FINAL REFLECTION
ŠIMON KNETTIG

Back to the User

Shaping the user experience of architecture through evidence-based design

Final reflection
Šimon Knettig | 5398185

City of the Future studio
Main mentor: Roberto Cavallo
Second mentor (Building technology): Piero Medici
Third mentor (Research): Stefan van der Spek

Delft University of Technology
Faculty of Architecture and the Built Environment | Architecture track
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Abstract

‘Back to the User’ addresses a critical issue in contemporary architectural practice: the dissociation from the user. In the software industry, 10% to 40% of a project’s budget is allocated to ‘User Experience (UX) Research’, which focuses on assessing and fulfilling users’ needs and experiences throughout the entire design process. This investment not only doubles sales but also nearly triples user satisfaction. Despite its proven value, UX Research is significantly underrepresented in architecture. This paper explores how to better integrate and utilize UX Research in architectural practice, proposing a new methodology. The methodology closest to UX Research in architecture is ‘Post-Occupancy Evaluation’ (POE), but only 5% of architectural firms in the EU offer (and even fewer conduct) it during the design phase. Architects may talk closely with clients, but not with users. Additionally, most UX Research involves 1:1 prototype testing with users to ensure that the design meets its intended benefits. In architecture, ‘prototyping’ usually consists of 2D plans, visualizations, or scaled models, which are often not comprehensible, accurate, or immersive enough. While constructing a full 1:1 prototype is possible, it is not economically, spatially, or sustainably feasible for large projects—or is it?

With the rise of Virtual Reality (VR), we can now test virtually unlimited 1:1 designs, leading to more objective, evidence-based conclusions. This paper explores this approach through participatory qualitative sessions using VR, where multiple design variations are tested and rated by users based on their satisfaction levels. The data collected informs design decisions, resulting in a final proposal to address the challenges of post-Soviet, concrete-prefab panel construction in the ‘Jižní Město’ district of Prague, Czech Republic. This ‘Back to the User’ methodology, is in fact a practice’s step ‘Back to the Future’.

Keywords

User experience research, user experience in the built environment, evidence-based design, participatory study using virtual reality, Jižní Město, concrete-prefab panel construction revitalization

Back to the user, the name of the paper, and the fundamental goal of the entire thesis which shaped the direction of every step I took in the process. In fact, the methodological process is the main product of the thesis too. From the beginning, I aimed to explore methodologies within and outside of architecture that could lead to more evidence-based conclusions on the potential of architectural designs, ultimately resulting in more satisfied users. This exploration was driven by the current lack of reliable methods for delivering the desired user experience (UX) promised by designers.

My journey began with a feeling, an assumption rooted in my personal experiences from studies and practice. In both environments, I frequently observed conclusions about users' behavior that seemed to lack a solid foundation, relying only on the designer's personal experience or philosophical background. This seemed insufficient, as I often witnessed projects failing to meet their proclaimed expectations, despite gaining support from at least a portion of the architectural community.

Therefore, I started by exploring existing literature for examples of both successful and unsuccessful projects in user experience throughout recent history. The inconsistency in the outcomes of these designs demonstrated to me that, while architecture certainly has the potential to deliver a great user experience, we as architects have not acquired the processes to predict this impact in advance (yet).

As I delved deeper into the roots of the issue, I discovered a significant disruption in the relationship between architects and the users of their designs. In many cases, this relationship is practically nonexistent or of low quality, despite the involvement of numerous other stakeholders from the beginning of any design process. This lack of connection leads to misinterpretations and biases, which are then reflected in the designs. This phenomenon is well-covered in the field of UX research which therefore became a major source of information and methods for addressing the issues described.

The contextual background of my thesis proved to be 'robust' well enough that I never felt lost in why I was conducting certain research or design, but rather in how I was doing it and how I could deliver it as planned. Planning became the biggest obstacle throughout the project and a theme constantly emphasized by my mentors. Research into UX methods revealed a direction requiring many steps before the final design could even be executed.

1. Preliminary study of local needs in the chosen test site through existing literature and interviews
2. Neural network analysis to determine the most unfulfilled local needs
3. Development of a series of conceptual design interventions to address these needs
4. Testing of these interventions using VR as an efficient prototyping tool in a participatory qualitative and quantitative session with a target group
5. Identification of interventions that most fulfill the needs in each typological category to incorporate them into the final design.
6. Final design development
7. Reflection on the final design again through the VR comparative analysis

Furthermore, if done properly to reach the most objective and conclusive results possible, there would have to be multiple rounds of such sessions for the high relevancy of data before the final design could be developed. This very soon clashed with the requirements of the architecture track study program as the modeling for VR, session design, and data processing proved to be time-consuming.

Between P1 and P2, my mentors emphasized the need to simultaneously develop the final design while preparing the VR prototype sessions to reach the required level of thoroughness. This conflicted with my research conclusions, which stressed the importance of testing versions before any conclusive design development. By the end of P3, I finally managed to conduct a pilot VR session within BK, but I already needed a strong foundation for the final design, including construction detailing in the form of 2D documentation. The data acquired informed my final design to some extent, but since the pilot involved fewer than 10 participants and only partially overlapped with the target demographic, the relevancy of the outputs was limited. The data helped me understand the relationships between design elements, different user perceptions, and which design directions seemed most desirable, but it was not reliable enough to make evidence-based conclusions.

As P3 and P4 progressed, there was no time to conduct more VR sessions due to other requirements around construction and addressing topics beyond the focus of the sessions. Despite strong support from both my main and research mentors in exploring the VR-user-focused methodology, they also had to ensure I met the other requirements of the study program. These program expectations were, therefore, a major obstacle from the start, partially jeopardizing deeper research into the topic.

If innovative research outside standard practice is welcomed or even expected from master's students, I would highly appreciate greater flexibility. This includes flexibility in focusing research on specific agendas and in the style and content of deliverables. While I believe in a holistic approach to architecture, such an approach should involve more people, including cross-disciplinary collaboration, as the field covers many different areas. Without this focus flexibility, especially the studies not following standard methodologies may end up with unnecessarily superficial results. If the reason for such program requirements is the expectation of students to demonstrate knowledge of specific areas such as construction, climate resilience, or sustainability, these should be covered by courses outside of the master thesis, I believe. This would provide students with more space to focus on innovative topics beyond the standard practice in their most extensive academic work so far.

Reflection questions

What is the relation between your graduation project topic, your master track (A, U, BT, LA, MBE), and your master program (MSc AUBS)?

The ‘City of the Future’ studio within the Architecture master track, as its name suggests, focuses on developing ideas for successful future urbanization. It emphasizes a cross-disciplinary holistic approach and supports participatory methods, aligning well with my values and the focus of my thesis. However, I found that these values were not as strongly projected in the track program itself, despite my firm belief in their necessity.

According to the UN, 70% of the world’s population is expected to live in cities by 2050. However, living conditions could vary significantly, from highly dense skyscrapers to sprawling urban homes, each with a distinct environmental impact. User choices about where to live are driven by their needs and desires. If we could better understand these desires, we could design solutions that meet sustainable standards while keeping users happy and achieving urban resilience. Unmet spatial needs can lead to mental and physiological health issues, highlighting the importance of addressing them correctly. Therefore, ensuring user satisfaction should be a goal for all architects, urbanists, and other experts in the built environment. I believe that UX research, which this paper aims to contribute to, is a key tool in achieving this goal.

Despite this belief, I realized throughout the process how little UX research is integrated into practice and the master track’s curriculum, resulting in limited opportunities to conduct it. As architects, we spend a great deal of time developing various design options and producing time-consuming graphic outputs without first fully understanding whom the design should serve, how it should look, and how it will ultimately perform.

Based on the research conducted, I encourage the architectural community, including academia, to reconsider its focus and redefine what architecture should represent. In my opinion, architecture should serve people, and therefore, people and users need to be included and understood throughout the entire design process.

How did your research influence your design/recommendations and how did the design/recommendations influence your research?

The research fundamentally altered the design process by requiring the testing of separate, distinguishable typological interventions with users before delivering a final, comprehensive solution. The VR tests of these typologies revealed which interventions were more likely to satisfy users and how to mix or modify them based on user feedback. These results then informed the final design solution, increasing its chances of success in the locality. Thus, the design and research were fundamentally intertwined as part of the methodology used.

Even before testing these interventions, after the initial user needs research, I had already begun to form an idea of what the final design could look like and made some preliminary design assumptions. Interestingly, most of these assumptions aligned with users’ desires during the VR sessions. However, in some cases, user perceptions were not just slightly different but completely opposite to mine. For instance, I considered the Ball-cony prototype to offer very little privacy due to its visual openness to neighbors and the environment. Yet, all users in the testing group perceived it as the most private. Conclusions like these highlighted the importance of conducting user sessions, regardless of how ‘professional’ or knowledgeable one may be. They also encouraged me to reconsider some further design decisions in the process.

How do you assess the value of your way of working (your approach, your used methods, used methodology)?

UX research reduces the personal bias of designers and other stakeholders, leading to more accurate design conclusions and potentially replicable knowledge about user behavior. Such data and methods can have significant social and economic impacts. Socially, users could become happier and more invested in their environment, and, as the existing medical research suggests, improve their health due to the exposure to a more satisfactory design. Economically, understanding users’ desires could lead to more efficient targeting of products, increasing their value and potential profit. Additionally, insights into users’ perceptions of design could speed up the approval process by various stakeholders, especially municipalities and their building construction offices, thereby increasing trust in the design and its presumed benefits for all parties involved.

These benefits will only grow in efficiency and scale as new VR technologies become everyday wearables. This evolution could enable continuous, real-time data gathering in any locality with access to these technologies, beyond just predefined individual sessions.

Although my iterative prototyping methodology has not yet been tested with enough users to draw definitive conclusions, the data collected has already influenced me to reconsider certain decisions, demonstrating the method’s great potential and encouraging further research.

Between P4 and P5, I tested the final design against the earlier prototypes, which underscored the need for certain reconsiderations or further research. Based on the data, I identified three topics that require additional focus or research:

1. Concept of spatial privacy

   The sessions revealed, as partially mentioned earlier, a strong interest among participants in the balance between privacy and community. While my designs explored this concept, I realized I lacked a clear understanding of how to achieve this balance. More focused VR sessions testing different options would greatly aid in developing the final design.

2. Concept of a meeting spot at the block scale

   Although all prototypes addressed the courtyard area, they intentionally did not include a specific meeting spot as I considered that need clear enough and therefore wanted to leave more research space focusing on other aspects. To no surprise for me, participants consistently noted the absence of a meeting spot. However, the expectations for its form

and function varied significantly and did not align with my assumptions. Developing prototypes that specifically focus on this typology would be very beneficial.

3. Pedestrian wayfinding and spatial readability

   Initial research suggested that the panelak neighborhood lacks clear spatial readability and distinction, making orientation difficult. I assumed this was due to the repetitiveness of the individual blocks and proposed a concept allowing for diverse and flexible appearances. However, the final proposal raised even more questions about readability and recognizability in different forms and especially at the pedestrian street level. I believe this issue developed from designing the space primarily in a 3D modeler or 2D plans, rather than in VR. My perception of the designs differed because they were largely created from an unnatural viewpoint, an issue I highlighted in my research findings but, frankly, insufficiently addressed in my own process.

How do you assess the academic and societal value, scope and implication of your graduation project, including ethical aspects?

This paper expands the discipline's understanding of human perception and use of the built environment, as well as methods to investigate them. Understanding user experience is crucial for the sustainable (re)development of cities, as only a holistically comforting environment can motivate people to stay in efficiently urbanized areas and care for them.

However, data about users must be handled with caution from an ethical standpoint. Similar to current discussions around internet privacy, extended data access could be misused by some companies for low-value targeted content and marketing, aimed solely at increasing profits. Therefore, it is important to use such data ethically, with the genuine aim of increasing users' satisfaction. Governmental institutions should be aware of the potential for abuse and be prepared to take action if it occurs.

On the positive side, knowledge about users could lead to higher levels of parameterization and ultimately automation of design processes, resulting in cheaper developments with similar quality for users. For instance, in the proposed final design concept, the arrangement of plug-in units could be fully managed by residents, who could negotiate terms with their neighbors via an app platform. This app could help them recognize the risks of specific arrangements, such as reduced sun exposure or conflicting programmatic expectations, enabling better-informed decisions. At the end of this design process, users could order and sell units on a common marketplace, benefiting from simplified construction processes and services due to the large scale of applications, allowing them to realize their wishes.

How do you assess the value of the transferability of your project results?

The methodology used for delivering better informed final design and the context of relevancy of such method is transparently shown in the final report in a step by step manner. By doing so, I hope to trigger interest and motivation in other researchers or private bodies to involve themselves in exploring further the potentials of the methodologies as well as use the already uncovered pre-conclusions. Since only the pilot session was executed, the data about the methods' relevancy, accuracy as well as the conclusions coming out of the session are not yet fully trustworthy, but they show a strong potential. My aim was therefore to be as clear as possible about the research done already, so that it could be easily transferred and explored in more depth in follow-up studies.

Findings about the Jižní Město development could already serve as a trigger for discussions about the new possibilities for the area's redevelopment. This is especially meaningful from the perspective of land ownership and law regulations that may jeopardize such design strategies to be implemented in the future.

How do you assess the value and use case of specifically VR in user-oriented research?

The exploration of UX research methodologies reveals that architecture faces challenges in using 1:1 prototypes for efficient user testing. However, with advancing computational capabilities, VR can closely approximate actual visual physical reality. Unlike other architectural forms such as 2D visualizations, scaled models, and videos, VR creates an immersive 1:1 spatial experience with minimal resources needed. This opens up opportunities for theoretically unlimited testing of design iterations from any location.

It is important to note that implementing VR technology still requires specific skills, technical support, and a considerable amount of time, which must be accounted for in project planning and budgeting. Nonetheless, I have personally witnessed the need to incorporate VR not only in user testing but also in the design process. When testing the final design with participants, the perception and readability of certain design elements I proposed differed from the VR experience. I believe this disconnection arose because I designed the interventions largely from an unnatural point of view, using external 3D views or 2D projections.

This is standard practice in architectural design, but I would like to challenge it. We should question whether ideas derived and presented through plans and scaled-down models truly reflect the real experience of a pedestrian. Instead of focusing on creating visuals of our designs from distant aerial perspectives, we should prioritize the real experience of city explorers.

Whom should be interested in and potentially use your results and methodologies?

The results of these UX studies should be of interest to the majority of stakeholders in the built environment and construction sectors. For architects, the findings are useful for informing their design agendas. Municipalities can use the data to efficiently allocate spending and reconsider building codes to support positive changes. Investors and developers can better target their clients' needs, potentially increasing revenues.

Determining who should conduct such research is a more complex task, as the method requires significant resources and time. On a societal level, it would be reasonable for governmental institutions or universities to commission these

studies for different localities. This approach would allow the results to be shared freely among all stakeholders, enhancing overall quality for users. All projects, regardless of size or budget, could benefit from this valuable data. Additionally, this scenario would reduce inefficient overlaps in research when it is solely conducted by private parties that secure the data for themselves.

Private stakeholders could still commission more nuanced or focused research for their own benefit. Investing in such knowledge could yield long-term returns by delivering more desirable and valuable products.

Ultimately, this approach should primarily interest users themselves, as it recognizes their fundamental role in the design process and places their satisfaction at the forefront. Users should see the value in investing in such research and should demand that design bodies have and utilize this knowledge in their processes.

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