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Article

Participation as a Tool for the Sustainable Redesign of Vacant Heritage: The Case of Politiebureau Groningen Centrum

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Abstract: This paper explores the opportunities for locals' participation as a tool for the sustainable redevelopment of vacant heritage. It focuses on the Politiebureau Groningen Centrum (The Netherlands) as a case study to apply a novel approach to engage community participation in architectural redesign. It fills the academic gap on participation in heritage building redesign lacking diversity in stakeholder perspectives and overcomes some of the current participatory design tools' downsides, identified in the previous literature: lack of transparent communication and high requirement for participants. This research employs a combination of methods structured by sets of divergent and convergent phases. Cognitive mapping, semi-structured interviewing, and a 2,5D model game were tested in the research for inquiry and redesign testing, the two key participatory stages. The research outcomes include participants' perceptions and remembrance of the site for generating redesign scenarios, the common ground in their scenario preferences, and their contrasting attitudes toward the overall material and the specific elements. The 2,5D model game tool turns out effective in transparently delivering the redesign possibilities to participants and lowering the requirements of time, language skill, and learning capacity, thus being easily repeatable for other sites and participants to boost social and community values. Future research recommendations are given on applying the approach to larger samples covering all the minorities to get in-depth knowledge on the community's collective perspectives in relation to their sociodemographic characteristics and validate the hypothesis on their preferences toward materials and elements.



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Keywords: sustainability; heritage redevelopment; participatory design; public engagement; community value; social value; Faro Convention; HUL; heritage; cognitive mapping

1. Introduction

1.1. Societal and Academic Importance of Participation in Heritage Building Redesign

Involving multiple stakeholders in cultural heritage management activities is a topic with growing societal importance. As pointed out in the UNESCO Recommendation on the Historic Urban Landscape (HUL) in 2011, “rapid and frequently uncontrolled development is transforming urban areas and their settings, which may cause fragmentation and deterioration to urban heritage with deep impacts on community values” [1]. To counter this threat, the HUL encourages the involvement of different stakeholders, such as locals, in urban development processes, as a way to keep and pass on community values [1]. The Council of Europe Framework Convention on the Value of Cultural Heritage for Society points out the opportunities in heritage governance and management where society can achieve consensus and boost social values through participatory activities [2]. Specifically, the Council of Europe Landscape Convention (2008) pinpoints that community participation connects people and their nearby environment to build identities for sustainable development [3]. UNESCO Operational Guidelines for the Implementation of the World Heritage Convention (2021) underlines the possible achievement of “quality of life” and

“well-being” by community participation in heritage protection and management [4]. Participation in heritage activities has been promoted locally in the Netherlands. The Cultural Heritage Agency of the Dutch Ministry of Education, Cultural, and Science (RCE) has been cooperating with stakeholders to explore the Dutch interpretation of the Faro treaty [5]. Based on the past three years’ experiments, they recently presented “The Implementation Agenda Faro part I” that concludes five basic rules and sixteen strategic themes calling for further development of citizen participation in community heritages [5]. In the field of architecture, the redesign of heritage buildings also entails community participation, specifically to preserve and continue heritage values and deal with dilemmas that redesign may cause [6]. Roders defines eight primary values of heritage: social, economic, political, historic, aesthetical, scientific, age and ecological values, among which social value regarding well-being, sense of belonging, place attachment, and community cohesion is encouraged to be promoted by community participation [1–4,7]. However, how to redesign heritage buildings by participation remains a question that academia and professional practice are still exploring.

1.2. Literature Review on Participatory Design

Participatory design (PD) refers to the design approaches involving different non-expert stakeholders in the co-design process by employing participatory tools [8]. PD approaches have been developed since the 1980s in various design fields, from ICT development to space design, with multiple tools, from talking to board gaming, for different purposes, from commercial to community-oriented [8]. Plattner, Meinel, and Leifer introduce a general participatory design methodology that includes a series of divergent and convergent phases for the designer and participants: from scoping to interviewing, generating Points of View (PoV) for iterations and final outputs [9]. Martin and Hannington summarize a similar methodology with five phases: definition, exploration, concept generation, evaluation, and launch and monitoring [10]. The methodology of Leung on architectural Participatory Design includes three steps: contextual inquiry, idea synthesis, and testing [11]. The Open Building Concept in the Netherlands, initially promoted by N. John Habraken, encourages participation in buildings’ entire life, followed by many local architects and inhabitants. They developed knowledge of enabling buildings to be flexible in such a way that future users can easily participate in their management and redevelopment [12]. These methodologies and concepts commonly show that PD can be conducted on three levels for architectural design: inquiry, testing, and acting. Inquiry is the initial phase, aiming at getting design input from participants. Testing is the middle phase, in which participants are involved in the co-design process and test different scenarios. As an observation-based qualitative study, testing enables participants to interact and exchange with the researcher and vice versa [13]. Pickering (2008) suggests that participants should perform as co-producers in constructive activities such as games in this phase [13]. Acting is the continued bottom-up management and development after the buildings’ main structure is completed.

Pioneer studies have developed many 2D, 3D, and digital tools for the aforementioned phases [8,11,14–16]. Recent practice includes Leung developing an image-based labelling tool for the inquiry phase and a model-making workshop for the design testing phase [11]. Binder and Brandt tested several participatory tools in their “Design: Lab”, including the Two-by-Two tool and the image-based game for inquiry, and the 2D game and mock-up game for layout testing [14]. Other than tools with physical models, UN-Habitat in collaboration with Block by Block applied Minecraft to urban design and management in the co-creation (testing) phase [15]. Dutch landscape office Urban Synergy explored a full-scale on-site model for locals to experience the design scenario for testing [16].

1.3. Problem Statement

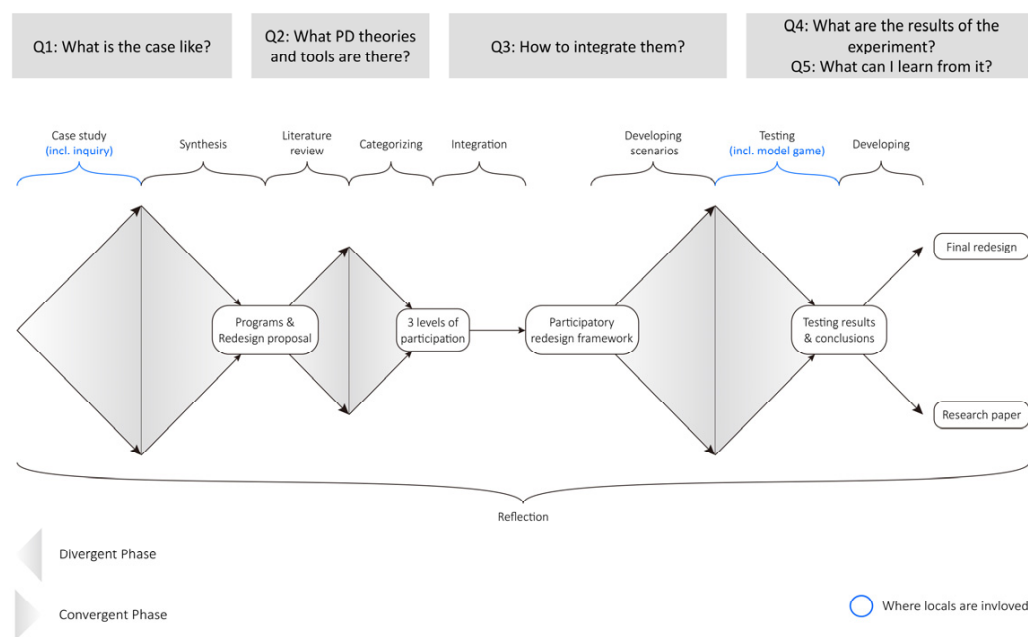
However, transparency in delivering design possibilities is lacking. In many cases, such as the iterating interview and the full-scale on-site model, only one or two design

scenarios are introduced to the participants. The limited number of scenarios presented to participants may lead to imperfect results because people are unaware of different design possibilities. Moreover, in some other cases, the participatory tools, such as model-making workshops and Minecraft games, are too complicated for participants with less time, a low level of language, or low learning capacity, limiting the diversity of participants. Another gap lies between PD and heritage building redesign. Despite the importance of involving communities and local stakeholders in heritage building redesign, PD and its gamified tools have hardly been applied to this topic. Thus, ordinary people's perspectives toward redesign have hardly been studied.

In the Netherlands, many obsolete buildings recognized as vacant heritage are being reappropriated by the public and reconnected to communities. For example, nearly 30% of police buildings across the nation are becoming vacant and need appropriate redevelopment [17]. Applying PD to these cases is an urgent need to open up the sites and promote their social values. This paper deals with Politiebureau Groningen Centrum as a case study. In the hypothetical design challenge, the police building is proposed to be transformed into a mixed housing program to reconnect to its surroundings after half a century's isolation, keeping the quiet atmosphere locals appreciate and providing more public programs lacking in the neighborhood. The program is also determined in consideration of its location, typology, demographics, and the municipality's goal of bringing diversity and lively public space [18,19]. Within this scope, this paper explores how participation can be used for vacant heritage redesign to preserve and boost possible social values for the future. In the following sections, a methodology for applying PD to the case study will be presented, followed by the results of the three experiments involving Groningen local participants, before a discussion and conclusion.

2. Methodology

This case study combines methods structured by sets of divergent and convergent phases that build up a complete research-design process (Scheme 1), as suggested by Hasso Plattner, Christoph Meinel, and Larry Leifer [9].



Scheme 1. Research-design structure (general scheme).

First, a thorough study on Politiebureau Groningen Centrum was conducted, including inquiry and site analysis. The police building was built in 1971 by municipal architect Ele de Haas (1921–2010) and renovated in 1996 by the local architecture office Karelse Van der

Meer (later renamed De Zwarte Hond). The blue and white color, rich materials, elements, and compositions make its facades stand out from its surroundings (Figure 1).

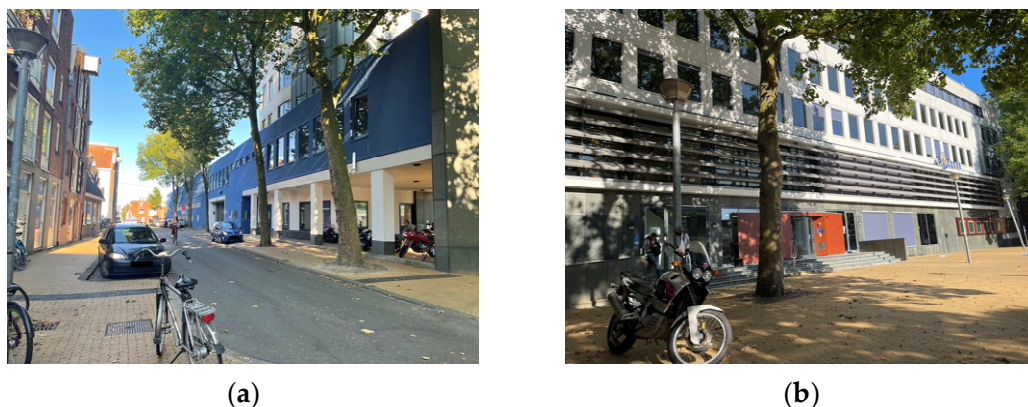


Figure 1. (a) North façade and surroundings; (b) west façade.

In order to investigate its value to the surrounding neighborhoods and get input for the redesign, inquiries of cognitive mapping and semi-structured interviewing with six participants were conducted and tested. Six participants were selected randomly near the site. The selection is random because every passer-by was considered a stakeholder in experiencing the place. Before starting the experiment, their demographic characteristics were acquired. All of them are neighbors or citizens living nearby, consisting of three males and three females aged from thirty to sixty, with cultural backgrounds from Asian to Dutch. These six participants cannot represent the complete population of the surrounding neighborhoods due to its limited size and possible missing or lacking minorities. However, since this is an exploratory study aiming at testing the methodological tool instead of getting statistically significant results, the sample with multiple backgrounds is adequate for observing the participatory process and evaluating the tools' performance. The cognitive mapping draws from Lynch's (1977) approach to getting people's point-of-view perception, in combination with Li et al. approach to identifying values and attributes in Almere [20,21]. By asking locals to draw the building and describe the drawings, their perceptions and remembrance of façade materiality were discovered. The semi-structured interview helps to know the locals' feelings about the site and their wishes for the future. During the experiment, the participatory process was recorded by taking notes. The results were then analyzed and categorized into "positive", "negative", and "contradictory" to generate the redesign starting points for this hypothetical design challenge. A complemented site analysis was conducted on three scales, city, building, and façade, to understand the broader picture of the site, referring to archival documents, the municipality planning document, and on-site observation. By synthesizing all these inputs, the future program was determined as mixed housing and public programs targeting future diverse residents and locals. Three design proposals for different parts of the site: "sensitive surface", "inclusive core", and "attentive home", from locals-oriented to residents-oriented, were concluded from redesign starting points.

The three levels of participation identified in the literature (inquiry, testing, acting) were combined with the redesign proposals, creating a framework for the participatory redesign. This framework clarifies different types of target participants for different design objectives (Figure 2).

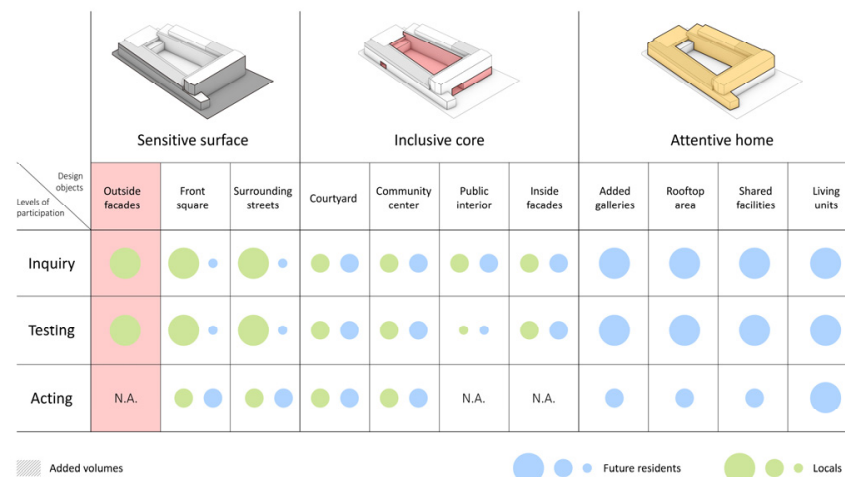


Figure 2. Applying three levels of participation to the case study.

This paper focuses on applying PD to redesign the façades of the complex, which is believed to have most impacted the community. Thus, the façade redesign is supposed to concern both existing and added values, being a representative case of dealing with heritage dilemmas. A puzzle-like 2,5D façade model game was developed and tested with thirteen participants. The selection of participants was random since everyone was considered to be more or less a stakeholder. As a result, the participants are all Groningen locals, eleven males and two females, aged twenty to fifty, with cultural backgrounds from Asian to Dutch. Five groups (seven participants) were selected on the main road in front of the building's west facade, and five others (six participants) were selected in the adjacent street to the building's north facade. The two test locations were chosen because of their proximity to the two facades, the redesign objects. The sample of thirteen locals does not represent the population, but is adequate to evaluate the tool's performance and give recommendations for future research to validate the results and discover more findings. As Figure 3 shows, the 2,5D façade model is divided into several parts, and for each part, multiple pieces representing different redesign scenarios out of varying redesign starting points are substitutive. The principle for making models was to reduce the pieces to their essence while keeping the variety of scenarios. In order to achieve this, several attempts at dividing models were made through sketching. Participants can play with and choose their preferred pieces, composing the façade by themselves. In this way, a large number of design variants are supposed to be transparently and equally presented to the participants. Locals were asked to tell why they prefer specific scenarios when playing. Their preferences and corresponding reasons were coded and categorized, through which the common ground among the participants was discovered and later translated into the final redesign for the hypothetical design challenge. During the on-site experiment, the tool's performance was carefully observed and recorded by notes and video, later analyzed and compared with other tools.

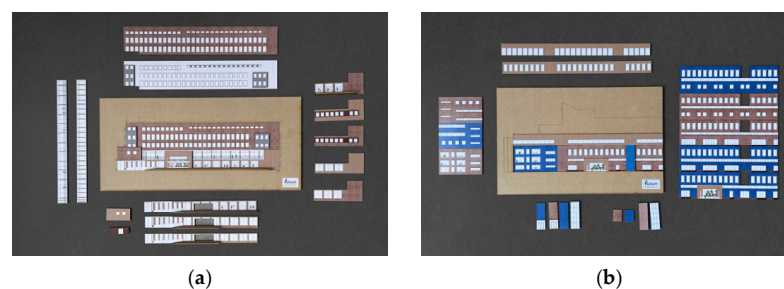


Figure 3. (a) 2,5D model for redesign testing (west facade); (b) 2,5D model for redesign testing (north facade).

3. Results

3.1. Results of Inquiry: Cognitive Mapping and Interviewing

In the inquiry stage, three participants were asked to draw their memory of the building (Figure 4); three others were interviewed on-site. The three participants that drew the mappings talked more about specific façade elements and materials related to their feelings and memories. In comparison, the other three participants described the satisfying and unsatisfying things happening around the site. Their viewpoints can be categorized into positive, negative, and contradictory.

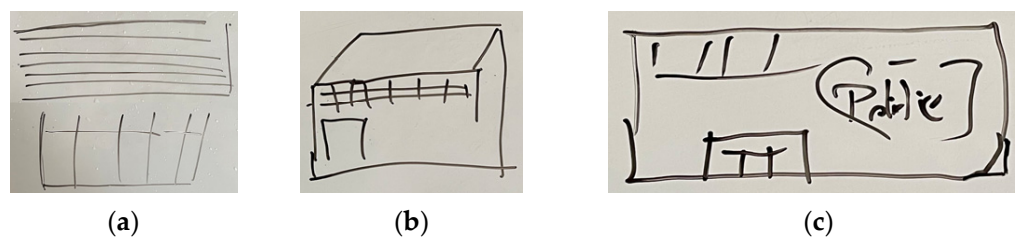



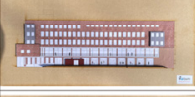



Figure 4. (a) Cognitive mapping from participant 1; (b) cognitive mapping from participant 2; (c) cognitive mapping from participant 3.

For positive aspects of the façade, participants regard this building as a landmark in the city for more than twenty years, as the building has a unique look with a characteristic dark red entrance and a repetition of windows on the west façade. Participants also appreciate the positions of the windows on the north façade, which are unaligned with the windows of their houses across the street, giving them a sense of privacy. For the negative aspects, one perceives the grille aluminum sun shadings and serpentine claddings on the front façade as “prison” and “grave”, which reminds her of terrible memories with the police officer. Participants see the metal gate on the north as a cold barrier between the inside and outside, giving them a strong institutional feeling. They feel the building is isolated because they know nothing about the inside. Moreover, participants complained about the noise made by students living nearby and the lack of greenery and meeting spots in the area. For contradictory aspects, some participants appreciate the blue and white colors as they are “peaceful and quiet”, while some others feel “cold” and unfriendly from them. The modern materials on the front façade are also argued differently by participants. Some like them because they make the building modern and imposing, while others state that these modern materials do not belong to such a historical area.






Following these categories and complemented site analysis, redesign starting points were generated and translated into scenarios tested with locals by a 2,5D model game.

3.2. Results of Testing: 2,5D Model Gaming

The results of ten groups of participants (thirteen people in total) playing the 2,5D model game were analyzed and coded into three main categories: Perception and Feelings, Spatial and Functional demand, and Aesthetic Preference (Figure 5). Perception and Feeling refers to how people interpret objects, such as open, inviting, stable, and vibrant. Spatial and Functional demand refers to what kind of space and program people prefer. Aesthetic Preference refers to the architectural language considered beautiful by participants, such as a certain rhythm, proportion, and balance. A large amount of common ground was found among their preferences.

	Peception & feeling	Spatial & functional demand	Aesthetic preference	Overall preference
Participant 1 (group of 3)	The new entrance is very open and inviting.	We like balcony space. I think there will be busy functions, so doors with lots of openings are better. For housing and public function, I want it more open.	It's better to use same materials as they next to each other.	
Participant 2	I prefer the dark wood to the light one, because dark red color feels more stable and works well with bricks.	I like the space where there are many people.	I'm not sure if wood & brick are compatible on the ground floor. But it seems that all bricks together are nice.	
Participant 3	You have to do something like the passage to make the building open.	N.A.	The bay windows are 3-dimensional and make the wall a bit different, otherwise it will be too even and boring. The passage doesn't fit the design when compared to bay windows in terms of material & structure.	
Participant 4	I don't like too many railings, because they make the building look too complicated and like prevent me from approaching.	N.A.	The combination of the frames (1F) and other parts is better. Add the volume on the right for balance. Put same material together!	
Participant 5	I like stairs & openings, because I feel they are contrast to police station. I see there is some stairs and it's good to extend them.	I want to put some coffee shop on the left with colorful look, and red lights. Put more functions on the rooftop	N.A.	

(a)

	Peception & feeling	Spatial & functional demand	Aesthetic preference	Overall preference
Participant 6	Considering it's going to be housing program, I prefer big windows.	The passage is a good eye-catcher for the community center.	I choose blue on the left, because I want to keep something from the old building. And for the continuity of the rest building, I want some blue on the right. Because there is a lot of "vertical" going on, I want the added floor windows to be horizontal to break up the vertical lines.	
Participant 7 (group of 2)	N.A.	I like natural light, so I want more glasses and bigger windows. I like the space with people.	Symetry is important.	
Participant 8	The blue color we have now is nice, which suits in this quiet area. The area is very quiet and private, so small windows suit here.	The passage is cool because it seems I can walk into the nice courtyard! Because the functions of two parts are separated, I can separate the facade as well. I don't like too much interaction in this quiet area.	The horizontal one is more in balance with the below part, and responds to the existing windows. Wood works well with stones. Small spicy thing is exciting.	
Participant 9	I like the blue color, because it is vibrant, and it makes the building unique.	N.A.	(After lots of attempts) I think this proportion and rhythm of the windows are the best.	
Participant 10	N.A.	N.A.	The horizontal window is more beautiful than others. It's good to have some parts protruded for aesthetics.	

(b)

Figure 5. (a) West façade redesign testing results; (b) north façade redesign testing results.

In relation to Perception and Feeling, participants prefer an “open” and “inviting” atmosphere for the west façade. This is often associated with a wide entrance, steps, and big openings on the ground floor. Participants prefer the north façade to be perceived as “quiet” and “private”, which is associated with the blue color and the small windows.

Concerning Spatial and Functional Demand, participants prefer the balcony space and public programs on the west façade and the connection to the greenery and meeting spots on the north façade. These are respectively associated with the transparent and accessible interface and the passage connecting the inside and outside of the urban block.

About Aesthetic Preference, participants prefer the same material to be brought together and windows to be protruding from the west façade, and horizontal windows, exceptional glazing for the north façade referring to “beauty”, “balance”, “symmetry”, “proportion” and “rhythm”.

The participants also showcased some personal preferences without mentioning specific reasons, such as deciding to choose brick as the façade material.

3.3. Observation of the Performance of the Tools

In order to evaluate how the approach works, observations on the process were documented.

The cognitive mapping and interview preparation are easy: prepare questions and a whiteboard with a marker. However, the process of requesting passers-by to participate is rather difficult. Ten people were asked to join cognitive mapping, but only three agreed, and three out of eight passers-by accepted the interview. The reasons for rejecting joining are mainly “I can’t draw” and “I can’t speak English well”. During the experiment, some participants were confused about what they wanted to draw and ended up with a general building look. In contrast, their oral communications turned out to be more fruitful and vivid, ranging from memories to complaints.

As for the 2,5D model game, the preparation takes more effort, while the participatory process is easier. Based on the redesign starting points generated from the inquiry and site analysis, redesign scenarios in terms of material, element, and composition were first tested by sketching, after which key solution alternatives were determined and translated into physical model pieces. The model-making process took one week, from drawing laser cutting files to wrapping up. On the day of the experiment, after setting everything down: a table, the model, a post, and a jar of candies, locals were curious, taking a look and engaging spontaneously. Twenty people were asked to join the experiment, and fourteen agreed, which is a high rate compared to the cognitive mapping and interview. Moreover, in contrast, people with a low level of English are still willing to participate. In the experiment, all ten groups of participants could quickly understand how to play it after a one-minute explanation. Five of them could intuitively play with the pieces by themselves without much instruction (Figure 6). Two participants thought out of the box, adding extra pieces to the model, thus adding new scenarios to the previous setting. For the front façade model, they started with the bottom part and turned to the next adjacent piece. For the north façade, the participants tended to do it from bigger to smaller parts. This way, participants got to think about each scenario carefully. The process is interactive: the researcher was not only asking questions to the participants but also answering their questions, such as the difference between the two pieces and the intentions and programs behind the pieces, which helped them make decisions. They all got satisfactory results in the end. “This is our design!” one group of participants cheered. Five participants wanted to document the final model, taking photos of their design or them with the final model.



Figure 6. One participant playing the game (photo by Baoky. King. Yang. Huang).

4. Discussion

Local participants freely expressed their perceptions and remembrance of the site from cognitive mapping and interviewing. Several findings help to generate the redesign starting points: the characteristic gate, the institutional colors, the windows layout, the modern materials, and the surrounding greenery. Due to the limited sample size, these viewpoints do not represent the whole community. It is recommended in future research to validate these viewpoints and discover new perspectives by involving larger samples covering all minorities. Compared to photo-based inquiries conducted by Leung, Binder and Brandt, and TU Delft pioneer students [11,14,21], the results of cognitive mapping are more general without many details. However, they reflect the participants' independent initial thoughts without the researcher's interference which might risk biasing the results because of the possible hints given to participants through pre-selected photos. In this sense, open cognitive mapping can be used before photo-based tools to collect initial data without bias. The results also suggest that people are more likely to speak than draw. Drawing, to some extent, might be a limitation for them to express themselves.

By analyzing the 2,5D façade models the thirteen participants created, a large amount of common ground was found among their preferences. The participants independently chose the scenarios from many options but made many decisions in common with reasons touching upon "perception/feeling", "spatial/functional demands", and "aesthetic preference". Such common ground indicated the redesign scenario that is most valuable for them, based on which the isolated building could be transformed into an inclusive place. However, due to the limited number of participants in this study, the common solutions identified cannot be assured to be representative for the whole community. Future studies or design projects applying this methodology, should consider demographic characteristics, and subsequently target a larger group of people to get final redesign solutions that are inclusive and accurately represent the community.

The data collected suggest that local participants appreciate keeping the brick texture on both facades while being more open to the changes in specific elements. They treat the two facades differently: for the north façade, they tend to keep the blue pigment painted on the original bricks, while for the west façade, participants tend to remove the white plaster layer and reveal the bricks again. The two different treatments both result in keeping or revealing the brick texture. In contrast to their traditional taste of keeping the brick material, they chose modern elements such as big wooden passages and glass openings instead of old ones. This contrast leads to the hypothesis that Groningen's local citizens prefer to redesign a historical building by keeping the traditional material which influences the overall perception of the building mostly while having flexibility in changing some elements to meet the prospect programs and atmosphere. It is suggested to validate this hypothesis by asking more participants more deeply in future research.

In terms of the methodological tool, the 2,5D model game successfully delivered a variety of scenarios to the participants, overcoming the downsides of some previous tools, such as the iterating interview [9] and on-site full-scale model test [16], which present a limit number of scenarios. During the experiment, participants with various characteristics across different gender, age, and cultural backgrounds all went through every piece in a sequence, such as from bottom to top or from bigger to smaller, ensuring they gave full thought to every scenario from piece to piece. This way, more accurate and extensive feedback on various scenarios is collected, and transparency in delivering redesign possibilities is achieved.

The tool is clearly readable and easy to play within a frame that the researcher set beforehand, thus significantly lowering the requirement for participants in terms of their time, language skill, and learning capacity, compared to the previous tools such as physical or digital model-making workshops [11,15]. People intuitively know how to play it without much introduction, just like playing a puzzle, making them more willing to join and easily satisfied. Participants with a wide range of demographic characteristics were all actively

involved in the game regarding understanding the game and going through scenarios, which suggests that the tool is repeatable for other cases and participants.

5. Conclusions

The paper builds up a framework to bridge PD to vacant heritage redesign and experiments with specific tools that help gain insight into participants' perspectives and overcome current tools' downsides. The paper takes Politiebureau Groningen Centrum in The Netherlands as a case study to explore how participation can be used for vacant heritage redesign in order to preserve and add possible social values for the future. It focuses on the façade, the most representative part of the site for the local community. Two levels of PD were explored: inquiry and testing. Through cognitive mapping and interviewing, locals' perceptions, memories, and remembrances about the site were collected and translated into design starting points, based on which different façade scenarios were generated for testing. Through the 2,5D model games, locals with different backgrounds tested different redesign scenarios and composed their preferred façade, revealing a large amount of common ground among their preferences. The contrast between their attitudes toward the overall material and specific elements indicates their preferred redesign ways. The puzzle-like 2,5D model helps to achieve high transparency in delivering redesign possibilities to the participants. It is easy to understand and play with, lowering the requirements for participants of their time, language level, and learning capacity. It can also trigger participants' curiosity and satisfaction during the process. The main limitations in this paper and future research opportunities are:

1. The sample size for all three experiments is too small to statistically represent the whole population of surrounding neighborhoods. Thus, the common ground discovered among the participants cannot be seen as "real common ground" to draw redesign solutions that benefit the entire community. It is recommended to apply this innovative approach to larger samples covering all minorities to get in-depth knowledge of the community's collective perspectives in relation to their sociodemographic characteristics.
2. The reasons for participants' different attitudes in treating the overall material and specific elements cannot be concluded upon due to a lack of follow-up questions in the experiment. Moreover, the limited sample size cannot prove that this phenomenon is common in larger groups. It is recommended to conduct future research on this question and validate the posed hypothesis by applying the approach to larger samples and asking more follow-up questions to participants.
3. To conduct future studies as mentioned in 1 and 2, it is recommended to select similar community-situated heritage buildings, especially those to be transformed into housing or community programs with the potential to counter the threat of urban fragmentation and to boost social and community values.

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