Engaging citizens in environmental health monitoring

Ioannis Tavantzis[a], Aikaterini Bakousi[a], Aikaterini Stamou[a], Eleni Evangelidou[b], Nikolaos Nagkoulis[b], Konstantinos Grizos[b], Theocharis Vlachopanagiotis[b], Efstratios Stylianidis[a]

[a] Aristotle University of Thessaloniki (AUTh) Citizen Science Hub, Laboratory of Geoinformatics, AUTh, Greece
[b] Rhoé, Politechniou 21 54 626, Thessaloniki, Greece

Introduction

- ✓ Citizen science has emerged as a powerful tool for advancing our understanding of environmental and health related issues.
- ✓ Environmental indexes, such as air quality, UV exposure and green spaces are vital indicators of environmental health and have been linked to a range of physical and mental health outcomes.

To what extent does presenting environmental indexes to citizens in both conventional and simplified units enhance their understanding of the potential health impacts of the urban environment?

Collaboration

INCENTIVE CITIZEN SCIENCE HUBS — "the potential of citizen science through the establishment, of Citizen Science Hubs (CSH) in European Universities"

inBOARD — "variables related to living conditions in a smart city in a way that is understandable to citizens"

Citizen Science Event

06 July 2023 — Waterfront of Thessaloniki, Greece — EVENT — "Decoding the science of the indicators"

Materials and Method

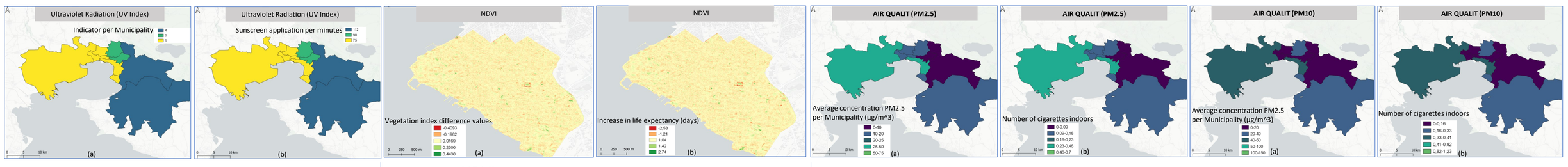
- ✓ Metrics from the inBOARD project
- ✓ Case study for the city of Thessaloniki, Greece
- ✓ Indices: PM2.5, PM10, UVI, NDVI

- ✓ Local air quality sensor network, meteorological data, Sentinel 2 images
- ✓ Research papers and the inBOARD project platform.

- ✓ Indices calculation for case study area
- ✓ Two maps per index were created: one with scientific legend and one with simplified.

Questionnaires developed for citizens to rate the map indicators on a scale of +5 (maximum benefit to human health) to -5 (maximum burden on human health)

- ✓ 25 citizens participated
- ✓ Basic statistical analysis of the questionnaire results
- ✓ Evaluation and lessons learnt

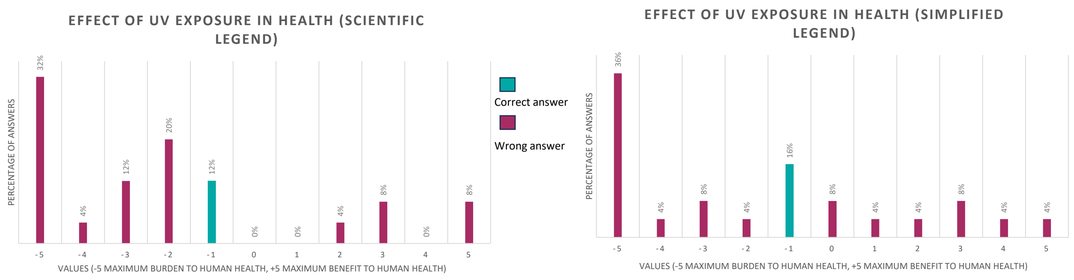


- UV index maps
- Scientific legend (a), presenting the UV index
- Simplified legend (b), explaining how often shall citizens apply sunscreen based on UV index.

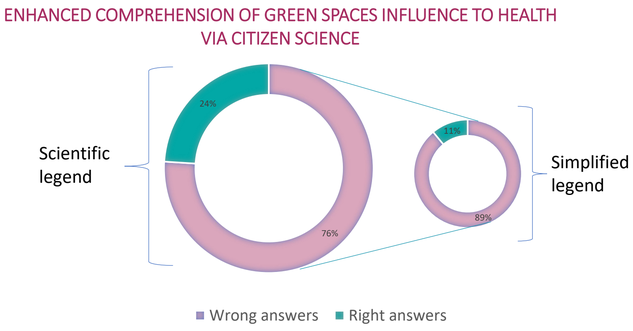
- NDVI maps
- Scientific legend (a), describing NDVI as an absolute value of vegetation index difference.
- Simplified legend (b), explaining how the NDVI variation adds days to citizens' lives.

- PM2.5 and PM10 maps
- Scientific legend (a), describing air quality in μg/m^3.
- Simplified legend (b), describing air quality in terms of the number of cigarettes smoked indoors.

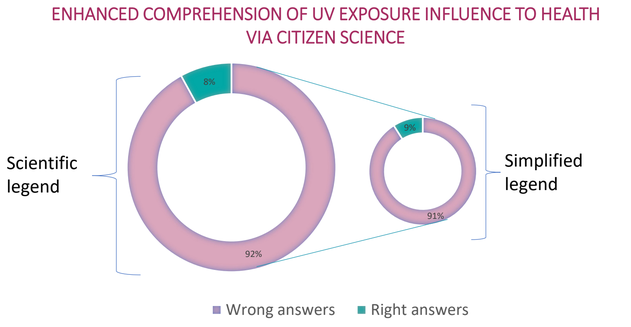
Results



The p-value for the NDVI indicates a significant difference between the scientific and simplified map ratings regarding UV exposure.



11% of participants who answered incorrectly with the scientific legend, answered correctly with the simplified legend.



9% of participants who answered incorrectly with the scientific legend, answered correctly with the simplified legend.

Discussion & Further research

While some simplified data presentations were effective, there is room for improvement.

Air quality data was not comprehensive in any given representation.

Sparse sample size and random participant selection with no prior knowledge may have influenced the findings' effectiveness.

- ☞ Refine simplified legends through co-creation workshops to align more closely with citizen preferences/ what they understand.
- ☞ Incorporate such a research in a series of public education about environmental health indicators and citizen science participation.
- ☞ Extend research to a broader geographic scope, encompassing a range of urban environments, each with its unique characteristics and challenges for insights into the adaptability and effectiveness of simplified legends in diverse contexts.
- ☞ Expand the sample size to enhance statistical power and improve the robustness of the results.

INCENTIVE CITIZEN SCIENCE HUBS

This work has received funding from the European Union's Horizon 2020 research and innovation programme under Grand Agreement no. 101005330. The content of this poster reflects only the authors' view, and the Commission is not responsible for any use that may be made of the information it contains.

AUTH hub CITIZEN SCIENCE
LABORATORY OF GEOINFORMATICS ARISTOTLE UNIVERSITY OF THESSALONIKI

rhoe
inBOARD