally remain neutral (3/5) regarding the impact of earning open badges on employability and career opportunities. However, PhD students express optimism in this regard, rating it at 3.7/5.

Key Findings and Implications

In light of the survey's outcomes, several conclusions emerge:

- **Climate concerns and perceptions:** European students exhibit significant concern about climate change and recognize the impact of human activities. However, they predominantly delegate the responsibility for climate action to governments, downplaying the potential individual contributions. Despite placing high importance on environmental protection, there is a misalignment between stated values and individual actions. This discrepancy may be attributed to a moderate sense of personal responsibility and a reluctance to sacrifice economic growth. Additionally, there exists a prevailing belief that individuals in positions of responsibility within their countries are indifferent to environmental concerns, contributing to a sense of hopelessness regarding the future of the environment.
- **Educational landscape:** Students express a perception of receiving average (not good) training on climate-related issues, with informal education being considered more impactful than formal education. Participation in eco-pedagogical activities remains notably low. While there is a moderate-to-high interest in learning about climate-related topics, students strongly advocate for the inclusion of such topics in formal education. Simultaneously, there is a widespread belief in the effectiveness of informal learning approaches.
- **Open-badges system awareness and utilization:** The Open-Badges system is not well-understood by students, requiring substantial efforts to convey its usefulness for recognizing and showcasing their learning achievements in the realm of climate-related topics. Familiarity with the system is limited, indicating a need for targeted awareness campaigns and educational initiatives.