Designing Large-Scale Systems for Societal Issues

Ngoc-Anh Gabriel[1]

Labor für Medieninformatik, TH Köln[1]

ngoc.gabriel@th-koeln.de

Abstract

While there is little disagreement about the general application domain for the third wave work, namely those that satisfy societal needs, the major part of the HCI community is still uncertain about how to translate these strategic intentions into operative action. This work explores three design approaches and frameworks that address this issue and consolidates the insights in the form of affinity diagrams and sketches of possible future application scenarios.

1 Introduction

HCI professionals describe a shift of their subject area from usability issues, over User Experience (UX) issues to even larger and more elusive matters. Whether this development is framed as three faces (Grudin, 2015), three waves (Bødker, 2006) or three paradigms (Harrison et al., 2007), all point in the same direction. Ten years later, those are still not fully hurdled, especially in terms of meaningful and scalable design (Bødker, 2015) (Shneiderman et al., 2016). However, with regard to ethical responsibility (see e. g. *Code of Ethics* of 1992 written by the *ACM Council*), finding solutions is urgent: In this anthropocene epoch interactive systems not only have deep impact on the humans' behaviour and well-being (Fogg, 2002) (Wendel, 2013), (Carr, 2017), but also on the whole environment beyond humanity. Two major issues in the course of this are first, the limited scalability of HCI methods and techniques and second, the inconsequential consideration of societal values in design procedures.

Common design methods and techniques in HCI lack a macroscopic view on the design objects to make (long-term and) large-scale problems explicit, decomposable and their partial solutions then again "orchestrateable". They usually revolve around single users and their mostly first usages and experiences in a manageable number of use contexts. Long-term usages and experiences for larger groups of individuals, or even the nature and the whole globe with their diverse and multiple goals and existing system dynamics, on the contrary, are scarcely

Veröffentlicht durch die Gesellschaft für Informatik e. V. 2018 in
R. Dachselt, G. Weber (Hrsg.):
Mensch und Computer 2018 – Workshopband, 02.–05. September 2018, Dresden.
 https://doi.org/10.18420/muc2018-ws02-0456

methodically observable and designable (Brown et al., 2017, p. 2). Designers need to reflect specifically on the situated interaction, as well as holistically on the wicked problem beyond that (temporal and spatial abstracted contexts), in order to stringently derive an adequate design. The professionals' discussions widened the problem space, whereas the designers' *equipment* to specify that spaces objects have not expanded in the same manner.

The difficulty of specifying, managing and measuring the societal needs is not only due to their large-scale-ness but also to their subjective and emotional nature. They can vary extremely and also even be contradictory. Nevertheless, since values determine meaning, and the construction of meaning is intrinsic to interaction activity (Harrison et al., 2007, p. 2), values in fact need to be authoritative when designing interaction. Cockton (2006) suggest this value-centered and worth-centered approach already for a long time, however, societal values are not considered explicitly in common design procedures.

Generally, solving wicked problems is certainly challenging by definition, there are approaches in the field of HCI and related fields, which address those in accordance with the third wave ideas. It is however unclear whether and in what why those complement or contradict each other.

2 Goals

The primary goal for this work is to get an overview of approaches in designing large-scale systems for societal needs. Therefore, the core of this work is a transdisciplinary analysis of such design approaches. Getting a feel for current practices helps to be able to evaluate approaches, as well as to construct and conduct an adequate methodology to solve this kind of problems in the real-world. As the problem space is too complex, when considering all possible application domains, the main part of this work narrowed its focus down to municipal (narrowing down in scale) and socio-ecological (narrowing down societal values) matters.

3 Procedure and Results

In order to achieve this goal, at first, contemporary design approaches of different design and computing fields that consider scale and societal values were outlined. Due to the limited resources of this project, the focus of this outline is on three publications with topical relevance: The *City Commons Framework* from Balestrini et al. (2017), *Social Design* from Le Dantec (2016) and *Civic Design* from DiSalvo & Dantec (2017). Insights from this research were listed as bullet points and then consolidated in two affinity diagrams (fig. 1), one with the focus on scalability and another with the focus von societal values. Lastly, a visioning session was conducted, in order to figure out potential applications of these insights (sketches of these visions are shown in fig. 2).

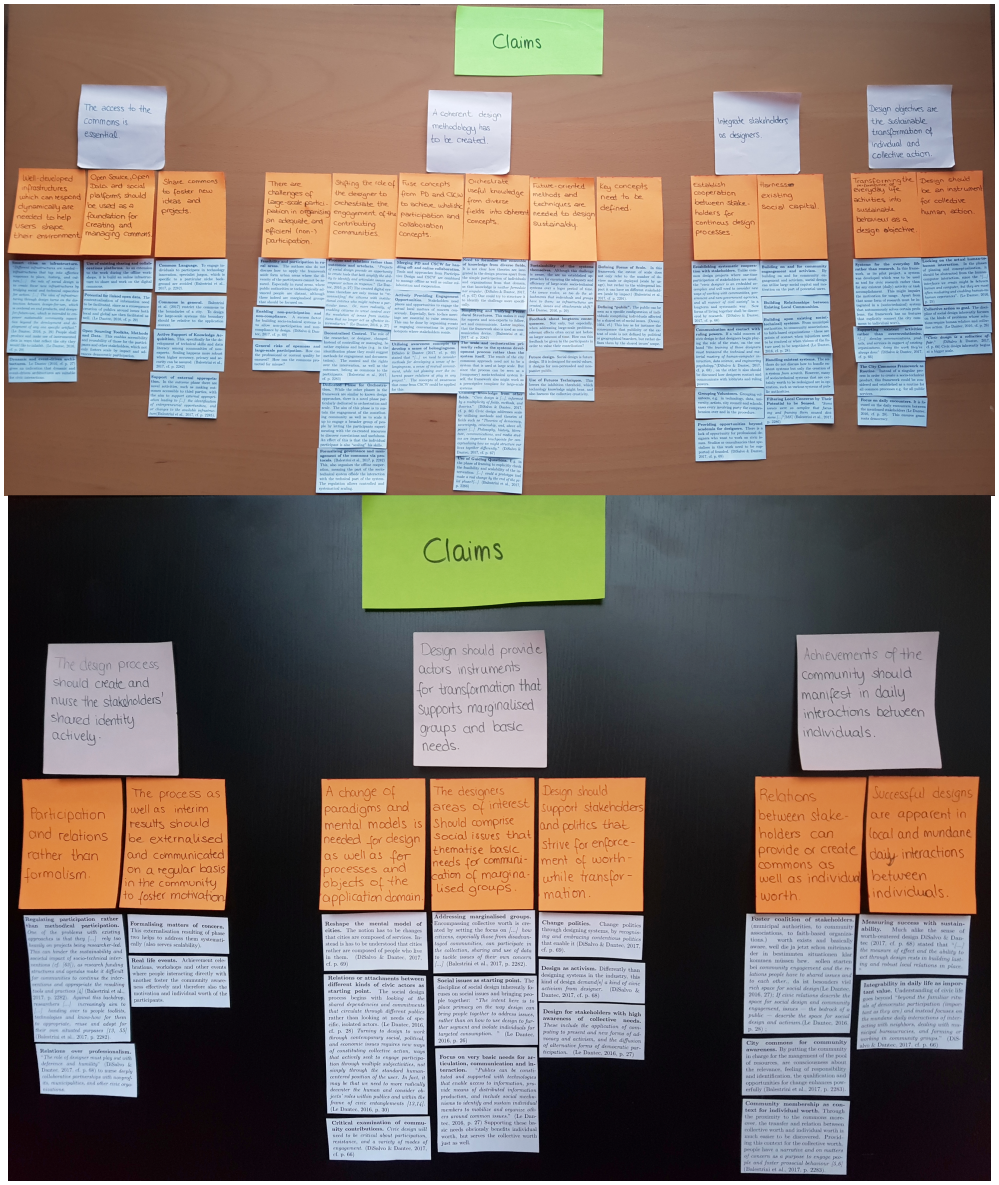

Figure 1: Affinity diagrams for dealing with scalability (left) and for addressing societal values (right)

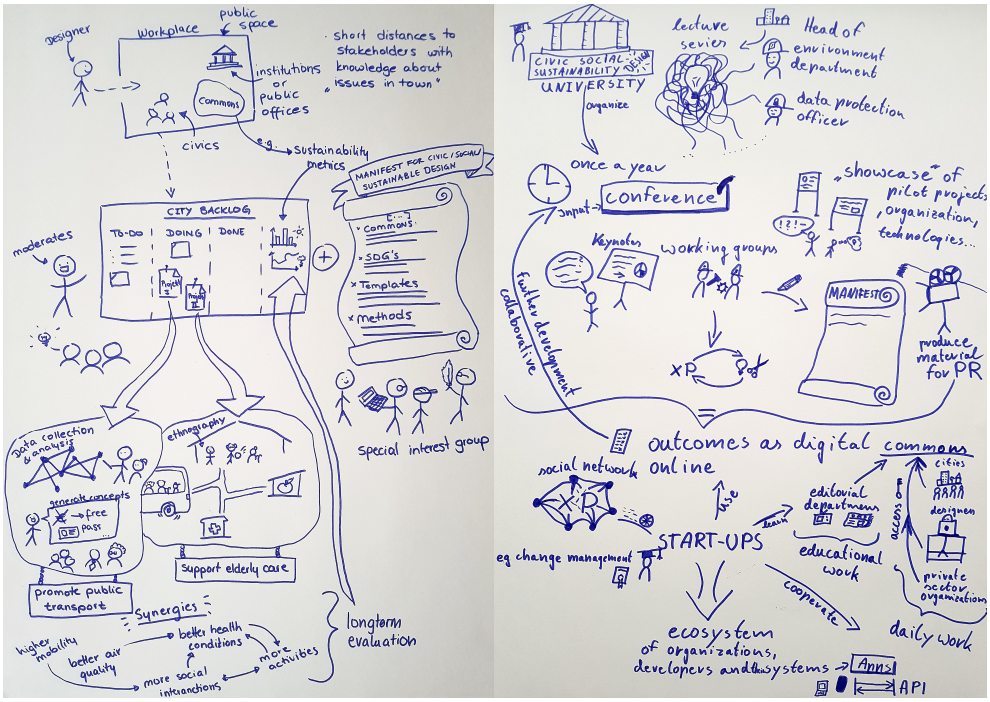

Figure 2: Vision about the daily life of a designer (left), Vision about a designer's professional context (right)

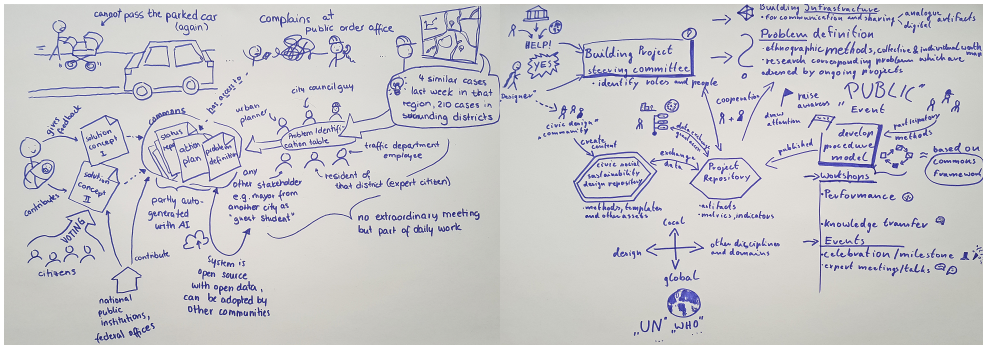

Figure 2: Vision about a prescriptive scenario (left), Vision about characteristics of a methodology (right)

4 Discussion, Conclusion and Outlook

At the end of this project it can be said that municipal and civic concerns are a basic or suitable application domain for scaled Interaction Design. The greatest insight is that the role of the designer and his field of activity is broadening and shifting remarkably towards designing the

actual human to human interaction, beyond the technology. The design of the social part of the systems requires more methodological and conceptual attention.

In the research phase, several research fields and design disciplines were identified that can contribute pieces of theories and practices to the third wave work, whereby only a few could be looked at closer. Although those selected three publications explicitly address how to design large-scale systems for solving societal issues, the majority of those contributions were fairly abstract and more like needs, claims or requirements, rather than a coherent set of pragmatic tools. Nevertheless, these insights provided enough material to envision a direction or first approach for further work in designing large-scale systems that address societal issues, though these visions still need to be evaluated with stakeholders.

All in all, the goal to gain an overview is achieved. The transfer of insights from the specific scaled system (municipal scope) that addresses a specific set of societal issues (socio-ecological ones) to a more general scope of application could be done smoothly without a separate, dedicated activity. This might be methodologically unsound, during the work however, it was actually more difficult to formulate insights for the specific municipal scope, since the social and technological structures and dynamics vary too strongly. For this reason, this transfer was done more implicitly. To sum up, all the results should be iterated and refined to achieve higher granularity, validity and applicability.

Literaturverzeichnis

Balestrini, M., Rogers, Y., Hassan, C., Creus, J., King, M., & Marshall, P. (2017). A city in common: A framework to orchestrate large-scale citizen engagement around urban issues. In Proceedings of the 2017 CHI conference on human factors in computing systems (pp. 2282–2294). New York: ACM. doi: 10.1145/3025453.3025915

Bødker, S. (2006). When second wave HCI meets third wave challenges. In Proceedings of the 4th nordic conference on human-computer interaction: Changing roles (pp. 1–8). New York: ACM. doi: 10.1145/1182475.1182476

Bødker, S. (2015). Third-wave HCI, 10 years later – participation and sharing. interactions, 22(5), 24–31. doi: 10.1145/2804405

Brown, B., Bødker, S., & Höök, K. (2017). Does HCI scale?: Scale hacking and the relevance of HCI. interactions, 24(5), 28–33. doi: 10.1145/3125387

Carr, N. (2017). Closing keynote: Computers, automation and the human future. In Proceedings of the 2017 CHI conference extended abstracts on human factors in computing systems (pp. 4–4). New York: ACM. doi: 10.1145/3027063.3056456

Di Salvo, C., & Dantec, C. A. L. (2017). Civic design. interactions, 24(6), 66–69. doi: 10.1145/3137097

Fogg, B. J. (2002). Persuasive Technology: Using computers to Change What We Think and Do. *Ubiquity*, 2002. doi: 10.1145/764008.763957

Grudin, J. (2005). Three faces of human-computer interaction. IEEE Annals of the History of Computing, 27(4), 46-62.

Harrison, S., Tatar, D., & Sengers, P. (2007). The three paradigms of HCI. In Proceedings of the ACM conference on human factors in computing systems (CHI). New York: ACM Press.

Le Dantec, C. A. (2016). Design through collective action / collective action through design. interactions, 24 (1), 24–30. doi: 10.1145/3018005

Shneiderman, B., Plaisant, C., Cohen, M., Jacobs, S., Elmqvist, N., & Diakopoulos, N. (2016). Grand challenges for HCI researchers. interactions, 23(5), 24–25. doi: 10.1145/2977645

Wendel, S. (2013). Designing for behavior change - Applying psychology and behavioral economics. Sebastopol: O'Reilly Media, Inc..