TU Delft Department of Architecture
BK Bouwkunde

Graduation Plan | aE Graduation Studio

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Title

The intergenerational healthy living community

Keywords

Social sustainability, repurposing, reusing, intergenerational living environment, healthy living, double-skin façade, wellbeing, 1 million homes, housing crises.

Problems Statement

The Netherlands is experiencing a significant housing shortage. The housing shortage in the Netherlands is worse than previously assumed, and it is projected to decrease in the coming years. The housing shortage will peak at 415,000 homes in 2024, according to the most recent estimates. This is about 100,000 additional homes than at the end of 2019, accounting for 5.1 percent of the total housing stock. According to the Dutch government's 'The State of the Housing Market,' the current housing shortage is now estimated to be around 331,000 homes. This is about 15,000 more homes than the forecast in Capital Value's research report from earlier this year. The increase in the housing shortage is partly due to a decrease in the number of new homes being built. (Value, 2022)

Due to the housing crisis, prices are continuing to increase across the country, and the housing market is becoming increasingly competitive, with many people who needed to overbid to get their ideal home. As a result, an entire generation is in danger of losing connection to the housing market. (Séveno, 2022)

Housing prices are increasing rapidly. As we can see below in the Percentage change on previous year of housing prices in the Netherlands from January 1996 to August 2021 graph. It is becoming almost vertical, what you see that in August 2021, house prices in the Netherlands increased with approximately 18 percent when compared to the same period a year before. (Stipp, 2022). That is indeed sounding the alarm and requesting a serious intervention.

As a result, a group of people, including officials from the housing and insurance industries, has presented a strategy that will allow the Netherlands to build one million new homes over the next ten years. (Stearns, 2022)

The plan also emphasizes the fact that the quality of life in various neighborhoods across the country is declining, and the groups would like to see an improvement in sustainable infrastructure and quality housing for all: "We are concerned about vulnerable neighborhoods and residents who sometimes need other forms of help and care than that which is available to them," said Martin van Rijn, chairman of housing corporation lobby group Aedes. (Stearns, 2022)

Building a 1 million homes in ten years would most certainly require a lot of resources and energy. As a result, it would be far more cost-effective and environmentally responsible to adapt and renovate existing structures.

Since the 2008 economic crisis, new issue has arisen in the Netherlands, essentially vacant unused buildings. Over the last decade vacancy levels in office markets worldwide are unprecedented. In the Netherlands, about 400 thousand residences are uninhabited; 190 thousand (2.5 percent of the dwelling stock) have been vacant for more than eighteen months. (Groen, Mateboer & van Daalen, 2022)

On one hand, the majority of the vacant buildings are among the "least appealing buildings" in the present stock. Apart from their lack of architectural quality, most buildings do not meet current energy efficiency criteria. In terms of cost and energy use, leaving buildings unoccupied is a waste of resources. (Remøy & van der Voordt, 2014) Nevertheless, and on the other hand, the vacant building issue could be turned into an advantage to participate in solving the housing crisis in the Netherlands, by transforming the vacant structure to usable homes for people.

However, different concept should be realized in these interventions especially sustainability concepts which leads to another issue mentioned in “Design for social sustainability” paper, which needs to be considered. According to the “design for social sustainability” paper, in popular sustainability debates, social sustainability is usually ignored. Economic and environmental sustainability have been prioritized in planning, housing, and communities, with policy and investment focusing on renewable resources, low-carbon communities, and encouraging pro-environmental behavior in households. As a result, there are few practical materials that directly address the subject of how to develop socially and environmentally sustainable locations and infrastructure. (Woodcraft, Bacon, Caistor-Arendar & Hackett, 2022)

Objective

As far as I am concerned, making 1 million homes is a very unfortunate framing of the housing shortage problem, this is not about the figure 1 million homes, this is about a system that make sense in relation to what the current needs of the population are. Therefore, just building new homes is not a sensible solution, indeed new homes must be created, however, that does not mean building from ground up. Especially with considering the opportunity of transforming and repurposing old vacant buildings into new suitable homes. First, certain aspects such as sustainability, healthy environment affordability level of the new created homes should be realized.

Overall design question

The design question:

How to transform an old vacant office building into a healthy intergenerational living environment, with enhancing the wellbeing of the target group?

As aforementioned, most vacant buildings do not meet current energy efficiency criteria, there is a need for a technical and architectural solution to make the building suitable for habitation and to provide a high quality of life for its residents.

Secondly, in Modern architecture, building design has changed substantially in response to evolving needs for comfort, functionality, and energy efficiency. This progress has

resulted in a variety of design innovations, ranging from the use of new materials to the incorporation of smarter design components. The double-skin façade, for instance, which is a standard single-skin façade that has been doubled up with an additional exterior layer that covers all or part of the building within. (CASSANDRA, 2022)

Finally, thematic research paper will be investigating the benefits of this type of facade system and if the implementation of a double skin facade to an existing vacant building will enhance the health and wellbeing of the building's residents, emphasizing at maximizing natural daylight without overheating, playing a role in the building ventilation whilst improving the air quality and noise attenuation. As same as exploring other potentials of the double skin facade, for instance, providing extra spaces that could be used as communal balconies to enhance social sustainability between different target group or winter garden with the experience of an outdoor space, connecting the residents with nature for which will reflect positively on their mental health.

Thematic Research Question

How can a double skin façade improve the health and wellbeing of the inhabitants of a building, focusing specifically on access to natural lights, ventilation, and noise attenuation?

Sub-questions:

1-What are the impact of natural lights, ventilation, noise attenuation and social spaces on the health and wellbeing?

2- How can DSF improve access to natural lights without overheating?

3- How can DSF contribute to the building ventilation whilst improving air quality?

4- How can DSF contribute to the building noise attenuation?

5- What kind of spaces does the double skin façade provide and what is its function?

Methodologies:

Case studies, simulation research, interviews, and data extraction

This research and design approach will be documented in the final graduation paper. It will include technological, architectural, and contextual considerations into the design during this process. Also, it will provide answers to the questions presented at the start and throughout the graduation paper.

The research will be carried out through 3 phases:

1st phase (done by P2):

First, Case studies on existing realized projects dealing with a double skin facade will be conducted for the first part of the research. These case studies will be carried out by investigating the application of the previously mentioned key elements (daylight, ventilation, noise attenuation and social spaces)

2nd phase (done by P3):

Furthermore, simulation research will be conducted to provide more insight into the possible technical adjustments. Natural daylight, ventilation, and noise attenuation could all be analyzed in the study project using different simulation tools, for instance BIM software. Revit or ArchiCAD. In this case, the WELL standard will be used as a baseline to determine whether the double-skin facade was successful.

3rd phase (done by P4):

Following that, what is considered necessary for the creation of a healthy indoor environment will be enhanced by interviews with potential residents. Several possible future target groups will be interviewed and shown the progress of the design as well as the role that the double-skin facade plays in improving the health and wellbeing of the residents. They will be asked about their needs and expectations, as well as whether they would like to add or improve certain aspects.

Then comes data extraction, in which data is extracted from simulation studies and interviews and combined in the form of design ambitions that the design should achieve.

The answers in this research paper will serve as the foundation for the initial conceptual design. The various elements will eventually come together in the final design by P5. It is a linear process, but it will be more circular in practice, as each component will react to the others.

Planning

See the last page

Relevance

The project is quite generic at a nation level, or even at a European level. the project will investigate a healthy living communal system to inhabit the elderly with youth people (students and starters). This project after completion could be set as a case study and could be done elsewhere in the Netherlands as it is a more generic issue, not a local one.

Literature

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Planning

		February				March					April				May				June				
		3-5	8-10	15-17	22-24	1-3	8-10	15-17	22-24	29-31	5-7	12-14	19-21	26-28	3-5	10-12	17-19	24-26	2	7-9	14-16	21-23	28-30
Graduation Plan	Pavilion & poster																						
	Graduation plan																						
Research	Literature																						
	Structure																						
	Writing																						
Design	Site Study																						
	Excursion																						
	Structure																						
	Design																						
Presentation	Preparation																						
	Presentation										P1									P2			

		September				October					November				December				January				
		7-9	14-16	21-23	28-30	1-3	8-10	15-17	22-24	29-31	5-7	12-14	19-21	26-28	3-5	10 12	17-19	24-26	2	7-9	14-16	21-23	28-30
Building technology	Researching																						
	drawing																						
Design	Structural																						
	Large scale																						
	Small scale																						
production	Planning																						
	Drawings																						
	Models																						
	Final																						
Presentation	Preparation																						
	Presentation										P3							P4					P5