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An Interdisciplinary Approach to Co-Designing Safe School Zones Through Placemaking

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A b s t r a c t

The research explored how social design might facilitate the creation of safe school zones for children with the tools of participatory placemaking focusing on their physical and mental well-being in an urban environment. The research applies both traditional (interviews, questionnaires, observations, etc.) and design research tools (problem mapping and participatory design workshops) together with quantitative speed measurement. The project was realised by an interdisciplinary team involving experts of urban mobility and traffic safety, child and environment psychology, pedagogy as well as policymakers. By involving students (aged 12-14) and their teachers into the research process, their insights were integrated into small-scale urban interventions, transforming school front areas into dedicated spaces, where they can gather, socialise and strengthen their connection towards each other and the school area. The implemented prototype proved to be an often used space and it offers transferable and scalable solutions for other school fronts in the city.

K e y w o r d s : Co-Design; Placemaking; Interdisciplinarity; Public Space; Urban School Zones.

1. Introduction

In 2025, urbanisation remains an ongoing process, since cities have become the primary environment of living and working. As a result of this ongoing change, people seek solutions on how society can coexist in a constantly growing population, while many new challenges arise constantly connected to our urban well-being. In an urban setup our overall quality of life is greatly affected by the public spaces we use day by day, since they are more than just functional places. These factors are much more relevant amongst children, since these urban environments become significant places of their development and well-being. That is why there is a growing interest in creating child-friendly cities, that focuses on the inclusion of children's needs and desires when it comes to urban planning.

he increased interest is happening in both urban planning practice and academic research, which has resulted in the growing body of literature and good practice collections over the years (UNICEF, n.d.). Many of these discuss the most relevant topics, when it comes to making cities more inclusive for children, including accessible green spaces, safe mobility options and participatory actions that involve children. Studies explain the importance of child-centered urban design and many frameworks show a know-how for child involvement, yet these efforts are still not consistently happening and are not well embedded in decision making processes (Wilhelmsen et al., 2023). Although there are some shared challenges in urban planning despite of the different urban contexts, there are no unified methods, and in many cases child involvement is often happening through unique, project-based frameworks, rather than an integrated approach (Cordero-Vinueza et al., 2023). There is a special traction in the concept of child-centered city planning, however this trend does not always have the depth, and many times ends up in a very superficial intervention, with no long-term effect or real values. One of the greatest challenges of such projects lies in the nature of children's and other stakeholders' participation. Discussions are crucial with the effected parties, but for sustainable solutions it needs to happen as an ongoing process.

Beside these known challenges there are still some gaps that serve as a barrier in systematic change. Bringing together urban planners, governments and the locals – both children and adults – should not be an exceptional occasion, but something that happens on a regular basis, to discuss current issues and challenges of the given neighbourhood (Nordström & Wales, 2019). Although the importance of engagement has been articulated since Altman (1978), the theory has been slow to come into practice

(Danenberg et al., 2018; NIUA, 2019; Krishnamurthy 2019; Slingerland et al., 2020). However, this also means that we cannot yet find a methodological recommendation that critically questions the already existing participatory projects and offers a tried-and-tested orientation for participatory urban projects that build on the already existing examples. Like in the International Guidelines on Urban and Territorial Planning (UN Habitat 2015), in The intercultural city step by step (Council of Europe, 2019) as well as in the Walk'n'Roll Cities Guidebook (URBACT 2022) it is stated in several chapters and pages that active involvement of local communities is crucial to develop liveable and sustainable urban spaces, still they do not include proper methodological recommendations about the practical know-hows. Since there are no frameworks for such a process, it cannot become a habit and remains as an additional part of the project. This results in an engagement which is not consistent and often superficial, and the inputs from the communities involved cannot really influence the end result, since it happens in an isolated way (Ataol et al., 2019). Although it is known that a dialogue between the affected stakeholders would make better solutions, there are many difficulties in enhancing genuine connections and real conversations, where every voice is heard and considered. As a result, many technically efficient spaces are realized, but these often do not react to the local communities' needs or desires (Cairns et al., 2024). In order to overcome these challenges, it is crucial to develop more inclusive and co-creative frameworks, where long-term engagement is prioritised over short-term consultations. Through integrating participatory principles, a real interdisciplinary approach can be realised, where all the relevant stakeholders can bring their experiences and knowledge to the table (Anthony Jnr, 2023). Working with such methods it is easier to react to any current challenges and create more adaptable solutions that work well on a long-term basis. Following these needs, the paper is going to introduce a research project to illustrate a concrete attempt to implement such inclusive principles.

he paper introduces a research project, that was initiated by a Hungarian-based design university in 2022 and was developed in partnership with relevant institutions, including the Budapest Public Transport Center, the Institute for Human - Environment Transaction of Eötvös Loránd University and the Municipality of the 7th district of Budapest. Throughout the process experts were involved from disciplines of urban mobility and traffic safety, child and environment psychology, pedagogy as well as policymakers. The main research question focuses on how social design and participatory placemaking might facilitate the creation of both mentally and physically safe school zones for children. The goal of the project was to examine the liminal spaces of school front areas and transfer them into safe school zones, while being inclusive with the local community.

Urban planning is a complex field, with the deep involvement of many different disciplines. Although there are more and more research and real-life projects that aim to create sustainable solutions for citizens, there is still a gap in how real interdisciplinary projects can be realized in order to realise results that try to immerse all the relevant aspects. Focusing on that matter, the research project was implemented with a significant focus on interdisciplinarity, which approach contributes to the growing body of knowledge on intersectoral collaborations. The research framework opens up the possibility to dive deeper into the very complex matter of urban development and cohabitation, while involving many stakeholders and relevant experts in the conversation, compared to a market-based project, which often operates where there are many pressing issues. These are mostly connected to time and money, which can urge the creation of fast solutions and put a band aid on a deeply rooted problem. In contrast to that this research project aims to look beyond the surface-level symptoms and holistically examine the urban fabric, in order to create a long-term solution, proposing a step forward to a systematic change in urban design.

The research was built on the following structure: an initial research starting with expert interviews, observation and dense description, questionnaires with the students of the examined schools, followed by problem mapping workshops and co-designing workshops. Besides the qualitative data collection, qualitative data was collected in the form of speed measurements. At the end of the process, the plans created together with the children were transferred into scalable and transferable installative elements and were prepared for validation, realisation and testing. Following the implementation of these methods, the research unfolded across two main phases.

The paper summarises the insights of two, slightly different project phases, that were realised in the same district and with the same conditions, but with some further development. It integrates the collected knowledge from the beginning of 2022 until 2024 spring. The paper will introduce the materials and the design research methods used in the project, with a special focus on the roles of the different stakeholders. It will showcase a detailed analysis of the involved expert team’s impact on the project, the several ways of their involvement and the researchers’ role in facilitating such processes. The research project emphasizes the fact that children can be experts as well, especially in matters that directly affect their everyday lives. Besides the advantages, the study will introduce the challenges of interdisciplinary projects connected to different goals and way of thinking each stakeholder represents. By introducing the results and outcomes as well as the interdisciplinary and participatory approach of the project, it offers valuable insights for advancing more inclusive, child-centered practices in urban design and planning.

3. Material and Methods

The key method of the research was to involve a diverse expert team into the process as deeply as possible. In our case we reached out to experts in two specific groups: on the one hand (1) professional experts, who representing different connecting disciplines and fields, such as environmental psychology, child psychology, urbanism and architecture, traffic technology as well as policy making, and on the other hand we also consider the school community - (2) students and (3) teachers of the collaborating school - as experts who can share their needs, critics and suggestions according to the existing as well as the developing school front area. The methodology aimed to involve and connect these two teams of experts into an interdisciplinary collaboration, bringing different perspectives and knowledge to the table.

The involvement happened in different formats according to the different groups based on their comfort and their motivation. The involvement happened mainly by separate expert groups but from time to time they also had the chance to meet and change ideas – in both cases the research team facilitated the process as well as their dialogues taking bridging role to ensure continuity and knowledge transfer between the groups. To introduce properly the different forms of involvement, in the

following the paper is going to explain the main steps of the second phase of the research project: (1) initial research, (2) problem mapping workshops, (3) collaborative design sessions, (4) validation, (5) finalisation of the proposed design.
As the first step of the initial research, we organised a shared consultation with the already listed professional experts where we could present them the framework and goal of the project as well as they could drew up the connecting points of their disciplines and gave valuable details in order to prepare and conduct the rest of the initial research phase. After, observations were conducted by the researchers of the design university focusing on the current situation of the street of the school, the main physical conditions and the general usage of the space. Besides the observation, questionnaires were filled out by the students focusing on their mobility and socialising habits. Also, during the initial research 5 interviews were conducted with teachers at the school in order to understand the main rules, routines and challenges connected to the usage of the school front area as well as an introductory presentation was held for the whole teacher community aiming to engage them from the very beginning into the process. We also could collect quantitative data by speed measurement tools installed at the school front area. At the end of the initial research phase, we collected and synthetised all the gathered data and presented it for the professional experts whom supported the preparation of the next step (the problem mapping workshops) by their valuable feedbacks and concerns.
The problem mapping workshops included 5 differently themed workshops (45 minutes each), facilitated by MOME researchers for one specific class (20 students at their age of 12-14) of 7th grade, aiming to move away from the traditional educational setting towards a more collaborative, dialogue-based process. To foster this calm environment, these exercises were playful and encouraged open communication. The very first session was dedicated to getting to know each other in a playful way, involving mainly movements instead of verbal methods. During the second workshop, the students created a common cognitive map (Altman et al. 1978) about the urban environment of their school. They had to involve not only its physical conditions (with parking sports, green areas, traffic lights and so on) but also they had to place their emotions (fear, happiness, loneliness, togetherness etc.) on this commonly created map to help the researchers to understand the advantages and limitations of the place in its fullness. By cognitive mapping, the research team gained a deeper understanding of how familiar the children are with the neighborhood, what functions they can identify, and what their emotional connection to this environment is (Fig.1).

Figure 1. Cognitive mapping with the students of Baross Gábor Primary School. Photo by Ádám Gábor Teket. 2024.02.08.

During the third workshop, we asked students to create “personas” with the aim to understand the habits of primary users of the school front area (especially through the experiences of the students). In the first round we asked them to list as many user groups as possible: they listed students, teachers, elderly people, parents, smaller siblings, drivers, locals, dog owners, students

from the neighbouring secondary school, bikers and walkers. After creating this list we asked the students to vote and categorise independently the groups into primary and secondary users. After the students developed four personas of the collectively picked four primary user groups (teachers, parents, drivers and students from the neighbouring secondary school), matched them with both internal and external characteristics (Fig. 2).

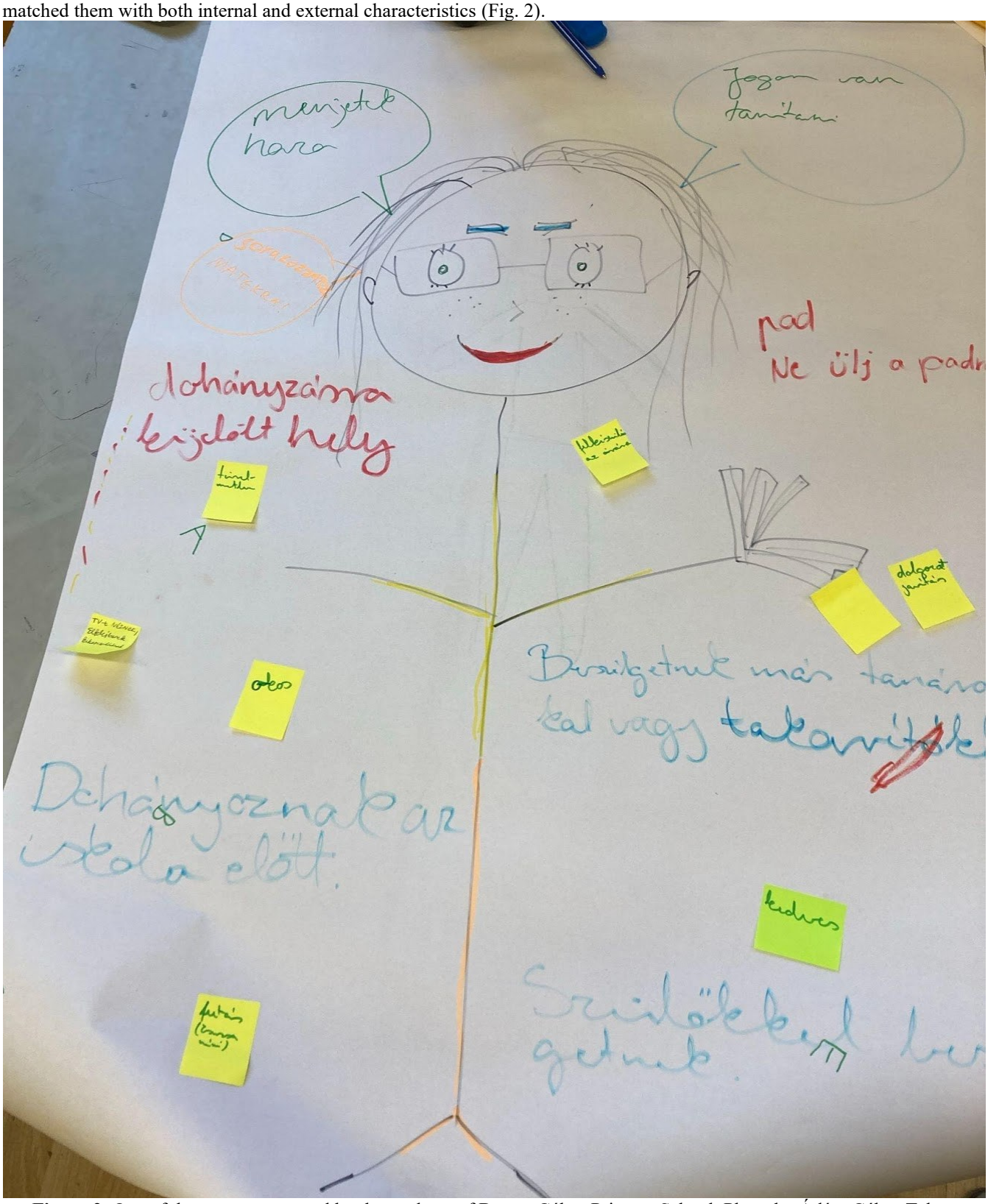

Figure 2. One of the personas created by the students of Baross Gábor Primary School. Photo by Ádám Gábor Teket. 2024.02.14.

As for the fourth session, the focus was on the children's needs. To gain a deeper understanding of what are the characteristics of their desired space and what are the main functional needs, a collaborative collage was created to identify the main functions and envisioned elements. During the last occasion of the problem-mapping phase, the children took a short walk around the neighborhood, critically examining the spaces, their functions and the current conditions, as well as in a playful way we tested

together parking spots replaced by imaginary, community functions. For this last occasion also a representative of the municipality as well as the architect of the project was involved aiming to let them hear directly the opinion of the children as well as to show the children transparency in the process and develop their motivation for active participation (Fig. 3).

Figure 3. Testing the parking spots and creating imaginary functions with the students of Baross Gábor Primary School. Photo by Ádám Gábor Teket. 2024.02.28.

After the 5 problem mapping workshops, data was collected and synthetised again to present it for the professional expert team as well as the community of the teachers to discuss together the explored challenges and prepare the collaborative design sessions.

The collaborative design sessions were facilitated not only by the researchers but the involved architect as well. As a very first step the researchers introduced for the students eight optional design principles, each based on the analysis of the problem mapping workshops. Students were asked to vote independently on three principles which they believed were the most important ones. Based on the independent votes, the class agreed on three main design principles to follow:

1. This is a place that is inclusive of others as well.
2. This is a place where we can release tension.
3. This is a place that helps us to calm down and feel safe (Fig. 4).

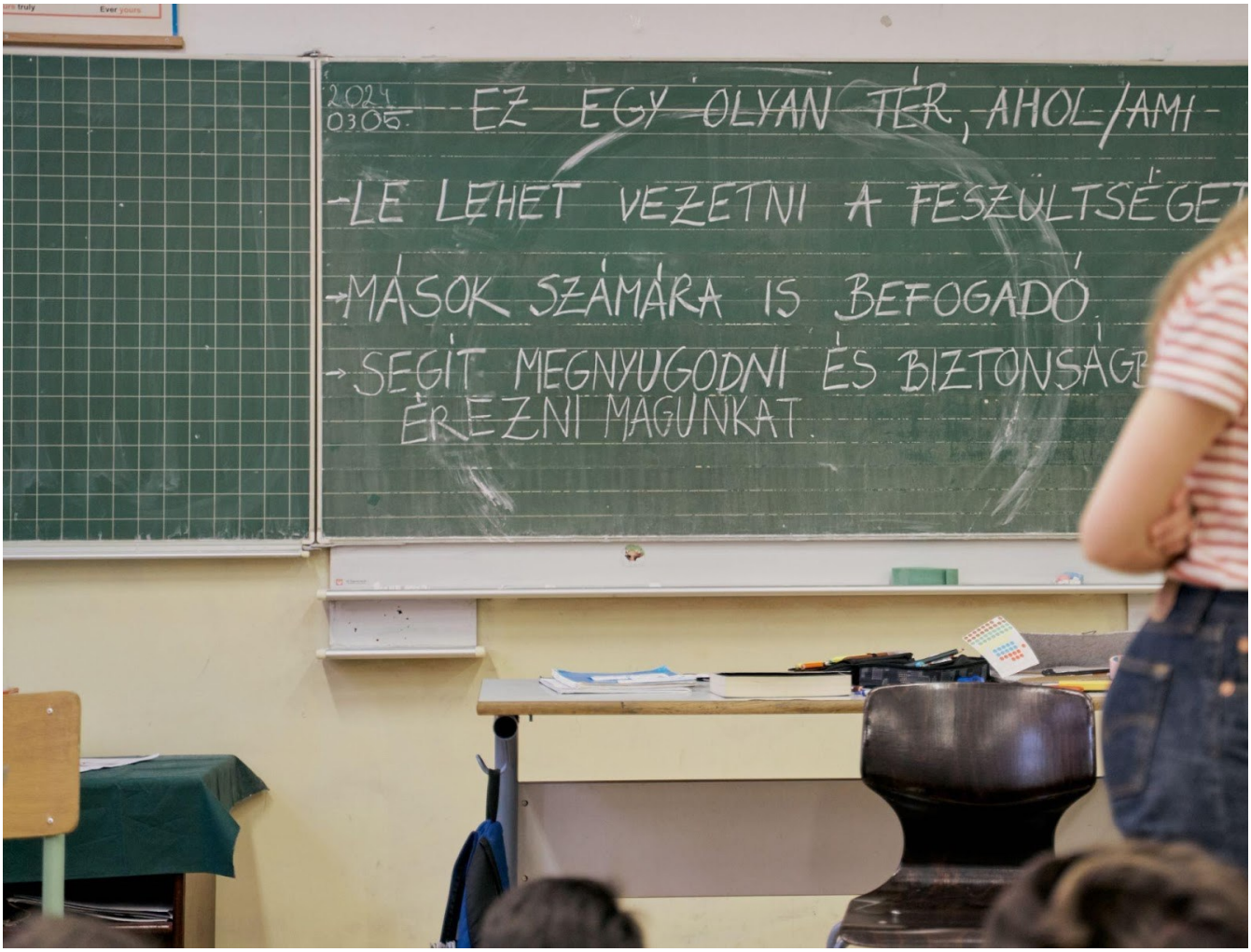

Figure 4. Design principles chosen by the children. Photo by Noémi Szécsi. 2024.03.07.

After deciding on design principles, students gathered into smaller groups, picked among previously collected functional needs (such as sitting, chatting, eating, relaxing, playing ect.) and started to brainstorm and model small-scale interventions into the school front area. Based on the inputs and results of the problem mapping and participatory design workshops, two different concepts were prepared by the already involved external architect: one version occupied two parking spots and involved lively colours and few sitting surfaces, while the other occupied four parking spots with less vibrant colours and more sitting (and thus waiting) opportunities (Fig. 5).

Figure 5. Co-design workshop with the students of Baross Gábor Primary School. Photo by Noémi Szécsi. 2024.03.07.

During the validation phase, the two concepts were introduced for the school community in different forms. First of all, the already involved class participated in a validating workshop, allowing them to contribute additional ideas and critiques to the proposed designs. For the other students at the school a large validation poster was created and placed in the corridor of the school for one week, offering an indirect way to give feedback. The poster introduced the concepts and asked for opinions in different playful ways. Regarding the teachers, the research team introduced the project findings and the two concepts through an interactive presentation. The occasion turned out to be a fruitful discussion and raised valid questions about the responsibility for students spending time in the soon-to-be-formed space after school. The teachers were also asked to support students at the validation poster while the researchers were away (Fig. 6).

Figure 6. Detail of the interactive poster placed at the school. Photo by Gábor Ádám Teket. 2024.04.15.

The results of the validation were introduced and discussd again with the external experts to collect even more feedback. Based on the feedback of the students, teachers and professional experts, the final design concept has been developed and handed

over to the representatives of Erzsébetváros in order to prepare the installation, which should start in autumn 2025. Until the beginning of 2025, the municipality collected feedback from residents through an online questionnaire to understand if locals are satisfied with the design concept and to find out their concerns as well.
By following the previously introduced steps of the research project, we can see clearer the formats of involvement in case of the different expert teams: while professional experts were involved mainly through consultations and partly by joining the problem mapping and collaborative design workshops, teachers were involved through interactive presentations and interviews, students were involved through different themed workshops and by filling out questionnaire and a validation poster.

4. Results

By the steps and formats of the previously introduced involvements, several results were identified step by step – these results are connected to gaining deeper understanding on the various stakeholders' views and by that harmonising them into a proposal of a small scaled urban intervention.
When speaking about the initial research phase it was key to understand the diverse perspectives of the professional experts. For example, the expert of environmental psychology raised awareness on vandalism and the challenges of preventing it. She also highlighted the diversity of users, functions, motivations and thus, behavioural patterns in front of the school: by acknoledging the shared ownership in front of the school, we might have the chance to serve the users the best way possible. The child psychology expert illustrated the diverse educational and socialising role of the school front area, while the representative of the municipality framed the collaboration by introducing the motivation of the municipality: to create safe environment, open up some parking spots and slow down the traffic in front of the school. Based on the initial research we could learn that most students live in the district (61%), get to school in less than 30 minutes (75%), they go to school with friends or alone, on foot or by public transport (87%), and their preferred closest places are Városliget (City Park) and Bethlen Gábor Square. We could learn by the teachers that it is an unwritten rule to send home students after school – not letting them socialising (and thus gathering and making noise) in front of the school. We could also learn from them that there is a lack of storage opportunities for bicycles and scooters and that at the end of the day, students are let out of the building all together. Through the researchers' observation we can state that several adults are smoking in front of the school building even it is prohibited, that the older students of the neighbouring school are spending time in front of the examined primary school, but these groups are not mingling. In the afternoon mass witing is caused by letting the students out at teh same time: parents, grandparents and siblings are waiting in front of the scool but since the pedestrian ways are too narrow, they stand also between parking cars, right next to the road. Regarding the children's physical safety, speed measurements proved that drivers not only avoid slowing down in the close environment of the school, but we recorded a significant amount of speeding as well. The speed limit was 50 km/h, and the maximum velocity was around 75 km/h. Besides the speeding, based on our observation we can also stat the school building has no recognisable attributes to help drivers recognise the presence of children and thus the need of slowing down and even more concernig, that children are covered by the densely parking cars.
The synthetised data of the initial research was complemented by the involved professional experts. Based on traffic experts, we could learn more in detail the limitations of the observed area as well as the most effective tools to slow down traffic: we understood that the most effective tools are physical barriers, obstacles and physically narrowing down the street and these obstacles could be combined with visual elements, taking into consideration that the street are already overcrowded with visual elements, so we need to develop something that "jumps out" both physically and visually from its environment. The involved environmental psychologist also raised awareness about the explored conflicting dynamics: the project aimed to develop a new urban space which (in case it is a good design) will make the students stay in front of the school to socalise, while teachers do not want them to stay and gather there – they rather prefer to send the students away from the school front area. It led us realise the need of even clearer communication between the school staff and leadership on order to avoid future conflicts. The child psychologist highlighted the importance of trust building and collaborative discussions with the students in order to treat them as partners during the process.
Based on the next, problem mapping phase we have learnt that the involved students face a high level of placelessness: there is no dedicated place for them to gather and socialise after school or to wait for each other. And even more, they feel unwanted in this environment resulting in them being unable to develop an attachment to this place which should have a major role in their development. There are lot of tension connecting to the school front environment by different user groups: drivers are disturbing as well as the neighbouring high schoolers, whom also smoke and yell on the street. Teachers send students away while parents are constantly worried by something. Student articulated the need of a 'magic gate' which can make all the homework and struggle dissapeare. They also articulated the need for greening, alternatives for playgrounds, colours, bright bus stops, seating areas, storage spaces for rollers and bikes, litter bins, and larger visible spaces but also smaller spaces for more privacy. They also have different levels of knowledge about the school environment, they could not (or hardly) point out favourite places, although they mentioned parks, squares and places for sport and sitting close by. Students' physical and mental safety also turned out to be a main concern: they feel that they are not visible and their sense of security is disturbed by traffic and strangers.
The findings of the problem mapping phase was presented for and discussed with the professional experts. The environmental psychologist highlighted the importance of the articulated 'magic door': the planned small scaled urban intervention should serve as a transitional space between the school and the outside world, helping the student to arrive and to release the tensions after leaving the school. Also, it was suggested to handle the school front area as an opportunity to give space not only for children but also for child-adult interactions, moreover, it was highlighted again to acknoledge the presence of other user groups of the urban environment. The child psychologist suggested to give extra care sharing the limitations of 'adult world'

for the student in order to make them understand the need of compromises. It was also advised by her to validate the design principles and directions by the students in order not to misinterpret their input. Traffic experts suggested to develop design which is fencing the used space as well as to avoid using any elements which would cover the children. The representative of the municipality suggested to work with the children on concepts which are modular in order to be able to modify the scale for the future.
Based on the collaborative design sessions two different concept was developed by the involved architect, both were introduced to the school community in different formats as it was introduced before (Fig. 7, Fig. 8).

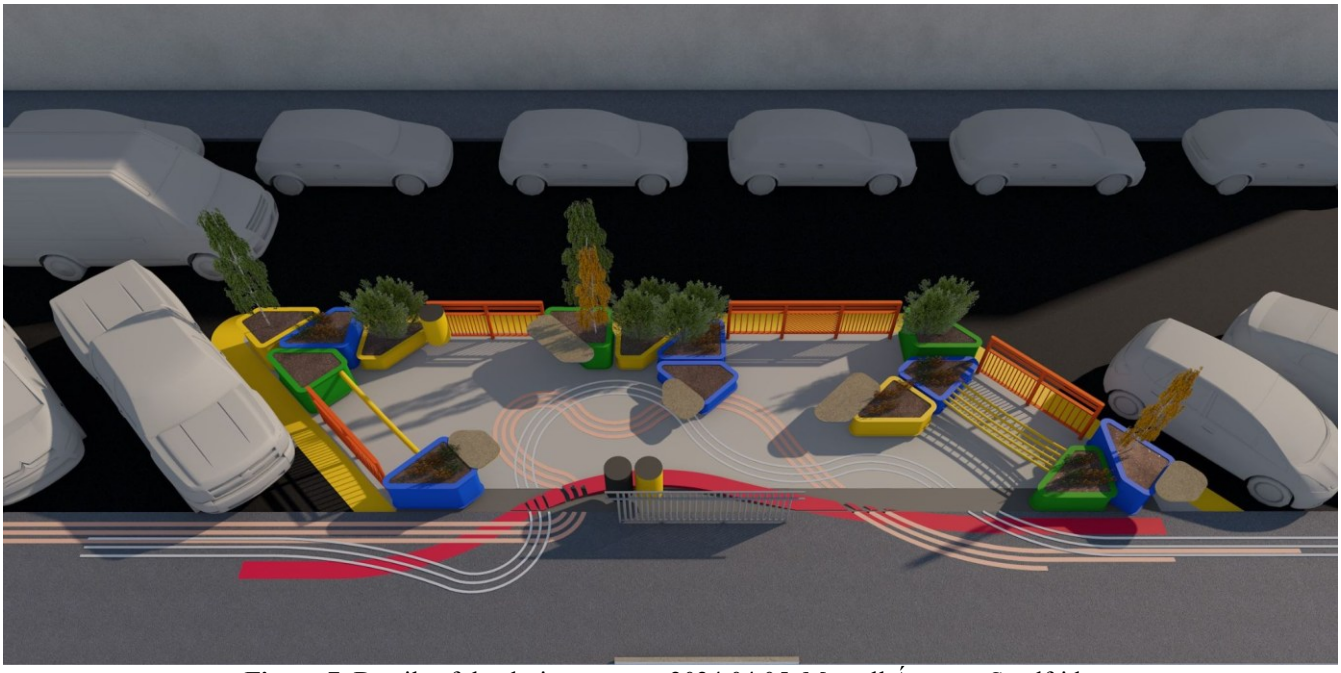

Figure 7. Details of the design concept 2024.04.05. Marcell Ágoston Szodfridt.

Figure 8. Details of the design concept 2024.04.05. Marcell Ágoston Szodfridt.

During the validation workshop students recognised the differences between the two versions, they were excited and thorough during the session. They understood the safety aspects (e.g. the need for a fence, and the reasons for not including large play elements such as trampolines and swings). Students considered the designs as safe. The majority found the design inclusive and expressed the view that the space would be used by children and that there would be features to support tension release. The students also made additional suggestions and expressed their lack of the following elements: wifi, trampoline, pull-ups, street workout elements, play elements, snack vending machine, posts in front of the zebra, jumping school, various signage. The interactive presentation to the teaching staff was able to generate a meaningful discussion, with both affirmations and doubts. A number of teachers expressed their support for the seating, litter bins and the creation of a 'smoking corner' away from the school, potentially providing space for the practice of smoking in a casual setting. Some teachers expressed support for the aim of traffic calming and the practicality of parents being able to sit down while waiting. Several expressed the need for a denser, safer fence and the need to reduce play elements to ensure safety (to avoid inattentive activity). Several staff members raised concerns around the issue of responsibility, i.e. "Who watches the child in the area in front of the school?". To address this concern, a joint private meeting was held with representatives of the municipality and the school, who mutually acknowledged that neither the Institute nor the Local Authority would take responsibility for the child's behaviour and safety in public spaces - it was the responsibility of the child's parent/carer to ensure this. The feedback on the validation poster summarises that the respondents appreciate the new plants and find the proposed installation inclusive, aesthetic, interesting and practical, and their feedback shows that it is child-friendly. There is mixed feedback on the fencing (some find it overwhelming, some find it underwhelming), the use of colour in the murals and the degree of playfulness (some find it not playful enough, some find it too childish). Feedback suggests that some respondents find the layout overcrowded, would like to see more features/playfulness in the murals, lack sufficient bike storage, wifi, 'magic gate', a swing.
From the professional experts mainly positive feedback was received during the consultation on the plans and validations. Psychologists suggested that children are likely to prefer inclusiveness as an external influence. Road safety is also a key consideration. There was a need to "merge" the two designs and to inform the children and the school when handing over the new space. It was clearly articulated that the education of users is a priority as well as the role of communication after the installation is completed (in order to maintain and to develop a sense of ownership).

5. Discussion and conclusion

One of the strongest aspect of the project was its interdisciplinary approach. By bringing together multiple stakeholders, the design managed to become a result of a shared discussion and made it possible to reflect to the different perspectives. Engaging with not only the students, but with their teachers, the whole school community and professional experts as well, a deeper understanding was established of the school's social and spatial aspects. Children share ideas in a very wide range of ways and these valuable inputs are oftentimes only heard but not realized in actionable design elements. The reason for that is these articulated needs or desires need to be translated to direct design principles, that is why many different experts were involved in the process from fields of environment and child psychology, urban planning and architecture, traffic safety, pedagogy and decisionmakers from the local municipality. With their help the children's experiences and perceptions connected to the space were transferred into valuable contextual insights. Teachers – who use the space on a similar daily basis to the children – highlighted the challenges of managing shared spaces, by introducing their perspective not only the behaviour of the students, but their parents and the local community.
By incorporating multiple perspectives the process raised awareness to the importance of a safe infrastructure (such as including speed bumps), how a shared space offers the possibility to foster social interaction between the different users, and how the toolbox of participatory planning can make it possible. The research process also served as a tool to bridge gaps between the different experts and the real users of the space, which promoted a collaborative thinking and joint problem solving, that resulted in an empathetic and inclusive approach of urban design.
Regarding the inclusion, there is still room for improvement, especially to involve the local community as well. Although the project focuses on the concept of school zones, the needs of the local residents should be also heard and addressed. The design concept was introduced to them through an online forum with the help of the involved local representative, where they had the possibility to share their remarks regarding the project. However, an offline forum would have fostered a more direct involvement and a better understanding of the local needs. This applies to the parents as well, since a paper format questionnaire proved to be not the best tool for a real engagement. In the future the project aims to involve additional stakeholders in more meaningful ways.

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Conflict of Interests
The Authors declare that there is no conflict of interest.

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