Appendix II

Reflection on the process

Situation

My graduation started from a research elective which I did literature review and planned a little bit of the experiment. It was a nice start as I already have some context information of the project. The research question ‘what is the influence of angle of attack on passenger comfort’ was also clear to me. I chose to finish a research thesis as my graduation project because I would like to take this chance as a pre-training to future PhD program.

Task

The main task was to conduct experiments with participants, analyze the data collected from the experiments and answer the research question. The aim would be to finish the knowledge gap. Besides the scientific goal, I set three ambitions I hope to achieve myself:

1, Learn to conduct experiment
2, Improve writing skills
3, Learn to plan a scientific research

Action

1. Make a stool
   It took me one week to make a measuring stool for anthropometry data. As the start of the graduation, it went very smooth. I got to know and really made use of PMB for the first time in my two years’ master study.
2. Prepare the experiment, build the setup
   The experiment was conducted in the fuselage. I could never expect that the most difficult part of this task was actually the physical demanding work of building the setup, such as mounting the wooden boards together, carrying the seats to the right position or even lifting the whole platform. My initial design of the setup changed many times due to various limitations. Finally, the problems were solved by scissor jacks and helping hands from others. This procedure took much longer than expected, about five to six weeks.
3. Do the experiment
   Too much time was spent on last procedure, in order to catch up the deadline of International Comfort Congress, experiments with 10 participants were done in the first stage. Two weeks later it was done with another 16 participants. For each participant, 3 angles were tested. Many measuring devices were used, and it was not an easy work to look after all of them, especially with Xinhe’s jacket combined in the experiment as well. Experiments with the first two participants

were still chaotic, even with a ‘detailed’ enough step-by-step protocol. In the end Xinhe and I formed a fixed code of conduct, and made the process much faster. In total it took two weeks (10 days) to finish 26 participants, which I planned 20 days initially.

4. Cluster the data
   This task is only a matter of patience, transferring pressure, HRV data from the devices, import questionnaires results to digital form.
5. Data analysis
   This was the most valuable step of my graduation process. I thought it could be difficult, but gladly I was ‘standing on the shoulders of giants.’ I had very limited knowledge on data analysis, for example I did not even know what t test was. I learned a lot by reading papers from previous researchers and learnt to identify significance and correlation with many statistic tools from scratch. HRV and pressure were analyzed in Python with Wolf’s code. I only made some small changes. With this I got a chance to improve Python skills from 0.5/10 to 1/10.
6. Write the paper
   It was also not as difficult as I thought, because I had rich data and clear structure of the article by then. I only gave myself one week to finish the first version of thesis by ICC deadline. It was very tight but on the other hand it gave me more time to reflect and improve the paper before the graduation. Thanks to Peter and Wolf’s sentence-by-sentence revision.

Result

In general I am satisfied with the result. The research question has been answered and my work made some contribution in understanding AOA and comfort. I overcame many difficulties, learnt many new knowledge and skills, went through the whole procedure of doing scientific research and ended with a thesis of the highest quality I have ever written. Now I can say that I achieved the personal goals I set. A little pity was that the time planning on each part would be more reasonable if I estimated the workload accurately, even though I finished the whole process on time.

Reflection

It was a big challenge for me to choose a research project as graduation, instead of designing or prototyping a product as I was familiar with before. To be honest I was not very confident about myself and about the project most of the time during my graduation. I don’t know what I will get in the end. However, now I’m coming to the end and about to graduate, I would like to say that it is the most valuable experience in my two years in TU Delft.

By doing this project I knew what a ‘real’ design/research should be. I used to think doing experiment would not be too challenging, just a more complicated ‘user test’. With those physical difficulties, I realized I was doing ‘a real human experiment’ in (almost) real context, not simulating in software, referring literatures or making beautiful renderings. It was quite a different experience from my previous design

practice (mainly conceptual/ideal design), a good chance to learn something new. Even though I spent such a long time to prepare the experiment, I eventually found out that it could never be well-prepared. Things as low battery, no storage in SD card and poor connection happened every now and then. The skills of handling those issues can never be learnt without really getting hands dirty.

There were also some funny take-aways from the project, like how to use a scissor jack or how to open and close an airplane gate. Those might be useful if I want to repair my car or be a flight attendant someday.

I was very fortunate and appreciate to have Peter, Wolf and Xinhe as my supervisory team. They are always being so kind, supportive and patient to me. The feedbacks they gave me were always to the point and concrete. I can clearly know what to do with their guidance. Besides, I always got compliments from my supervisory team even though sometimes I knew I did not do that good. Maybe we Chinese tend to be humble and are not used to praise. It was a pity that my CSC application was not successful, I may not work with them any longer. However, with this experience I am determined and confident to be a design researcher in the future.