Thematic Co-Exploration for GREENGAGE Observatory (GO)

Thematic co-exploration for suitability and air quality of POIs at University of Deusto's campus in Bilbao, Spain

WHY – Reason why this Citizen Observatory' thematic co-exploration is needed (arguments for promoting the execution of this Citizen Observatory's campaign)

Purpose for the Citizen Observatory campaign and its associated objectives.

The purpose of this thematic co-exploration is the "*reflection on the suitability and air quality of important points of interest (POIs) within the campus of the University of Deusto in Bilbao, Spain*".

The associated missions are as follows:

- Determine the air quality perception of the university community in the campus
- Campus facilities status to facility campus life
- Gather suggestions about possible improvements or problems currently in the campus
- Take photos of spots in the campus where improvements could be considered

Reasons why this Citizen Observatory's thematic co-exploration's realization is needed for your district/neighbourhood.

The University of Deusto is a private university which distinguishes by offering excellent teaching but also offers first level installations in its campus that can be reviewed by students and staff in order to determine possible improvement areas.

List beneficiaries of this Citizen Science (CS) driven thematic co-exploration.

- Students
- Lecturers
- University staff and directors
- Visitors

Possible policies for which the results of this CS campaign could help.

- Decision making regarding where and why to invest in campus retrofits
- Expenditure of Maintenance Budget
- Local Maintenance budgets

Potential societal / environmental / economic impact expected.

- Higher satisfaction of campus users
- Reduced pollution within campus
- Better usability and acceptance of campus facilities

Risks (describe potential failure factors and risks).

- No maintenance budget available
- No participants gather the data
- No agreement on assessment criteria

WHO – Involved and affected stakeholders' groups in Citizen Observatory's thematic co-exploration (describe the target groups and their possible motivation)

Who is the **promoter and/or sponsor** of this Citizen Observatory's thematic co-exploration?
- MORElab research group belonging to Faculty of Engineering
- Managers of the University of Deusto

Who are **responsible for the Citizen Observatory's thematic co-exploration**?
- MORElab

Who are the **domain experts and leaders of the Citizen Observatory's community** to be involved in this thematic co-exploration?
- Members of the MORElab team who are knowledgeable on technology and air quality domain

Who will be the **participants in this CS campaign of the Citizen Observatory** and what will be their **collaborative duties**?
- Researchers and collaborators of MORElab – data gatherers, walk and assess
- Students of courses taught by MORElab staff members – data gatherers, walk and assess, provide feedback
- MORElab managers – discuss metrics, assess, prepare feedback strategy
- MORElab members and university managers – Reflect on the campus visualisations

What **social collectives, influencers, societal representatives** could help you disseminating the outcomes of this Citizen Observatory's thematic co-exploration?
- Staff – To other university staff members
- Managers – policy documents
- Students – to other students, families and external people

Who will be the **multi stakeholder members affected** by the Citizen Observatory's **thematic co-exploration's results**?
- Students and staff of University of Deusto

WHAT – Actual endeavours of the Citizen Observatory's thematic co-exploration

The problem (describe the problem statement and the challenge that you are addressing)
Campus maintenance and quality of air at the University is a topic that is not monitored sufficiently at the university. There are feedback portals for university's stakeholders to note maintenance tasks, but this remains an underused platform. By untangling the governance behind the campus maintenance and standardising data about suitability and breathability criteria, this problem should be streamlined.
However, then the question rises if campus' stakeholders should have influence on the maintenance agenda or are solely responsible for reporting. Understanding how participation can be used in this particular context is a matter that deserves scrutiny.

Objectives (describe the intended result)
- Public Space and Air Quality Suitability Criterium – What is even meant with suitability and breathability
- Data (suitability & air quality) on the state of different POIs in the campus
- A qualitative assessment of POIs by different target groups
- Facilitation of the governance process and understanding the participant role.

Added value (describe the potential benefits for the Citizen Observatory's thematic co-exploration's stakeholders)
- Better campus experience
- Safer and more enjoyable and satisfactory use of the campus

- Clearer participation strategy

Current and desired situation (describe the current approach including existing practices, and the desired situation)

- Maintenance not on priority list -> standardise and simplify its inventory
- Standardised maintenance criteria -> completer and More experiential list
- No standard data on maintenance state -> data gathering strategies in place
- Convoluted reporting structure -> Clearer reporting structure
- Participants can only report -> Participants report as a community

CS hypothesis and research questions (to be validated by the outcomes of the execution of the Citizen Observatory's thematic co-exploration)

How can campus stakeholders´ participation engage with the university maintenance agenda within a university governance situation by gathering campus suitability and air quality evaluation data on different points of interest in the campus?

- The current maintenance frameworks for campus can be expanded through interviews with the students and university staff
- Better campus' public places' suitability may lead to a more appealing university experience
- Participants can contribute better to maintenance when working as a community.

Metrics definition (of indicators of success for the Citizen Observatory's thematic co-exploration)

- *Perception of Air Quality Index (PAQI)*, where on a scale from 1 to 5, people have to indicate their perception from very clean (no noticeable pollution effects) to highly polluted (major health concerns, unliveable conditions
- *Public Space Suitability Index (PSSI)*, where again in a 1 to 5 scale, volunteers have to express their perception regarding accessibility & connectivity (20%), safety & security (15%), environmental quality (15%), functionality & comfort (20%), sociability & inclusivity (15%) or maintenance & management (15%) aspects. Again, 5 ranges of suitability are defined ranging from excellent suitability (average answer values >4) to poor suitability (<1).
- Apart from perceptions of air quality, those volunteers who counted with an Atmotube Pro device also collected air quality data through it. Some studies indicate PM2.5 at or below 12 µg/m3 is considered healthy with little to no risk from exposure. If the level goes to or above 35 µg/m3 during a 24-hour period, the air is considered unhealthy and can cause issues for people with existing breathing issues such as asthma.

WHEN – Planning of activities and period when Citizen Observatory's thematic co-exploration will be executed (indicate for how long, what activities, where and for whom will be realized)

Workplan: phases, milestones, and tasks to be completed during the Citizen Observatory's campaign execution, i.e., onboarding, the realization of a citizen science experiment, evaluation, and validation.

The following sessions are planed:
a) initial training, specification of the thematic co-exploration, team and co-creation process setup;
b) crowdsourcing campaign and co-design of possible useful visualizations;
c) collaborative reflection on the gathered data and analysis results;
d) participation in Discourse channel, social media dissemination of public results and policy brief

Work assignment of tasks to participants during the Citizen Observatory's **thematic co-exploration's duration**

The coordinator of the experiment, Prof. Diego López de Ipiña will chair the training (activity a) and reflection session (activity c) mentioned above. At least 10 people from MORElab research group are envisaged to be recruited to take part in the experiment.

Engagement plan for Citizen Observatory's **thematic co-exploration's participants**
In this case, researchers collaborate frequently in validation of other researchers' work, hence, an email will be sent to recruit people and a Doodle set up to arrange the time slots when the meetings and activities of the thematic co-exploration will take place.

WHERE – Geographical locations where Citizen Observatory's **thematic co-exploration will take place** (actual geographical areas where data collection and analysis will be carried out)

Geographical areas covered by the Citizen Observatory's thematic co-exploration.

- The campus of the University of Deusto. The red circles indicate the POIs that will be used in the crowdsourcing campaign. The coordinates of the 4 POIs that want to be used in the campaign from top to botton and left to right are:
  - Lat: 43.271606823048856, Lng: -2.9402953219734345
  - Lat: 43.2711571622459, Lng: -2.9402953219734345
  - Lat: 43.271157163906985, Lng: -2.939677756057301
  - Lat: 43.2711571622459, Lng: -2.939060190141168

Types and number of measurements to be taken by each area and period.

- Qualitative point measurements about suitability of that POI as a public space, important part of University of Deusto's campus
- Qualitative point measurements about air quality of that POI part of University of Deusto's campus
- [Optional] If the user has an Atmotube Pro device gather an air quality measurement in such point
- Textual feedback about that POI what could be improved, added, should be corrected

- Photo feedback about spots near the POIs where different issues may want to be raised

WHICH – Materials and resources (actual materials and resources needed to execute the Citizen Observatory's thematic co-exploration)

Logistical and financial support (describe what resources you will need to carry out the project):

- No need for compensation since this thematic co-exploration is realized by researchers of the MORElab research group
- However, coffees and cookies were offered to participants in its 4 activities

Needs regarding infrastructure (e.g., number of sensors, and expected date for availability, maps to be used, access to the platform, etc?)

- Atmotube Pro air quality devices
- GREENGAGE app to crowdsource information
- Participants in the thematic co-exploration will make use of GREEN Engine's infrastructure to process the collected data and generate visualizations
- Several CO enablers from GREENGAGE Academy may be leveraged, like this specification of thematic co-explorations.

Functionalities of tools from GREENGAGE or third parties to execute this Citizen Observatory's thematic co-exploration.

- 4 atmotube pro devices are available for taking measurements
- All users are expected to install GREENGAGE app

HOW – Data analysis process to be able to capture, analyse and generate indicators and visualizations sought in Citizen Observatory's thematic co-exploration

Data protocol for your Citizen Observatory's thematic co-exploration**:**

- What type of data do you need?
  - Sociodemographic data questionnaire and consent form acceptance will be required from all campaign participants
  - Questionnaire with Likert scale answers for qualitative assessment of POIs
  - Geopositioned data point photographic evidence
  - Textual feedback about POIs reviewed
  - Measurements of air quality gathered through Atmotube Pro devices
- Does it involve objective or subjective measurements?
  - Subjective
- Do you focus on one or more parameters?
  - We want to measure "public space suitability", "air quality" and gather "photographic and textual feedback" about POIs.
- Does it involve creating a new dataset or adding to an existing dataset?

  - A new dataset with sociodemographic data of participants
  - A new dataset with perceptions of air quality and suitability for the 4 POIs to be analysed
  - Pollution data measurements in 4 POIs considered
  - Textual and photographic evidence gathered in spots near the POIs considered
- What is the geographical and temporal scope of the data collection process?
  - Data crowdsourcing will be realized in one single session over a 2 hour timespan
- Do you need a representative sample?
  - No – different perspectives are collected in the reflection phase
- How will participants have to collect the data: via one or several measuring instruments?
  - Using the GREENGAGE app and also Atmotube Pro devices, in case of having them.

Analytical methods which should be applied within the Citizen Observatory's thematic co-exploration.

- Analysis of answers received for each single POI
- Analysis of answers gathered for the whole campus, averaging answers received in the 4 POIs
- Summarization of feedback received textually
- Photo collage with photographic evidences collected

Visualization and metrics to generate to support the decision-making through Citizen Observatory's realization.

- As earlier indicated the following metrics will be gathered:
  - Perception of Air Quality Index (PAQI), where on a scale from 1 to 5, people have to indicate their perception from very clean (no noticeable pollution effects) to highly polluted (major health concerns, unliveable conditions
  - Public Space Suitability Index (PSSI), where again in a 1 to 5 scale, volunteers have to express their perception regarding accessibility & connectivity (20%), safety & security (15%), environmental quality (15%), functionality & comfort (20%), sociability & inclusivity (15%) or maintenance & management (15%) aspects. Again, 5 ranges of suitability are defined ranging from excellent suitability (average answer values >4) to poor suitability (<1).