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Fragments of frictions: A route to spatial manoeuvres for uplifting wellbeing in school environments

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Abstract: In the context of design for human flourishing (DfHF), this paper reports on a two-week research-by-design-and-built project by master students in (interior) architecture. A cocktail of qualitative research experiments was executed to function as a seismograph that registered fragments of frictions in the wellbeing of K-8 pupils. This particular study firstly explains how the research cocktail was designed, based on the ethnographic, participatory and immersive methods infused by the theoretical guidelines of DfHF theory, and secondly seeks to reveal how an analysis of the wellbeing related results from the experiment cocktail can lead to a novel type of design problem statement and thus design brief, defined by a richer understanding of the link between human flourishing and the spatial surroundings of school children. Next, the paper illustrates its merit by reporting on the design realization following the research. The paper concludes by stating the values for wellbeing theory, architectural practice and school designs.

Keywords: wellbeing; architecture; design; qualitative data collection

1. Introduction

Often, when looking at the spatial environment through a wellbeing lens, the 'pink elephant in the room' is pointed at first, the very obvious reason why people are not feeling well or can or cannot seem to flourish in a certain environment. For instance: a city park with no visible play infrastructure for kids. But actually, wellbeing is a more nuanced phenomenon in which seemingly trivialities can cause a dip or rise in one's perception of one's wellbeing. Think of the same lovely park in which a flower picking meadow allows children to experience the smell and colours of flowers in spring, or the presence of willow huts that can be seen as fortresses stimulating creativity. Now let us imagine this same park, that suddenly puts up a sign that does not allow walking on the green because the grass might get trampled. This intervention will definitely disappoint kids. Even more often, an accumulation of trivial events like these can cause one's wellbeing to rise or drop without others being aware

of it, or taking it seriously. Therefore, we suggest wellbeing ought to be better conceptualised as a "seismogram". Indeed, to further develop insights into the phenomenon and to be able to simultaneously react to it, we adopted the character of a seismograph, that aims to register the small human frictions just below the surface that pass unnoticed or are dismissed by the great majority, but can cause a (waterfall) effect on the personal level of wellbeing and flourishing.

Concretely, a seismograph registers frictions and movements at and below the surface of the earth and codes these on paper with line drawings. Similarly, we aim to capture all the small frictions between humans reciprocally in their behaviour in an environment and between humans and their actual interaction with and their emotions in the environment. The design brief will function as the bearer, of the piece of paper on which we 'draw' these friction in together. Thereby, we hope to create a novel type of design brief. Specific for architectural design, the design brief is a document that is provided by the client, and mostly contains the self-proclaimed design and programmatic features clients can anticipate on from their limited spatial expertise (Stevens et al., 2021) when commissioning a 'building'. Research has shown that on top of that, architects often have a too narrow understanding of what these demands imply on a programmatic level (Cherry, 1999; Stevens et al., 2021), and they usually only limitedly refine the existing design brief (Yu et al., 2010). In that respect, one can imagine the typical design brief is a rather biased document. In earlier research, we have dissected the design brief to determine where and how more experiential aspect can take part of the story that is told via a design brief (see Stevens et al., 2021). In this, study, we take a first attempt in developing a more 'novel' type of design brief, which establishes a more enriched take on the actual experiences, emotions and flourishing affordances of the future building.

Therefore this paper seeks to explore how a qualitative approach can develop insights in wellbeing and simultaneously lead to a novel design brief that instigates design interventions that uplift wellbeing in school environments.

1.1 Qualitative encounters

As Muratovski (2016) states, the designer has evolved from providing an artistic service into translating human needs to technological possibilities, on in the case of an architect, to spatial possibilities. In architectural design, a similar understanding can be found in the theory of Design for Human Flourishing (DfHF) (Stevens et al., 2019b). Therein, an architect aims to render a positive influence in the flourishing or the personal growth of a person through the design. However, a DfHf-approach stands out in the landscape of human-centred design strategies through the nature of the design process' starting vision, that is of stimulating positive experiences rather than compensating for negative experiences in a certain environment (Stevens et al., 2019a). Moreover, its nature of striving for a psycho-emotional effect on users and the generosity of a long lasting effect by positively influencing users' personal growth, both position DfHF in a unique spot (Stevens et al., 2019a). To positively influ-

ence personal growth, DfHF seeks for a common ground in users, that is the psychological needs attached to certain user groups, for instance older persons that benefit from inter-generational contact, or young children that benefit from being creative and exploit bravery.

To practice DfHF, we tend to focus on a series of qualitative methods to enable us to simul-taneously get a grip on the components and layers of the phenomenon of wellbeing and answer to frictions that are noticed (Stevens et al., 2019b). However, as wellbeing research is rather still in its infancy (Schotanus-Dijkstra et al., 2016), a methodological structure is still to be developed. Here, we seek to combine multiple relevant theoretical insights to over-come barriers and enable ourselves to practice a seismographic approach in school envi-ronments.

In particular design disciplines such as service design, experience design, product design, a Positive Design approach has been introduced and methods have been validated empirically (e.g. Desmet & Hassenzahl, 2012; Hassenzahl et al., 2013). However, the architectural con-text adds complexity of the methods both in the realization as in the process of creating ar-chitecture. Architecture is in contrast to other design domains characterized by its slowness, large scale, cost and longevity. But foremost, architecture can never be neglected, as the environment is always surrounding one and thereby influencing one's mood, emotions, ac-tions, behavior, etc., requesting a more holistic approach in finding suitable design method-ologies (e.g. Stevens & Desmet, 2020).

In architectural design, design-researchers often turn to either participatory design or user centred design methods (Sanders & Stappers, 2008) when handling the complex issue of user-space-interaction. In user-centred design, the user is seen as an expert of his/her own experiences, and is encountered that way. In this case, the user does not take an active part in the actual design process, but is kept in mind of the designer. The user is questioned, or 'researched' multiple times regarding personal experiences and reflections on the output of the design, often via applied (auto)-ethnography (Chang, 2008; Denshire, 2014).

In participatory design or co-design that stems from the process of democratic decision mak-ing (Clarke, 2013; Papanek, 1971), the user is given a prominent place as a partner at the design table, and he/she takes an active part in the actual designing throughout the different stages by giving input and feedback on a personal, experiential level (Sanders & Stappers, 2008, Sanoff, 2007).

Translated to DfHF in which it has deemed to be crucial to be acquainted with the psycho-logical needs of the target group (e.g. 'older persons' or 'school children'), one suggests a research-led approach. However, the intensity in how an individual of that particular target group outlives the shared needs and acts on these needs, is a highly personal experience. For instance an older person might experience intergenerational contact by babysitting on young children, while others are satisfied with just having a terrace looking out on a small local playground, thus passively enjoying their company. Capturing the diversity in intensity

levels in the needs that people display willingly or unwillingly, seems a challenging task via a solely research-led approach.

Moreover, in our study of wellbeing in school environments, we work with children. As Ghaziani (2021) mentioned, more research is needed to explore the variety in methods of data collection with this target group to gather their opinions and input. In the study of Christensen and Prout (2002), four different ways of approaching children in scientific research are described, ranging from seeing them as an object of study, up to viewing them as social actors in their own right and 'awake' participants in a study. This model correlates with four types of roles a child can take up explicated by Druin (2002), that of a user or a tester (implicating a passive role) or that of an informant or a design partner (implying a more active role). Studies with children linked to the built environment, indicated that children are experts and natural designers of their own environment (Ghaziani, 2021), and are able to vocalize their preferences. They have their own curiosities and create their proper social constructs that are not the same as those of adults (Druin, 2002; Ghaziani, 2021), and of which adults can merely have fragmentary understandings (Valentine, 2008).

These insights advocate for a more participatory approach of the target group of children in our DfHF-approach, however it must be operationalized in a way that it can empower the child in its roles (cfr. supra). In our view, the empowerment of the child can be obtained by performing the research in the safe environment that the child knows very well, that is in this case in the school environment itself. That way, the child can take up the protagonist role throughout the conducted research (Iversen et al., 2017)

2. Set up of the research plan

This explorative research project for uplifting wellbeing in a school environment was rolled out within the educative framework of the Live Projects, a two-week course in the curriculum of master students in Architecture and Interior Architecture, in which they work on site for the entire duration of the project and build a physical realization answering to a spatial problem they surfaced there.

This two-week-course entails 3 ECTS. Traditionally, the first week on site is used to perform research into a particular malfunction or issue at site, and the second week is for the actual building. To answer to our twofold research question, we developed a four-step plan. Step 5 and step 6 take place in the light of the didactical purpose of the Live Project, and are not particularly linked to developing insights in wellbeing via qualitative methods and explicating a rich experiential problem statement via qualitative methods.

Table 1.   Research plan in 4+2 steps.

Step 1	Designing a qualitative research frame for the researcher
Step 2	Designing interactive experiments for pupils as protagonists
Step 3	Understanding frictions in pupil and spatial perspective
Step 4	Stating rich, experiential problem statement and design brief via auto-ethnography
Step 5	*Conceptualizing a design intervention including synergy & conflict*
Step 6	*Building the design*

Step 1
Designing qualitative research frame

Step 2
Designing cocktail of experiments

Step 3
Understanding frictions

Step 4
Stating rich problem statement

Step 5
Designing
Step 6
Building

Elicitation cards

No. 1
Anecdotes in free play

How to learn about frictions below the surface

No. 2
"Tell a secret…"

Pupil perspective

friction

frictions

No. 3
Drawing

Spatial interpretation

Observation Cards

Step 1:
Cards to explicate the researcher's ethnographic interpretation and the pupil's action & reflection

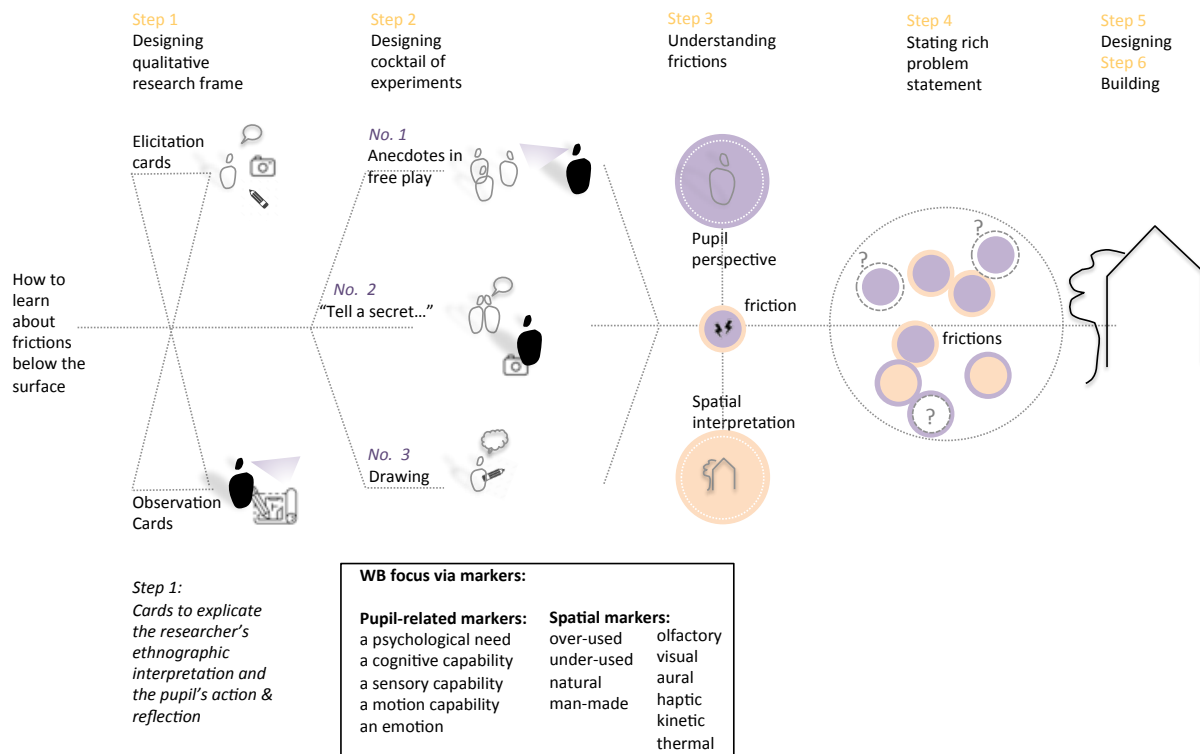| WB focus via markers:		
Pupil-related markers:	**Spatial markers:**	
a psychological need	over-used	olfactory
a cognitive capability	under-used	visual
a sensory capability	natural	aural
a motion capability	man-made	haptic
an emotion		kinetic
		thermal

Figure 1. Research set up scheme

In the first step (see Table 1), we used our wellbeing lens to develop capturing cards from an ethnographic and participatory focus that serve as an anchor in the development of future qualitative research experiments with the target group. We developed two type of cards through which the researching students could map their ethnographic interpretation and the pupil's participation in a particular situation (cfr. the three experiments) at school: an elicitation card and an observation card, each comprised of information that needed to be gathered to dive into the wellbeing of the pupils. To dive into the wellbeing in a spatial envi-ronment, we took a holistic approach, fit for the domain of architecture, and defined 'mark-ers' for spatial wellbeing. These pupil-related markers for wellbeing were selected from the

theories on (1) Design for Human Flourishing (Stevens et al., 2019a,b), (2) Design and emotion (Desmet, 2018, Yoon et al., 2016) and (3) Universal Design (Jones, 2014; Keates & Clarkson, 2003). These markers are respectively the (1) psychological needs of the pupils, the (2) emotions pupils could encounter and their (3) cognitive, sensory, motion capabilities, all linked to a particular situation. That way, via the cards, a holistic mapping of the human behavior on many levels and the emotions in the environment is realized.

Also, spatial markers for wellbeing were included on the cards, so that the researching student could take notes of the spatial references they noticed or were mentioned by respondents throughout the experiment. The spatial markers include sensory characteristics of a space (e.g. olfactory, visual, … aspects), usage information of that particular space (underused versus over-used spaces) and the nature of the space (natural versus man-made character). Both the pupil-related and the spatial wellbeing markers (see black lined text box in Figure 1) had the purpose of guaranteeing a holistic wellbeing focus in the qualitative data collection. A list of smart questions linking the pupil's behavior to the spatial markers were added to the cards, together with more general questions on person information of the respondents and the background of the situation that is being observed or researched.

Concretely, the observation card asked the researcher to draw the situation he/she observed, for instance a conversation between a number of pupils next to a wall, and describe this is bullet points. Then, the researcher had to describe the motor actions (e.g. pupil is standing, jumps from left foot to right all the time), the cognitive aspects in pupils (e.g. participates in the conversation, makes remarks, looks at faces of others and remembers what other say) and the sensory aspects (e.g. a lot of noise in the group, they loo at each other, touch each other) of both the participants that were observed. Also the surroundings had to be described via the spatial markers (e.g. a lot of noise in the group, hard and cold underground to sit on, colorful wall next to them). Then, the emotions that were noticed (e.g. one pupils raises his hand to participate, but is not 'seen' and feels ignored in the conversation) were captured on the card via the Premo (Desmet, 2018) and set out on timeline that captures the changes of emotions throughout the observation.

The elicitation card asked researchers to capture an anecdote of an experience a pupils wished to share. First, the researcher had to pinpoint the exact location they talked to a pupil on the map, and write down the anecdote the pupil in detail. Then the researcher linked the anecdote to emotions the pupils felt, and linked it to psychological needs of this particular target group. Furthermore, the researcher asked questions regarding what spatial aspects in that place added to the experience of negatively influenced it (e.g. a tree came in handy to hide behind), and what spatial aspect could uplift the experience even more (e.g. a tree with more low branches and more leaves that made noise in the wind would help in staying hidden for a longer period of time).

Thus, via these two cards, we aimed to capture an experiential passport of the behavior of the respondents in the future experiments (step 2, see Table 1).

Figure 2. Visualization of the elicitation and observation cards

In step 2 (see Table 1), three qualitative exploratory 'experiments' were developed, that aimed for coverage of the continuum between ethnographic and participative research, and for diversity between a pupil centred and a more spatially centred focus. This continuum was developed to incorporate the contemporary international research findings on types of user-centred design that are already applied in architecture, and to safeguard that through-out the experiment designs, the focus on the space and the person would be equally represented. The experiments were purposed to map the genuine behavior and experiences of pupils in the environment, which could complement the wellbeing information on the personal characteristics (emotions, capabilities, needs) that resulted from the cards in step 1.

The continuum learned that next to researchers' ethnographic understandings when observing actions, and leaning on one's proper experiences from primary school, a specific communication method needed to be searched for in the experiments in which bias would be avoided. We opted to use the technique of drawing, to find a common language to discuss spatial aspects in a scenario where pupils are not spatial experts. Also, the continuum learned that if we would develop a role-play, we needed to be sure that the behavior of the pupils would be genuine and we had to obviate the socially desirable conduct that could occur. Therefore we decided to 'hide' our role-play into a realistic scenario that occurs in playground. For instance, instead of asking pupils where they would isolate themselves in specific situations, we told them a secret they had to share with their classmates without teachers noticing. At that moment, pupils were fully immersed in the activity without realizing they were part of a research experiment. The aforementioned considerations when reading out continuum led to the development of three unique experiments.
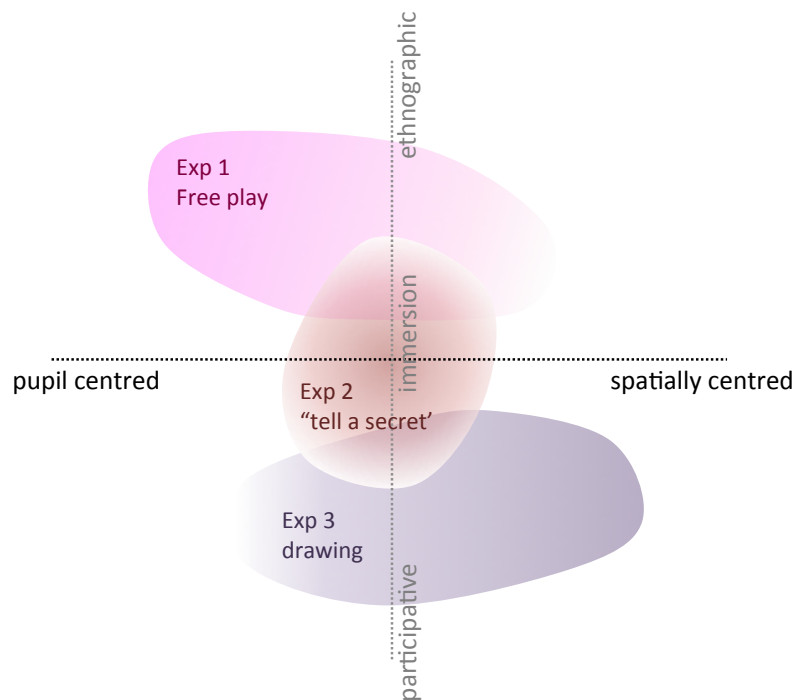
Figure 3. Step 2: a cocktail of experiments in a human-centred continuum for spatial research

A first experiment consisted of collecting anecdotes of pupils within their free play. Here, the researching student approached a pupil or group of pupils that seemed to experience some friction or synergy in there play. Pupils were asked to describe what they were doing and to explain how they and possible other pupils around experienced their play. They were asked to describe the key emotion they felt during that moment, and were asked to draw the physical surroundings linked to their play at that moment, e.g. a tree and a bench. Eventually, they were asked to draw one modification that would -in their perspective- positively influence their play experience of that moment. For instance, some boys were playing football while a few girls were doing head rolls around the horizontal goal post. The boys felt annoyed that the girls were there distracting the goalie, while the girls were scared to get hit by the ball, but felt they were allowed to use the goal post as well, even though it was not for football purposes. Both parties were included in the questioning. Both parties gave their perspective on the play and the friction that rose. Out of the drawing of the boys, the frame to aim a ball in deemed important, while in the girls' drawing, only the horizontal goal post was important in their play. In their additional drawings that carried an alteration to the actual physical situation, they came up with an alternative design of the goal.

When they are asked to draw or discuss a spatial issue, pupils were given the spatial markers that can be seen in the black lined text box in Figure 1, for inspiration.

A second experiment was a role-play called "tell a secret" in which a researching student approached a pupil to hint that they had learned about a "secret" about the pupils' teachers

and they wanted to pass it on in secrecy. This experiment was purposed to give insight in particular spaces at the school site in which pupils would isolate when they felt the need to, for instance when feeling sad or when in need for peace and quiet, or share secrets.

The researching student shared the secret with the pupil and asked him/her to share this with another pupil in absolute secrecy, as no other pupil should sense something was going on. When pupils ran away to seek a suitable spot to pass on the secret, the researching student followed, took photographs of the spatial surrounding the pupils went to. Afterwards, the participating pupils were asked to draw their impression of the surroundings, to gauge for what they were 'looking for' to 'hide' behind/in. This helps us to understand the spatial perspective of the child, for instance, when the pupil felt that he/she was standing 'covered behind large trees', but in reality they stood behind one semi-large tree, that tells us something about a child's versus an adult's spatial perception on being 'hidden' in the surroundings.

A third experiment focused on capturing the spatial capacity of the site. As the researching students sensed that the school site topography together with the layout plan of the existing pavilions were very layered and resembled an onion with many peels, they searched for a way to capture the different layers and the frictions associated with that. The students sought to find out whether pupils could sense these layers as well, and if these layers were experienced as barriers in the play and daily goings of the pupils at the site. Also, the students had picked up on 'small site specific issues' throughout conversations with the school director earlier, for instance, a large shelter was missing, and the unpleasantness of a rather hard border separating the playground of the pupils aged between 6 and 12 and that of the toddlers aged between 2,5 and 6. Moreover, the school director was planning on building an amphitheater, however she found it difficult to pick the 'right' location at the site.

The researching students developed a participative approach called the "soft atlas" to get grip on these issues. The cartographer in the student team first drew a map of the school site on a chalk board, making visible the classroom pavilions, the different zones such as the football field on the west-side, the forest on the north-side, the toddler playground on the south-side, and the playground of the pupils in between all of the above, and the landscape topography and materialization. Then, the cartographer asked pupils to come to the chalkboard and note where they often played and what they were doing there, what they believed was missing there, what their ideas were regarding the amphitheater, how to overcome height differences, etc. They were allowed to 'soften' the 'hard edges' between the different zones on the map by erasing or adding things. In other words, pupils were asked to visually reflect on the layout of the playgrounds and existing and planned play infrastructure, see Figure 4 below.
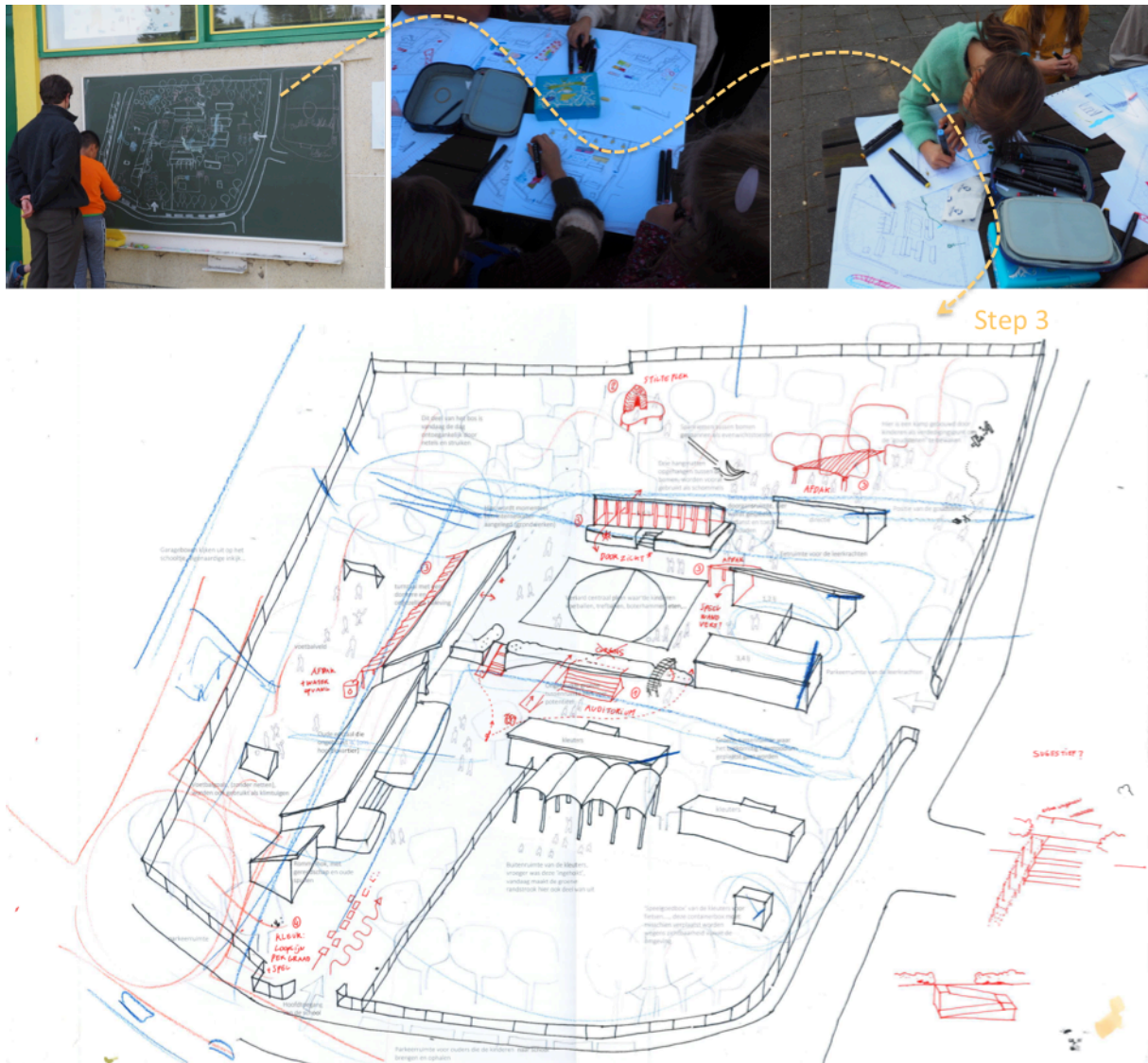
Figure 4. Step 2, Experiment 3 - Top: children adding to the original chalk board "soft atlas" and re-productions of it on paper - Down: the end result of the "soft atlas"

Now, the set up of the qualitative research plan is discussed, and the paper will continue with discussing the results. In that section, firstly, I will zoom in on how the students processed the data that were collected throughout the three experiments, and how their auto-ethnographic approach led to the explication of a more rich problem statement and design brief. This corresponds to step 4 of the research plan in Table 1. In the following section, I will zoom in on the design avenues the students have explored to finally land with a design proposal and built realization, which corresponds to steps 5 and 6 in Table 1.

3. Analysis of the results: Towards a rich design problem statement

As the students had gathered rich data out of the free play observations (exp. 1), the role-play experiment (exp. 2) and the "soft atlas" drawing (exp. 3), a next step consisted of comparing the different types of data. Next to the elicitation and observation cards that cap-

tured several interesting anecdotes, students had the "soft atlas" with spatial interpretations of the school site to build upon. From an auto-ethnographical standpoint they noticed out of experiment 1 that children seemed to be rather rigid in the type of play in each of the different zones of the school site. For instance, at the football field, they played football, and not much else. Due to a strict scheme of when pupils are allowed to play in certain zones (e.g. the football field on the west-side of the terrain, the small forest on the north-side), children were not able to spend much time at the football field to develop other play strategies there. In contradiction, they did notice in their answers that some of the girls who did not join the football game wanted a stronger connection with the boys at the football field, because they felt they were "not allowed" there. The girls wanted to engage in different types of play there, driven by its rather 'remote' and 'private' atmosphere, resulting from its spatial location behind a larger pavilion and the west-frontier of the site. But that might cause disturbance to the football game. Experiment 2 on its turn showed that some children tried to hide nearby the "hard edges" of the football field, for instance in a narrow passage between two pavilions, or in atmospheric transition zones, for instance where a pavilion meets the first tree lines from the forest. In experiment 3 the students noticed that pupils drew a lot of slides, tunnels and trampolines between the different paved play zones (in red on Fig. 4). The researching students marked these spots on their "soft atlas", and noticed that a few other specific places at the site provoked similar behavior and showed similar experiences, see the red circles on the left part of Fig. 5. The students connected the circles, and noticed that several 'barriers' started to surface at the "soft atlas", that were associated with frictions in the qualitative data collected in the experiments.

Thus, out of the first experiment our students learned that more various type of play ought to be facilitated at a particular zone, e.g. the football field, in a way that different groups of pupils can also 'find' and connect to each other in their proper play. The second and third experiment learned that the pupils at the site had a particular, wicked relationship with the 'hard edges' between the different play zones, clearly expressing the need to alter these through adding slides or other transitioning objects.

In search of a rich, experiential design problem statement, the students argued that they felt the urge to find ways to better connect the transitional spaces that the pupils noted on the map in a way that it could also bring pupils together and draw them in each others' play. Thus, the interpretation of the behavior and emotions that the students picked up on out of a reading of the data made them argue that they wished to 'explicate and break through the borders', as their rich problem statement. To clarify the areas to work in, on their "soft atlas", they searched for a routing throughout the entire terrain that would connect the transitional zones and activities that took place there, see the right part of Fig. 5.

Figure 5. Step 4: Explicating (a) rich wellbeing related problem statement(s) occurring at the school

4. Illustration via a design and realization

The design problem statement handled the aspect of making visible and meanwhile breaking 'hard' borders both between pupils reciprocally in their rigid play driven by preconditioned zones at the site (see the example of the boy on the football field), and physically between the many different architectural and topographic layers of the school site, (i.e. stairs or low walls between the paves and green areas), as referred to as 'peels'.

The students continued their research and design process by developing conceptual ideas of playful ways to firstly make more tangible the barriers between the different peels present at the site and secondly to make pupils aware of the barriers and help them to *physically break through* the borders or *overcome* certain barriers. That way, they aimed on a meta-level to even nudge pupils to critically think about borders and barriers in their daily goings at the school and to experience connectivity with the site and with other pupils. As can be seen in Figure 6 below, a number of playful interventions were sketched onto photos to conceptualize the physical activity that it would provoke in pupils crossing borders between different zones at the site and the connective strength of the intervention in the architectural layers of the site. Examples contain stepping stones, of a 'rope wall' in which pupils had to find a 'hole' to dive through. That way, pupils are more aware that they are physically crossing a border at the site, and are challenged to overcome this, and perhaps even work together to cross it.

Step 5

Figure 6. Step 5: developing design avenues for the rich design problem statement of 'making more tangible and breaking through borders'

As we have explained that this research project was rolled out within the educative framework of a Live Project, the students also had to build at least some parts of their design. The students opted to build a ramp that would connect the paved playground of the 6-12-years-old pupils to the greens nearby the football field. The installation would simultaneously function as an amphitheater, see Figure 7 below. Moreover, it presented a wheelchair accessible way to overcome the height difference between the two aforementioned zones. As the amphitheater could function as an outdoor classroom due to its encapsulated location, an additional spatial dilemma that the school director was struggling with, was resolved.

5. Discussion

As this explorative study is part of a larger study on wellbeing in school environments, we can critically review the results of the analysis and elaborate on its value for theory, architectural practice and for the design of school environments.

5.1 Value for theory
Here we have learned from a design methodological angle in architectural design for wellbeing research that between the so-called counterparts of user-centred strategies and participative strategies (see Sanders & Stappers, 2008), many more options are available when
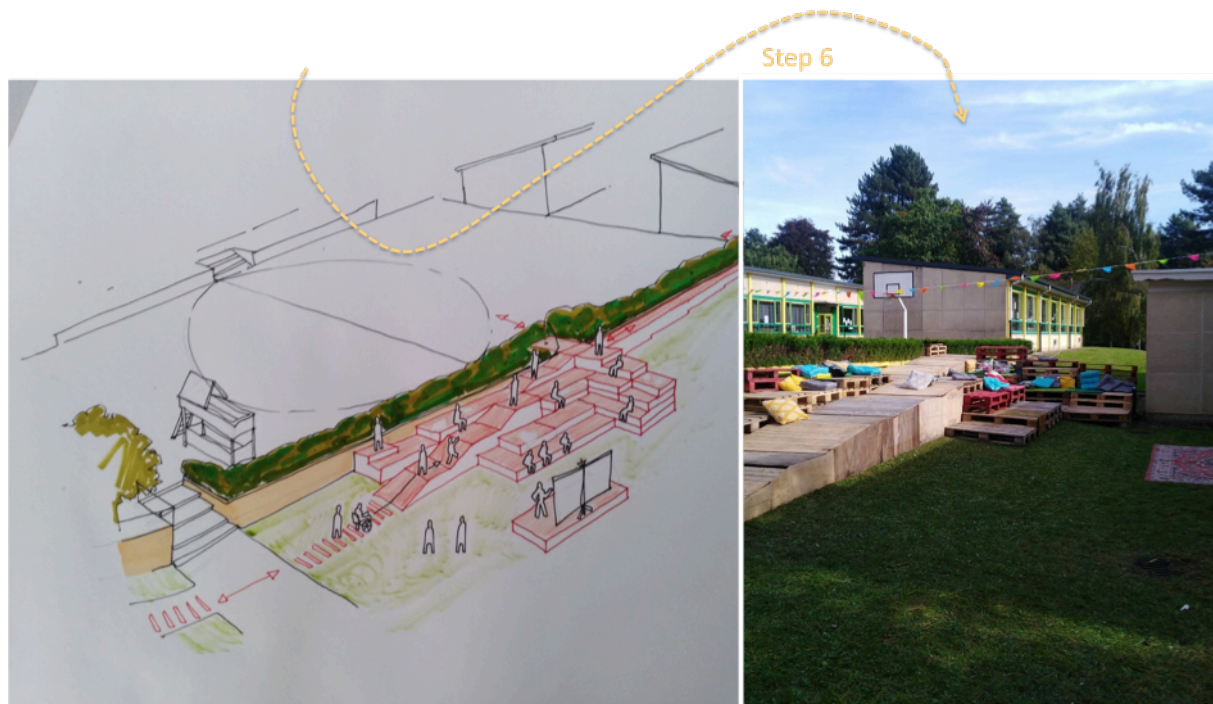
Figure 7. Step 6: the design and built realization of their design: border-breaking amphitheater

playing with the characteristics of both. Solely ethnographic observations tend to miss out in understanding the link between the pupil's behavior and the spatial characteristics of the environment, and they only make visible what is already happening and cannot hint at the hidden potential of a particular place. Participative methods have shown to be an interesting working method with children, as children are able to vocalize their preferences, but these methods miss out on rich insights on the actual psychological needs and emotions that are behind certain decisions that children share. Therefore, by infusing the methodological strategies with markers derived from wellbeing theory, universal design theory, and spatial experience theory, we were able to develop a rich pallet of experiments that can be placed on a continuum between user-centred and participative strategies. Our contribution is not so much the experiments in itself, but the innovative cocktail that brings together valuable insights from different methods and renders a richer understanding of wellbeing in a spatial setting of a particular target group.

Moreover, as we noticed that the researching students developed a routine in working with pupil-related wellbeing markers and spatial markers in their experiments (in step 1 up to step 3 of their process, see Table 1), they showcase a critical reflection in the final steps 5 and 6 of their process (see Table 1) when detailing the architectural design solution and building it. This can be illustrated by the ramp that the students in the design example had built; the ramp answered to their rich design problem statement by making visible and over-coming the physical barrier at the school site and bringing pupils closer together in the am-phitheater. But, the design of the ramp also ticked off the accessibility aspect which is linked to the motoric skills of a person –one of the pupil-related wellbeing markers- and the en-

closed atmosphere that is created via the positioning of the amphitheater ticked off a number of sensory qualities, which are spatial markers.

In relation to wellbeing related research in other design branches, this research seems to further manifest wellbeing research in an architectural setting, and enlightens how architectural designers should read experiential data and connect it to the spatial lens they usually take in overviewing the usage of particular spatial environments. Further researching this understanding can enlighten the recent findings of Desmet and colleagues (2019), that state that people tend to change their behavior according to their moods, and the setting of context they are active in can be designed to incorporate these moods, and the work of Hassenzahl (2003) who claims that the 'mode' of a user (playful or goal-oriented) is influenced by the situation, hence the context, he/she is in.

5.2 Value for architectural practice

Our main focus was to seek understanding in how a well-thought qualitative data collection could lead to a novel, more human-centred type of problem statement, or design brief. In that respect, we believe this study can help architects in firstly developing a deeper understanding of their target group, when designing for larger audiences, such as 'school children' and developing a particular interest in seemingly unnoticeable frictions that can occur when a group is co-experiencing a particular architectural environment. Secondly, it helps architects to seek for hidden potential in the environment.

We are aware that this kind of studies result in placing even more weight on the fuzzy front end of the design process (Sanders & Stappers, 2008), which was already hypothesized in the theoretical definition of DfHF (Stevens et al., 2019a) and was shown in a limit amount of practical tests (Stevens et al., 2021) with the DfHF framework in architectural practice. Therefore, we do acknowledge that it raises question with regards to the wingspan of the architectural profession. Yes, recent research has shown that developing insights in the psychological needs of one's clients is important, and can best be developed oneself, not by outsourcing this task (Stevens et al., 2019a), but this simultaneously urges for another set of skills that architectural designers should train, or get acquainted with in their studies for becoming an architect.

5.3 Value for the design of school environments

This explorative study helps to reveal more in-depth information in the spatial wellbeing debate in school environments. We do acknowledge that this research lifts only pieces of the puzzle, as we have not yet incorporated the opportunities of including educational and pedagogical work methods. Therefore, we see potential avenues for further research.

Moreover, this research approach offers a fun, varied and low-treshold way to pupils to give valuable input in the design process. As Ghaziani (2021) highlighted in het research, the creative input of children is beneficial in school design processes.

Via this process, we believe quick wins on the school site can be realized through activating hidden potential, which would benefit the spatial reality of many school. For instance here in Flanders, where the spatial reality is still rather problematic (Châtel, 2011) due to an overly old school patrimony.

5.4 Critical reflections and limitations

A number of critical reflections can be made that should be addressed in more detail:

Due to a limited amount of time to analyze the data of the three experiments, students used an auto-ethnographic approach and each of the two design groups that were active on this school site went for a spot or a theme in their rich data that seemed to trigger or touch them in some way. We do acknowledge that there are more structured ways to analyze the data, and we have already developed more structured and theoretically funded routes to analyze the qualitative data in a larger follow-up project that is being rolled out as we speak, from September 2021 until January 2022. Moreover, the experiments focus on the emotional character of the pupils as well, in order to truly understand their behavior and reactions in the spatial environment. We do acknowledge that in certain parts of the world, pupils and people in general are not used to share emotions in an open and honest way, which could hinder the data collection and the flow in the experiments.

Regarding the limitations of the study:

Firstly, this study has an explorative character, as it took place in one school environment, with a limited amount of students involved, and within the limited timeframe of two weeks. The students together with the coordinating tutors (which are researchers in architectural design for wellbeing) had to develop the research plan and collect qualitative data all in the first of two weeks. The second week of the project was purposed for designing, collecting building materials, and building a realization on site.

Secondly, too little data were collected to 'generalize' the results, and therefore this paper does not pretend to present a 'fixed' method. Moreover, design processes cannot be generalized according to us, as design processes are hardly rigid and linear. Therefore, this study presents an assembly of knowledge that can be integrated in the proper design processes of architects.

5.5 Avenues for further research

Firstly, we are challenged by our results to search for a more in-depth link with the pedagogical concept and the didactical methods that teachers use. An important first avenue is to add educational and pedagogical aspects to our list of markers for wellbeing, that in this study solely existed of personal (pupil-related) and spatial markers (see Figure 1). We acknowledge that certain pedagogical aspects can be responsible for or augment certain frictions as well (see Figure 1, Step 4, symbolized by the question marks). A study including the working methods of teachers should shed a light on where potential benefits for pedagogy can be found, as these play a major role in trying to design learning affordances in the

environment. We saw hints thereof in the results of experiment 3, in which children became more aware of the architectural and physical boundaries that were present at the school terrain. Throughout their data students developed the design brief of helping the pupils get closer together by bridging the different play zones intended for different types of play by a clambering installation. Instinctively our students recognized personal situations in which they tried to learn something by heart, by doing it while moving around. Here, we see a potential didactical opportunity and an interesting link with research in embodied cognition, and rhythmic exercise. This interesting overlap in fields of research is next on our agenda.

Secondly, we feel that the teachers should be more included in the experiments in the near future. Via steering our research in these directions, we can assist architects in getting acquainted with trends and evolutions in the pedagogical field as well in order to be ready to create interventions in an educational context that are considered as 'future proof'. Here lies a responsibility for architects in supporting schools in the (architectural) roll-out or translation of their pedagogical concept.

6. Conclusion

In this paper we have provided insights in a thorough qualitative research experiment to gauge for a holistic understanding of spatial wellbeing of school children. We have explored the range of user-centred data collection methods and have set up a cocktail of experiments that vary from an ethnographic to a participative and immersive approach, in which children were approached as experts in their own spatial experience and were placed on the foreground. We infused the qualitative methods with wellbeing markers from DfHF theory, which include psychological needs of the target group crucial in becoming the best version of themselves and experience personal growth and eudaimonic wellbeing (*Nicomachean Ethics,* 4BCE; Ryff and Singer, 1998; Huppert and So, 2013), and we have added spatial markers to gauge for spatial experiences in relation to wellbeing.

That way, a data collection was set up consisting of three different experiment and two complementary ways of capturing what was happening willingly or unwillingly, tangible and intangible, throughout the experiment.

After collecting the data, our researching students analyzed the data using auto-ethnography, and formulated a more rich and experiential design problem statement. While transitioning from the design problem statement to designing a solution, the students took a holistic design attitude integrating multiple perspectives from stakeholders (pupils, the school director, teachers, neighbors, etc.) and adopted a critical attitude that became clear in the constant weighing of the design concepts with the pupil-related wellbeing markers and the spatial markers that had directed the data collection (see Figure 1).

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