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From Citizen-Led Street Experiments to Transformative Change

A Case Study in Improving School Environments in the Netherlands

MARCO TE BRÖMMELSTROET and SJOERD BRANDSMA

Recent scholarship has outlined the mechanisms, impacts, and limitations of street experiments. This paper applies those insights to a citizen-led street experiment aimed at enhancing the resilience of a school environment in Ede, the Netherlands. The project successfully improved physical resilience with greenery, improved microclimates, fostered neighbourhood cohesion, created playspaces, and reduced car traffic. While citizens influenced radical, feasible, and communicative aspects, they had limited control over strategic and challenge-driven elements. As a result, the experiment's broader transitional impact depended heavily on support from key stakeholders like school management and municipal authorities. Despite notable behavioural and material transformations, institutional and organizational shifts were minimal. The absence of sustained ownership puts the physical successes achieved under continuous pressure. Future action-oriented research should investigate how to consolidate resilient street initiatives by addressing the complexities of individual learning and creating supportive environments for citizen-led experimentation.

Until the 1920s, urban streets were considered 'the remaining space between buildings' (Solnit, 2000). Not governed by a uniform logic, they were open places for trade, play, social interaction, greenery, and travel. Their ability to absorb or positively adapt to changing circumstances made them resilient (Hermann *et al.*, 2011; Standish *et al.*, 2014). In response to rapid growth in motorization, streets were increasingly seen through the lens of traffic engineering (Norton, 2011), codified into traffic laws, design guidelines, and institutions, and finally solidified into asphalt, concrete, and steel (Prytherch, 2018). Today, most take for granted that

public spaces are traffic spaces while other uses and goals remain neglected (Verkade and te Brömmelstroet, 2024; Brandsma *et al.*, 2024).

The rapidly growing urban populations and rising concerns about pressing environmental and societal challenges (i.e. urban heat, water retention, biodiversity, social isolation, physical fitness) increase demands on public spaces. This development calls for a more comprehensive approach where streets regain their resilience, i.e. the *physical resilience* that allows for richer and more diverse street use. However, as streets are 'a material space and social construct'

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(Prytherch, 2018, p. 13), they also represent *social resilience*, which challenges the view of individuals as consumers of street spaces and reframes them as active citizens. It calls for a shift from a technocratic and depoliticized process towards a more inclusive, participatory, and experimental approach to street design (Bertolini, 2020).

Both research and practice are increasingly looking into participatory street experiments (Kinigadner *et al.*, 2024), which are an 'intentional, temporary change of the street use, regulation and/or form, aimed at exploring systemic change in urban mobility, away from 'streets for traffic', and towards 'streets for people' (Bertolini 2020, p. 735). Scholars have developed conceptual frameworks for street experiments (Van-Hoose *et al.*, 2022; Kinigadner *et al.*, 2024) and explored their deeply political nature (Sierhuis and Bertolini, 2024; Savini and Bertolini, 2019; Verlinghieri *et al.*, 2024) and connections to justice (Smeds *et al.*, 2023).

This paper reports on the embodied and lived experiences gathered during a two-year long citizen-led street experiment to understand how such processes relate to physical and social resilience. By integrating insights from the authors' engagement in the six-year design process, it brings a new perspective to the academic debate on citizen participation in urban development. The paper continues by describing the context, the conceptual underpinnings, and the research design. It then presents our experiences and explores the criteria for transition experiments. There follows a discussion of the experiment's transformative impacts, while the final section draws lessons to inform the theoretical understanding and practical mechanisms of citizen-led street experiments.

The Context: Challenging a Technocratic Traffic Plan for a School

In 2018, the City of Ede announced plans for a new elementary school for 240 children

in the Enka neighbourhood. The announcement emphasized that the plans followed extensive expert consultations, ensuring compliance with all regulations, rules, and norms. The school environment is a fundamental part of the lives and memories of children and their parents, requiring input from various experts, including architects, urban designers, landscape architects, soil experts, building engineers, traffic engineers, project developers, heritage agencies, sound experts, and the school management. Each expertise brings in valuable knowledge, guidelines and norms, such as playspace requirements, water retention, soil quality, noise pollution, structural engineering, protection of monumental buildings, inclusivity of special mobility needs, traffic circulation, and budgets.

The school is housed in a transformed industrial building in the centre of a new neighbourhood. The permit stipulates that the 739 m² schoolyard offers the 240 children exactly the required minimum of 3 m² per child (Menses and Bollen, 2024; VNG, 2020), while the paved car parking and a car drop-off zone totals 1,100 m² (figure 1). For architectural and safety reasons, the schoolyard was lowered and required a permanent concrete pavement (to protect the children against the polluted soil). The result is a hot microclimate and no space for plants or water infiltration. These choices were presented as underpinned by expert recommendations and, as such, were apolitical. However, each trade-off is highly political since many of the applied norms conflict with each other, and these decisions impact the overall quality of this vital space.

Between 2018 and 2024, the authors, who live nearby and whose children attend this school, participated as leading volunteers to challenge the design of the schoolyard in a citizen-led design team. From 2019 to 2023, we worked to improve the resilience of the school environment. Using technical drawings as the starting point for physical resilience, we asked the children, parents,

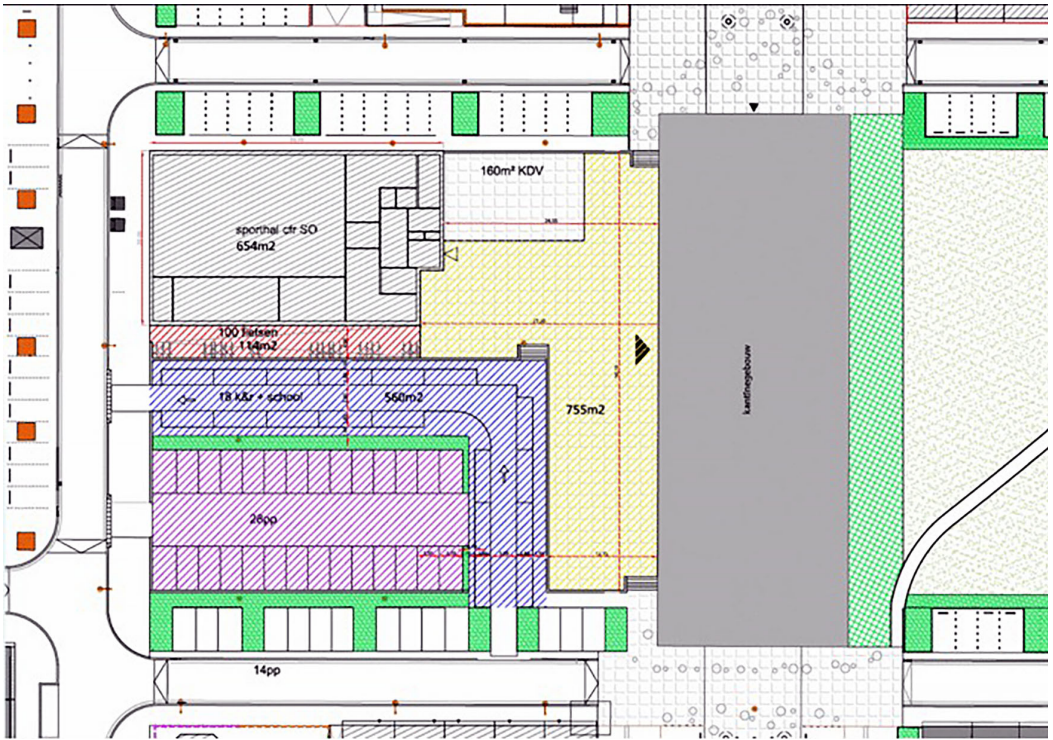


Figure 1. Original layout of the school environment. (Source: Gemeente Ede)

teachers, and school director to share their ideal vision. Their dream of a green and diverse schoolyard could not be met within the allocated 739 m².

To improve social resilience, we created a more inclusive and participatory process via a citizen-led street experiment, with the aim of transforming a norm-based into a vision-based schoolyard. Using our embodied and lived experience, we developed a profound understanding of how such an experiment works in theory and in practice. We applied the state-of-the-art conceptual work by VanHoose *et al.* (2022) to structure our experiences and observations. While our personal experiences bring the risk of observation bias, our long-term involvement offers a unique position and highly valuable insights into citizen-led street experiments. It directly focuses on problem-solving with practical outcomes and positive change (De Oliveira, 2018). Having a stake and lived

experience, allows us to become aware of realities that have not been thought of before, which De Oliveira identifies as ‘a valuable form of collective critical consciousness’ and adds that ‘the commitment of the community of interest enables the research project to access community understanding of emancipation’ (De Oliveira, 2023, p. 290).

Conceptual Pillars: Transition Experiments and Transitional Capacity

Transition Experiments

In contrast to prototyping or piloting, experimentation acknowledges that the key goal is not to develop a solution but to *learn* about what works and why. The challenges of social resilience require all stakeholders to learn collectively by experiencing an alternative approach. This learning entails

knowing how to achieve different goals and the process that generates these goals and their underlying worldviews.

Pel (2022) warns of a reductionist view of any intervention in an experiment. We follow his argument that a transition perspective takes a long-term, evolutionary view

of change, the multidimensional elements of innovation processes, and system innovation – instead of conventional, incremental innovation logic (*ibid.*, p. 29). These characteristics are embedded in transition experiments as ‘short-term actions through which alternative structures, cultures, and

Table 1. Criteria for a successful transition experiment. (Source: based on Roorda *et al.*, 2014, p. 31; Nevens *et al.*, 2013; VanHoose *et al.*, 2022)

Criteria for Transition Experiments	Description	Questions (based on VanHoose <i>et al.</i> , 2022)
Radical	The practices foregrounded by the experiment should be fundamentally different from dominant practices.	(1) How unique is the experiment in the urban context? (2) How does it alter the use of the streetscape? (3) How does it include a shift to non-motorized mobility?
Challenge driven	A transition experiment should be a step towards a potentially long-term change pathway to address a social challenge. It is about experimenting towards the future.	(4) How does the experiment model already establish examples of city street experiments? (5) How does the experiment connect to existing policies or programmes within the same city? (6) How interdisciplinary is its ambition?
Feasible	It should be possible to realize the experiment in the short term and with readily available resources (including public acceptance). A transition experiment should find a path of limited resistance.	(7) How long was the preparation? (8) How did it generate resources? (9) How well is it organized and communicated? (10) How did it garner support from residents, local businesses, and other stakeholders? (11) How did it make arrangements for alternative transport and parking options?
Strategic	A transition experiment should generate lessons about how to reach the envisioned fundamental changes. All agents needed for such changes can access these lessons.	(12) Does it recognize drivers and barriers to long-term change? (13) Was the experiment monitored, assessed and/or evaluated? (14) Was this linked to long-term policy development? (15) How did it aim to broaden mainstream mobility data? (16) Did it have the ambition to scale up, repeat, or extend?
Communicative	News about the experiment can reach and possibly mobilize the wider public.	(17) How did it garner attention from the outside in? (18) How did it promote itself from the inside out? (19) How did the experiment build coalitions? (20) How did the experiment awaken or increase a sense of community? (21) How did the physical presence of the experiment draw attention?

practices are explored’ (Roorda *et al.*, 2014, p. 32). Accordingly, transition experiments should optimize five dimensions: radical, challenge driven, feasible, strategic, and communicative. These five dimensions are operationalized into twenty-one specific sub-dimensions (table 1), which help structure our understanding of the mechanisms of street experiments.

These five criteria are often in direct conflict because of the inescapable trade-offs during implementation. Tensions are particularly strong between the feasibility of an intervention in terms of resources and public support, on the one hand, and the radicalness of the proposed changes, on the other. For example, guerrilla urbanism or artistic provocations are often highly radical but not feasible, while pilots or policy projects are often highly feasible but not radical. Additional challenges emerge when citizens lead street experiments. Although likely to

be more radical and communicative, it is more difficult to link these efforts to policy programmes (i.e. challenge driven), to inform long-term policy, and to scale up (i.e. strategic).

Measuring Transitional Capacity

Understanding the trajectory and outcome of transition experiments requires tracing their impacts on the *status quo*: what changed, how it changed, and what remains the same. This so-called ‘transitional capacity’ can be divided into four key categories (VanHoose *et al.*, 2022). Transition experiments ‘aim to simulate a complex process of social and technological co-evolution with emergent properties’ (*ibid.*, p. 3). The focus, however, is often on the readily visible material changes in public space, which are location focused and limited. In contrast, changes to the socio-technical arrangements of the

Table 2. Dimensions of transitional capacity. (Source: Based on VanHoose *et al.*, 2022)

<i>Dimensions of Transitional Capacity</i>	<i>Involves</i>	<i>Questions (based on VanHoose et al., 2022)</i>
Behavioural	A shift in individual use and behaviour. Changing the behavioural patterns of individual users.	(1) Did it ignite a shift in mobility behaviour from private automobility to alternative transportation options? (2) Did it ignite a different use of the streetscape? (3) Did it ignite social interactions?
Institutional	Alterations to city-wide mobility and public space policies, legal and financial frameworks, and cultural/ social norms.	(4) Did the experiment lead to the introduction of regulatory instruments? (5) Did it lead to the introduction of market-based instruments? (6) Did it lead to the introduction of information-based instruments?
Material	A physical change in the composition of the streetscape including an alteration of the physical form.	(7) Did it ignite an alteration of the physical form of the streetscape? (8) Was the experiment replicated/scaled up/ extended?
Organizational	A shift in the network of players, organizations and/or state, market, and civic collaborations.	(9) Did the experiment lead to the creation of new organizations or groups? (10) Did the experiment lead to new relationships within existing organizations or groups? (11) Did the experiment lead to new relationships between existing organizations?

regime that could drive the much-needed broader impacts often remain obscured. Therefore, the impacts of a transition experiment on behaviour, institutional change and organizational learning should be carefully considered (see table 2).

Research Design

Two research questions emerge from the problems and context outlined above:

- ◆ How can citizen-led street experiments be transformational, considering their challenge-driven and strategic nature?
- ◆ How can citizen-led experiments be successful, particularly in terms of institutional change and organizational learning?

Action Research: Data Gathering and Analysis

Action research is a methodological framework for studying urban and regional policy that assumes that social processes (e.g. street experiments) are not linear, fixed, and imposed but evolve through collaborative negotiation and sense-making among diverse actors (Bartels, 2020; 2017; Bartels and Wittmayer, 2018). In other words, the causal relationships in these processes are not successive but generative. Although action-oriented participatory research is vitally important to unpack and understand such messy processes, it remains scarce and its potential for the design and implementation of street experiments remains underutilized.

We acknowledge the ethical and methodological limits of our position as both leading citizens in the street experiment and observers/authors of this paper. Nevertheless, we argue that our work adds value to the academic debate about street experiments precisely because of this unique position. Recent contributions have further developed insights into the mechanisms of street experiments, learning from urban

logistics projects in Bergen and Groningen (Shrestha *et al.*, 2025) and the specifics of learning in the different implementations of Low Traffic Neighbourhoods in London (VanHoose *et al.*, 2025). However, these studies focus on government-led street experiments, not researcher-driven, direct experiences.

The data are based on our observations and recollections during the experiment. Without an *ex-ante* formalized research plan, we measured specific phenomena related to our interventions. Our reflections on the mechanisms of street experiments build on various sources: the designs drafted by the children; surveys administered together with the school and municipality; policy documents; design drawings; texts for funding proposals; meeting notes; official communication with stakeholders; pictures and observations; debates with politicians' stakeholders and experts; newspaper articles; and our design exercises and meeting notes. We aim to balance our participant observer bias by building on this broad range of sources.

Case Description

To enhance the physical and social resilience of the school environment, the design team challenged the norm-based approach by documenting the visions of all users. An external agency (OBB Spelmakers en ruimtedenkers) explored this topic with the children, parents, neighbours, and teachers. During the design festival, these stakeholders discovered a common need for 'a much greener' school environment, leading to the design in figure 2.

This common need posed a significant design challenge. To find the required space and healthy soil, we had to challenge the design choice of a private car park and drop-off zone. The 1,100 m² allocated for parking and drop-off had to be transformed into a green space for children to play and for neighbours to socialize. The 'supporting survey' (demanded by the municipality) documented the community's preferences,

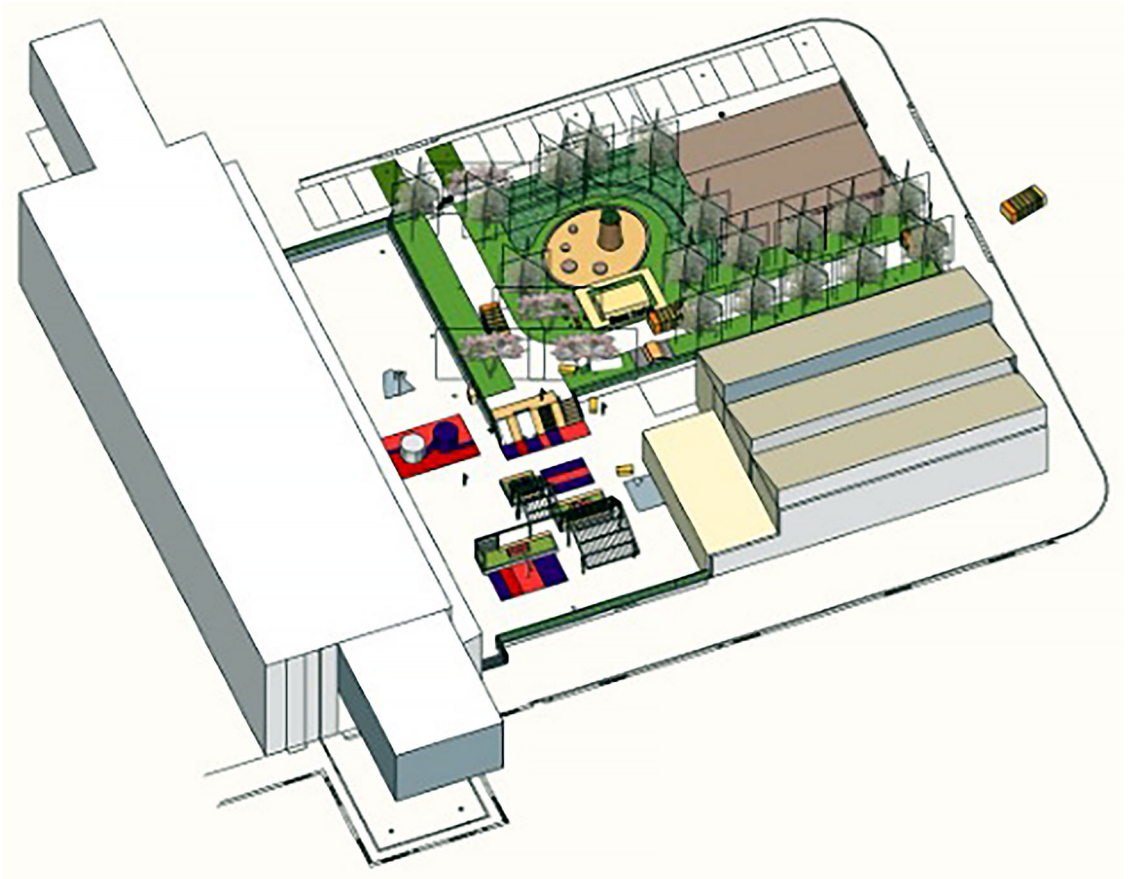


Figure 2. The alternative dream of the children and teachers. (Source: Sjoerd Brandsma)

granting the Deputy Mayor for Mobility sufficient confidence to allow a two-year experiment. The experiment was set up with the municipality, the school, and the building's owner with agreements to temporarily transform a part of the private parking and the drop-off zone for two years. During and after this period, surveys were sent to parents, teachers, and local residents to provide feedback on whether to make the new design permanent.

The key stakeholders in the experiment were the director of the school, the representative of the umbrella organization of the schools, the deputy mayor and his spokesperson, the owner of the building and the outdoor space, the primary tenant, the neighbourhood developer, and the traffic engineer

of the municipality. At our request, the municipality appointed a supervisor to manage the complexity of the process halfway through the experiment. Two different civil servants executed this role in succession.

During the experiment, parents and children were encouraged to walk or cycle to school to minimize the potential negative traffic impacts in and around the school environment. Parents and teachers who had to rely on cars were requested to park outside the neighbouring streets. The location of the dedicated parking spots shifted several times due to ongoing construction in the surrounding neighbourhood. In year two, the municipality created remote parking spaces as alternative drop-off zones. The steps of the experiment are represented in figure 3.

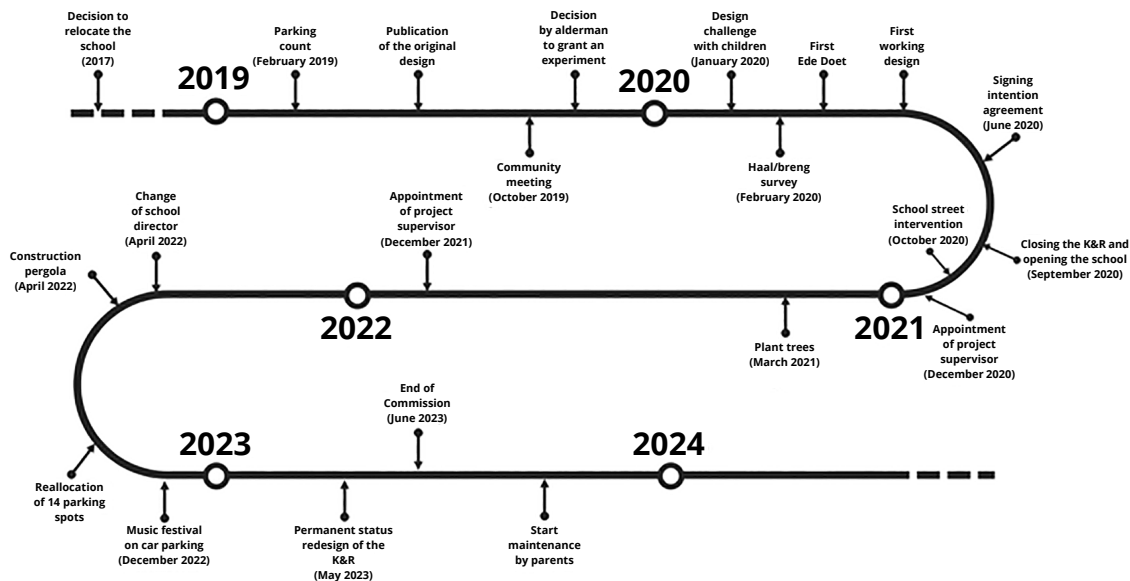


Figure 3. The timeline of the experiment. (Source: Authors)

Several dynamics made it much harder for the experiment to stay on course. During the design process and the experiment, the school grew from the planned 250 to over 450 children. The childcare facility also doubled in size, while the other foreseen neighbourhood functions (such as a hair-dresser and fitness facility) were all cancelled. During the entire duration of the experiment, construction containers occupied a large part of the schoolyard, and trucks and vans frequented the school environment due to the ongoing works. The continuously shifting detours and road works forced the relocation of parking facilities and rerouting.

Reflecting on the Five Mechanisms of a Street Experiment

The five criteria for transformative street experiments (table 3) are used to structure our reflections on what happened during the citizen-led street experiment. We will first focus on the trade-off between feasible and radical to then expand on the communicative and mobilizing aspects. Finally,

the particularly challenging criteria for citizen-led street experiments (challenge-driven and strategic) are explored

How Radical and Feasible Was It?

The new school is in a typical planned residential area in Ede and was designed by leading urban planning and architectural firms. Every square metre had a dedicated purpose according to the applicable norms and guidelines. Its development did not involve the participatory engagement of prospective residents to explore how they would like to use their public space. Thus, our aim was not only to challenge the physical design but to challenge the norm-based design process itself – arguably a radical step in this urban context.

The experiment also demanded a radical shift in the mobility behaviour of parents and teachers. Instead of accommodating parents who bring their children by car, as is the norm at most schools in Ede, the new streetscape aimed to facilitate independent walking and cycling to school. In

Table 3. How we implemented the five criteria.

<i>Radical (2/3)</i>		
(1)	How unique is the experiment in the urban context?	
(2)	How does it alter the use of the streetscape?	<i>strong</i>
(3)	How does it include a shift to non-motorized mobility?	<i>strong</i>
<i>Challenge driven (1/3)</i>		
(4)	How does the experiment model establish examples of city street experiments?	
(5)	How does the experiment connect to existing policies or programmes within the city?	
(6)	How interdisciplinary is its ambition?	<i>strong</i>
<i>Feasible (5/5)</i>		
(7)	How long was the preparation?	<i>strong</i>
(8)	How did it generate resources?	<i>strong</i>
(9)	How well is it organized and communicated?	<i>strong</i>
(10)	How did it garner support from residents, local businesses and other stakeholders?	<i>strong</i>
(11)	How did it make arrangements for alternative transport and parking options?	<i>strong</i>
<i>Strategic (2.5/5)</i>		
(12)	Does it recognize drivers and barriers to long-term change?	
(13)	Was the experiment monitored, assessed and/or evaluated?	<i>strong</i>
(14)	Was this linked to long-term policy development?	
(15)	How did it aim to broaden mainstream mobility data?	<i>medium</i>
(16)	Did it have the ambition to scale up, repeat or extend?	<i>medium</i>
<i>Communicative/mobilizing (4.5/5)</i>		
(17)	How did it garner attention from the outside in?	<i>strong</i>
(18)	How did it promote itself from the inside out?	<i>strong</i>
(19)	How did the experiment build coalitions?	<i>medium</i>
(20)	How did the experiment awaken or increase a sense of community?	<i>strong</i>
(21)	How did the physical presence of the experiment draw attention?	<i>strong</i>

the first weeks, we closed the school environment to car traffic (figure 4). During several weekends, children, parents, and neighbours transformed the drop-off zone into a playscape by bringing healthy soil, planting trees and bushes, placing picnic tables, gardening, and playspaces (e.g. a sandbox and stepping stones) (figure 5). Due to the experimental status, we were not allowed to remove pavement, but we could alter the space with temporary installations.

We decided to plant eleven non-native cherry trees (*Prunus Yedoensis*) strategically in the drop-off zone. Their abundant foliage and pink blossoms created a green schoolyard and ensured that stakeholders did not

want to revert to the original situation. The use of the streetscape was altered to allow soil access for plant roots, water, birds, insects, and worms.

Although the focus was on increasing the physical resilience of the school environment, the safety of children who cycled and walked to school always came first. To ensure safe cycling, the developments around the neighbourhood were continually monitored.

We lobbied successfully for a temporary bike path, keeping a road along a construction site open, adding lighting and physical protections to routes, installing a one-way street and school-zone road signs, and extending green times and crossing



Figure 4. The school environment was closed to car traffic, and parents and children were requested to come by foot or bike. (Photo: Authors)



Figure 5. Children and parents worked together to transform the drop-off zone into a green schoolyard for the children. (Photo: Authors)

options. We sometimes used local media to publicize and generate popular support and pressure for such changes (De Gelderlander, 2022).

To optimize feasibility, we first had to engage with the stakeholders responsible for urban planning, project development, and construction, as well as the users of the school environment. The experiment was presented as a positive user story – parents making space for a green schoolyard for their children – in meetings, mailings, and conversations.

Control of finances, process management, design, and construction rested on a changing group of six parent volunteers and neighbours. A grant expert from the municipality supported the applications for grant schemes. The cost of implementing the final design (EUR 100,000) required the organizers to apply for more generic grants for schoolyards. However, due to physical limitations, the norm-based schoolyard did not meet the basic requirements for funding programmes. Converting the drop-off zone into a green schoolyard made the project eligible for the needed funding mechanism. The municipal scheme EdeDoet provided an additional funding opportunity, as each household receives an EUR 7.50 voucher twice a year to donate to a local initiative. The children collected over EUR 16,000 through this channel, securing funding for five elements of the schoolyard.

Feasibility demands strong popular support throughout the experiment. Tensions between opponents of the experiments in the neighbourhood and some key stakeholders generated continuous pressure. The citizen-led approach triggered these tensions, as the municipality explicitly avoided taking ownership. It put pressure on the volunteers to avoid escalation. Instead of focusing on organizing the financing to safeguard the quality of the physical design, we also had to carefully manage the tensions between the opponents and other stakeholders. For instance, we were asked to organize a

community meeting to discuss the experiment with the neighbours and had to prepare public support surveys. When the debate got heated, the municipality's representatives emphasized that volunteers had planned the experiment.

An alternative school drop-off location was offered to maintain the parents' support, which was created 100 metres from the school building. However, parents could not access it because, almost immediately, the street was closed for construction for a year and a half. This example highlights how the lack of ownership put the experiment in continuous conflict with other projects and processes.

How was Communication and Mobilization Optimized?

Extensive effort went into regularly communicating progress and changes to local residents (e.g. via the official municipal newsletters). We shared all steps before and during implementation in school newsletters and by speaking directly to parents at school drop-offs. The municipality purchased and set up two information boards in the schoolyard. Regular updates were communicated via the information channels of the neighbourhood association, local newspapers, and social media, highlighting the project's successes and challenges. The step-by-step approach sought to celebrate accomplishments and milestones along the way, maintain high energy among volunteers, and promote the experiment as a success story.

We also aimed to increase the potential for external communication and mobilization, for example, by inviting councillors and directors from other schools to visit the site. The experiment played a prominent part in a popular book about mobility narratives co-written by one of the authors, and we presented the experiences with the experiment at national and international conferences and as lectures at our universities.

The communication effort did not demonize car drivers; instead, it emphasized a key goal of the experiment – to create a safer, more enjoyable, and relaxed play environment for the pupils. Children had a prominent role in the experiment, for example, constructing bird nests and adopting and maintaining the trees. Their voice was amplified via the information boards around the schoolyard and our messaging.

Efforts to improve communication and mobilization were integrated throughout the entire process. With their physical presence, volunteer traffic guards communicated to parents and the neighbourhood the desired behaviour changes, their importance, and the stake we all share in the experiment's success. We also mobilized neighbours and parents through volunteering days by making the maintenance of the school's green and play areas part of a scheduled task. During the experiment, 7th graders were tasked with designing a positive intervention to raise awareness of the mobility rules. These were communicated in several school newsletters and via supporting cards, outlining good behaviour during two action days. When our active involvement ended, the school was asked to organize a 'street host' to guide parents (temporarily fulfilled by the school's janitor).

Similarly, crowdfunding was helpful not only for enhancing feasibility but also for creating awareness and ownership of the project among parents and neighbours. The children played their part through doorstep collections of the EdeDoet vouchers. Similarly, surveys not only measured feasibility but also communicated the behaviour shifts that were taking place.

Finally, the physical design and the dream-based design process made the street experiment more communicative. Incrementally converting car infrastructure into a green and high-quality play environment communicated the need for changing mobility behaviours and was essential for guaranteeing quality and beauty. The *design process*

in which we challenged the children to take the lead was part of our mobilizing efforts. They could experience the social resilience of the streets through their *lived experience* of designing a school environment.

How Challenge-Driven and Strategic Was It?

We could not build on existing programmes within the municipality to make the experiment *challenge driven*. We modelled the experiment on international examples of temporary road closures (School Streets) and physical designs of playspaces and greenery.

Although the experiment directly connected to the municipality's ambitions to put pedestrians and cyclists first (Gemeente Ede, 2024a, b), the ongoing policy process did not connect with our experiment. Despite continuous efforts, local politicians and civil servants mainly operated in a problem-solving mode instead of engaging more structurally with the project.

Various stakeholders and experts, either on invitation or their own initiative, helped shape the experiment. For instance, parent and neighbour volunteers contributed relevant knowledge, skills, and experience. The group included builders, a public greenery manager, a steelworker, an architect, a landscape architect, an urban planner, a mobility expert, municipal policy officers, teachers, grant experts, police officials, green policy experts, urban garden enthusiasts, and a communication advisor. On the other hand, we had to cooperate with other stakeholders: design agency; project developer; municipal communications advisors; deputy mayors; landowner; school board; traffic engineers; fund managers; urban designers; heritage experts; permit issuers; and the public space manager. Our experience revealed a significant difference between those who directly and voluntarily worked on the experiment and those who came with the location and existing plans.

To enhance its strategic impact, the experiment addressed drivers and barriers

to long-term change. Most stakeholder representatives had been working together for a long time and had different bilateral agreements about developments in the neighbourhood. For example, the project developer had to abide by a strict neighbourhood-wide parking standard, and thus, each deviation from his original plans triggered tensions in other dimensions. We had simultaneously to pressure stakeholders to support the design and keep them on board. The combination of the children's dream vision and hard numbers (e.g. parking pressures, modal split, and neighbourhood satisfaction) gave stakeholders the confidence to deviate from earlier agreements. However, the barrier of the fixed parking norms could not be overcome, blocking a large part of the green dream.

Our goal was to limit the number of cars near the school and to allow a transformation of the drop-off zone into a green schoolyard. We discussed three variants with stakeholders:

- (1) Keeping the original idea of a small hard schoolyard with a drop-off zone and pick-up and drop-off at school;
- (2) Transforming the drop-off zone into a larger green schoolyard with an active mobility policy (parking at a distance); and
- (3) Transforming the drop-off zone into a larger green schoolyard without an active mobility policy (car access near the school).

The third variant was something all parties wanted to avoid. To guarantee a shared commitment to a resilient school environment (the second option), we brought all stakeholders together in a series of roundtables, co-creating and signing a *Letter of Intent* outlining their commitments and duties. Despite these efforts, we experienced an increasing fragmentation and shifting of responsibilities of the school, the daycare, the building owner, and the municipality. With each focusing on their everyday duties,

shared commitment decreased. For example, the municipality did not enforce the parking policy, the overarching school organization instructed the school not to focus on public space, and the newsletters no longer provided mobility instructions to parents.

Monitoring and evaluating are crucial elements of a strategic experiment. We administered surveys before, during and after the experiment, measuring the support and experiences of parents, teachers, children, and neighbours. These results were published through the school app, the neighbourhood platforms and local newspapers. They revealed broad support for the mobility policy and the redesign of the school environment. Moreover, they foregrounded the safety concerns of parents and neighbours, who called for a more open attitude from all stakeholders and stricter policing from the school and childcare to keep car traffic out of the school environment. Even though the findings were presented in the roundtable, the key stakeholders had limited responses to these signals.

The experiment was not explicitly linked with policy development; it was, first and foremost, a direct response to a local problem. We tried to connect it with newly developed policy documents that articulated progressive goals for reducing car traffic around schools and making streets more pleasant and more inviting for active travel modes. While the new mobility vision of the municipality did mention our school environment as an inspiration, it did not reference the physical and social resilience of the experiment or its alternative to the norm-based approach to designing school environments.

From the start, we emphasized the necessity for a holistic approach and actively challenged stakeholders to include broader indicators to monitor and evaluate. As the tension between stakeholders intensified, we had to shift our focus to developing insights that generate support, improve the modal split, and address the lack of parking and

traffic problems. Even though the approach was diluted, we kept on pushing to include the views of children.

Scaling up the experience is particularly difficult for citizen-led street experiments. Volunteers initiated the experiment in response to a local emergency. Since both authors are also working on these topics as academic teachers and researchers, they realized during the experiment that many school environments face similar problems with traffic safety and low spatial quality. Accordingly, we shifted attention to transferring solutions from other schools and providing lessons to duplicate the effort in the municipality and elsewhere. The ambition was not only to ensure the intervention's success but also to replace a norm-driven approach with a more holistic one.

Evaluating the Four Dimensions of Transitional Capacity

Behavioural Change

In terms of changes to mobility behaviour, the expected parking demand did not materialize. Many parking spots remain unused, especially during and after school hours. With the recommendation that all children from the neighbourhood should come by bike or foot, most children walked or cycled to school, often independently. As a result, the bike parking spots quickly ran out. Over time, when new children joined the school (and the drop-off policies were communicated less frequently), more parents and grandparents picked up their children by car (five to twenty vehicles per day, depending on the weather conditions). Due to the removal of the drop-off zone, car drivers must now make dangerous manoeuvres near young children. Compared to other schools in Ede and similar contexts, the high percentage of children and staff who walk or cycle indicates a shift in mobility behaviour. However, due to the lack of ownership, small increases in

car trips in the school environment could lead to more parents opting to drive their children to school.

In terms of social resilience, the design and construction process spurred social interactions, thereby creating meaningful social connections between neighbours. We observed children playing more frequently and teachers and neighbours using the benches during breaks and after school. The new conditions triggered interactions with the natural environment. For example, new visitors walked under the blossoming fruit trees in early spring. Children played with plants and mud, built houses for birds, and studied flowers. Parents and children watered the plants, and the school taught pupils how to take care not to damage the new trees.

Institutional Change

The main institutional stakeholders were the municipality, school, and daycare. While the municipality does refer to the experiment in their mobility policy document *Koersnota Mobiliteit* (Gemeente Ede, 2024a), it is unclear whether and how lessons from this process were translated into school environments. There were no alterations to policies, frameworks, or institutional norms. On the contrary, the design process of a new school in the adjacent neighbourhood follows a similar norm-driven, expert-oriented setup. The focus lies again on solving the safety problems of the expected car traffic around the school, with a drop-off as the main solution. At the time of writing, the neighbours of this new school are protesting the plans, frustrated by the norm-driven process.

The school actively honoured children and parents who walked to school, for example, by handing them flowers while requesting drivers park their cars further away. The school and daycare published these efforts on their website and in newsletters. However, we also observed that both organizations took limited ownership of the mobil-

ity behaviour at the site, constructive communication with the neighbourhood, and the role of the host with positive enforcement of desired behaviour. The coupling between the new mobility behaviour and the transformation towards a green schoolyard was not adequately communicated. As a result, many parents are unaware of the unique process and work behind the observed changes.

The owner of the building and the parking places supported the experiment positively and was pleased with the quality of the new schoolyard. The new schoolyard even contributed to the school winning a prize for 'most sustainable heritage building 2024 (Cultureel Erfgoed 2024)'. However, the owner also remained conservative about redesigning the empty parking spots. Over time, the lack of deep commitment can reassert pressure to utilize the schoolyard for car traffic.

Material Change

The drop-off zone of 560 m² was completely transformed with a new design and street-scape use (figure 6). Now, it is a comfortable green area with play equipment, growing trees, infiltrating water, birds and pollinating insects. The intended use is not mono-functional and is much more resilient, promoting engaging experiences between people, plants, and animals.

The new materialization profoundly improved the development of nutritious soil, water infiltration, microclimate, and biodiversity and created the conditions for diverse functional programmes of playing, meeting and relaxing. The foreseen drop-off spots contain healthy soil, eleven cherry trees, one apple tree, two pear trees, and a wide variety of other plants, making the area greener, cooler and more fun for play. However, due to the possible reversibility of the drop-off zone, the intended roadway had to be constructed (albeit a section was recently narrowed). At the time of writing,

four trees are to be planted in the original schoolyard, as soil tests indicated significantly lower toxicity than initially assumed.

The stakeholders could not agree on a permanent redesign for the other areas. While not formally reassigned, half of the parking spots have been converted from car parking to play space and additional bike storage. The other half remains available but underutilized for parking. Similar material changes have not been replicated elsewhere in the municipality.

Organizational Change

As a citizen-led experiment, the key change driver was the core group of volunteer citizens. They challenged the plan, developed an alternative proposal, managed the project and processes and even did most of the construction work. This group disbanded after the design and realization phase, and no other stakeholder took ownership of the project. We have repeatedly signalled to all parties the importance of seeing the schoolyard, the wider environment, the tensions with neighbours, and mobility behaviour as connected challenges that need long-term commitment.

We have a limited view of how other stakeholders changed their norms or frameworks. The parties gave the impression that they wanted to see the new situation as the new normal as quickly as possible. There is minimal mention of the plans or the drop-off policies in the newsletters. After repeated requests, the umbrella school organization indicated that they 'only focus on the indoor climate' and that for any complaints about the drop-off and mobility policy, we should not contact the school but the municipality. Neither the school nor the daycare wanted to keep this topic on the agenda because of the expected negative feedback from neighbours and parents. The municipality also withdrew from the school environment and pointed to the school and daycare as responsible for being good hosts.

Now we are navigating a new context in which we have intentionally moved away from a school environment that was previously structured around traffic norms and standards. A physical transformation has occurred, transitioning from a drop-off zone to a green schoolyard, accompanied by an

active pick-up and drop-off policy. However, the enforcement of this policy by stakeholders is currently insufficient, and a return to the previous situation is no longer feasible. We are now faced with a scenario where the number of cars is increasing in an environment that was not designed to



Figure 6. Before and after the redesign. (Photo: Authors)

Table 4. Transitional capacity of the school drop-off zone experiment.

<i>Behavioural (2.5/3)</i>		
(1)	Shift in mobility behaviour from automobility to alternative transportation options?	<i>yes</i>
(2)	Different use of the streetscape?	<i>yes</i>
(3)	Social interactions?	<i>maybe</i>
<i>Institutional (1/3)</i>		
(4)	Did the experiment lead to the introduction of regulatory instruments?	<i>no</i>
(5)	Did it lead to the introduction of market-based instruments?	<i>no</i>
(6)	Did it lead to the introduction of information-based instruments?	<i>yes</i>
<i>Material (1/2)</i>		
(7)	Did it ignite an alteration of the physical form of the streetscape?	<i>yes</i>
(8)	Was the experiment replicated/scaled up/extended?	<i>no</i>
<i>Organizational (0/3)</i>		
(9)	Did the experiment lead to the creation of new organizations or groups?	<i>no</i>
(10)	Did the experiment lead to new relationships within existing organizations or groups?	<i>no</i>
(11)	Did the experiment lead to new relationships between existing organizations?	<i>no</i>

accommodate them, leading to heightened safety risks for children.

Conclusion and Recommendations

Conclusion

Today’s pressing social challenges require careful reconsideration and the reshaping of our urban environments. Many streets and public spaces are largely monofunctional conduits for motorized traffic and storage space for private vehicles. To transform these monofunctional spaces into resilient streets, new approaches are needed to turn these streets into more physically and socially resilient streets that support and enhance active transport, ecological restoration, urban climate adaptation, autonomy and playfulness of children, and social cohesion.

As both leading citizens in a citizen-led street experiment and researchers, we used our experiences from practice to enrich the ongoing academic debate about the mechanisms of city street experiments. Building on a pragmatist approach, we argued that

our embedded, action-oriented position offers valuable insights into the real-life mechanisms of street experiments to assess their transformation and success potential. Following the conceptual frameworks for mapping criteria for successful street experiments and the dimensions of transitional capacity (VanHoose *et al.*, 2022), we expected to change the material and behavioural dimension but anticipated stronger challenges in other areas.

The experiment had a dual goal: to develop a new, vision-based, and resilient school environment and to change the process of designing school environments. Many stakeholders took the established processes for granted, mainly because they were unaware of realistic alternatives. We found that, although people also defended the need for certain norms, nobody was against starting the design process from the perspective of the dreams of the local residents and the children who will grow up there. These insights encourage communities and institutional entrepreneurs in other cities and jurisdictions to explore the potential of street ex-

periments to transform their neighbourhoods.

Our experiment revealed a fundamental danger of citizen-led street experiments:

optimizing material change (i.e. changing the physical layout of the school environment) without accompanying organizational change puts the users of the space in limbo.

They now face a potentially dangerous situation without anybody taking long-term ownership of it.

Looking at the transformative potential, the experiment's outcomes showed that we had some control over several mechanisms of street experiments (radical, feasible, and communicative); however, we could not influence the challenge-driven and strategic aspects. As expected, the limited control over these elements hampered the transitional capacity for institutional and organizational changes. The passive role of key strategic stakeholders further reduced the potential for transitional capacity.

In particular, we found that the success of a citizen experiment depends on individuals in institutes and organizations creating the right conditions for new initiatives to thrive. These 'institutional entrepreneurs' (Hardy and Maguire, 2008; Uittenbroek *et al.*, 2014) should have the intrinsic motivation to create windows of opportunity to make space for the dreams of citizens and forge cracks in the existing regime. We believe that citizens can more effectively activate these entrepreneurs by sharing their dreams.

Recommendations for Research

The experience of being fully committed to the experiment, with an in-depth understanding of the situation (both physical and social), i.e. 'with skin in the game' (Taleb, 2021), amplified our understanding of what citizens face when trying to alter the *status quo*. We recommend that researchers in street experiments seek out conditions that enable embodied learning. The participant-observer perspective holds great promise to enhance the academic analysis of street

experiments and, in turn, support their implementation in practice. However, in advocating action-oriented research, data collection should be more structured to go beyond observations. One way would be to interview stakeholders before, during, and after the experiment. The key methodological dilemma to consider is the intrinsic tension between a fully engaged, lived, and contextualized experience of the experiment and the controlled outsider perspective.

Another reflection relates to the snail pace of institutional changes (if any happen at all). Is it reasonable to expect institutional stakeholders to adapt their practices soon after participating in an experiment? Or does this learning happen at a slower rate and more organically? One does not speak to a 'municipality' but with the individuals who work there, people with distinctive backgrounds, experiences, knowledge, and approaches. Learning, therefore, follows a much more complex trajectory from their individual experiences to more systemic change. Following Straatemeier *et al.* (2010) we emphasize the significance of collaborative learning and propose that future research should incorporate Kolb's (1984) Experiential Learning Model. The model, widely employed in the design of educational programmes, is cyclical in nature and consists of four distinct stages:

- (1) *Concrete Experience*, which involves engaging in an actual experience;
- (2) *Reflective Observation*, where individuals reflect on their experience;
- (3) *Abstract Conceptualization*, wherein insights and understanding are derived from the experience; and
- (4) *Active Experimentation*, which entails applying the acquired knowledge in practice.

Consequently, 'street experiments' should be integrated as a continuous component within educational programmes to facilitate ongoing, real-world learning experiences.

Conducting longitudinal research could reveal this mechanism and evaluate the transitional capacity of street experiments. Such efforts would make both academic and practical experiments more sensitive to individual learning processes and how they relate to organizational change.

Recommendations for Street Experiment Practices

We learned the importance of having almost complete freedom when engaging with problems and solutions. In the context of the neighbourhood, the institutions and individuals that worked with us were limited by existing responsibilities, schemes, budgets, expectations, agreements, and roles. Institutional entrepreneurs alone cannot bridge this gap. Participatory engagement requires going beyond individual responsibilities and challenging the structures that underpin current practices (Scott, 1998).

While citizen participation should be promoted, citizen-led initiatives also bring inherent risks. The theory infers built-in conflicts and tensions within the logic of street experiments – radical vs feasible. To truly engage with such challenging learning processes, citizens and institutional entrepreneurs need protection from conflicts between the experiment and its environment. Not acknowledging this stress puts citizens in a vulnerable position, hampers the learning process, and can lead to what we describe as ‘participation burnout’. Formal stakeholders need to play a role in creating safe spaces for real learning to occur. Governments need to level up with the courage of active citizens and institutional entrepreneurs and see them as essential elements of desired urban transitions.

Significant time and effort were dedicated to maintain the support of all stakeholders during the experiment. Parents and neighbours who opposed the reduction of car spaces exerted intense pressure from the start. Even though this was a small minority, it substantially impacted the perceptions

and attitudes of key stakeholders. For instance, while a survey showed that over 90 per cent of parents supported a stricter drop-off regime, the school stated that there was no consensus and that it wanted to respect the different opinions. This finding resonates with recent insights that these types of processes face a systematic over-estimation of the resistance against policies to reduce cars (Walker and Te Brömmelstroet, 2025). It is essential to sensitize all key stakeholders via various dedicated methods (i.e. hard data, meetings, and user stories) to understand the full scope of local opposition to, as well as support for, innovative measures.

The final reflection concerns the specifics of school environments. As the design and construction of these environments can span several years, their impact on pupils should be acknowledged. Four years may sound like a feasible time span for urban development, but for children this is half of their school life. Ethical considerations need to ensure that the affected children also have a say in the process, and their needs are considered (see Smeds *et al.*, 2023).

To change school environments into more physically and socially resilient spaces, we need to challenge the norm-driven, technocratic process itself. As Pirsig (1974, p. 92) fittingly summarized: ‘if a factory is torn down but the rationality which produced it is left standing, then that rationality will simply produce another factory’. To radically change a system, it is not enough to target its individual elements or to change its goals. Systemic change requires changing the underlying worldviews, assumptions, and ways of working that created the system in the first place (Meadows, 2008; te Brömmelstroet *et al.*, 2022).

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