SENSAIR

A Tangible Tool Through A Data-enabled Approach to Improve People's Perception of Indoor Air Quality

Ward Jonathan Leenders
Eindhoven University of Technology
Eindhoven, The Netherlands
w.j.leenders@student.tue.nl

Huizhong Ye
Eindhoven University of Technology
Eindhoven, The Netherlands
h.ye@student.tue.nl

Jing Li
Eindhoven University of Technology
Eindhoven, The Netherlands
j.li1@student.tue.nl

ABSTRACT

Good air quality is essential for long term health. And as stated by the World Health Organisation, even seemingly imperceptible levels of air pollution can cause premature death[1]. In this project we noticed that the air quality (AQ) perception doesn't always align with the actual AQ. Various air quality sensors were used to gain insight in the users day to day experience, related to air quality. Based on the first findings a concept direction was formed. During this project, data tracking probes were used in combination with a diary, and insights were gained by means of interviews. This process resulted in a concept that measures in-door Dust and Gas concentration and visualizes it subtly, enabling the user to actively influence the indoor air quality (IAQ) in a positive way.

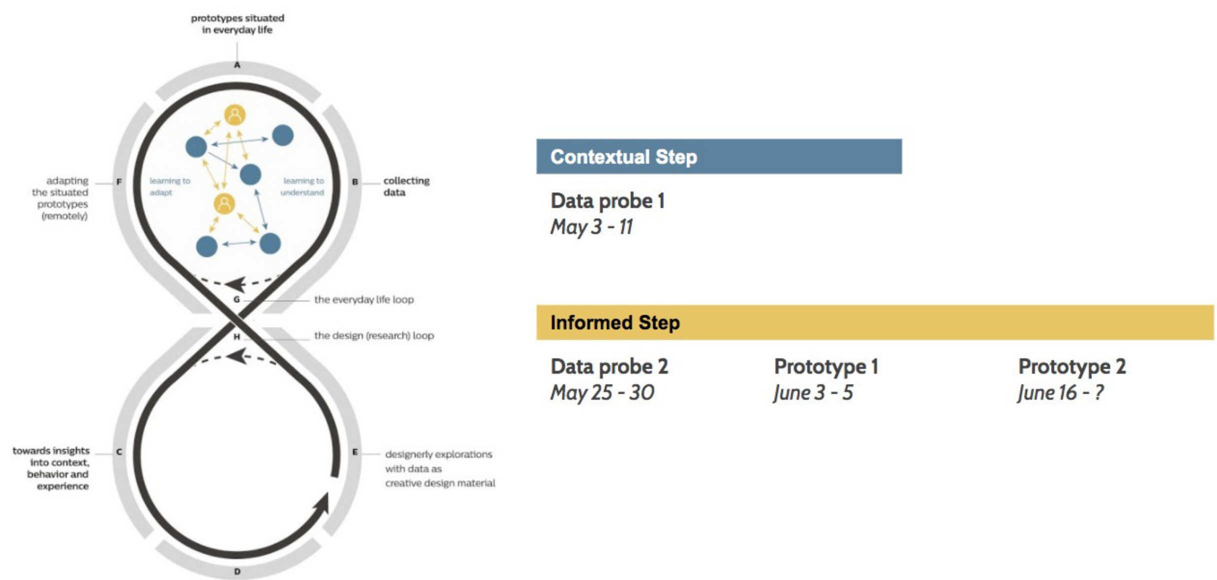

Figure 1. The Data-Enabled Design process, as it was followed during this project.

INTRODUCTION

The perception of indoor air quality (IAQ) can differ between people and cultures. It has been shown for example that pollution percepion is varies between people of different age, sex, respitory problems and knowledge of air quality. [2] However, a study also shows that the public perception of air quality is not a reliable indicator of actual air quality [3].

Especially during the time of a global pandemic we should be conscious of the air we breathe, to ensure the safety for everyone. Since more people are spending the most of their time at home, IAQ becomes significantly more important. Therefore, in this project we aim to increase the awareness of peoples of the air quality in their homes. In this project we focus on the IAQ of fellow students, currently living in their shared student homes. Firstly, we needed to find out in what way the common perception of air quality seems to be limited. We approached this by trying to understand the relation between the perceived air quality and the actual air quality. This understanding laid the foundation for a design that can inform and instruct people about matters related to air quality.

We used the Data-Enabled Design approach, which has an emphasis on using data as creative input. The method consisted of two main parts; The Contextual Step and the Informed Step (as seen in Figure 1). In practice, this approach data was gathered before the project scope was defined. Data, in combination with a diary and interviews, was used to gain an in-depth

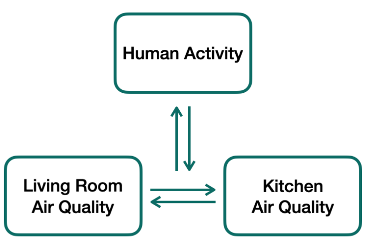

Figure 2.

understanding of the participants situation (Contextual Step). Based on this, a second probe was created which was the basis for our first and second prototype.

Through Data probes (figure 3), diaries (figure 9) and interviews (figure 21), we found that the perception of air quality is quite low. More specifically, while Humidity and Temperature seems to be easily observable, Dust- and Gas concentration are not. When we compare the latter two, we find that Dust concentration is the main indicator of general AQ and Gas concentration barely noticeable. These were the main findings that resulted in a concept focused on the visualization of the IAQ. The final design, SENSAIR, visualizes sudden differences of Dust- and Gas concentration in the air, in a natural and interactive way. With this design we aim to provide an effective and unobtrusive unobtrusive feedback in the users everyday life. The design has been shown to increase the general awareness of IOQ, but still has limitations in detecting the quality of the air properly. Lastly there are limitations to the current user experience, suggestions are mentioned in the discussion about future improvements.

CONTEXTUAL STEP

Before starting to design an intelligent product to improve the IAQ, we collect data to gain a detailed and nuanced understanding of the user and the context the design is situated in [4]. Starting from the everyday life loop of the 8-shaped model, we deployed several devices that are referred to as data probes to collect data of IAQ. We designed a diary for the participants as a self-reporting method to acquire qualitative data during the deployment. After analyzing the IAQ data together with the diary in a visualized way, we conduct semi-structured interviews with the participants for more insights.

Data probe I

Overview

In data probe I, we used data as material to explore the relation of IAQ in different rooms and human activity, see Figure 2. This section explains why we looked into these three elements and how we collected data.

The IAQ varies in different areas of the house. In order to specify the design context into a relatively small area, we focused on how the air quality in different areas different from and relate to each other. Kitchens are common rooms with the specific intended use, and the harmful chemical compounds which occur in the air of kitchens might migrate to more frequently used areas like living rooms[5]. This is why we have chosen the kitchen and the living room as locations to deploy our data probe I, see Figure 2.

There are no clear and precise law regulations on the quality of indoor air in residential areas because the chemical compounds are too complex [5]. To get an overview of the IAQ, we collected data on various parameters. Indoor air pollution is mainly caused by burning solid fuel sources for cooking and heating [6], which could produce many flammable gases and particles in the room. Therefore we used an optical particle sensor (PPD42NS) to detect dust concentration, and a MQ2 sensor to collect data of gas concentration (including CO, alcohol, CH_4, Propane LPG, Butane, and H_2, they could be summarized as flammable gases). Moreover, we used a DHT11 sensor to get current temperature and humidity, since they can affect the IAQ measurement [5]. All the data was collected through an ESP 32, and was uploaded to the OOCSI server. We downloaded the data from Data Foundry which received data from OOCSI, and visualized it with software called Tableau.

To get to know more about the user, we explored the humanistic factor in IAQ, and how the IAQ influenced the participant. Since we didn't want the participants to feel that they are being monitored, we adopted a PIR Motion sensor (HC-SR501), getting very ambiguous data of the human activity. The data only tells if there is a human nearby. And the participants filled out their activities in a self-reporting way, with the perception of IAQ in the diary (see Appendix 1).

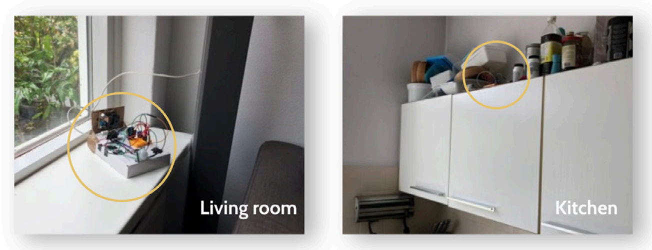

Figure 3. The two sets of data probe I in the living room (left) and the kitchen (right)

Findings

The air quality in the kitchen and living room were strongly connected. The visualization of air quality showed similar trends in all the four parameters between the two areas, see figure 4. It is because the two areas are connected directly in the participant's home, so the participant has no chance to separate the air quality between them. Considering that most Dutch families have an open kitchen, we wanted to narrow down the context into a specific room instead of open space in the next step.

different resistors unintentionally)

IAQ changes are mainly caused by human activity. Through continuous data and diary observation for 7 days, we noticed that around 8 pm, there is always a peak in the dust concentration in the living room (see Figure 5) due to gathering activities with all roommates. And the cooking activity with different equipment can have different impacts on IAQ (see Figure 6). When the participant opened the door from the kitchen to the outdoor environment, the dust concentration in the kitchen decreased (see Figure 7).

The participant didn't perceive the air quality, especially the dust and gas concentration. Even though the flammable gases and dust concentrations were influenced by human activity largely, the most perceived parameters are temperature and humidity. "I don't really think my activity is influenced by the air quality." said the participant during the interview. Without any perception of indoor air pollution that is revealed by dust and gas concentration, there could be a risk of health problems.

Figure 4. The visualization for comparing air quality in the kitchen (green), and the living room (red). They have similar trends. (note that the difference in MQ2 data is because we used different resistors unintentionally)

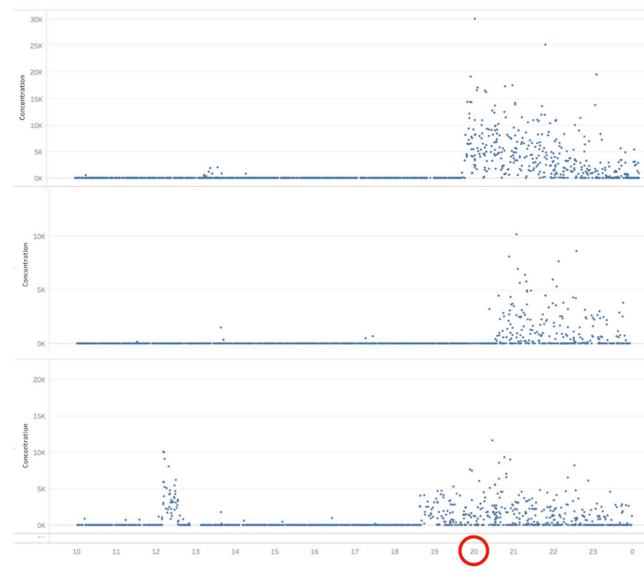

Figure 5. Dust concentration in the living room, on May 3 (down), May 6 (middle), and May 7 (up).

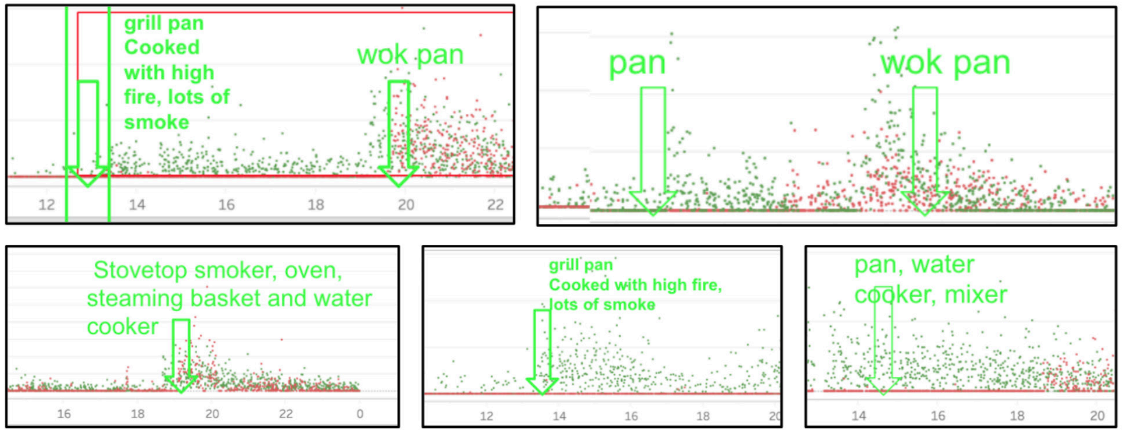

Figure 6. Dust concentration in the kitchen (green) was influenced differently by the different cookers.

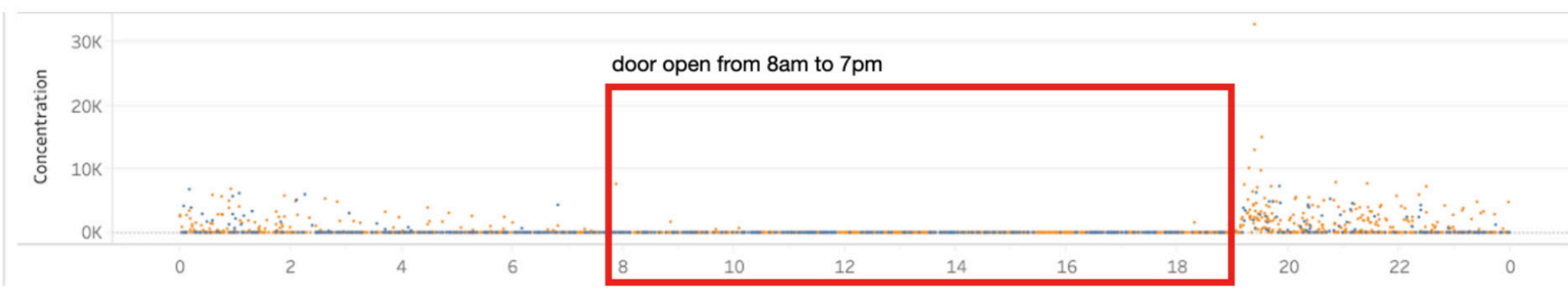

Figure 7. Opening the door to the outside environment decreased the dust concentration.

Data probe II

Overview

According to the findings of Data Probe I, we concluded that humans can improve the IAQ through activities, but this process was not performed because users lacked perception of changes in IAQ. Here come three keywords: human activity, IAQ, and perceived indoor air quality (PIAQ), and we use data probe II to explore the relations between them, see Figure 9.

In probe II, we used the optical particle sensor and the MQ2 sensor since dust and gas concentrations were enough for revealing the IAQ. And the probe was placed at the second participant's study desk, in the center of the room.

To understand the participants' activity and their perceived the IAQ, we asked the second participant to map the perceived IAQ and her daily activities together in diary 2 (see Figure 9 for an example, and Appendix 2 for the full version). We divided the perception of IAQ as five levels which were not corresponding to the real level of IAQ. It was used to observe the changes in perception and compare the fluctuation trend with the real changes in the data from the sensors. The diary was operated on Miro, an online workspace so that we can get the information immediately. The black line in the middle indicates the participant's perception of IAQ, and she dragged the scale vertically to map. The blue box on the top was used to fill in the activity. She can add a post-it to provide more information that may matter. To get a continuous and thorough understanding, we asked her to fill in the diary every hour.

Findings

It was hard for the participant to perceive IAQ, especially gas concentration. After visualizing the PIAQ and the IAQ together, we found that the perception of air quality is very unclear. Most of the time the participant perceived the air quality at a normal range despite the fact that the air quality changed a lot. Sometimes the perception changes were similar to changes in dust concentration, see Figure 10. However, based on our observations there was no clear perception of flammable gas concentration.

Deploying a physical data probe and keeping the diary increased awareness of IAQ. The participant felt that she was reminded by the working probe and diary every hour to reflect on the IAQ intentionally. She said, "I realized the probe is ongoing and I do think I started paying more attention to sensing the air quality of my room for reflecting indoor air quality on dairy".

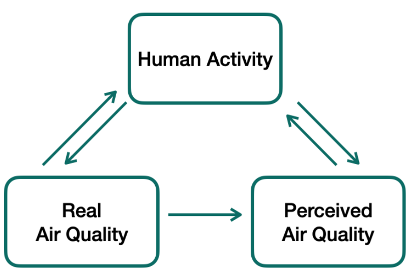

Figure 8.

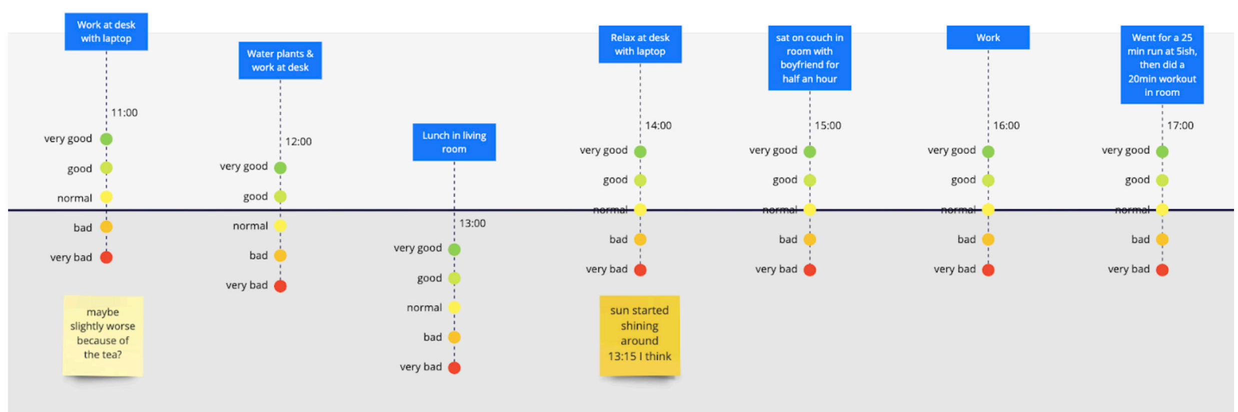

Figure 9. A piece of diary 2.

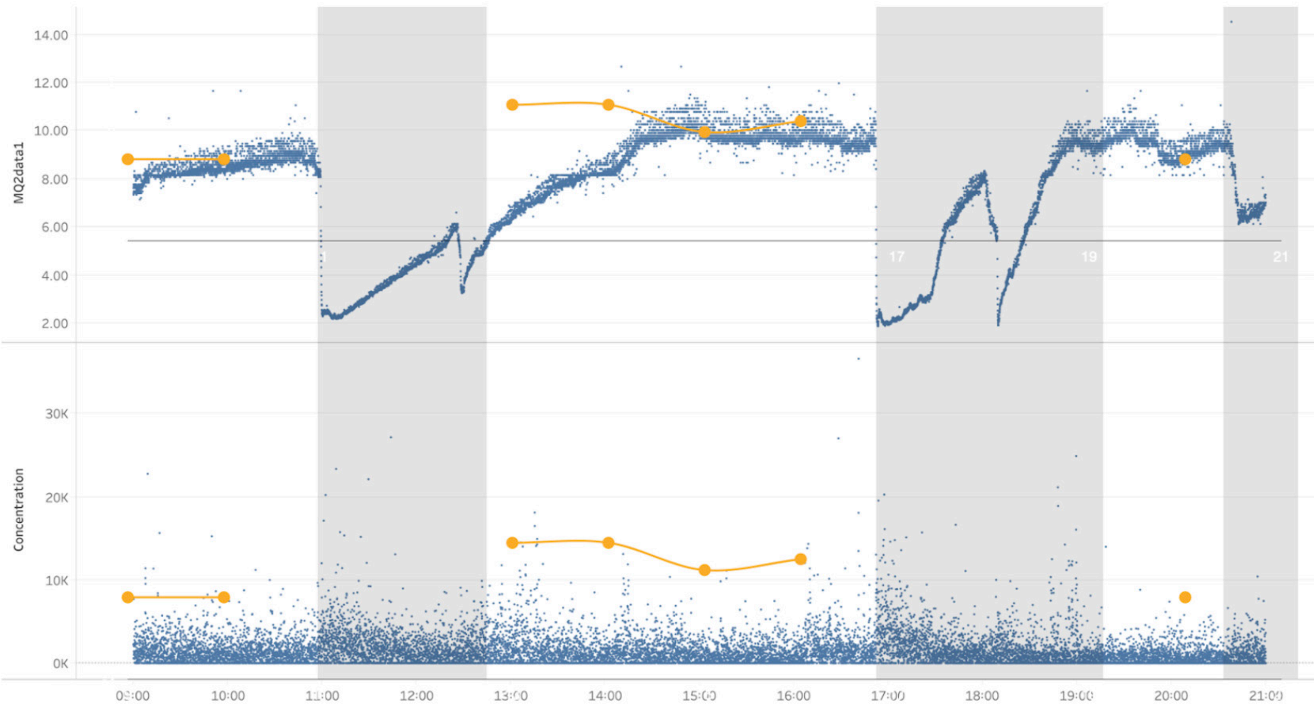

Figure 10. The PIAQ (orange dots), gas concentration (up), and dust concentration (down). The grey block shows the time period that the participant was not in the room.

Conclusion of Contextual Step

In the contextual step, we used two iterations of data probes and diaries to explore the design context, mainly focused on discovering the relation between IAQ and human perception of the air quality.

Based on this we concluded three insights:

People's PIAQ needs to be increased as it is generally weak.

Dust and gas concentration can be affected by human activity, but people are unable to perceive these parameters well.

A physical and interactive representation of the IAQ can help increase people's awareness.

Based on these insights, our goal was to design for empowering people to improve the IAQ by improving the awareness of air quality changes.

INFORMED STEP

Design process

From our findings in the contextual step, we noticed the participants had little sense of IAQ except the temperature and humidity. The participants had limited information about the IAQ at their home except for temperature and humidity, thus the participants had a lack of perception of the IAQ even though they knew the research probe was ongoing. Overall, the relationship map had been built to explain the interpreted data as well as the design opportunity as Figure 11. The ecosystem of humans with Air Quality lost balance since the weak relations. In the next step, a design should be applied to enhance the relations between Human Perception of Air Quality with Human activities and IAQ.

In order to involve the participant in further research, we aimed to design an informed prototype which is used for improving the user's awareness of IAQ from a user-experience oriented perspective[4]. We had a brainstorm on informing the users of the real-time data of IAQ by the means of a Graphic user interface (GUI), Voice user interface (VUI), and Tangible user interface (TUI), as is visible in Figure 12. Several concepts were developed to communicate with users and exchange information, and hereby improving the awareness of the IAQ.

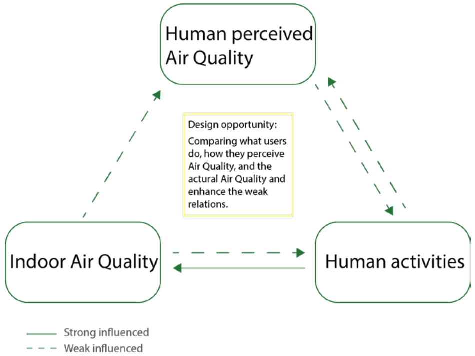

Figure 11. The relation map and design opportunity.

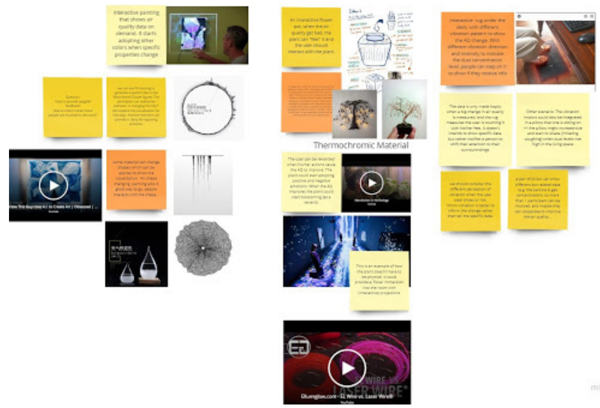

Figure 12. Prototype brainstorm via the platform Miro[7]

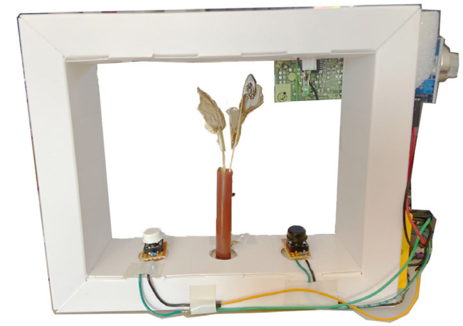

Figure 13. The plant frame.

Iteration I: the plant frame

Overview

In order to improve people's perception of IAQ and In order to improve people's perception of IAQ and see if people's actions are influenced when they notice the decrease of IAQ, we developed a plant frame as a prototype that informs people when IAQ is stated "Bad". The threshold between "Good" and "Bad" air quality is the average data of probe II. The reason why we used the average as the threshold is to inform users of the changes of their IAQ, instead of the real level of IAQ. This was explained to the participant before setting up the prototype at the home. The participant had the option to interact with the plant frame, hereby providing the prototype with feedback.

As Figure 13 shows, the plant frame is embedded with MQ2 and Dust sensors for monitoring the air. It is built with buttons, green and red light, and the vibration motor underneath the plant.

Figure 14 shows the interaction flow. When it detects "Bad" air quality, the red light turns on and the vibration starts to shake the plant. In this way, it can inform the participant. Once the participant receives the information, he/she can press the white button on the left side to turn off the vibration. At the same time, the system confirms that the participant receives the information. When there is no one close by, the vibration turns off after keeping vibrating for 10 seconds but the red light will still remain until the air quality becomes better. After the participant receives the "bad" air as feedback from the system, when the participant does anything with intentions to improve the current IAQ, he/she can press the black button to tell the system that an action has been conducted. When the IAQ goes above the threshold, the green light stays on, otherwise, the light stays red.

The plant frame has been used at the participant's room for a week, see Figure 15. Besides interacting with the plant frame, the dairy we designed for data probe II needs to be filled by the participant at this stage to record his/ her PIAQ at any moment. To compare the participant's perception with real air quality data coming out from sensors, we can study the changes and accuracy of his/ her perception. Its result would be contrasted with the result of the accuracy of perception from the data probe II, for analyzing what changes happen after applying our prototype.

Findings

The participant interpreted notifications as a reflection point. In the data visualization, see Figure 16, we can notice that when the dust and gas concentration levels were over the threshold, the participant did reflect on dairy at almost all same time series after getting the "Bad" IAQ notification form the plant frame. Even sometimes the participant didn't feel the decrease in IAQ, she still used notifications as a reflection point.

The prototype being present stimulates awareness of Air Quality. From Figure 16, we can also see the results of dairy are close to the detected IAQ from sensors that both of them have no big fluctuation at this time slot. In the interview, the participant said "I felt I was aware of IAQ more frequently than before using the plant frame. And sometimes I was aware the IAQ is indeed not good after I was informed by the plant frame. This evidence shows the participant's awareness of IAQ has been stimulated and became more accurate after using the plant frame.

The participant is interested in feedback about AQ, yet

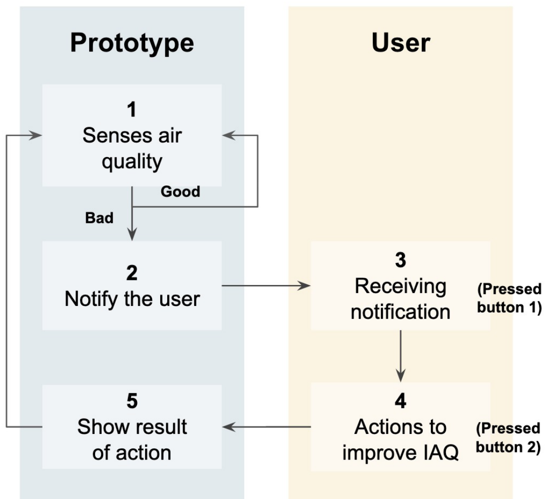

Figure 14. The interaction flow of the plant frame

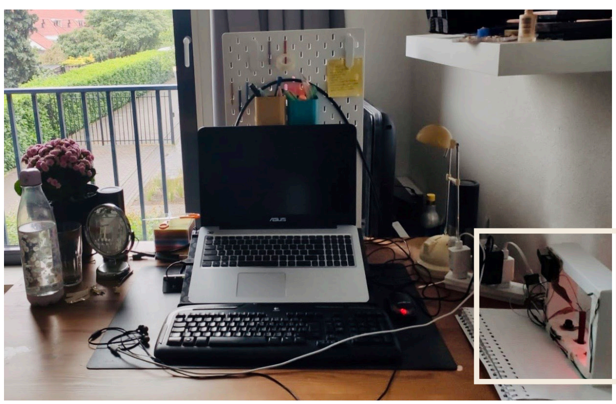

Figure 15. Placement of the plant frame on the participant's study desk.

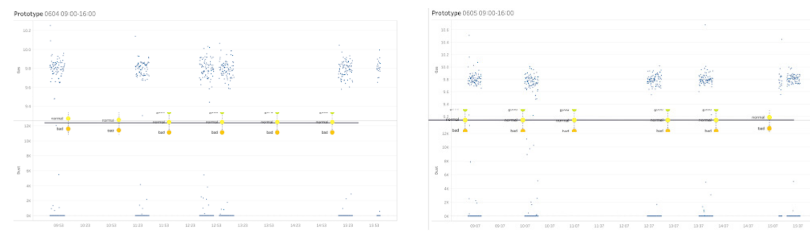

Figure 16. Several time-series data visualizations on gas concentration (up), dust concentration (down), and PIAQ (middle).

in an unobtrusive manner. Through the interview with the participant, we knew that the participant expected to be informed by the plant frame and she was being curious about IAQ during the experience. But the participant thought the vibration sometimes is quite invasive.

The high frequency of notifications reduces the user experience of the plant frame. Once the concentration was higher than average, the notification was sent out. From the reflection of the participant on the plant frame, the notification was too frequent and the participant couldn't sense the small increase of dust and gas concentration, which indicates the threshold is too low

Pressing the buttons was not interactive enough for empowering the participant to take action. The participants realized IAQ was not good after she received the notification from the plant frame, but she wasn't motivated to take action to improve IAQ for most times. The interaction of pressing a button to tell the system the conducted action for her wasn't meaningful nor encouraging.

Iteration II: SENSAIR

Overview

From the findings of the first iteration, we noticed that user experience influences whether the prototype can achieve the goal of improving the user's perception of IAQ. Therefore, in the second interaction, we focus on how to improve the user experience based on the previous results.

We proposed SENSAIR, see Figure 17, as the second iteration of our informed step. The working principles of SENSAIR stay the same as in the first iteration. When people receive the notification from the prototype, they can touch the light conductive fibers to stop the vibration, after that, when they do any action with intentions to change theIAQ, they touch the fiber again. The second touch will trigger a rainbow light for 10 seconds, in this way, it can encourage users to do an action and give feedback to the system. The second touch is interpreted by the system that users are active with improving IAQ. In the coming 15 minutes, the system will keep monitoring the IAQ and informing users only by the light without vibration. The working process is shown in Figure 18, and the scenario is described in a video (a link here).

Besides the interaction being changed from pressing to touching to be more natural, there are two other improvements of notification. One of the main improvements is adding a motion sensor to provide the system the information of the user's location in order to have different modes, which are motivating mode and silence mode. The modes work depending on if the motion sensor detects people or not. When there are people close to the notification for "Bad" IAQ will be more active, it informs users by lights and vibration at the same time to have people's attention. When there are no people close to the prototype, it will inform in a silent way, by indicating IAQ by a light strap (Red is

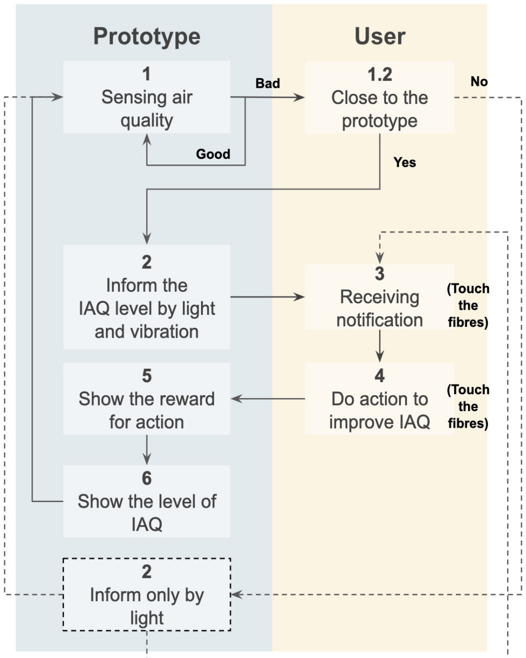

Figure 18. The interaction flow of SENSAIR

Figure 19. The placement of SENSAIR and data probe II at the participant's room.

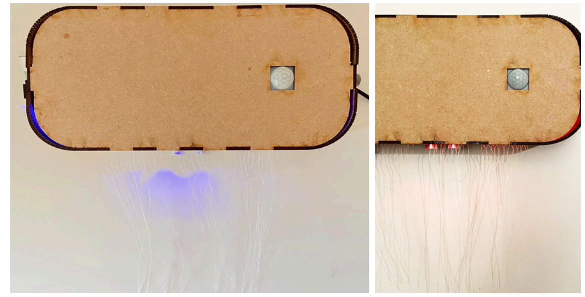

Figure 17. SENSAIR hanging on the wall

"Bad", Blue is "Good"). The second main improvement is that we set three different levels to indicate how "Bad" the current IAQ is to the system, and inform users by the different intensity of vibration. The worse IAQ is, the stronger the fibers' vibration is. In this way, it aims to provide users with clear information about the fluctuation of IAQ.

Method

SENSAIR has been deployed in the participant's home for one day, see Figure 19. We also deployed a data probe II with SENSAIR to collect dust and gas concentration data. The participant was asked to keep a diary as was conducted in the first iteration as well as data probe II.

To prepare for the final interview, the participant was asked to consider the prototype according to the User Experience Questionnaire (UEQ) [8]. After filling in the questionnaire, the results were discussed accordingly. The questionnaire consists of pairs of contrasting attributes that may apply to the product, as is visible on Figure 20. A likert scale was used to represent gradations between the opposites of the attributes. During the interview the most significant attributes were discussed, resulting in gaining insight in how the prototype is experienced.

Next to the questionnaire about the general experience, specific sensor data in combination with the diary was discussed (an overview is visible on Figure 21).

Findings

Firstly, SENSAIR was quite predictable due to the ease of getting to know how the device would respond to specific situations. With high temperature and high levels of humidity high the windows were typically open. This resulted in the device reacting similarly to situations multiple times. For instance, SENSAIR notified the user about bad air quality typically around the same time every sunny day. The participant said: "In the mornings the prototype usually works fine, but when it is warm outside it seems to start buzzing out of nowhere, every time."

Secondly, SENSAIR was experienced as slow. First of all due to the bugging feedback mechanism, communicating to the device that you have tried to improve IAQ was therefore extra obtrusive. The participant stated that she "needed to ".This made SENSAIR rather obstructive as opposed to supportive. Because the notifications could not be ignored and not easily be put off, it disturbed the participant in her daily activities. After some time, interacting with the prototype became impractical and demotivating. This is especially the case when a part of the time the prototype rewards your actions, and another part of the time doesn't recognize your effort.

The prototype was, however, easy to understand. The notifications were understood intuitively by the color of the lights, and the lights were visible enough without being obtrusive. Especially on colder days, when the

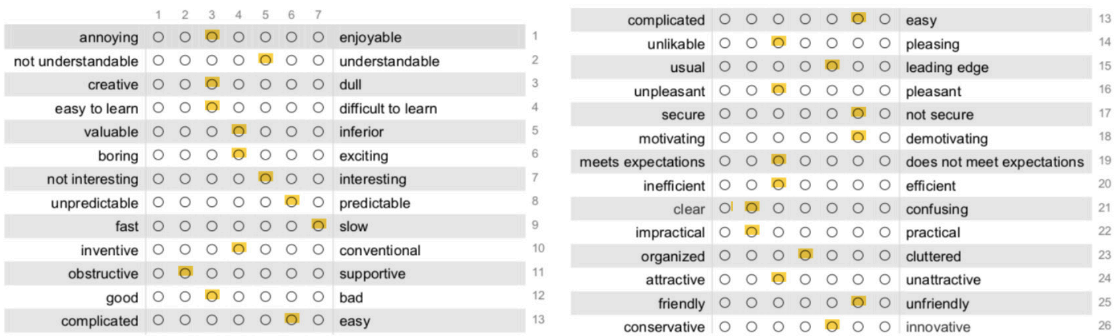

Figure 20. User Experience Questionnaire (UEQ) results from our participant. UEQ was retrieved from https://www.ueq-online.org/.

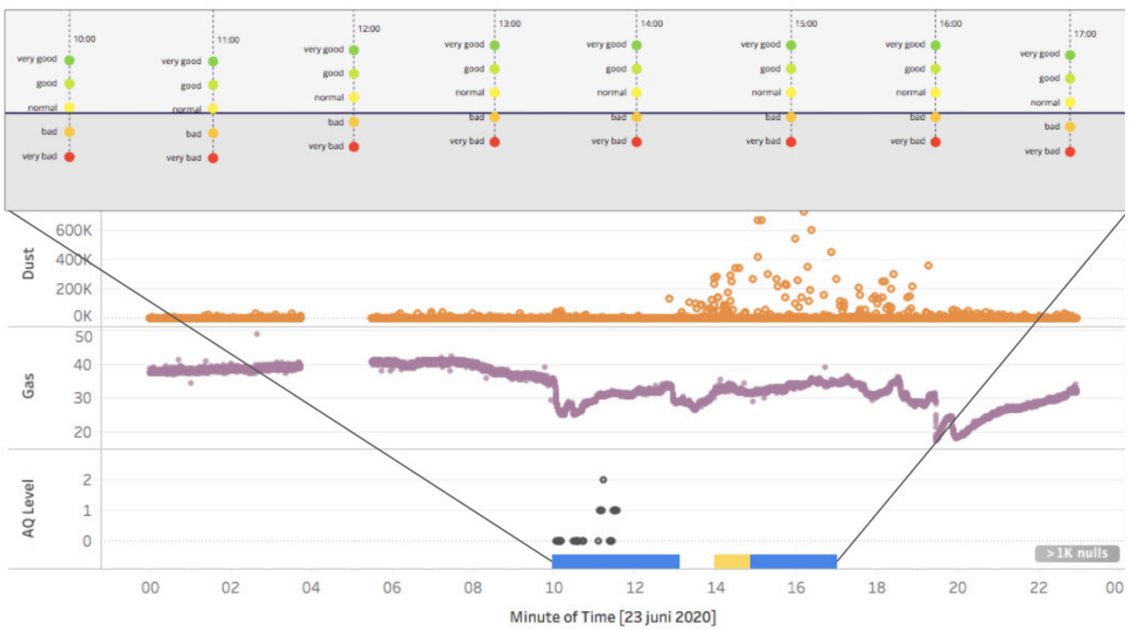

Figure 21. Overview of IAQ, PIAQ and activities to support the interview. Dust concentration, Gas concentration and The blue and yellow bars are indicating different activities.

notifications about IAQ seemed to be more accurate, the device was much appreciated by the participant. The participant stated that the potential is there, and it is an innovative idea, yet it needs a lot of improvement in terms of user experience. The biggest difference between the previous plant frame (see Figure 13), was the improvement of visual feedback and using the vibration more subtly.

Conclusion of Informed Step

From the evaluation, we can conclude that the From the evaluation, we can conclude that the design is currently not user friendly enough. The user experience could be improved by making the prototype more responsive. We suggest multiple ways to do this. Using glowing fibers as a 'passive' feedback mechanism worked, and could therefore be utilized more. Providing feedback about IAQ in a clear and visual way has the advantage that it is rarely obtrusive. Ideally, there should be one notification sound when the device wants your attention, and let the information IAQ be visualized with light. Once the user is notified a, currently unavoidable, interaction moment becomes hereby unnecessary. Now, in an unforced way, the user is free to perform actions resulting in better IAQ without being disturbed. Lastly, the design should be able to quickly recognize performed changes with regard to IAQ, and reward the user for their effort.

DISCUSSION

SENSAIR improved the awareness of IAQ, yet only at specific times and the accuracy was unstable.

The key factor that influenced this was the outdoor environment. When the weather is warm and high in humidity windows tend to be open all day. This possibly influenced the air flow and, because of this, increased the amount of rising/additional particles (pollen) inside of the house. Regardless of the cause of this, the only time that the prototype proved to be useful was during a time it was colder outside. We therefore suggest a simple integration of a comparison of the outdoor environment with indoor climate, and adjust the sensor (sensitivity) settings in such a way that the right feedback is given.

Furthermore, the working prototype has only been tested for one day. Due to the limited testing time we were unable to see designs impact in multiple situations like different indoor climates, the interaction with multiple people, or a longer-term effect of constant IAQ feedback.

Air quality is more than dust and gas concentration, so more parameters can be included in future work.

It can be debated whether choosing for merely dust and gas sensors is the right decision. From the diary and interviews resulted insights on the participants underlying reasoning behind their PIAQ. In multiple cases high temperatures and humidity levels influenced the PIAQ (as was concluded from one of the interviews). Adding temperature and humidity as input for feedback may not be needed to help users notice these specific parameters, but including them may improve the users value towards the provided information.

Moreover, other causes of indoor air pollution such as carbon dioxide, water vapor, tropospheric ozone, radon, or nitrogen oxides [9], were excluded in our process. Since the air pollution is not only occured by human activity, but also by the constructing materials, there could be more parameters that are worthy to be monitored.

The user experience is very important in the data-enabled design process.

As the user-experience oriented perspective on designing intelligent ecosystems is introduced by Janne van Kollenburg [4], we found the user experience influenced the PIAQ as well as the whole process of this project. In diary I, the participant found it hard to recall the activities when he filled in the diary three times a day. And the form of the diary I was annoyed with so many questions to answer. So we suggested diary II as a more interactive form with better user experience.

To improve user experience in the future, SENSAIR could be integrated into the home environment better. The light conductive fibers can be replaced by the plant as in Figure 22. Plants naturally have the function of purifying the air, and therefore it has a good intention as a product which is used for IAQ

Considering the future of intelligent ecosystems, we also argue that a personalized threshold needs to be designed. The main function of SENSAIR is the communication of changes of IAQ, however, now we only set the threshold with one participant based on the data we got in data probe II. In the future, we want to use machine learning to personalize the thresholds to provide a more intelligent product and better user experience.

Our processes can be described as an initial iteration on an intelligent ecosystem.

Currently we have completed a loop of the 8-shaped model, and there should be more loops in the future to build an intelligent ecosystem. In the process we deployed a stand-alone product (the plant frame), and tried to explore one-to-one connected product (the SENSAIR and data probe 2). In the future the concept of SENSAIR can be extended to an intelligent ecosystem where multiple products and services are connected with each other. For example the action feedback of opening a window can be detected by an intelligent window. So we believe that SENSAIR has the potential to be adopted in future design and research in the field of IOT.

CONCLUSION

In this report we describe our process through the Data Enabled Design method, through which we address the perception towards IAQ and propose a design to increase the awareness of the IAQ. The Contextual and an Informed phase allowed the team to go through multiple iterations , gaining insights into people's perceived Air Quality along the way. This resulted in a concept called SENSAIR, that aims to enhance the awareness of the IAQ and with this allows to perform actions that affect IAQ positively. The design measures Gas- and Dust Concentration, because of man's inability to accurately observe these by itself. The state of the IAQ is visualized in an unobtrusive way by means of glowing fibres and vibration motors that make them shake. The final design is meant to be integrated into the home environment, and is therefore visualized in an aesthetically pleasing way (Figure 22). The final evaluation shows promising results regarding the improvement in perception of the IAQ. While one of the participants stated that it is an innovative concept, there are still multiple issues regarding the general User Experience. Ideally, the experience is designed to be blended into daily life in an inconspicuous way. Allowing users to judge themselves when action towards better IAQ is necessary, and avoid the generation of negative positions towards the feedback over time.

Figure 22. Illustration of the prototype with plants included.

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APPENDIX 1

	MORNING	AFTERNOON	EVENING
0) Please note the time of filling in this form.	[11:30]	[16:00]	[24:00]
1) How are you experiencing the <u>air quality</u> in a) the living room and in b) the kitchen? 1 2 3 4 5 6 7 Very bad Neutral Very good	**a) In the living room** 1 2 3 **4** 5 6 7 **b) In the kitchen** 1 2 3 **4** 5 6 7	**a) In the living room** 1 2 3 **4** 5 6 7 **b) In the kitchen** 1 2 3 **4** 5 6 7	**a) In the living room** 1 2 3 **4** 5 6 7 **b) In the kitchen** 1 2 3 **4** 5 6 7
2) How energized were you during this day? 1 2 3 4 5 6 7 Low energy Neutral High energy	1 2 3 **4** 5 6 7	1 2 3 **4** 5 6 7	1 2 **3** 4 5 6 7
3) Did you one of the residents make use of the kitchen today?	[ ] No. [x] Yes, the tools I used were…. Water cooker	[ ] No. [x] Yes, the tools I used were… Stove, mixer	[] No. [x] Yes, the tools I used were… teapot
4) Did you open the windows in a) the living room and in b) the kitchen?	**a) In the living room** [x] No. [ ] Yes, from [:] to [:]. **b) In the kitchen** [x] No. [ ] Yes, from [:] to [:].	**a) In the living room** [x] No. [ ] Yes, from [:] to [:] **b) In the kitchen** [] No. [x] Yes, from [15:00] to]	**a) In the living room** [x] No. [ ] Yes, from [:] to [:]. **b) In the kitchen** [x] No. [ ] Yes, from [:] to [:].
5) What types of activities did you do?	[ ] Work [ ] Sport	[ ] Work [ ] Sport	[ ] Work [ ] Sport

APPENDIX 2


Date: Day1(second iteration) 03/06/2020
1) Note your activities
2) Note the how you perceive the air quality


Date: Day2(second iteration) 04/06/2020
1) Note your activities
2) Note the how you perceive the air quality