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Unlocking wellbeing-affordances in elementary schools initiated by a 'natural experiment' caused by Covid-19

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Unlocking Wellbeing-Affordances in Elementary Schools

A "Natural Experiment" Initiated and Caused by Covid-19

Ruth Stevens, Ann Petermans and Jan Vanrie

In 2020-'21 Covid-19 rolled over the school landscape as a pressure wave. Elementary schools had to push through ad hoc changes in their physical structure to succumb to the safety regulations issued after the first lockdown in the Spring of 2020. These physical alterations influenced the organizational structure of schools and the wellbeing of protagonists. Through all the negative, also positive sparks were noticed, as some changes were appraised positively, inveterate ideas were abandoned for an open minded view and teachers at home overthought their functioning and searched for meaning in their profession. This relevant momentum can be viewed as an opportunity to critically question the rather cumbersome design type of elementary schools, and to provide more attuned spatial affordances to teachers and pupils. The aim of our study was thus twofold: first, to get a grip on the values and needs that teachers and pupils had (re)attached to the functioning, and positively appraised changes in the school organization and environment. Second, we aimed to combine the gathered data and explore design strategies to design wellbeing related affordances inspired by the "natural experiment" caused by Covid-19. To conclude, the paper discusses the 'flourishing affordance' in school architecture.

Keywords: architecture; design for wellbeing; psychological needs; programming; learning environments

Introduction

In Flanders, Belgium, currently, there are 2661 elementary schools (Vlaamse Overheid, 2021). The Covid-19 pandemic pushed schools into a "natural experiment" dealing with the sudden crisis situation. From a spatial perspective, the closure (which started in Belgium in March 2020) and the reopening of primary and secondary schools (initiated in Belgium mid May 2020) urged school administrations to push through ad hoc spatial changes to succumb to the safety regulations regarding "social distancing". These changes penetrated onto the levels of the organizational structure (e.g. different opening hours for each grade) also including the pedagogical concept (Tomasik et al., 2021) (e.g. not being allowed to work cross-class) but also affected the protagonists functioning here: pupils and teachers (e.g. Reinius et al., 2021). Both pupils and teachers showed signs of having performed introspections during the lockdown, regarding the values and needs related to their functioning at school. In this paper, we zoom in on the geographical and cultural context of Flanders, and we hypothesise that evaluating the diverse spatial interventions schools implemented from the point of view of the protagonists (i.e., pupils and teachers) will provide insights into the potential of the existing school infrastructure to increase the wellbeing of pupils and teachers. Indeed, in a context where the patrimonial situation of many schools is still rather problematic (Châtel et al., 2011), even small adjustments or improvements in the spatial environment could make a difference.

We opted to use this "natural experiment", and learn what and how spatial alterations were appraised in a

particular way. Our research question thus is the following: **what new affordances[1] did the space offer to its users?**

The Current Status of Designing Learning Environments

Designing 'optimal' school environments and spaces for learning is a considerable challenge. On the one hand, there is the aspect of the design of these environments. International researchers investigating learning environments often separated teaching and learning from their spatial setting, or failed to incorporate classroom practice in spatial studies (Gislason, 2010, 2018). On the other hand, while curricula tend to change in line with societal evolutions (Kessels, 2013; Gislason, 2018), the spatial environment in which the courses and teaching methods take part, has, in general, hardly evolved. This is of course in part due to the 'slowness' of the architectural domain in general and school typology in particular. With some notable exceptions, also in Flanders, Belgium, most of the schools are still located in the same type of buildings or have the same interior as during the second part of the 20th century (Châtel et al., 2011; Van Den Driessche, 2009). We notice two gaps in literature that hamper designers to create school environments that focus on wellbeing combined with evolutions in pedagogical organization.

Firstly, in terms of the patrimonial situation of schools in Flanders, the school landscape has known two recent waves of building programmes for school infrastructure at the beginning of the 21st century, via Design-Build-Finance-Maintain (DBFM) projects of the Flemish Government, supervised by the Team Vlaams Bouwmeester (i.e., a governmentally supported team safeguarding the architectural quality of the built environment). This action ought to tackle the non-desirable constellation of school sites today and respond to an extensive demand for extra space. Notwithstanding these initiatives, in the ad hoc, fragmentary alterations that schools undertook over the years in order to answer their local 'most urgent needs' (Châtel et al. 2011; Nusche et al., 2015), interesting opportunities to help resolve particular spatial needs 'are hidden' in the current landscape. While novel projects often integrated particular evolutions and novelties, these were mostly focusing on the level of the architectural masterplan of the school site and surroundings, such as the combination of a school program which non-school programmatic elements (e.g. a nursery), or the more active relation between the school and the fabric it is situated in (Châtel et al., 2011) via the opening-up of parts of the school infrastructure to local residents (e.g. a school's sport facilities), or inserting shared facilities (e.g. a small petting zoo). However to date, a detailed look on the spatial reality of an elementary school tuned to the pedagogical concept, and vice versa, is still missing (Grannäs and Frelin, 2017).

Secondly, it is clear that over the years, studies regarding the physical, social and academic conditions of the school environment have grown steadily (cf. Corral Verduga et al., 2015) but although the built environment in this context can be seen as a didactical agent for positively influencing learning and teaching processes (Gislason, 2010; Daniel et al., 2019; Tapia-Fonllem et al., 2020), there is still too little empirical knowledge to have a solid knowledge base for creating appropriate learning environments that also incorporate the subjective wellbeing of the different protagonists functioning here. More specifically, a lack of empirical data that connects the pedagogy and the actual spatial elements hampers architectural designers to truly integrate wellbeing drivers of pupils and teachers in their design, as they for instance do not know how certain pedagogical strategies can be supported by specific spatial elements. The issue of wellbeing is not only an increasingly frequent topic in educational discussions (cfr. infra), but also in design disciplines. In architecture, this issue has been partially documented, with a focus on spatial aspects that cover objective wellbeing in the environment, such as 'ventilation', 'noise', 'lighting', etc. (e.g. Barrett, 2013, 2015). However, often these issues are studied in isolation, not incorporating the pedagogical approach of a teacher in that particular environment or other elements which might impact of such considerations (e.g. Higgings et al, 2005; Burman, 2018). To develop environments in which learning gain and learning pleasure is promoted, a more systematic view needs to be taken, and one must think in terms of what the environment can offer to fulfil certain needs that allow teachers and pupils to become the best possible version of themselves in the school environment.

An Affordance-Based Approach in Architecture

Becoming the best person one can be, is called 'flourishing', a topic originating in positive psychology (e.g.

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[1] The concept of 'affordance' originates in psychology and stands for how various kinds of environments, ranging from urban spaces to intimate interiors, can appeal to particular users, and why they do so in different ways for different people (Petermans et al., 2020). Users of a particular environment can recognize action possiblities linked to certain needs and goals they have (Stevens et al., 2019b).

Ryan & Deci, 2001). The topic has recently been operationalized in architecture as "Design for Human Flourishing (DfHF)" (Stevens et al., 2019a,b). This approach stands for a search for designing programmatic gestures that allow people to enforce their talents, and fulfil their psychological needs, in order to become the best possible person one can be, or in other words, to flourish. Strategically, a DfHF-approach uses opportunities that are noticed in the social and spatial environment, and is based upon a definition of the target group's psychological needs (Stevens et al., 2019a,b). In other words, DfHF takes an affordance-based approach (see Petermans et al., 2020, p.25), in which psychological needs are translated into designed activities that are thus supported and triggered by the environment. The activities cover various intensity-levels and are shaped together into a so-called 'enriched' program (Stevens et al., 2019a,b), see Figure 1. Based on the enriched program, a spatial reality covering all kinds of architectural elements, is then designed to house the activities. Figure 1 shows how a DfHF-framework in architecture can be composed.
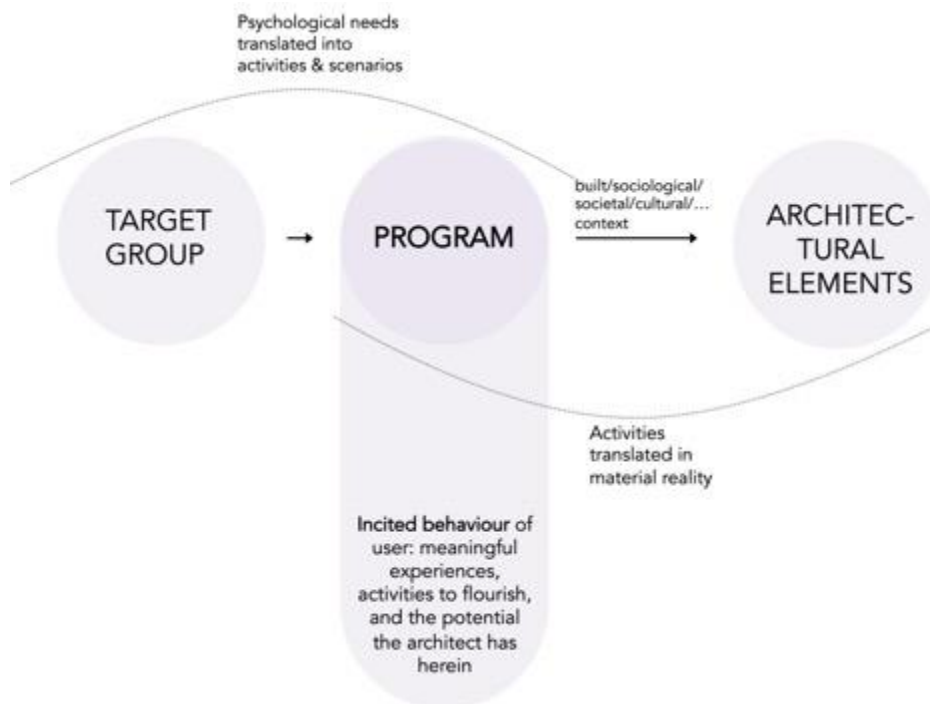

Figure 1. The DfHF-framework in architecture.

As demonstrated in Figure 1, the DfHF framework indicates to first determine the psychological needs of the concerned target group, then translating these into rich activities (i.e., building a program for the site), which leads to designing a space using architectural elements to accommodate the program. Extrapolating the DfHF-framework to the spatial context of school environments, learns that the 'program' or the 'rich activities' are largely determined by the pedagogical concept and didactical methods teachers apply in their educational practices. Regarding the target group, the psychological needs of both pupils and teachers should be taken into account and be balanced out. Thus, in order to create a supportive, flourishing environment, the balanced psychological needs of teachers and pupils should be tuned to pedagogical activities (incorporating the evolutions in the field such as digitalization and the institutionalized character of learning), and can then be facilitated through architectural elements (i.e. elements that make up the exterior and interior of the school building and its surroundings, such as trees, desks, white boards, lounge seats, …).

As the context of school environments poses novel challenges in applying the framework (cfr. supra), in this paper we apply a Research by Design set up to explore possibilities and new affordances the school space can offer to its users based on experiential insights that were gathered during the Covid-19 period. In what follows, we will sketch the set up of the research by design practice, and zoom in on the question of how particular spatial interventions were developed. Then, we will attempt to translate our explorative design research results into design avenues that schools can take to focus on flourishing affordances for pupils and teachers.

Research by Design: A Seminar to Surface Spatial Flourishing Affordances

Context of the Seminar
This Research by Design project was organized within the framework of a master seminar, set up for master students in Architecture and Interior Architecture. A seminar is a one-semester-course, entailing 8 to 9 ECTS, in which master students of the Interior Architecture and Architecture program can enrol. They meet up every Monday and work all day. During these Mondays, the students study a particular topic in the field of human centred design via applying research methods (e.g. qualitative research and literature studies) together with research by design. The topic this academic year related to filtering and designing for positive experiences in elementary school environments, while focusing in particular on one elementary school, located in the east of Flanders. This elementary school was selected as a case study to work on due to the enthusiasm and avidity of the school principle to tackle certain spatial issues, and develop insights into wellbeing. At the end of the course, a master jury was organized in which students presented their research and design results to the tutors and the stakeholders of the concerned case.

Set-Up of the Seminar
The 19 students that enrolled in the seminar were divided into four design groups, each consisting of four or five students. First, students were asked to collect research data of the two protagonist groups of the elementary school: pupils and teachers. For each of these protagonist groups, the students performed a literature review to surface psychological needs and values. As tutors of the seminar, we provided the students with a set of papers (N= approximately 15 per protagonist group) that was composed via a selection on search terms such as 'psychological needs', 'wellbeing' in journals such as Journal of Educational Psychology, Journal of Happiness Studies, Social and Behavioral Sciences, International Journal of Educational Research and Frontiers in Psychology. Additionally, the students organized qualitative studies (i, ii) to get acquainted with the needs, wishes and experiences that the target group expressed and felt during the current Covid-19 pandemic. To learn from the target group of teachers (i), students prepared a focus group panel discussion in which they posed in-depth questions and presented a number of these, all based on the literature review. That way, they could grasp the intensity levels in which certain needs and values occur, and learn to understand what novel insights teachers developed during the lockdown with regards to how they experience their job, and see themselves functioning as a teacher. For the target group of the pupils (ii), the students prepared a trifold qualitative study in the natural habitat of the pupils, that is, the school site (some results are displayed in Figure 2 below). First, they performed a photo elicitation study (see Warren, 2005), in which pupils were asked to visit their favourite place/space in school, the place they go to when they had a fight with a friend, the place they go to for private conversations, the place in which the pupils feels safe, etc. The pupils who participated had to make a picture of the particular place and add a few words to describe what made them feel that way. Secondly, the students organized a 'playful interview', in which they presented a number of pairs of pictures of spatial organizations and interiors of school environments to the pupils, accompanied by specific questions. For instance *"Do you prefer to learn outdoors or indoors?"*. The pupils had to answer the question by selecting their favourite of the pair of pictures. Thereafter, a group discussion was organized in which pupils were asked to describe what the most enjoyable moments are in school, and what they missed during the lockdown and distance-learning –phase. In groups, they had to draw their ideal spatial classroom setting. Thirdly, a group of the design students observed the pupils and the teachers during the 'playful interview' and the introduction of the teachers, to grasp in what way the pupils 'master' the environment, have their own space, and how the teachers handled and altered the spatial layout and approached their pupils during the playful interview and learning moments.
To conclude this part of the research, the design groups were asked to combine their data and draw up lists of psychological needs and values that the two protagonist groups of teachers and pupils attached to their specific functioning at school. That way, the design students could get a grip on wellbeing drivers and possible barriers for the protagonists of elementary school environments in the Covid-19 era in Flanders, Belgium. Additionally, the design groups performed a spatial analysis of the architectural and environmental reality of the particular school site by drawing interiors, floor plans and site plans, circulation schedules, etc. As the students were not allowed to physically visit the school terrain due to the entangled Covid-19 restrictions in the fall of 2020 in Flanders, the teachers and pupils of the school had made a video of the school surroundings, and sent existing plans and photographs to the students via email. The tutors of the seminar had been able to visit the school terrain at the end of the summer of 2020, and were able to address questions that students had.
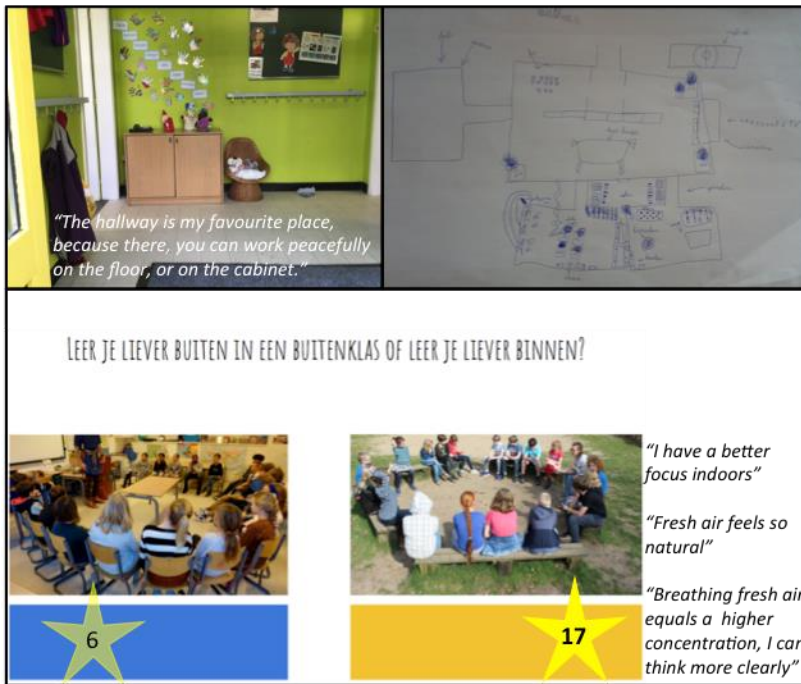
Figure 2. An illustration of the data collection – Top left: a photo elicitation of a 'favourite spot' – Top right: a drawing of 'the ideal classroom' – Below: the result of the picture-pair "Do you prefer to learn outdoors or indoors?" with quotes.

A Conflict-and-Synergy Approach to Analyze and Develop Spatial Experiences

At that point, students had learned about the architectural characteristics of the school site, had dived into the general psychological needs of pupils and teachers, and had also gathered insights into the experiences and proper introspections (see Nunan, 1992, Overgaard, 2011) of pupils and teachers during the specific period of Covid-19 relating to their activities at school (e.g. teaching, learning, social connections, etc.). Through the lens of the DfHF-framework, those actions comply with the starting point of a DfHF-design process, covering information on the **target group** (see Figure 1 above).

Here, the typology and particular situation add complexity to the approach due to the multi-stakeholder perspective and the testimonials in which pupils and teachers expressed what they have learned during the Covid-19-period. In an elementary school environment, needs and values of pupils as well as teachers must be balanced in one environment. To do as such, we developed a technique called the "conflict-and-synergy-search". Concretely, the students were asked to envision situations –taking place at certain locations in school- in which needs and values of teachers and pupils could collide. Via the technique of narratives or storytelling (Heylighen, 2005; Stevens & Desmet, 2019), experiential data were included and situations came to life in which teachers and pupils interacted. In these hypothesized interactions, experiences were set out that surfaced what potential conflicts or synergies could be found in the pupil-teachers-relationship in the school's organizational structure. For instance, when a teacher prefers a visual overview of the class and a pupil wishes to work in privacy, or when teachers display a great deal of informative posters on the classroom walls, but pupils feel they cannot concentrate when carrying out a think exercise due to the 'visual noise', there is a potential –spatial- conflict. When teachers prefer flexible set ups of the furniture, and pupils prefer playful learning, possibilities for synergy arise. Below, in Figures 3 and 4 the conflict-synergy analysis of a design group incorporating their literature and qualitative research data, is showcased. In orange, the specific psychological needs of respectively the teachers and the pupils is written, and in between in black, the hypothesized conflict (figure 3) or synergy (Figure 4) situation is explained. For instance in Figure 3: teachers need structure and pupils need flexibility. Here, a potential conflict rises as the needs are operationalized in the following behaviour: pupils do not wish to sit still al day long at school, but teachers need the overview of the class group. Moreover, teachers also wish to teach in a creative manner, that way meeting the a more active posture of the pupils, however they fear to loose a grip on the pupils and miss out on some pupils who need extra guidance and not dare to ask questions.

Teachers ⚡⚡ **Pupils**

NEED: Structure

Teachers need flexible space to teach in a creative manner

Teachers need overview of the group/class

Pupils do not want to sit still all day long

NEED: Flexibility

NEED: Guidance

Some pupils need more guidance

Pupils wish to work together

NEED: group feeling, connectivity

Some pupils wish for a private spot, or a place for isolation

NEED: Autonomy

NEED: Structure & guidance

Teachers need space to store didactical items, but also feel obliged to display an amount of didactical material

Some pupils prefer a quiet surrounding with less stimuli

Some pupils need a playful, stimulating environments

NEED: Flexibility

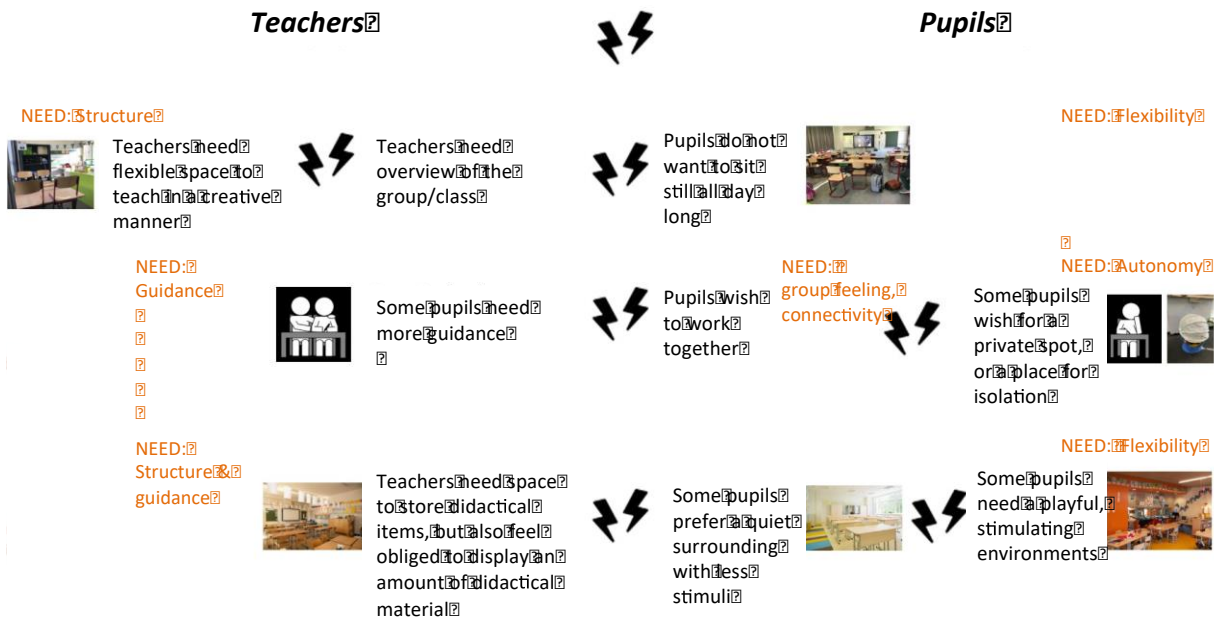*Figure 3. Conflicts between teachers' and pupils' needs and values in certain situations at certain spaces in a school.*

Teachers ⊚⊚ **Pupils**

NEED: Playful learning & greenery

Teachers value playful teaching (to uplift motivation)

Lessons in the outdoors

Learning in a more natural environment

Playful learning

NEED: Varying didactical methods

NEED: Flexibility

Flexible learning environment/ classroom

Pupils value the choice in learning/ working: quietly on their own, together in a group, or guided by the teacher

NEED: Tranquility

Tranquil, quiet space or transition space

Places where quarrels can be solved, stories can be shared, can be read
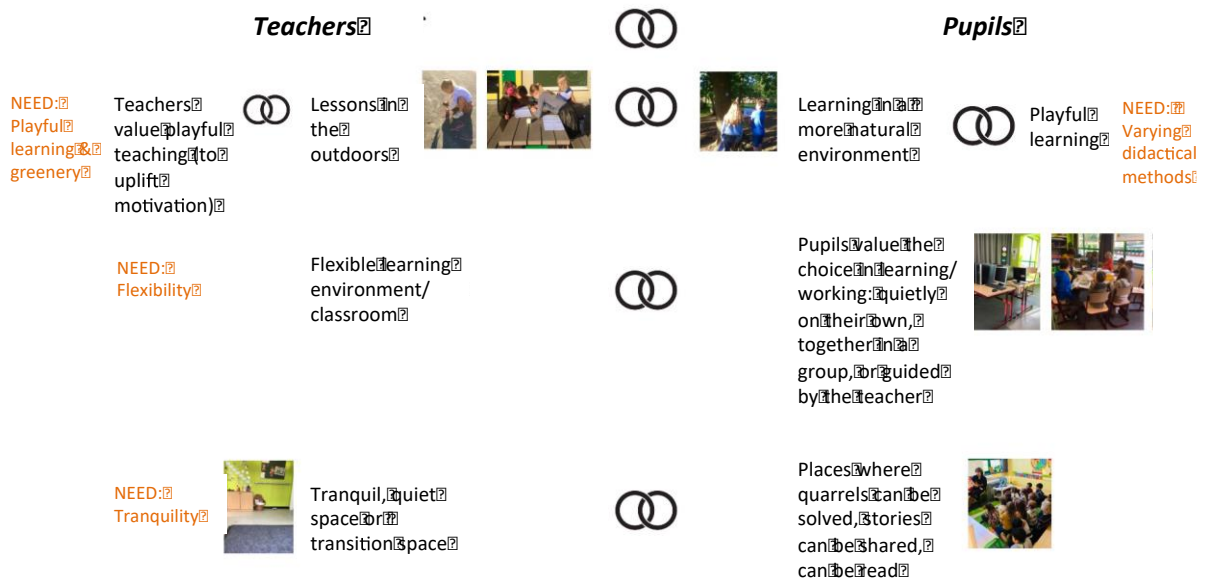
Figure 4. Synergies between teachers' and pupils' needs and values in certain situations at certain spaces in a school.

By screening the spatial environment of a school in this way, a what we label **"experiential passport"** can be developed. This experiential passport links the (universal) needs and the personal values of teachers and pupils to the spatial reality in the environment by an active mapping of the potential conflicts or synergies that can occur when protagonists are present. Thus it brings together three types of information.

Students extrapolated this technique to the particular elementary school that they studied, as visualized in Figures 3 and 4, in which pictures helped to understand where potential conflicts of synergies could occur in the experience of needs. The experiential passport surfaces the potential conflicts and synergies than can occur during certain activities, but can also lead to finding opportunities to obviate conflicts and focus on

developing more synergy. For instance, the concerned school had an on-terrain forest, that currently functions solely as a playground during the lunch-break. However, the literature review the students performed on needs and values as well as the in-depth discussions with teachers and school children pointed at the possibility of playful learning and the benefits of the fresh air to a sense of tranquillity for pupils. Moreover, the Covid-19-period has brought more appreciation to spending time outdoors for pupils and has removed certain prejudices teachers might have felt in organizing lessons outdoors. In the novel perspective, for teachers the outdoors implies a more flexible spatial setting, in which set ups can change quickly without obstacles of class furniture being present, blocking the way.

Thus, within the experiential passport, avenues for spatial interventions can be deduced by narrating *how* the protagonists wish to experience their school-time. Moreover, from a spatial lens, conditions can be formulated to intervene in the existing setting to meet the needs and values that the protagonists have.

Exploration of Design Results: The Conflict-and-Synergy Design Technique to Integrate Spatial Learning Affordances

After developing an experiential passport integrating the school environment's spatial reality with the values and needs of protagonists during their daily goings in school, the students were asked to optimize the situations in which synergy was noticed, and obviate the situations in which conflicts or frictions were found. The difficulty here lies in keeping a bird's-eye perspective and a holistic view on the delicate balance between needs and values in the spatial reality, while diving into the detailed level of specifics in the design intervention. As conflicts and synergies are often entangled, there is a causality in trying to optimize synergy while magnifying existing or causing new frictions of conflicts.

For instance, learning in the outdoors can help pupils to have better focus. However, it might cause difficulty for a teacher to keep an overview of the students, and when all teachers carry out the idea of learning outside at the same time, distractions might hamper pupils' focus. Here, we will zoom in on two design results in this respect, to see what parallels we can draw, or what we can learn from these.

A first interesting design result on the scale level of furniture design is the "Connector" project (see Figure 5), proposed by one of the student design groups. The Connector can be described as a flexible, modular furniture system that facilitates a multitude of actions or activities for pupils and teachers. It consists of a number of flexible cubicles that can be shaped together into furniture ensembles that support teachers in spatially organizing their pedagogical activities indoors and outdoors.

This design groups started to design based on a number of key psychological needs and values that were shared by teachers and pupils, such as competence, connectivity, autonomy, and the need for creativity within pupils.


Figure 5. The Connector in a certain set up.

This design group saw the potential of the natural environment of the particular school and directly linked it to aspects of competence and connectivity. Within their modular furniture system, they designed a modular seating ensemble that can also facilitate different forms of group discussions (e.g. an arena stand of a circular conversation). As the list of possible combinations of the modules is quite infinite, the design group developed a manual based on anticipated synergies and conflicts between certain values and needs, and illustrated these with spatial examples of assembled modules, see Figure 6 below. That way, teachers could search for ideal combinations of the modular system based on their own plan of action, and create a synergetic environment

in which the needs of teachers and pupils could be balanced.

To give an example and linked to the shared need of competence and connectivity, the manual contains the experiential passport of a suggested composition of cubicles that incorporates kitchen and greenery elements, see Figure 6 below. The experiential information learns that creating a greenery module and allowing children to grow herbs or plants together can help them in achieving that "we did it this ourselves"-feeling, and nudge them to work together, promoting connectivity. As for the teachers, such a module can nudge them to work together with colleagues, have pupils build a bigger module and place it in the mail hall, in a way that different classes can each be responsible for the maintenance of some of the greenery cubicles. That way, not only pupils, but also teachers will be nudged to work together. This type of composition hints at potential synergies in creative and flexible learning, and outdoor learning... On the other hand, the manual also hints at possible conflicts, such as an overload of visual and olfactory stimuli that can disturb pupils in their learning, when the module is placed in their direct eyesight or used as a room divider. Reading the manual this way, allows teachers to see the potential of the cubicles in line with their plan of action and anticipate on synergies and be aware of conflicts during the usage.
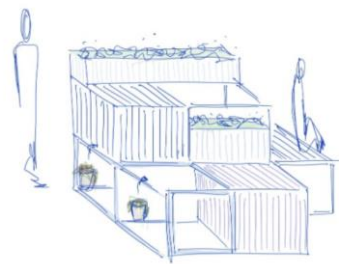
NEED: Competence

Design proposition: modular seating ensemble

Playful use versus storage

NEED: Structure
- Seating ensemble as a room divider
- Seating ensemble as the area for face-to-face instruction
- Possibility to use in the outdoors
- Overload of visual stimuli
- Versatile use can hamper the structural simplicity

NEED: Competence
- Pupils can 'design' and assemble themselves -> sparks creativity
- Pupils decide where to place the modules
- Integration of kitchen garden and greenery

NEED: Connectivity
- Nudges connectivity between pupils from different classes
- Nudges parents to get together while waiting for their children
- Stimulated connectivity between teachers

NEED: Autonomy
- Playful learning
- Nudges pupils to explore features of the assemble

NEED: Flexibility
- Flexible: arena, waiting area, kitchen garden, …
- Easy to move between indoors-outdoors
- Mind the size of the host environment (e.g. Classroom vs. Recreational ground)
- Mind weather conditions

Figure 6. Experiential passport of the Connector design.

Another interesting design result is the "Pergola" (see Figure 7). Here, students departed from the strength that lies in the quiet green environment the school was built in. Involving the green surroundings in the actual teaching strategies, could benefit the need for creativity and playful learning of pupils, but can also help to

foster relationships between teachers and pupils reciprocally as it offers a multitude of atmospheres. To do as such, the design group developed an 'add-on-structure' (see Figure 7 below). First, a greenhouse was designed, to literally connect the building blocks in which the first and second grade are housed. That way, via the greenhouse, teachers of the first and second grade could meet regularly during their classes, and co-working-initiatives could be facilitated. Additionally, a pergola was attached to the enlarged building ensemble in a way that the hard transition from indoors to outdoors could be softened. Moreover, the pergola offered possibilities to rearrange the daily goings in the main building. The two add-ons and the existing buildings are connected in a way that pupils could swarm out within the novel infrastructure in an autonomous manner, but could remain active under the watchful eye of a teacher. The pergola structure is a transitioning space, equipped to facilitate transitioning from recreational playing to playful learning by for instance firstly providing space to store coats and school bags out of sight, to provide enough free space to introduce a novel topic (e.g. learning about clock reading can be accommodated by drawing a large clock on the floor, which can be operated during transitioning moments) and reorganize instruction and work spaces based on the emerging and changeable need for autonomy or for guidance of pupils, etc.

Figure 7. Top left: Aerial image of the school site – top center: existing floor plan. Top right: Altered floor plan with pergola and greenhouse. Large image: 3D render of the altered school environment.

To further detail and 'enrich' the program of their add-on structure, the design group developed a number of activity schemes that could inspire teachers to make use of the add-on structures. For each of the activity schemes, the experiential passport (covering the synergy/conflict-status) was also provided, see Figure 8 below.

Here, we see that an experiential passport can also be drawn to communicate a design intervention, and express the benefits (in terms of synergies) and the hazards (in terms of conflicts) of the designed intervention, see Figures 6 and 8 in which renders (of the spatial future reality) help to visualize the synergies and conflicts, together with the needs that are acted upon via the designed intervention. Below, in Figure 8 the shared needs that render opportunities for synergies between teachers and pupils through the pergola-structure, are presented on the left. On the right, the potential conflicts that one should be aware of when using the greenhouse structure are presented.
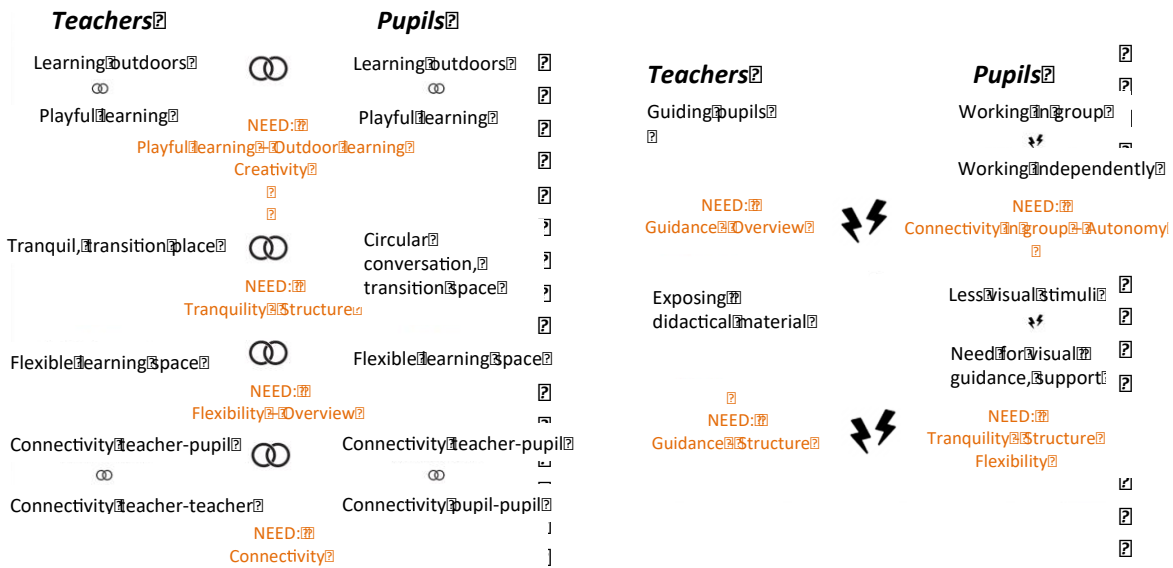
Teachers   **Pupils**

Learning outdoors   Learning outdoors
            ⊙⊙
Playful learning   Playful learning
            NEED:
     Playful learning – Outdoor learning
            Creativity

Tranquil, transition place   Circular
            ⊙⊙   conversation,
            NEED: transition space
      Tranquility - Structure

Flexible learning space   Flexible learning space
            ⊙⊙
            NEED:
      Flexibility – Overview

Connectivity teacher-pupil   Connectivity teacher-pupil
            ⊙⊙
Connectivity teacher-teacher   Connectivity pupil-pupil
            NEED:
          Connectivity

Teachers   **Pupils**

Guiding pupils   Working in group
                               ⤨
                               Working independently
     NEED:
Guidance - Overview   NEED:
                        Connectivity in group – Autonomy

Exposing   Less visual stimuli
didactical material   ⤨
                               Need for visual
                               guidance, support
     NEED: NEED:
Guidance - Structure   Tranquility - Structure
                                    Flexibility

Figure 8. Activities in the pergola and greenhouse structure with their respective experiential passports.

Conclusion: Avenues for Unlocking Learning Affordances

In this paper, we investigated in what way flourishing affordances can be designed in elementary school environments, based on surfaced, positively appraised changes that the Covid-19 natural experiment set in motion in the field of education.

We departed from the Design for Human Flourishing framework (Stevens et al., 2019a,b) and used this model to develop flourishing affordances out of the contemporary needs and values that teachers and pupils attached to their functioning in elementary school environments, while valuing the positively appreciated alterations that occurred after the reopening of elementary schools in Belgium in May 2020. Out of the design results that were presented by the four design groups, we can draw two important conclusions:

Firstly, we developed a technique called the "conflict-synergy-approach" to manage the delicate interactions of psychological needs and values of the protagonists groups in elementary school environments. This technique can be uploaded in the DfHF-framework, as demonstrated in Figure 8 below. By analysing the daily goings in schools via this perspective, synergies and conflicts between the needs and values of protagonists can be deduced, which can be extrapolated to the spatial level. At that moment, a designer can strategize what spatial aspects and architectural elements can be applied to solve conflicts or strengthen synergies.

Secondly, the program of school environments is a fragmented concept containing the didactical activities that teachers undertake, driven by the pedagogical concept of the particular school and undulating on evolutions in the field such as for instance digitalization and in-class versus out-of-class learning. For architects, the programming-phase in their design processes is to date still undervalued and sensed as inefficient (Hassanain & Juaim, 2013; Yu et al., 2005; Bogers et al., 2008). It has recently been brought back to the attention of researchers (Rietveld & Rietveld, 2011; Zwemmer & Otter, 2008, Stevens & Desmet, 2019). Therefore, the creation of an experiential passport can be a key in answering this call to the 'programming- phase' in architectural design. In so doing, it can help handling the first two components of the DfHF-framework, and is essential to be able to initiate the design process of a suitable spatial facilitator of activities. When managing psychological needs and values, and anticipating on possible activities that teachers can undertake, designers

can have a head start in developing learning environments that foster wellbeing of pupils and teachers. Via the known architectural elements, potentials in the environment can be unlocked and facilitators can be developed. That way, learning affordances can be designed; see Figure 9.
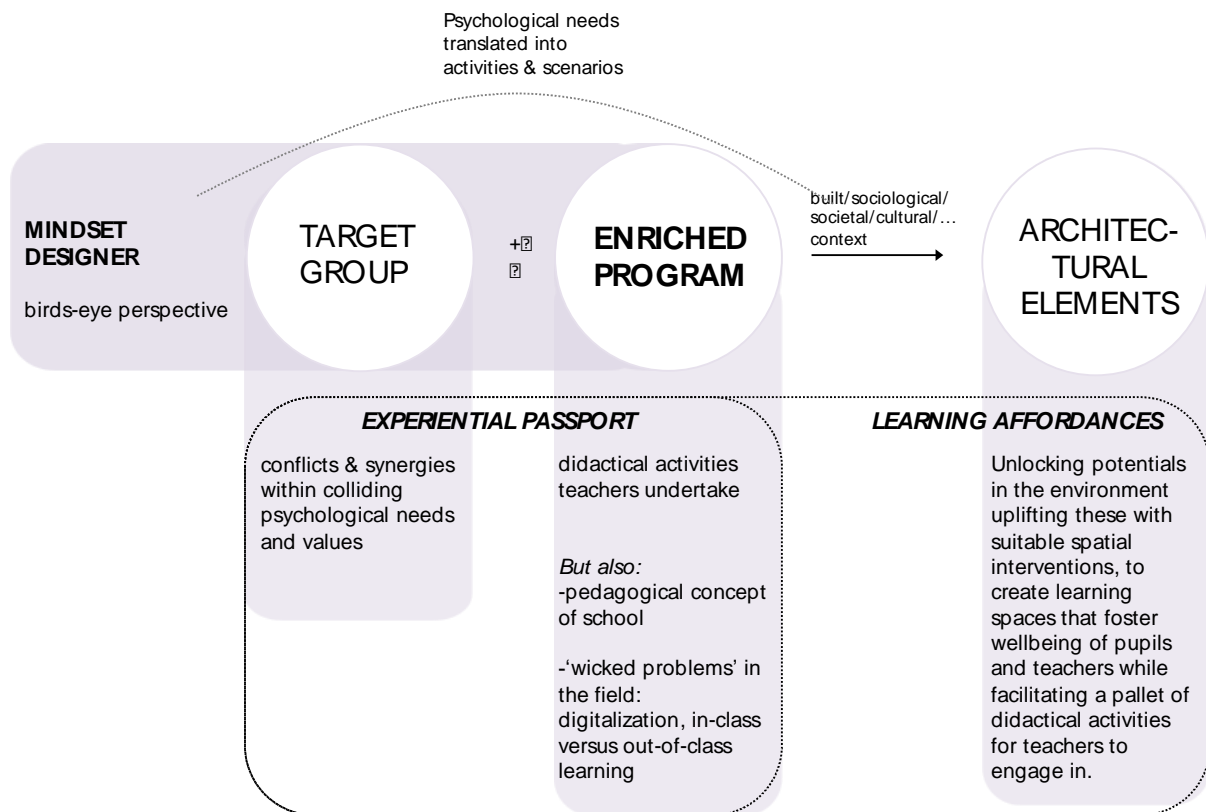

Figure 9. The DfHF-framework translated to the typology of school environments: creating learning affordances.

Discussion, Implications and Further Research Avenues

Now that we have designerly explored flourishing affordances in elementary school environments, or in other words, 'learning affordances' (see Figure 9), we can critically review the results of our analyses and elaborate on the value of our research for theory and practice.

Value for DfHF Theory and Design for Wellbeing

This project allowed us to further dive into the DfHF-framework and test its abilities in practice. In 2016, a case-based study was organized to surface this framework and make explicit certain techniques that architects implicitly use while creating enriched programs (Stevens et al., 2016). There, we took a broad perspective. Via this study, we took an in-depth perspective, and selected a specific typology that is currently undergoing a natural experiment due to the Covid-19 pandemic: elementary school environments. Applying this in-depth perspective allowed to search for deepening in the meaning and significance of the three items of the DfHF-framework (that is, target group, program and architectural elements). In so doing, this particular study adds value to DfHF theory and theory on design for wellbeing.

Value for Architectural Practice

Here, we have learned a novel technique in designing based on psychological needs and values, the "conflict-synergy-approach", that brings a different lens to the design of particular environments in which different target groups interact.

We have also learned about the preconditions that are at play when attempting to apply the DfHF-framework. For instance, psychological needs of a target group might result in balancing out synergy and conflict, which implies applying a holistic view and a bird's-eye perspective. The latter can be framed as a key characteristic of a DfHF-designer, and should be part of his/her mindset when stepping into this process, see Figure 8. Also, our approach urges for a holistic view in designing school environments or parts of school environments,

in which architects should get 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.

Value for the Design of School Environments

We have mentioned that the spatial reality of many schools in Flanders is still rather problematic (Châtel, 2011). The current trend is to build new, quite large school campuses, but these projects are all part of a long-term plan. There are hardly any strategic and structured short-term solutions for schools to tackle ad hoc space demands or spatial issues. We have now learned that there is a great deal of hidden potential in the current spatial school landscape. By taking a flourishing, wellbeing approach in design, designers are set out to surface these potentials, unlock them designerly, and thereby generating quick-wins for schools. Often, these quick wins can be realized at a low cost.

Critical Reflections and Limitations

It is clear that a number of critical reflections can be made that need to be studied in detail in the future: Firstly, a methodological concern is how to assist designers in applying and integrating field-specific knowledge in their design process. Here, we mentioned the importance of understanding different didactical approaches teachers can take -here applicable in elementary school settings- while grasping important 'wicked problems' or novelties in the field, e.g. digitalization. Such aspects or considerations need to be taken into account as they play a major role in the design process when one aims to trigger learning affordances in a particular context. We are confident that designers know how to immerse and retrieve information on the typology or target group, but still, this is an important point of attention that warrants more research.

Regarding the limitations to this study, a first limitation concerns its explorative character. The study was organized in one school environment with a limited number of design students involved. Moreover, the debate on how to measure aspects as wellbeing and flourishing is still in its infancy (Stevens et al., 2019a,b), and has not yet been applied to this particular case. Secondly, it needs to be noted that the results do not pretend to concern 'fixed' design methods that can be used to design enriched programs via the DfHF-framework; too little data were collected to generalize. Moreover, generalizing design processes is a questionable goal in itself, since design processes are hardly linear nor rigidly structured in a similar way. This study should therefore be interpreted as an assembly of practical knowledge with regard to creating enriched programs in an elementary school environment, and can be offered to architects to experiment with.

Avenues for Further Research

The existing Flemish school infrastructure is not always compatible with more contemporary didactical techniques and pedagogical evolutions such as digital learning. In that respect, this exploratory research has surfaced the issue of in-class learning versus out-of-class learning. Zooming in on opportunities in the environment to unlock hidden potentials, and developing strategies to activate these as quick-wins, is a goal. More research can be done in developing the "conflict-synergy-approach", as it shows promising avenues and creative results to develop learning environments and reach a very detailed level in architectural design, especially in the programming-phase. Moreover, recognizing and activating hidden potentials in the environment is an avenue for further research as well, and can form the basis of a tool that schools can apply themselves.

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