Impact Assessment Report – GREENGAGE Thematic Co-Exploration

1. Introduction

This report presents the impact assessment of the thematic co-exploration conducted as part of the GREENGAGE project at the University of Deusto's campus, performing a *"reflection on the suitability and air quality of important points of interest (POIs) within the campus of the University of Deusto in Bilbao, Spain"*. This impact assessment evaluation has been carried out following ACTION impact assessment framework. The experiment aimed to engage participants in a Citizen Science (CS) process to co-explore and reflect on issues related to environmental awareness, political participation, scientific engagement, and community empowerment.

A total of 10 participants took part in the pre- and post-evaluation surveys designed to capture changes in perceptions, behaviours, and engagement across several impact areas. As mentioned, this exemplary thematic co-exploration took place within the campus of the University of Deusto in Bilbao, SPAIN on Friday 14th March 2025, from 11:30am to 12:30pm CET

2. Methodology

The ACTION framework outlines impact dimensions in five major areas: Scientific, Social, Political, Environmental, and Economic. Pre- and post-evaluation questionnaires were administered to the same group of participants to capture quantitative and qualitative changes. Quantitative scores were compared, and qualitative responses were analysed to assess transformation.

3. Summary of Quantitative Impact Comparison

The following table summarizes the average scores (± standard deviation) across impact dimensions from pre- and post-evaluation surveys:

Impact Area	PRE Score (AVG ± SD)	POST Score (AVG ± SD)	Change
Environmental	3.1 ± 1.2	3.12 ± 1.14	Slight decrease
Political	Qualitative: Low	3.33 ± 1.26	Significant increase
Scientific	3.75 ± 1.26	3.73 ± 0.97	Slight stable
Social	Qualitative: Medium	3.77 ± 1.32	Slight increase
Economic	Not measured	Qualitative: Low	Slight increase

4. Key Impact Area Observations

4.1 Scientific Impact

Participants demonstrated high scientific literacy at the outset, with an average score of 4.55, which slightly increased to 4.58 in the POST experimentation's questionnaire. Many participants had existing research backgrounds. During the project, they reported increased involvement in Citizen Science campaigns, suggesting improved understanding and appreciation of science and CS tools. Participants had a positive perception towards Citizen Science which was kept varying from 3.75 to 3.73 from PRE to POST questionnaires' answers. Still, the standard deviation was reduced meaning that there was a more consistent positive view regarding Citizen Science by participants after concluding the thematic co-exploration. Anyhow, it must be admitted that there is clear scope for improvement regarding the "vision towards science" that participants in thematic co-explorations have. Such aspect was gathered by assessing participants' perceptions of science's benefits, its role in improving quality of life, its societal pace-setting influence, and its balance with non-scientific values like faith.

4.2 Environmental Impact

Environmental concern remained stable (slight decrease from 3.56 to 3.45). However, there was a clear improvement in ecological behaviours, as participants moved from 'often' to 'always' in adopting environmentally friendly practices. The shift from "Yes, often" to "Yes, always" across all 8 environmental behaviours indicates a strong reinforcement of pro-environmental habits. Notice that ecological behaviours were perceived through self-reported adherence to sustainable daily habits—such as eco-friendly purchasing, energy conservation, and environmental advocacy—revealing the extent to which individuals integrate green values into their lifestyle choices. The slight increase of social desirability from 2.6 to 2.8 in the POST evaluation (e.g., convincing others not to buy harmful products) suggests that some participants moved beyond personal behaviour to community advocacy. This transformation reflects a slight behavioural deepening: participants not only maintain eco-friendly habits more consistently, but they also internalize and promote these values.

4.3 Political Impact

In the PRE evaluation, political impact was low, with participants showing minimal engagement beyond occasional discussions; most had never participated in lobbying, activism, or community initiatives, and had little to no communication with politicians or involvement in data-driven civic projects. Post-evaluation indicated increased political awareness, with participants feeling more empowered to discuss and engage in political discourse. The average political engagement score reached 3.33, highlighting a moderately positive political impact perception. Participants' testimonies after participation in the thematic co-exploration reflect increased civic awareness and engagement through involvement in data-driven environmental initiatives like SOCIO-BEE and AmiAire, greater confidence in expressing informed opinions, a deeper understanding of community power, and a belief in the need for evidence-based policymaking—despite ongoing challenges in directly influencing political decisions.

4.4 Social Impact

In the PRE evaluation, participants already identified as researchers or educators with strong theoretical knowledge of scientific processes, yet many had limited hands-on experience in full-cycle scientific activities or in using Citizen Science (CS) tools—indicating a gap between academic identity and practical civic science engagement. Participants possess high cognitive and professional potential, but practical engagement and transformative outcomes (central to social impact per ACTION framework) have not yet materialized. By contrast, the POST evaluation reveals significant development across social impact dimensions. Participants rated their knowledge, skills, and competences at an average of 3.68, showing a shift toward practical involvement in CS projects. They also expressed intent to continue engaging in future initiatives, and reported changes in attitudes, values, and behaviours (average 3.8), with several explicitly acknowledging transformative personal growth. Additionally, a strong sense of community empowerment emerged (average 3.73), reflecting the GREENGAGE project's role in fostering not only

4.5 Economic Impact

Economic impact was only assessed in the post-evaluation. Results suggest a minor impact in terms of employment and research-related opportunities. The dimension remains limited at this phase. GREENGAGE had a modest economic impact for DEUSTO's team by enabling the creation of a few research-related positions, including a predoctoral role, and identifying potential future needs for manpower, though some participants were uncertain about the extent of this effect.

5. Transformative Potential

Thematic co-exploration contributed to behavioural changes and increased interest in future CS projects. The project demonstrated radical and catalytic features by promoting reflection and reinforcing community-based engagement strategies. Learning outcomes were evident across scientific, political, and social dimensions.

6. Conclusion

The GREENGAGE co-exploration had measurable impacts across key areas, especially in political awareness, scientific engagement, and ecological behaviours. It served as a valuable opportunity for citizen empowerment and reflective learning. Further engagement and long-term monitoring are recommended to consolidate these changes.

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