Personal Course Reflection

Jochem Verstegen

During this course, I have come to see data-enabled design (DED) as a design process with an emphasis placed on collecting data to feed into the design. First, it is about exploring the context, which means designing something to collect data about the context you want to design for. Then, it is about using the data to design something and collecting more data about how it is received and how to improve the design. Ideally, with enough time available, the design is iterated on many times, repeatedly collecting data about how it operates in the context and using this data to improve the design further. At first sight, this process benefits from quickly occurring small iterations, but it also requires a well-considered way of analysing data, which can also be iterated on.

The project

With my group, I worked on the topic of sustainability, using DED to design something to use the dishwasher at a more sustainable time. After deciding on our subject and buying the electronics needed to measure electricity, I worked on programming the probe and preparing it for implementation. This included making it accurately measure the electricity, processing this data to tell whether the dishwasher is running, and sending this data to Data Foundry. I also envisioned the need for over-the-air (OTA) updates, so I implemented this as well. This was useful since the code required different optimisations for every dishwasher. Looking back, the need for OTA updates can be avoided by not processing the data on-device before sending it to Data Foundry but instead processing the raw data in a script on Data Foundry. However, I prefer having the option to update the probe remotely, especially if the user interacts with it in any way, as I think this provides greater flexibility and more options when deployed in the context. I remotely updated the probes seven times for our first participant and four times for our second participant. It would be cool to have this functionality in Data Foundry; I used OTAdrive.com instead.

I learned halfway through the project that we might not have chosen the ideal topic for a DED process. This mostly concerns the data we collect for it, the dishwasher usage being fairly low-frequency. A dishwasher runs at most once per day, or in the case of our first participant, usually once in three days. This makes it a slow process to wait for enough data to be used, causing the whole process to happen slower than ideal. Because of this, we only went through the loop two times instead of the three I initially aimed for. This topic would be better suited for DED when extending it to multiple high-power appliances. However, that would require more electronics as each appliance would need its own energy meter, which was not feasible for us. Based on this, I think not all data is suitable to use in a data-enabled design process, and the next time I use it, I will know to look for data sources with a high enough frequency to enable an actual fast-paced process. I think this is a valuable lesson.

The future

Data-enabled design started and is most commonly used in a healthcare context. However, I am interested in designing for the smart home, and I certainly think there is a place for DED in this context as well. In a way, our topic of dishwasher usage already touches on the subject of smart homes. Upon first thought, I already see opportunities to use DED to improve interactions with the smart home or design innovative and useful automations. In both of these topics, self-reporting could be used to measure the experience with the smart home, while the usage data can also be stored due to the smart home being internet-connected. I am sure other topics could also be defined to design better and more meaningful experiences in the smart home, and it is certainly something I would like to explore further.

I also think elements of data-enabled design could be borrowed and used in other design processes. For instance, after a more mundane design process, the design can be implemented in a context where it collects and stores data, which can be used to conduct data-enabled interviews. This would turn it more into a design validation method. I'm sure there are other ways certain DED elements can be used in another process, which is interesting to explore further.

The principles

The DED principles feel like guidelines intended to maintain a strong and ethical DED process. Designing with stories and anecdotes emphasises the qualitative data from the context, which DED is all about. During the project, this meant searching for and caring about both our participants' thoughts and opinions. This aligns with treating qualitative and quantitative data equally, where we used qualitative data to explain the quantitative data and favoured deep contextual data over big data by only having two participants. Visualising data in an understandable way is also important to keep participants engaged. We should be sensitive to the data we receive and shift perspectives when we struggle to understand it. Without shifting perspectives, we would not have realised the importance of convenience when using the dishwasher.

When it comes to using data as material, staying in contact with the context we design for is important to ensure we gather the right data at the right time. Designing with the data we gather in real-time is also a main focus point of DED, although data shouldn't be the only reason for decisions made in a creative design process. To make data collection easier and safer, tools used for data collection should be modular and reusable. We used microcontrollers and sensors and ensured they were perfectly safe before implementing them. Automation makes it possible to scale up the data collection; we used automation during data collection but could have used it more for the analysis. The notebook I made to analyse the data downloaded the most recent data directly from Data Foundry, but it was too difficult to make sure it plotted the data per week. It also took manual effort to add the recommended timeslots to the visualisation, so I know to further extend the automating efforts to the data analysis next time.

In DED, it is important to design prototypes capable of collecting data. Not collecting data from the prototype means not knowing how participants interact with it. We used Figma to quickly make a UI prototype but could not track how much it was opened and used. Something like tracking how much each participant opens a Data Foundry URL would be a valuable addition.

The conclusion

Data-enabled design is a valuable design process with lots of potential for various design topics. While it is developed in a healthcare context, I am sure it can be adapted to fit other contexts as well, including but certainly not limited to smart home, sustainability, vitality, mobility, or even architecture. This course has taught me the basics of DED through a hands-on approach, following the process of other groups through the in-class pitches, and peer-reviewing a pictorial. The differing topics of other groups show how DED can be applied to various topics and can be an inspiration for my future projects.