Pollution Explorers Tiny Pledges

Brief Description

Pollution Explorers Tiny Pledges helps improve air quality in Tower Hamlets through hyperlocal intervention in neighbourhoods that harnesses collective behaviour change. It builds on WearAQ (http://umbrellium.co.uk/initiatives/wearaq/), a 2 years AQ initiative we undertook with 120 residents, council members, activists and children across Tower Hamlets. Consisting of a proven set of tools and processes that combine citizens' subjective perception of their environment with wearable tech, machine learning and citizen engagement, it is intended to help improve a neighbourhood by working directly with the residents, empowering them to make sense of air quality issues and more importantly, act upon them through behaviour change.

Images from WearAQ Phase 2

Participants explore air quality in their neighbourhood through their innate subjective perception using tech tools, understand the impact they have on the environment, share experiences and motivate each other in committing to tackling air quality issues through their own actions. Through the engagement, participants make a statement on the air quality with their own physical actions of recording perceptual data using the wearable tools, help to fill in missing 'gaps' of air quality data in order to make sense of the quality of air in their neighbourhood and devise collective pledges that they can commit to helping tackle air quality issues for a period of time.

In Pollution Explorers Tiny Pledges, we have engaged with a total of 72 parents and children from Marner Primary School SHINE program over a month period in November 2018 through 3 workshop sessions with 46 students aged 10-12 years old. The parents were involved during the period where students monitored their commitment to their individual pledge to tackle air quality issue in Tower Hamlets.

Key Activities from the workshops

In each workshop, participants are encouraged to make sense of air quality issues by collectively describing, discussing, and pollution exploring in their vicinity using technological tools. Depending on the length of each workshop, participants went through the various key activities:

- An **open discussion** among participants regarding air quality in their neighbourhood
- **Pollution Explorers walk** using custom made wearable technology in outdoor locations near the workshop space. Participants make sense of air quality using custom-made wearables designed to record their perception of air quality using body gestures.
- **Action change session** where participants were shown data they have recorded during the walk and to collectively discuss and make their own correlation regarding the relationship between their perception and quality of air. We look at how we can harness **collective behaviour change** to tackle air quality issues through changes in participants' behaviour (coupling children to their parents) by encouraging them to commit to a specific action for an extended period of time. Their actions were tracked over a period of 21 days to analyse the correlation between their level of commitment to air quality improvement.
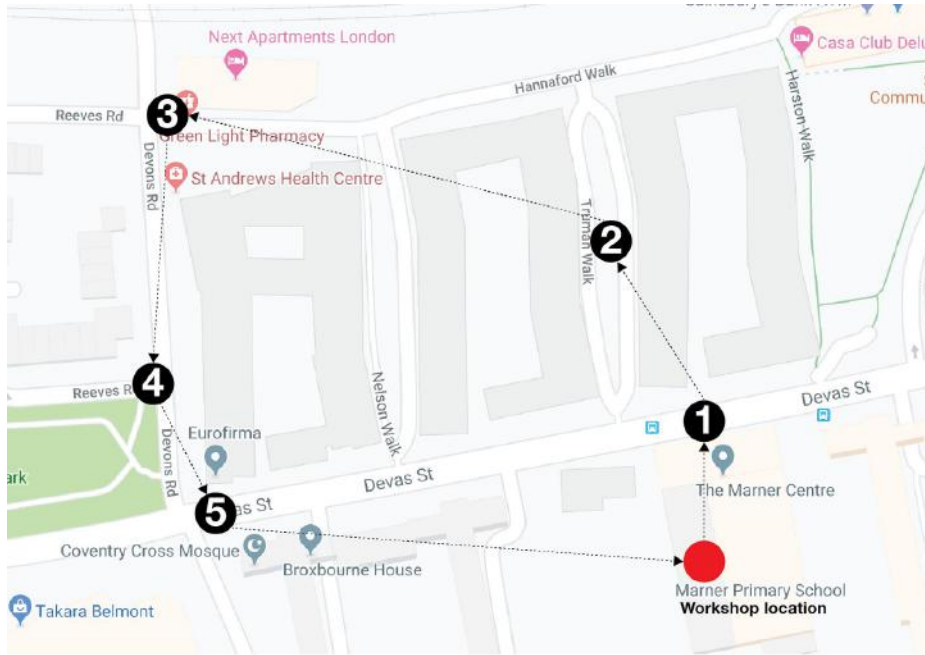
Findings from Pollution Explorers walk

Two sessions of Pollution Explorers walk were carried out on Saturday 10th November 2018 with a total of 46 students from Marner Primary School. First one at 1030am with 23 participants aged 10-11 years old, and second walk at 130pm with 23 participants aged 11-12 years old. The walk brought participants through 5 locations near the school, they were selected because each location lacks air quality data and has complex environmental built up (e.g a park situated near the highway and a junction with high-rise residential buildings nearby creating wind tunnel effect).

For each walk, participants each wear a custom-made wearable coat that capture the body gestures relating to their perception of air quality in each location. 2 mobile airbeam devices were also deployed, each device capture air quality data such as pm 1, 2.5 and 10. As they are low calibrated devices, they are suitable to give an aggregate overview of the peaks and falls in pollution, especially with pm2.5 value. The data were analysed to look for

correlations between participants' perception and machine sensor data to find out how their own senses compare with machine reading in terms of detecting changes in the air quality in their environment.

Pollution Explorers walk locations for both workshops
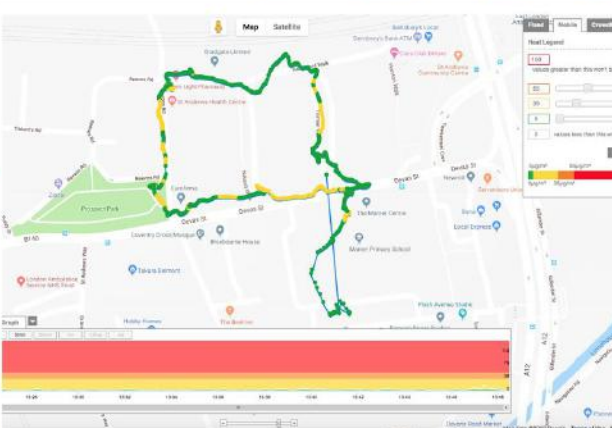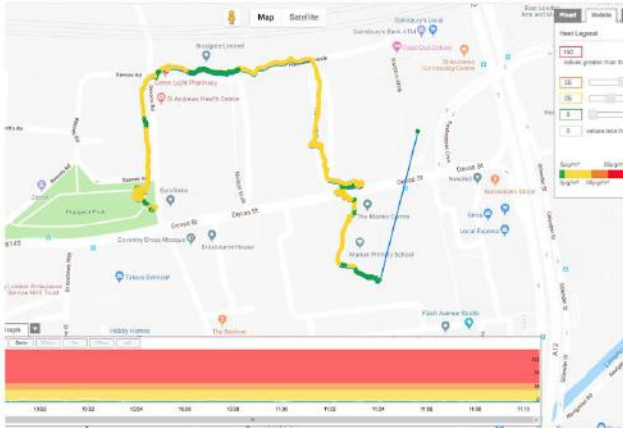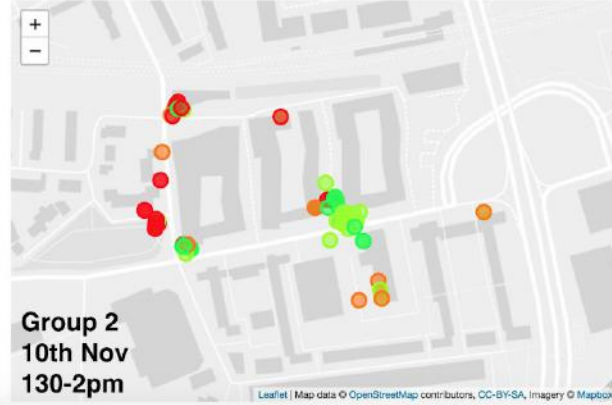
Perception data(top) and airbeam pm2.5 data (bottom) collected during the 2 workshop sessions on 10 Nov 2018

Our analysis has shown that

- people's ability to assess the quality of air in each workshop compared to the digital sensors vary widely, the highest correlation in a workshop was 61% and on average 25-35%.
- When participants were overwhelmingly wrong about their perception (i.e. when the % of participants who perceived correctly was less than the average for that workshop), they were more correct in their perception of a change in AQ. Putting numbers to this, whenever there was a majority who perceived under the average, 65% of the time they were able to do better as a group in perceiving a relative change, up or down, in AQ from their previous position.
- 57% of participants who demonstrated a high level of commitment to their pledges also demonstrated higher sensitivity to perceiving changes in AQ during the Pollution Explorers walk.

Findings on collective behaviour change

Each participant were given a custom designed badge that enable them to trace their actions over the period of 21 days.
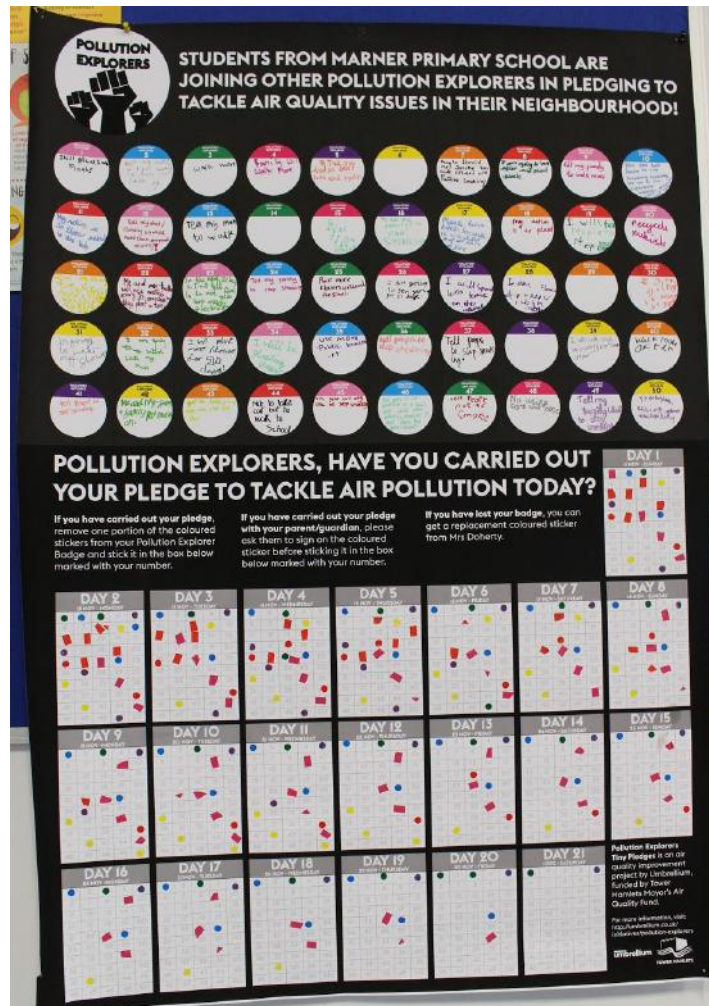
A larger poster was placed at the school entrance area designed to track participants' level of commitment to their pledges over the 21 days. Each day participant can choose to stick 1 sticker found on their individual badge into the appropriate box in the poster if they have committed their action the day before.

A total of 46 pledges were made by the participants to be carried out over a period of 21 days to tackle AQ issues.

- 31% chose to change their travel behaviour e.g adopt walking as the main commuting method and/or get their parents/guardian to drive less and/or take alternative forms of transportation
- 32% chose to encourage a family member/someone they know to stop smoking
- 15% chose to plant more plants
- 11% chose to recycle or recycle more
- 7% chose to reduce electrical consumption
- 4% chose other alternatives such as taking AQ measurement to report to the local authority and/or get the family to wear masks when outdoor

Our analysis has shown that a high percentage of participants (63%) committed to pledges that have a short-term and visible output on AQ such as changing their travel behaviour and/or encouraging a family member to stop smoking. Most participants chose these actions because they thought that it will directly reduce the amount of gas exhaust released into the environment and to help improve the health of people who have asthma. Refer to Appendix document for more information.

Among the other participants (37%) committed to pledges that had a long-term and less visible outputs to AQ such as planting and/or growing more plants and/or reducing their electrical consumption. With these participants, there

---

was a higher level of commitment, i.e some participants committed to their pledge for 21/21 days and on average the participants committed to their pledge for 12/21 days.

On average 54% of participants carried out their pledges with their parents at least once. Most participants who did not carry out any pledges with their parents gave the reason that their parents were busy with work to get involved.

Conclusion

The findings from the project suggests that participants who were more sensitive to perceived changes in AQ in their immediate environment were more committed to undertake actions that tackled AQ in their neighbourhood.

Future behaviour change models can also focus on engaging:

- children with long-term pledges through pledge devices that can help remind them of the benefit of improving AQ
- parents with short-term pledges, involving more adults from local councils, community centres and businesses to incentivise collective effort for a short period. This could be in the form of a collective action day in Tower Hamlets to reduce AQ visibly in a given timeframe, producing quick and tangible output such as a reduction in measurable readings.

Pollution Explorers Tiny Pledges is an air quality improvement project by Umbrellium, funded by Tower Hamlets Mayor's Air Quality Fund.