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GLOSSARY

EC	European Commission
EU	European Union
HR	Handlungsraum der Stadtentwicklung / Urban Development Action Area
IHRK	Integriertes Handlungsraumkonzept / Integrated Urban Development Plan
ISEK	Integriertes Stadtteilentwicklungskonzept / Integrated Urban Regeneration Implementation Plan
M	Project Implementation Month
NEB	New European Bauhaus
NEBourhoods	Creating NEBourhoods Together
NGO	Non-Governmental Organisation
NPL	Munich Neuperlach
OA	Open Access
T	Task
WP	Work Package
Organisation Name (Consortium)	
AGM	Architekturgalerie München e.V.
BYF	Bayerische Forschungsallianz GmbH / Bavarian Research Alliance GmbH
GC	Green City e.V.
HM	HM Hochschule München University of Applied Sciences
HM:UniverCity	HM Innovationsnetzwerk / HM Innovation Network
MGS	MGS Münchener Gesellschaft für Stadterneuerung GmbH
MS	UnternehmerTUM MakerSpace GmbH
MUC	Landeshauptstadt München / City of Munich
MUC CCI	Kompetenzteam Kultur- und Kreativwirtschaft / Team of Excellence for the Cultural and Creative Industries
MUC CULT	Kulturreferat / Department of Arts and Culture
MUC LED	Referat für Arbeit und Wirtschaft / Department of Labor and Economic Development
MUC PLAN	Referat für Stadtplanung und Bauordnung / Department of Urban Planning and Building Regulations
SCE	Strascheg Center for Entrepreneurship
STR	Str.ucture GmbH
SAAD	Studio Animal-Aided Design GmbH
SSR	Studio Stadt Region Forster Kurz Architekten und Stadtplaner Partg Mbb
TUM	Technische Universität München / Technical University of Munich
UTUM	UnternehmerTUM GmbH
Organisation Name (in Cooperation with)	
MER	Münchner Ernährungsrat e.V.
MIN	Münchner Initiative Nachhaltigkeit
OTH	Ostbayerische Technische Hochschule Regensburg
Organisation Name (Associated Partners)	
BDA	Bund Deutscher Architektinnen und Architekten e.V.
BDA-By	Bund Deutscher Architektinnen und Architekten Bayern e.V.
ByAK	Bayerische Architektenkammer, Körperschaft des öffentlichen Rechts / BAK – Federal Chamber of German Architects
BYD	Bayern Design GmbH

SUMMARY

This report is part of the deliverables of Creating NEBourhoods Together (2022-2025). NEBourhoods is one of the six lighthouse demonstrators of the New European Bauhaus funded by the EU to address the great challenges of climate, environment, and health. Combining co-creation and entrepreneurship while placing culture and creativity at the core of the transformation process, the project delivers accessible and empowering solutions to make the EU Green Deal beneficial for all in Munich Neuperlach and beyond.

The NEB Action “Mobility NEBourhoods” addressed a contribution to the sustainable transformation of mobility in Neuperlach and, at the same time, tackled the need for meeting points. For this reason, we designed and installed two physical NEBourhood Hubs based on a co-creation process. These hubs are placed at nodal points of Neuperlach’s pedestrian network and combine mobility-related and social functions with general improvements for the public space. Furthermore, we prototyped, implemented and evaluated a digital platform (D5.6). This platform builds upon urban data from the Digital City Twin project of Munich and comprises several tools for the co-creation of NEBourhood Hubs.

This report describes how two NEBourhood Hubs were designed and implemented through a co-creation process with citizens from Neuperlach. Firstly, we introduce the topic of mobility in Neuperlach and describe the concept of NEBourhood Hubs – multifunctional and context-specific pavilion-like installations supporting sustainable mobility forms and contributing to liveable public spaces. In collaboration with citizens of Neuperlach, we found locations and defined functions for these hubs. Through various co-creation formats with creatives and artists – drifting, photography, and model-making – we gathered the necessary information for the design of the NEBourhood Hubs: potential locations on a larger district scale, positioning on a small scale, configurations of functions, and design ideas. On this basis, we describe the final design and installation of the hubs in collaboration with the company Gronard in Neuperlach. Based on the results of monitoring the usage of the hubs, we evaluate the results, discussing their impact on the immediate environment and the potential for future replication.

1 INTRODUCTION

1.1 PROJECT OVERVIEW

“Creating NEBourhoods Together” is one of the six lighthouse demonstrators of the New European Bauhaus funded by the EU to address the great challenges of climate, environment, and health. The aim is to collaborate on the European Green Deal to create more sustainable, inclusive, and beautiful living environments across the EU. In Munich-Neuperlach (NPL), one of Europe's largest post-war urban expansion areas, NEBourhoods is collaborating with citizens and stakeholders from culture, science, and business to implement ten actions from all fields of urban development, encompassing circular construction and redesign of residential and commercial buildings, innovative forms of mobility and energy communities, biodiversity and green space concepts and nutrition and youth culture. Encouragement of entrepreneurial thinking and action and practical implementation in co-creative processes support the formation of sustainable neighbourhoods in liveable, inclusive, and beautiful cities of the future.

Combining co-creation and entrepreneurship while placing culture and creativity at the core of the transformation process, the project will deliver accessible and empowering solutions to make the EU Green Deal beneficial for all in NPL and beyond. The district will be carefully cultivated into a resilient urban innovation landscape. Within two years, we will create NEBourhoods together and show how we can realise circular thinking and acting in society and the economy, activate the green transformation in building, mobility, energy, food and health and enhance public spaces.

1.2 OBJECTIVE OF THE NEB ACTION “PROTOTYPING MOBILITY”

The sustainable implementation of innovative forms of mobility is a crucial aspect to mitigate pollution and CO₂ emissions and to create more liveable, attractive urban environments. The NEB Action Prototyping Mobility contributes to the development of a more healthy, accessible, and sustainable mobility infrastructure in Neuperlach. Sustainable traffic projects must build upon both: evidence-based methods, and collaboration with local stakeholders. Thus, we explored and tested how mobility infrastructure can be situated in urban spaces, and how it can be connected to other social, economic, and cultural contexts. As physical intervention into the existing networks, we designed, installed, and evaluated two multifunctional NEBourhood Hubs combining offers to support the mobility of people with context-specific community functions. These hubs were located, configured and designed through a co-creation process with citizens and creatives. Additionally, we prototyped and implemented a digital platform with several participatory tools supporting the co-creation of NEBourhood Hubs (D5.6).

1.3 ACTION TEAM

The action was led by a team at the Chair of Architectural Informatics at the Technical University of Munich (TUM), consisting of the experts from urbanism, digital design, and computer science Matti Drechsel, Nick Förster, Dr.-Ing. Gerhard Schubert and Prof. Dr.-Ing. Frank Petzold as well as the student assistants Carla Souvant, Carolina Meirelles Coutinho and Karolin Savitri Klein. The co-creation process was developed and conducted in close collaboration with the NEBOurhoods TransitionHub (Transition Hub), in which two partners combined their competencies: HM:UniverCity, the innovation network of Munich's University of Applied Sciences (Workpackage Co-Creation Lead), and the Team of Excellence for the Cultural and Creative Industries of the City of Munich, now Kreativ München (MUC CCI). Additionally, the three creatives from the NEBOurhoods pool Ralf Otto, Sandra Singh and Enrica Ferruci were involved in different co-creation formats. The NEBOurhood Hubs were designed and produced by the company Gronard GmbH in Neuperlach. The Münchner Gesellschaft für Stadterneuerung mbH (MGS) and the City of Munich (MUC), as a central stakeholder, provided support and advice for the implementation and the maintenance of the hubs.

1.4 OBJECTIVE OF DELIVERABLE 5.5: MULTIFUNCTIONAL MOBILITY HUBS

This report documents the co-creation process, the final design and the installation of two multifunctional NEBOurhood Hubs. In addition, we present the monitoring results, and the evaluation of the hubs implemented on site. We assess the potential of NEBOurhood Hubs to contribute to sustainable mobility as well as to liveable public spaces and we give insights into crucial steps of implementing NEBOurhood Hubs through co-creation.

2 MOBILITY IN NEUPERLACH

Considering the future of Neuperlach as a sustainable district, mobility transformation is a key challenge. The Integrated Urban Development Plan (IHRK) as well as the Integrated Urban Regeneration Implementation Plan (ISEK) consider “traffic and mobility” as one of the central topics for the development of liveable and sustainable urban space (Legeland, Camplisson, Gregorczyk, & Krogh, 2021, S. 51) (Landeshauptstadt München, 2021). A strict separation of traffic modes, of pedestrian and car networks, characterises the late modernist estate of Neuperlach. Following the urbanistic theme of the “gegliederte und aufgelockerte Stadt” (structured and scattered city), the original master plan favours one-fits-all solutions and optimisation for car traffic. The Ständlerstraße and several multi-lane streets structure the district of Neuperlach, and parking spaces are dominant in public spaces. At the same time, the ratio of cars per citizen is below the motorisation average of Munich (Legeland, Camplisson, Gregorczyk, & Krogh, 2021, S. 56).

A large pedestrian network extends between these streets and is detached from the main roads via sculptural bridges, which seem to be generally ignored by Neuperlach’s pedestrians. This disposition causes long ways for pedestrians and barriers for citizens with mobility impairments. While the IHRK asserts a specific spatial quality to the pedestrian network, at the same time, there are many barriers for strollers or wheelchairs and challenges in terms of orientation (Legeland, Camplisson, Gregorczyk, & Krogh, 2021, S. 58). This is especially problematic with respect to the high ratio of elderly citizens as well as young families (ibid.). Furthermore, concerning gender dimensions, many paths are poorly lit and unwatched, leading to a low feeling of safety, especially at nighttime (ibid.). Moreover, the IHRK asserts that the general availability of public transport is good. However, public transport stations lack integration in the street spaces and squares and are partly not barrier-free (Legeland, Camplisson, Gregorczyk, & Krogh, 2021, S. 62). New transportation offers like bike sharing are underrepresented in the area (Legeland, Camplisson, Gregorczyk, & Krogh, 2021, S. 64).



Figure 1 Street Network in newly constructed Neuperlach (Image Source Karl Schillinger, 1974; <https://www.muenchenwiki.de/wiki/Neuperlach#/media/Datei:Neuperlach.jpg>)

As we learn during our on-site research within the NEBourhoods project, the district's mobility disposition is far more complex than the original modernist masterplan assumes. Mobility is experienced very differently by several social groups and stakeholders. Mobility is, for instance, related to unexpected practices like hacking shopping carts. It involves dealing with mobility impairments and collective grief for the disappearance of public furniture. Mobility does not only concern traffic but also local communities, the beauty of public spaces, and sustainable ways of living. Intervening in this domain means dealing with a classical "wicked" problem (Rittel & Webber, 1973) requiring collaboration with multiple stakeholders and negotiating between conflicting perspectives. According to Pim Peters study of transport planning in Munich, many instruments, standards, and indicators for mobility planning are rooted in an automobile-centred modernist planning tradition (Peters, 2019) – in the same period in which the original masterplan of Neuperlach was created. The challenge is therefore not only reorganising mobility infrastructure but also to experiment with the instruments and processes of mobility planning.

3 NEBOURHOOD HUBS – CONTEXT-SPECIFIC INTERVENTIONS

To contribute to a sustainable transformation of mobility in Neuperlach, we designed, installed, and monitored two “NEBourhood Hubs” based on a co-creative process with citizens from Neuperlach. As part of the NEB action, which was implemented as a living lab, citizens were co-creators in the decision-making processes and in the design formats. The result is a tangible improvement of support for mobility and social offers as well as of public space.

NEBourhood Hubs are small pavilion-like interventions – about the size of a parking spot – and react to the specific mobility conditions in Neuperlach. The hubs should be placed in direct relationship with the pedestrian network of Neuperlach – at specifically important points like nodes with other modes of traffic or at relevant public spaces. Instead of sharing cars, they aim to improve this pedestrian/bike infrastructure. Specifically, they should provide relevant mobility offers to different local groups: users of mobility-aiding devices (e.g., by a borrowable trolley), young families (e.g., a shared cargo-bike), or cyclists (e.g., a repair station).



Figure 2 Installed NEBourhood Hub at Therese-Giese-Allee (RESI). Image Source: NEBourhoods/Nick Förster

Furthermore, the hubs should have a positive impact on their immediate environment. As the IHRK states, the traffic buildings of Neuperlach are not well integrated into their environment

and do not contribute to livable public spaces (Legeland, Camplisson, Gregorczyk, & Krogh, 2021). In general, many citizens of Neuperlach mention degraded and removed public furniture, leading to a decreased quality of stay in urban spaces and making it harder to appropriate different places. Hence, the hubs should not only provide mobility functions but also contribute to beautiful and livable public spaces. Furthermore, the hubs should combine mobility-related improvements with elements allowing better usage of public spaces: They offer a place to meet and stay. They allow interactions like borrowing items, using a repair station, or using a graffiti wall. Furthermore, they should activate the urban surroundings and support appropriation through citizens. For instance, they allow you to borrow games and mobile furniture. The topic of mobility should be approached in an integrative matter towards functions which seem unrelated but are wished for. This can lead to innovative solutions in the sense of the New European Bauhaus.



Figure 3 NEBourhood Hub at Therese-Giese-Allee (RESI). Image Source: NEBourhoods/Patrick Thomas

As we have discussed in the previous chapter, such interventions cannot be designed in a top-down manner. To locate and configure the functions of NEBourhood Hubs, it is crucial to work with local groups. Using co-creative formats as part of the living lab approach, we discussed possible locations together, jointly gained experience by moving through the space together, and defined functions based on local needs and wishes. Thus, we examined sustainable and more inclusive mobility modes for different groups in Neuperlach – and how the current situation can be improved. Ensuring that the NEBourhood Hubs match the needs of the population also enhances the long-term impact of the intervention for a sustainable transformation. In the next chapter, we introduce how different workshops set up with

creatives from the NEBourhoods pool helped to learn about needs and opportunities for the design and implementation of the NEBourhood Hubs.

4 CO-CREATING NEBOURHOOD HUBS

In the first phase of our action, we developed analogue tools for the co-creative localisation and configuration of the hubs together with NEBourhood pool creatives. We enacted and tested these methods in open-ended workshops with residents from Neuperlach. Besides methodological learnings, we identified possible locations and ideas for the functions of the hubs. Maps were created showing the popularity of different locations, their spatial location in the district and the respective functions or services people wished for. These maps were then used in a workshop with representatives of local authorities, local public companies, creatives, local civil society organisations, and SMEs to jointly find the best locations, the best mix of functions for each of these locations and to develop joint uses with local initiatives and operator models. Based on the results of this event, the production of the hubs was commissioned (Figure 1).

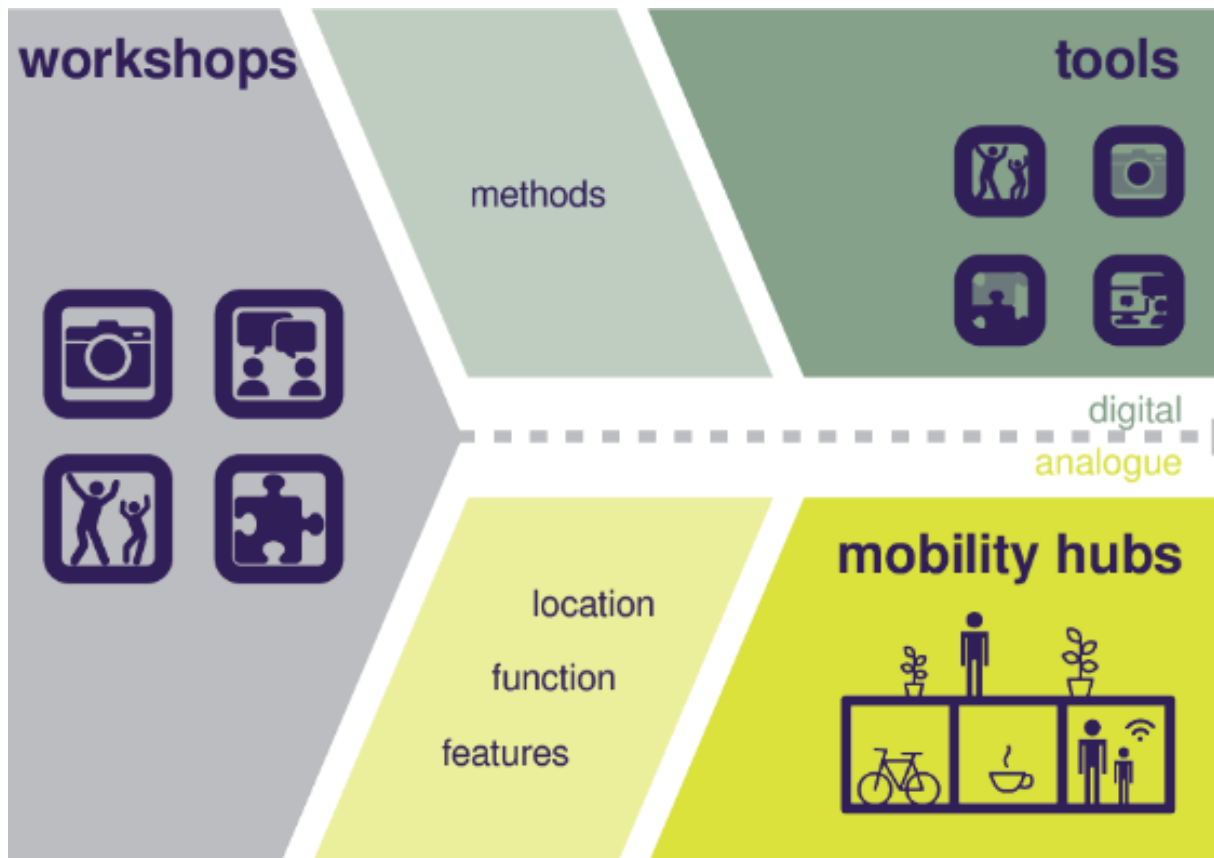


Figure 4 The analogue and digital co-creation process

Additionally, we created a digital toolbox for the co-creative design of NEBourhood Hubs. These tools build upon data from the Digital Twin of the City of Munich. To include specific learnings and experiences from the analogue co-creation process, a thorough analysis of the workshops formed the basis for the design of these tools. The toolkit integrates key findings regarding the required types of information and formats for collaboration. Innovative approaches of co-creation – joint exercises on the perception of urban space and experimental forms of co-design – are also included. On this basis, we developed several reusable digital elements and prototyped a range of tools building upon these components. To evaluate them, we tested the tools together with Neuperlach citizens. This prototyping process shows how the production of digital tools using data from the Digital Twin (or immersive media) can be brought together with the potential of analogue co-creation formats. The resulting tools can be used for future urban projects – e.g., to establish additional mobility hubs, or for adaptive climate interventions. Both the digital toolkit and the prototyping process are described in more detail in the NEBourhoods deliverable D5.6.

4.1 SCALES AND FORMATS OF THE CO-CREATION PROCESS

To design the NEBourhood Hubs, it was necessary to collect different types of data that we gathered in co-creative settings. As this is central to our work, we quote the following article from our second publication in the context of NEBourhoods: “Situating Digital Participation: Incorporating material, contextual, and performative learnings into digital toolkits.” Published in: Proceedings of the International Conference on Education and Research in Computer Aided Architectural Design in Europe, 465–474.

4.1.1 Large-scale localization

“Locating the NEBourhood-hubs on the scale of an entire district poses various challenges. On the one hand, it is crucial to clarify the criteria to identify the most suitable locations. A vote based solely on the participants’ place of residence or neighbourhood should be avoided. Therefore, the participants were informed at the beginning of the event that their choice of location must be publicly justified in a joint feedback round following the event. This also allowed for the collection of qualitative information about the choice of location, which helped in the subsequent planning process.” (ibid).

4.1.2 Small-scale localization

“Once a decision has been made in favour of a rough area or neighbourhood, a specific site for the hub must be determined. Traffic regulations, pipework, ground loads, and clearance areas are essential to consider, as well as practicality, proximity to various facilities, and design ideas. Bringing these two poles - hard and soft factors - together is the challenge that needs to be mastered.” (ibid).

4.1.3 Configuration of functions

“Various functions are conceivable for the hubs. However, they must be adapted to the needs of a concrete location and react to local conditions. The challenge is, therefore, finding a method that allows us to gather, compare and discuss desired configurations. Furthermore, an operator model and concrete steps for the implementation need to be discussed.” (ibid).

4.1.4 Design

“How can small-scale ideas such as bookshelves or lockers be integrated into the hub design? What are the concrete requirements of the place? What ideas do residents have about colours and materials? The respective participation format must encourage residents to be creative and, at the same time, convey the technical limitations and necessities.” (ibid).

4.2 ANALOGUE, ARTISTIC AND COLLABORATIVE EXPERIMENTS

In collaboration with three local creatives from the pool and the NEBourhoods Transition Hub co-creation team, we devised a variety of experimental formats. These formats were tailored to the specific local context, fostering meaningful engagement with mobility planning. Additionally, they served to gather data crucial for the design process of two NEBourhoods Hubs.

4.2.1 Multimodal drifting

In this workshop, we pioneered the fusion of large-scale and small-scale localization through collective movement within urban environments. This innovative format was co-created with Ralf Otto, a local dancer with extensive experience in "drifting" as a method of collective spatial exploration and social engagement. Participants traversed the designated area on foot and by bicycle, aiming to pinpoint the most promising locations for NEBourhood Hubs. The workshop commenced with a clear briefing on its objectives and rules: participants were to move deliberately in one group, whether walking or cycling. Leadership was fluid; any participant could steer the group in a new direction by taking the lead. This principle also applied to the choice between walking and cycling. Potential locations were meticulously recorded using geo-referenced points of interest (POIs) and subsequently assessed for their suitability. A critical insight emerged early on – the drifting method is not entirely safe for cycling in open spaces in Germany, thus limiting its effectiveness for identifying hub locations on a larger scale. The necessity for ongoing discussions about the next biking area deviated from the original method but proved highly effective for identifying spots on a large scale, such as squares or parks. Despite some participants' initial confusion about the drifting method, the group adapted and operated within the framework. It became evident that a comprehensive and explicit explanation of the method is essential to ensure equitable participation. This includes a thorough warm-up to alleviate awkwardness and foster familiarity among participants. In conclusion, drifting offers significant potential for co-creative identification of locations on a small scale. It also provided a unique opportunity to

experience urban spaces intermodally and to empathize with the perspectives and ideas of others. The result was an intermodal travel chain and a curated collection of suitable locations.



Figure 5 Warm-up exercise of the drifting workshop. Image Source: NEBourhoods/Matti Drechsel

4.3 PHOTOGRAPHIC DATA GATHERING

We developed and applied this approach together with the photographer Sandra Singh. It kicked off with a complimentary urban photography workshop for Neuperlach residents. Following this, participants engaged in a two-week competition, tasked with identifying pivotal locations in Neuperlach essential for mobility and capturing these spots through creative photography. Participants also documented their rationale through written or audio recordings, ensuring precise location data and giving us valuable insights in their daily routines. All images were then mapped onto a NEBourhoods map and evaluated in discussions with local planning experts. Despite the number of competition entries being lower than anticipated, the format unveiled significant insights into the possibilities for a collaborative search for hub locations. The workshop provided a welcoming atmosphere and showcased photography as a powerful tool for collective engagement in urban development. The method is inherently suitable for identifying locations on a neighbourhood scale. However, to fully realise its potential, a larger participant base is crucial.



Figure 6 Explorative photography exercise. Image Source: NEBourhoods/Nick Förster

4.3.1 Collaborative Design

In collaboration with Enrica Ferrucci, a local architect and member of the NEBourhoods pool who also specializes in design-centered pedagogy, we held a workshop focused on configuring and designing individual hubs. During the initial phase, participants covered cardboard cubes with images, collages, or symbols representing different functions. These cubes were then stacked and combined in various ways to explore different configurations and to test the interactions between the functions. At the end of this phase, participants used sticky dots to vote on the importance of each function. In the second part of the workshop, the most important functions identified by the voting were constructed on a scale of 1:20. Participants used wooden parts, plastic rings, and paper constructions to bring these functions to life so that they could be concretized and assessed for feasibility. Participants also developed designs that best supported each function. Overall, this method proved to be very successful with the participating people of all ages. The functions and configurations that were most frequently expected from the hubs were easily identified. However, participants had some problems with the use of the materials provided for the design of the 1:20 scale hubs. It became very clear that materials like wood, or dough offer many possibilities for presenting ideas and working on designs thoroughly but also require a lot of skill. Materials such as cables, building blocks or straws are obviously easier to handle to begin with. However, they do not offer the same opportunities to visualise ideas precisely.



Figure 7 Model-building workshop. Image Source: NEBourhoods/Matti Drechsel

4.3.2 Collaborative Decision making

Together with inhabitants, experts of the City of Munich and stakeholders we held a workshop to decide for locations, designs and configurations of the hubs. Therefore, we prepared analytical maps and figures showing all the collected data in an easy, understandable way. The participants could propose spots for further development using a three-by-three metre aerial image carpet. The participants then grouped themselves around the proposals they want to help shape. All participants were asked to change groups at least once and the experts were asked to visit each group. At the end of the workshops, seven scenarios had been worked out, each consisting of a location, a configuration and suggestions of local partners who would take care of the hubs. Finally, the scenarios were ranked, everyone could choose their two favorite scenarios. With this information, we were able to start with the concrete planning the hubs.

5 THE IMPLEMENTATION

At the beginning of the conceptualization phase, we knew that there are certain aspects of a planning process we could not carry out in a co-creative way. In this section, we describe the

standard process for the final realization of the NEBourhood Hubs, which involved discussions and coordination with various departments and divisions of the City of Munich and the manufacturing metal company.

5.1 LOCATION

The first site we looked at in detail was Steinplatz, as it was rated best by the workshop participants. It is located in a public park and is managed by the City's parks and -green spaces division. It is responsible for deciding on and maintaining public installations. With the support of NEBourhoods management, we met with this division. Approval of the location was facilitated by the fact that table tennis was available at this site for several years and that it is close to a basketball court, a skatepark and a soccer pitch. This meant that planning could be continued quickly at this location.

Albeit the scenario at Steinplatz being an instant success, finding the second spot proved more difficult. The location rated second was close to Perlacher Herz, a very active neighbourhood centre in the eastern part of Neuperlach. However, the only available space for our hub was directly on the street, which is normally used for parking cars. This would have meant achieving the allowance for a "Munich parklet" which comes with the duty of dismantling the hub again in October. This was not in the interest of NEBourhoods. An alternative site at this location had to be discarded due to unsuitable ground conditions. We then focused on Hanns-Seidel-Platz in the very centre of the district as a second possibility. However, there were no options that would have left the necessary space for footpaths. Another spot we had in mind right from the start was Plettstraße. It is centrally located in the network of footpaths, and we had noticed that many shopping trolleys were constantly parked there. The location would have offered more synergies with two newspaper vending machines serving the neighbourhood and a municipal mobility station with parking space for shared mobility. Since the location is owned by the most important private housing company of Neuperlach, we organized an on-site meeting with a responsible person. Together, we explored what improvements the hub could bring for the residents. Although the meeting went well and next steps were agreed, the company then ceased communication without giving a reason.

This left us with two options: the sports ground in the Wohnring and a location on Therese-Giese-Allee. As a quick decision was necessary, we decided in favour of Therese-Giese-Allee. The sports ground location would have been too similar to the first location and the possibility of evaluating different functions of the hubs would have been significantly limited. The decision in favour of Therese-Giese-Allee also offered the opportunity to reach the southern part of Neuperlach with NEBourhoods. All the necessary meetings and preliminary consultations with the administration for Therese-Giese-Allee went well with the support of the City of Munich and we were able to take the next steps to obtain all the necessary authorisations.

5.1 PERMISSIONS

Our aim was it to install the NEBourhood Hubs in June 2024 and have them on site for at least the time until the end of the NEBourhoods-Project in March 2025. From an administrative perspective, we had to decide against our Hubs being parklets, as this would have meant dismantling them by October as this is the by the city administration intended process. Also, we wanted to build them as real structures and not only as places marked by paint on asphalt. Given that we had exclusively planned for public spaces under the jurisdiction of the City, we needed a swift process to install temporal structures there. Therefore, we decided to apply for a special use allowance. This is an allowance introduced for merchants wanting to place some of their merchandise out on the street or for advertisement structures. But we were assured, this process could also be used to accompany all sorts of temporal structures on public ground. Furthermore, since we didn't expect more than 30 persons being at our Hubs at the same time, there was no need applying for an event permission. This would have come with a lot of responsibility for personal safety and would have needed to be insured in an explicit way which is difficult for universities. As we had spoken to all the responsible representatives of all the critical agencies of the City, we were very confident that the process with the Department of Public Security and Order (Kreisverwaltungsreferat, KVR) could be accomplished very swift.

Unfortunately, this was just the case for the spot at Steinplatz. With the spot at Therese-Giese-Allee we had to deal with rejections from different agencies. One was caused by internal coordination issues within the City's administration. The other one could be resolved by determining and taking into account the exact function of a nearby power line of the municipal public utilities company (Stadtwerke München GmbH / SWM). The most severe problem being an electricity cable located close to the hub and therefore needing a larger clearance space than we could provide. However, we discovered this cable is just for the supply of internet infrastructure which is classified not as critical for the supply of households and therefore allowing us to proceed.

5.2 DESIGN

For the design and the construction of the Hubs we held an open tender in the summer of 2023. The tender process consisted of a fixed base configuration of the Hubs and an array of additional extensions which needed to be designed and priced. The company Gronard GmbH from Munich-Perlach won the tender and we set up a collaboration to further develop the respective design of the Hubs. As the results of the collaborative decision-making workshop were not yet available at this time, the final configurations were just finalized after some delay.

In the meantime, we were able to clarify which configurations could be built by the company, which initiated the second level of the entire planning process. Both we and the company strove to comply with all the applicable regulations for barrier free design. Not all proposed locations and configurations could be implemented, leading to two Hub configurations for the respective locations. We could not use every spot which was proposed by the participants, and we could not build every configuration they proposed. So, we ended up with two different configurations for the two spots according to the previous mentioned scenarios. The Hub at Therese-Giese-Allee was named RESI after the name giving person to the street Therese-Giese and includes: A roof for shading, a bench, a repair station, a book exchange shelf, a blackboard and a library of things. The library of things, was an item a lot of participants voted for, is a storage unit with various compartments which can be accessed by a mobile app. It is closet with different compartments which can be opened using an app.-This technology was provided by the Austrian company Variocube. The individual compartments were filled by us according to the items the inhabitants wished for at the workshops and using a special mailbox we installed on site. In the summer we wrote a letter to all neighbors asking what they wished for. As there are less compartments than items wished for, we grouped them thematically. As by now there are six compartments: The chilling outdoor compartment, the outdoor celebration compartment, a sport compartment, a table games compartment, a tools compartment, a compartment with a wagon and a compartment with keys for the cargo bike and the trolley. The STEINI Hub consists of: A roof for shading, two deck chairs, a picknick table with one bench and enough space for a person in a wheelchair, a repair station, a book exchange shelf, a blackboard, and an exchangeable graffiti wall. Gronard GmbH started building the hubs during spring 2024. In summer 2024 they shipped them to their locations pre-assembled and completed on-site assembly within a single day.







Figure 8 Impressions of the opening of the Hubs. Image Source: NEBourhoods

6 EVALUATION

6.1 FREQUENT INSPECTION TOURS

We organised a caretaker service for the weekly clean-up work. In addition, NEBourhoods project staff checked the hubs at regular intervals. This allowed us to make sure that everything was working and to improve the design we had developed in small steps. This section summarises the observations of these people.

STEINI and RESI are used very differently. People pass RESI all day long when they go shopping or are on their way to work or home. STEINI, on the other hand, is a place that is deliberately visited. People come here for the sports fields, the skate park, to linger on the benches in the green corridor or because of the Hub and what it has to offer. The benches in the Hub were particularly popular in summer, especially in the evening. It was remarkable that there was almost no vandalism at STEINI. In contrast, we had to repair certain parts at RESI again and again. Although there were already book exchange shelves in other places in Neuperlach, the two in the Hubs were in constant use from day one. There were more books than could fit on the rather small exchange shelves and the books circulated well. The repair stations were also very popular. Even during the short time we were at the Hubs, we saw people using them. The pump was used frequently, and all the other equipment was used too. We saw posters on the notice boards advertising events in the neighbourhood.

However, using the app to borrow materials from our Library of Things was a hurdle for many older people. The action lacked the resources to organise a personal introductory event. The usage data showed that the Library of Things is very popular with those who can use it. As part of the NEBourhoods Workshop 3 – Hacking Neuperlach, UnternehmerTUM four groups of students put on the challenge “Barrier-free access to systems designed for app access” (see NEBourhoods Deliverable “Hacking Evaluation Workshop 3). ResiAI, Sweasy, ResInterface and RentBee proposed solutions. However, they could not be tested or implemented so far. For future projects, the challenges of creating accessible solutions for all need to be tackled much earlier in the process.

6.2 USAGE DISTRIBUTION

As we observed that STEINI seems to be used a lot less since autumn and that RESI still sees frequent use, we wanted to evaluate what people are doing at RESI and how usage

patterns vary over the course of a day. So, in the beginning of November, we went there to observe the hub a whole day (from 8 a.m. to 5 p.m.). A supermarket in sight helped to stay hidden and still observe every movement in the vicinity of this Hub. However, as the daylight faded at around 5 p.m. Heavy snowfall set in and made every further observation impossible. As the deliverable was due, another date for field research could not be organized. The data we collected until then seems to show a normal distribution over the day. This would mean that the Hub is not mainly used by commuters but by the public. As otherwise the peak usage would be early and late in the day. This is also bagged by the observation of the things they have done there. Mainly people were reading the blackboard, looking for interesting books and children were playing in the Hub. Since it was that late in the year it seems like a reasonable assumption that this would be a normal winter usage of the Hub. Sitting there, repairing the bicycle or spending time with the rented materials is far more enjoyable with higher temperatures. Of course, it is possible that in summer the Hub is used more by commuters, but they also commute in winter, so it seems likely, that RESI at least for now was not able to attract commuters. Still the number of people using the Hubs (16) seems what could be expected for the functions offered and the location chosen.

For STEINI, being located in a park, we expected that during late autumn and winter usage would be weak. So, we didn't start a methodical observation. However, through our frequent visits to the spot we could observe some people using it in a similar way to RESI at this time of the year.

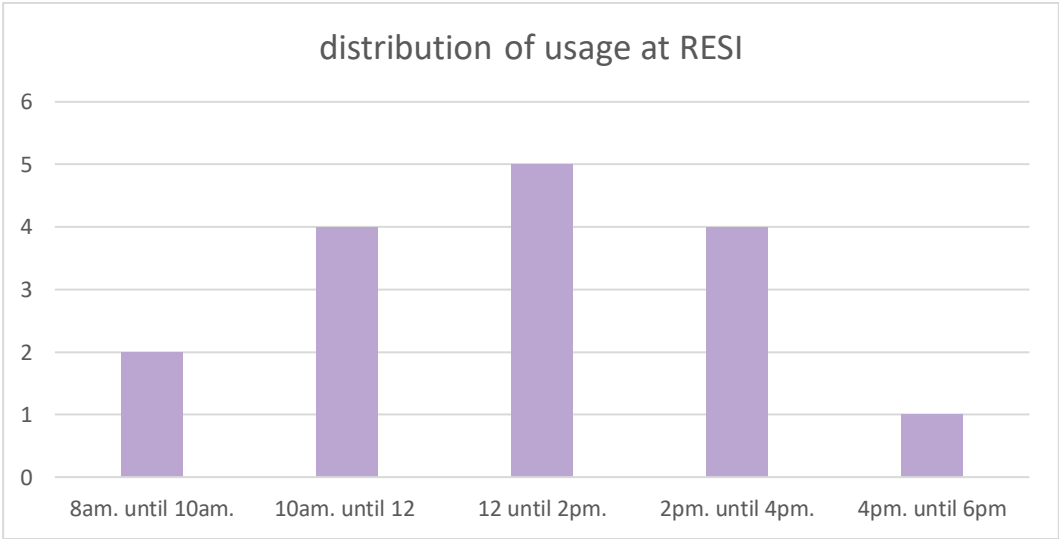


Figure 9 Distribution of usage at RESI. Image Source: NEBourhoods/Matti Drechsel

6.3 SURVEY

At the beginning of November, we conducted a one-day survey among passers-by with general questions about the use of STEINI or RESI. We also asked again for suggestions on

how to improve the Hubs. As these were random passers-by, we were able to gain an impression of the general acceptance and the use of our Hubs. A good percentage of participants had already interacted with one of the hubs at least once. The Hubs are being noticed and many people are curious about the new offer.

The answers that the book exchange shelves, and the repair stations are used the most correspond to our observations. As we reached people from different parts of Neuperlach, our assumption that the location is a relevant destination for daily shopping was confirmed.

A second part of the survey covered the quality of the hubs. We asked about requests for change and particularly positive feedback. Most participants found the bookshelves too small and realised that the doors of the shelves were not completely watertight. We suggested improvements for these problems. One person mentioned that she feels unsafe because of the people sitting in STEINI. This is a problem that often occurs with different social groups using the same spot in the dark. Most respondents were positive about the Hubs and wanted them to stay. The bookshelves are very popular, and many people said that they use them. We learned that the hubs have made people feel that something is changing in the neighbourhood in their favour and that someone is thinking about young people. The fact that children play in the hubs was emphasised very positively. The other functions of the hubs were also mentioned. In a third part of the survey, opinions were asked about the redesign of public space. The analysis of all results is presented below.

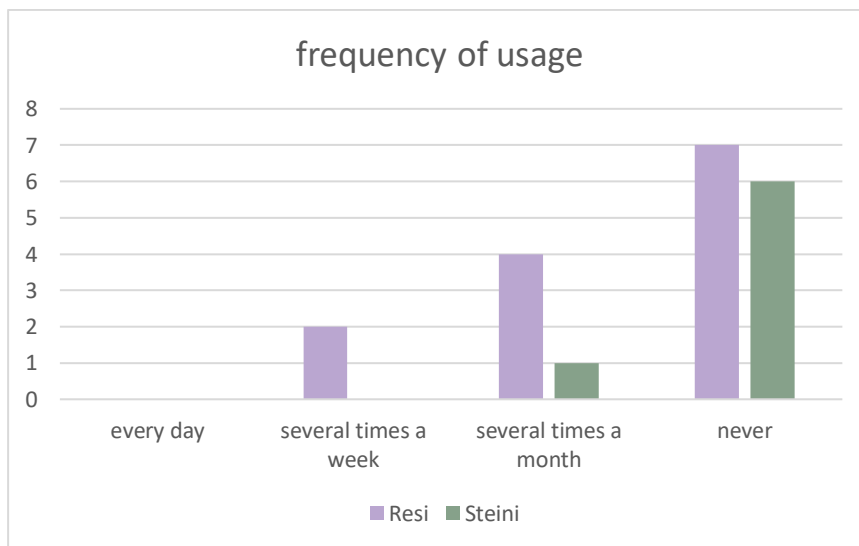


Figure 10 Frequency of usage. Image Source: NEBourhoods/Matti Drechsel

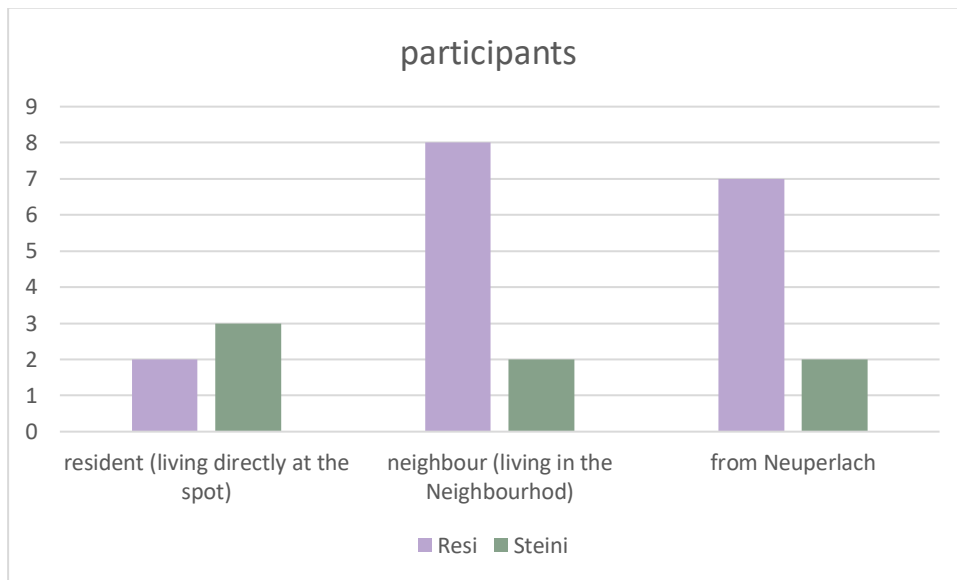


Figure 11 Participants. Image Source: NEBourhoods/Matti Drechsel

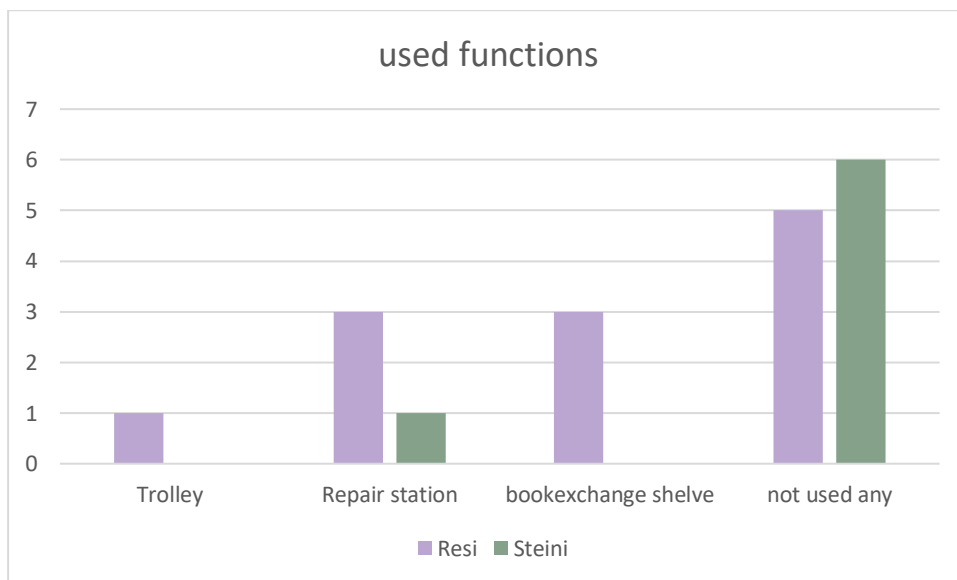


Figure 12 Used Functions. Image Source: NEBourhoods/Matti Drechsel

6.4 GENERAL FEEDBACK

Our colleague from the City of Munich received about 10 phone calls from residents concerning the Hubs. Most of them mentioned broken parts at the repair stations and overfilled bookcases. There were also frequent complaints about the missing or faulty construction of the bookcase door. Due to this fault, many books become so wet that they had to be disposed of. One person reported that the ramp was too steep. All requests from citizens were fulfilled as far as possible. The missing tools were replaced and a door was added to the bookcase. The problem of the ramp being too steep could not be solved at the

temporary location. This will be remedied when the Hub is moved to a new location in March 2025.

6.5 THE LIBRARY OF THINGS

Although the Library of things was highly wished for by the inhabitants, after a busy summer, its usage dropped significantly in autumn. There were various reasons for this. Our services are primarily geared towards summer needs and people are less likely to use an infrastructure like the hub in winter. However, the sign informing pedestrians about the purpose of the Hub, its functions and how to use the library of things was also stolen at the end of September. It was not possible to replaced it until mid-November. During this time, it was probably difficult for interested passers-by to know how to gain access to the sharing facility. Apart these problems, we are in constant dialogue with the residents via the above-mentioned mailbox and by talking to people on site. During our inspection visits, it seems that there are currently winter-specific requests for things for the library.

Looking at the rental data it is very clear that people used the tools-compartment and the chilling outdoor-compartment most. The tools compartment includes many tools residents wished for. The chilling-outdoor-compartment, however, was proposed as test by colleagues from the City of Munich and MGS.

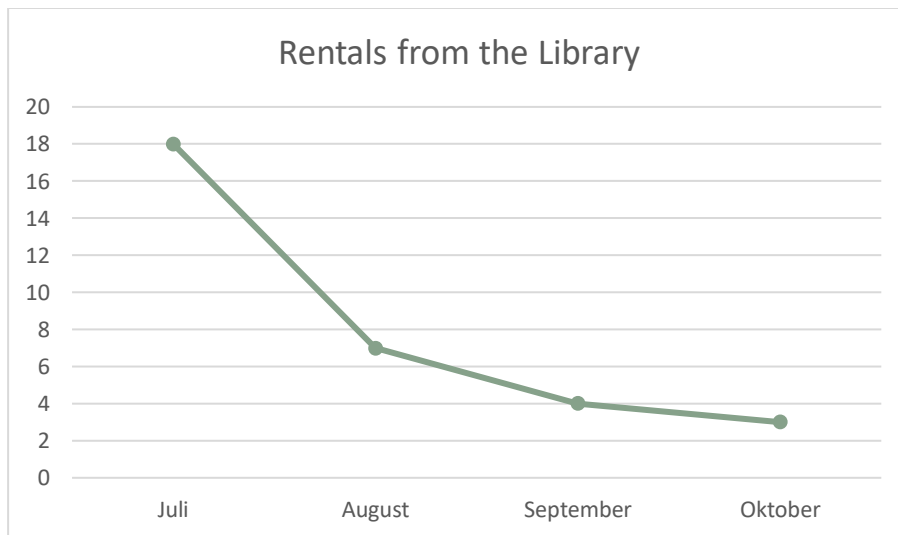


Figure 13 Rentals from the Library. Image Source: NEBourhoods/Matti Drechsel



Figure 14 Most used items. Image Source: NEBourhoods/Matti Drechsel

6.6 TRANSFORMATION OF SPACE

From our conversations with local people and our survey, it became clear that the presence of our Hubs has changed the way residents perceive the space. Once two commonplaces in the neighborhood, they are now distinguished by the Hubs and some of the connotations associated with them are being adopted. As already mentioned, these are surprisingly positive.

People said that they like to see things happening in the neighborhood and that something is being done for children and young people. Also, they mentioned that it is good for them to know that there are tools when they need them to fix something. They also perceive the colour of the Hubs as an addition to the area. The STEINI Hub site is now labelled as a destination for leisure and sports. In summer, people meet there in the evenings. For the first time in years, there is a seating area at RESI. The little square in front of a supermarket and a vegetables stall where STEINI is located now has a quality of stay and other functions that make the square itself a destination.

The small square in front of the supermarket and the vegetable stall where STEINI is located now has a quality of stay and other functions that make the square itself a destination.



Figure 14 Before and after – locations of STEINI and RESI. Image Source: NEBourhoods/Matti Drechsel

6.7 EVALUATION CONCLUSION

Besides a few problems like the stolen sign at RESI we are satisfied with the results, especially as we can assume that the Library of Things will be used more frequently again. Overall, we received a lot of positive feedback. With one exception, our fear of vandalism has not materialised. There was no serious damage, no noise complaints and no littering. For us, this indicates that the residents have accepted the Hubs in their living environment.

RESI and STEINI are now listed on Google Maps and also noted as a repair station on <https://www.fahrradpanne-muenchen.de/> This being done by inhabitants further encourages us that the Hubs are on a social level there to stay. Also, the feedback has been very positive with the negative feedback being hints to what is damaged and needs to be fixed. All in all, the evaluation shows that the NEBourhood Hubs were given the right functions, that people start to care about it and that both spaces have changed to the better through their installation.

7 CONCLUSION

This project has shown that even in complex sustainable mobility processes it is possible to involve residents in a co-creative way. We have successfully experimented with ways to work together with residents on the transformation and come up with solutions that are truly unique and fit the local communities. Ultimately, people need to respect these new infrastructures. Otherwise, they will be subject to vandalism or they will be abandoned very quickly.

Creating together included a process starting with an overall concept and configurations and ending with design concepts and concrete locations. The overall outcome is widely liked in the quarter not only because it makes new uses of different spaces possible, but also because it is beautiful. Many people stated that they think those spaces are now more colorful and that they now would have a new additional meaning to them. This outcome can encourage people to go outside, share their books or lend some tools, to walk, or to ride a bike. At STEINI it also gives the opportunity to fix or modify your board and to try it out directly beside the hub at the little skatepark. Also, the elderly now can easily reach the shop at Therese-Giese-Allee since now they have the possibility to sit and rest. If they need to rest for a longer period, they have a little connection to the book at hand. This all contributes to a sustainable transformation of the quarter, showing people the qualities of a commute outside of a car and giving them incentives for doing so. Of course, our hubs are not perfect yet. We had very little time to implement them, and not everything worked perfectly as we planned, but for RESI and STEINI, the process is far from over. There are a few tweaks in the design which are already planned with those who take them over in March. Thanks to the engagement of our colleagues from the city of Munich and MGS, they will continue to serve the Neuperlach inhabitants, albeit in different places. In this way, the co-creative Process will keep on going, making sure that the two Hubs will stay relevant and helpful for the local communities. The co-creation process encompassed the entire process from the overall concept and configurations to design aspects and specific locations. The result has been very well received in the neighbourhood, not only because it enables new uses for different spaces but also because it is beautiful. Many people stated that they felt that these spaces are now more colourful and have a new, additional meaning. In this way, people can be encouraged to go outside, share their books with others or borrow tools, walk or cycle. Depending on the location, special opportunities have been created, for example for skateboarders, or especially for older people thanks to the seating opportunities. This contributes to a sustainable transformation of the neighbourhood and incentivises people to give up their cars. Due to the short time available and the limited resources for our prototypes, there is still plenty of room for improvement of the Hubs. Even after the end of NEBourhoods, the use and further development of RESI and STEINI will continue. Thanks to the cooperation with the City of Munich and MGS, they will stay in Neuperlach, even if one of the locations must be changed. Co-creation will remain a guiding principle.

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