

Local Government Open Data Breakthrough Projects 2014/15 Evaluation Report

Project title: Air Quality+

Lead organisation: Sheffield City Council in partnership with The Better With Data Society

Date report is submitted: 24 April 2015

Type of project: Data release, usability and engagement

Total grant: £84,950

Summary of the project

Air Quality+ published open data related to the topic of air quality in Sheffield, and delivered a programme of co-design activities to engage people with the data and use it to better understand and tackle the issue of air quality.

Challenge/opportunity:

Through Air Quality+ we used a focus on a particular thematic issue of interest to people in Sheffield as a route to engaging people with open data, rather than taking the data as our starting point. The project provided an opportunity to build on the partnership between Sheffield City Council and with the local open data community, accessed through The Better With Data Society, in order to establish precedents for good data publication and engagement behaviours, and lead to an improved open data ecosystem.

Data published and uses:

- A number of public sector bodies were consulted. This included the South Yorkshire Fire and Rescue Authority; South Yorkshire Passenger Authority, as well as a number of service areas (approx. 30 including Public Health) across Sheffield City Council which formed the Council Working group.
- Information on the number of datasets published; volume of data downloads within period and datasets downloaded most often can be found here data.sheffield.gov.uk/analytics
- Number of users within period: 79
- Type of users: Local open data community via Better With Data; University teaching staff and students; local authority officers; community organisations; campaign groups and activists; artists; individuals with an interest in data, air quality, health, art.

Approach to publishing data

We have established a Socrata data platform – data.sheffield.gov.uk – for publishing data, with responsibility for publishing managed within teams and departments, co-ordinated through an Open Data Working Group chaired by John Curtis.

Within Sheffield City Council, all departments have been trained in how to use Socrata and in what when and how to publish. Key personnel in The Better With Data Society have also been able to access the platform and publish datasets.

The Socrata platform works well for static datasets, but not for dynamic datasets such as the flow of sensor data taken from Sheffield's air quality monitoring stations. This is a

problem experienced nationally, where publication solutions have tended to focus on static data only.

Alongside the Socrata platform, The Better With Data Society developed agents to take the air quality data from Sheffield's air quality monitoring stations and construct a semantic store to convert the local proprietary practice into an easily adopted common standard. This means that users can obtain the data they want in the way they want directly from the datastore, rather than have to download several separate files, merge and post-process and then manipulate the data. More detail about the technical rationale and benefits of this approach are available here:

<http://betterwithdata.co/2015/publishing-air-quality-data-good-data-well-published/>

Socrata's publication workflow directs data publishers through a process of constructing datasets so they are more machine-readable, as well as guiding the publisher to add metadata. Whilst this does mean new publishers can find the initial hurdles to publication quite difficult and frustrating, (datasets can often need significant manipulation before they can be published) it means that those datasets, once accepted, are more likely to be usable. Relevant staff within the authority have been trained in publishing data using Socrata and are working to the implemented publication scheme.

It is worth noting that, with the sort of distributed departmental data publishing approach adopted within Sheffield City Council, the person publishing a dataset may not necessarily see the value in the end-use of the data and so might not be incentivised to publish the data to a high standard with quality metadata. The Socrata platform allows for data users to give feedback on datasets and direct questions to the publisher. We think this will prove to be a helpful feature in connecting publishers and end-users, and lead to improved opportunities for co-design and co-production.

How data users assess the availability and use of data:

We delivered a range of activities and interventions to help connect people with the newly open data, the subject of air quality and its causes and consequences, and to get people to start working together across disciplines and communities. Our main strands of activity were:

- **Art, Data and the Quality of Air:**

We commissioned three artworks that made use of the newly open data measuring pollutant levels taken from monitoring stations around Sheffield. The commissioned artists produced three interesting and inspiring works which were unveiled at our project launch event on 31 January, then exhibited at the Sheffield Institute of Arts from February to April 2015. Each of the works took a different approach to the medium and the aspect of the topic of air quality addressed.

- **Co-design workshops:**

We ran a series of three workshops in January, February and March to bring citizens, businesses and organisations together to create a data-driven ambition for air quality in Sheffield and make smart things happen. Forty-seven people from the local authority, other public sector bodies and contractors, the universities, museums, community organisations, activists, technologists and others worked together, some as data holders, some as data users, to explore the topic of air quality, and related issues such as public health, transport and cycling, to help improve the quality of data being collected and put it to good use.

- **Hack & Play Experimental Series:**

Following on from the co-design workshop series, we followed up with a series of three hack and play evenings where interested people could get hands-on with the data – to hack it, play with it, explore it, and design with it, and use it to make something interesting, informative, insightful or just fun and good for Sheffield. This culminated in a final Show and Tell evening at the April Open Data Sheffield meet-up, where hack evening participants could show the Sheffield open data community what they'd been working on, how far they'd got, and recruit interested people to help them develop their ideas further. From the university students and lecturers, open data enthusiasts and other community members who got involved in the hack series came several interesting developments and prototypes, including:

- An Open Data Kiosk app for presenting and visualising air quality data (and extensible to other forms of data), including the real-time monitoring station data, community diffusion tube nitrogen dioxide monitoring, and industrial permits.
- Using Sheffield air quality data to produce a teaching module for students to learn the interpretation of data and graphs.
- A highlighter tool to improve the ability of beginners to get over the technical barriers to using SPARQL for querying the air quality open data.

- **Maker Day and Display Devices:**

We ran a maker day on 13 March for people to get involved in devising and building Raspberry Pi-based handheld devices for displaying visualisations of the Sheffield air quality data. We were pleased to welcome the Raspberry Pi Foundation and the developer of the Air Pi to the session to share their knowledge and insights. The devices are now available for use by Digital Media Centres, community centres, educational establishments and libraries as a learning tool for understanding more about air quality in their local area, as well as helping them engage with open data and hacking and making.

Benefits and impact

- **Impact to Sheffield City Council:**

Through a council wide working group (open data working group) there has been increased awareness of the value of Open Data. Users across the Council are now empowered to publish datasets they manage in an effective and efficient manner. A number of presentations and reports have raised the profile of open data and how it will support public service reform, as well as local transparency. Going forward Open data will also support three key Information management strands; Freedom of Information; Business Intelligence and Information Sharing. Overall the open data work undertaken in Sheffield is based upon supporting 5 key design principles of Accountability; Choice; Productivity; Quality and Outcomes and Social & Economic Growth. To support the knowledge sharing of the work undertaken at Sheffield, the working group minutes and presentations are available from <https://knowledgehub.local.gov.uk/> (Sheffield Open data Working Group)

- **Impact to data users – the co-design series:**

Seventy-nine people from the local authority, other public sector bodies and contractors, the universities, museums, community organisations, activists, technologists and others worked together through the co-design workshop, maker

day and hack evening series, developing new project ideas, uses for the data, and providing useful feedback to data holders.

- **Impact to the general public:**

Awareness raising through the arts: Our Art, Data and Quality of Air programme was perhaps the most successful way we found of engaging the general public with the project and with open data. The arts launch event was attended by 50 people, with more than 2,000 people visiting the exhibition of the works held at the Sheffield Institute of the Arts from February-April 2015.

- The existing Sheffield AirMap is highly regarded throughout the UK AQ community, being one of the first local authorities to commission such a map. However, the existing map is essentially a static brochure site i.e. data values are hard-coded into XML documents. The AQ+ project has laid the foundation for a dynamically updating air map (AirMap2) which automatically populates itself without intervention from data published in the Socrata repository. This means there is no ongoing cost of updating the air map data, and, perhaps more importantly, citizens can contribute to the ongoing discussion about air quality in the city. The new air map also includes new data such as real-time sensor locations and readings and the locations of industrial process permits.
- Through this project, both Sheffield City Council and Better With Data have established good relationships with Socrata. We plan to continue to work together in order to ensure the technical developments of Air Quality+ are integrated with Socrata and can be rolled out across the network, on order that sensor based open data can be more easily comparable across authorities.

Further information:

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- Sheffield Socrata Data Store: <http://data.sheffield.gov.uk>
- Better With Data Society (for AQ+ project page and blog series):
<http://betterwithdata.co/>
- Sheffield Sparql endpoint: <https://apps.opensheffield.org/sparql>
- Open Data Kiosk: <http://odk.opensheffield.org/#/AirMap2>
- Project Github (for Air Quality Agent):
<https://github.com/BetterWithDataSociety/ShefAirQualityAgent/>
- Sheffield Open Data working group <https://knowledgehub.local.gov.uk/>

Appendix

Details of commissioned artworks

- Air Transformed – Stefanie Posavec and Miriam Quick: two series of wearable objects based on open air quality data from Sheffield that communicate, in different ways, the physical burden of air pollution on the human body. Seeing Air comprises three pairs of glasses where pollutant levels are communicated by patterns etched on to the lenses, and Touching Air comprises three necklaces representing data on large particulate (PM10) levels.
- Anatomy of Human Breath – Kasia Molga and Adrian Godwin: An interactive installation where participants breathe into a tube in order to produce a visualisation of the gas composition of their exhaled breath on one screen, which is juxtaposed with a visualisation of the real time Sheffield air quality data.
- Exhausted Sound – Kingsley Ash: A musical score produced from the pollutant data is coupled with video feeds from Sheffield's traffic cameras. In the live version of this work, the score is performed by musicians, while audience members are invited to pedal a stationary bicycle, their pedalling rate controlling the tempo of the music.

Details of co-design workshop content

- Workshop 1: Participants explored data they own or have access to, and outlined wish-list data that they'd like to be able to access, thinking about data that measures air pollution as well as wider factors that contribute to the quality of air, and the consequences of changes to our air quality. With a common grounding in the Air Quality+ data landscape, participants formed teams to start defining key practical challenges to improving air quality in Sheffield. By starting to express stories and ambitions for the city's air quality narrative, they began to identify practical actions, and potential impacts for the city, that could be driven and supported through better use of open data.
- Workshop 2: In the second session, we turned our attention to understanding the Air Quality+ datascape and how we might use combinations of datasets to drive ideas for products and services, policy and campaign initiatives, public engagement and behaviour change activities. In the afternoon session, we broke into teams to play the AQ+ Data Insights game, putting together cards featuring datasets in different combinations to stimulate our thinking towards new connections, new projects and new possibilities for actions that address air quality and related issues in Sheffield.
- Workshop 3: Building on the work done in co-design workshops 1 and 2, in this session we laid the groundwork for the forthcoming Air Quality+ hack evenings and challenge series, by exploring the ways open data initiatives could be developed to influence policy, effect positive behaviour change, create new products and services, and present data in new and interesting ways. We went on to explore personas for potential users of air quality related open data projects.